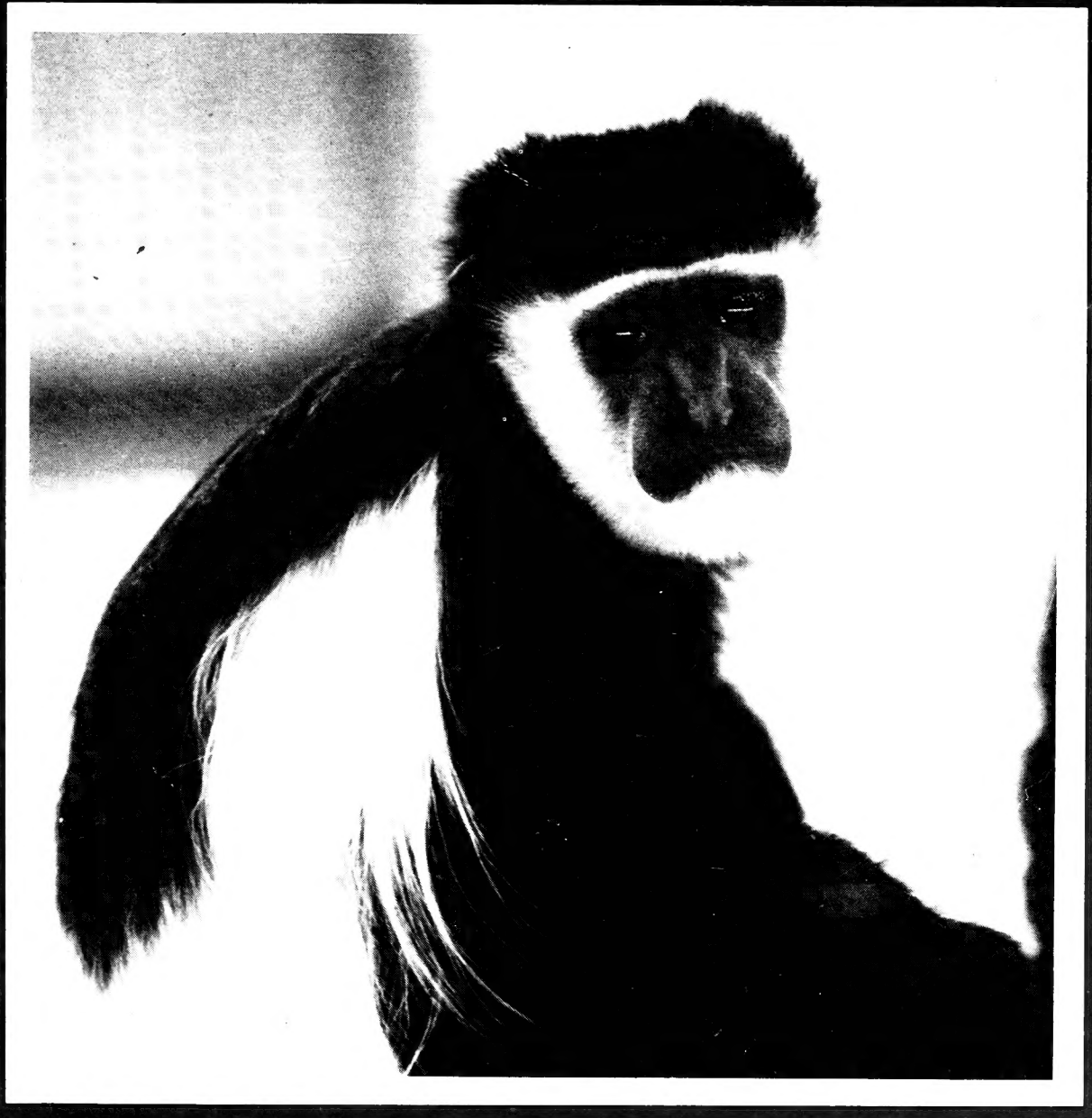
Significant Trade in Wildlife:

A Review of Selected Species in CITES Appendix II

Volume 1: Mammals



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SIGNIFICANT TRADE IN WILDLIFE:

A REVIEW OF SELECTED SPECIES IN CITES APPENDIX II

COMMERCE IMPORTANT DES ESPECES SAUVAGES: ENQUETE AU SUJET DE CERTAINES ESPECES INSCRITES A L'ANNEXE II DE LA CITES

COMMERCIO SIGNIFICATIVO DE VIDA SILVESTRE: ESTUDIO DE DETERMINADAS ESPECIES INCLUIDAS EN EL APPENDICE II DE CITES

VOLUME 1: MAMMALS

VOLUME 1: MAMMIFERES

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The views of the authors expressed in this publication do not necessarily reflect those of IUCN or the CITES Secretariat.

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This report was prepared with the assistance of many of the staff at IUCN Conservation Monitoring Centre. The first drafts of the species accounts were written by the following authors:

Steven Broad	*Felis colocolo*, *Felis geoffroyi*, *Felis lynx*, *Felis manul*, *Felis pardalis*, *Felis tigrina* and *Felis wiedii*;
Martin Jenkins	*Dusicyon culpaeus*, *Dusicyon giseus*, *Conepatus humboltii*, *Lutra perspicillata*, *Lama guanicoe* and *Manis* spp.;
Richard Luxmoore	*Macaca fascicularis*;
Nicholas Payne	*Monodon monoceros*;
Jane Thornback	*Saguinus labiatus*, *Saguinus mystax* and *Saimiri sciurius*;
Jane Williamson	*Cercopithecus petaurista*, *Colobus guereza* and *Colobus polykomos*.

Tim Inskipp was responsible for the overall co-ordination of the contract and assisted with the literature research. Douglas Fuller carried out initial literature research for a number of species. John Caldwell produced the basic trade tabulations from the Wildlife Trade Monitoring Unit computerised database and Wendy Coombes carried out some of the analysis of the trade data. The accounts for *Felis pardalis*, *Felis tigrina* and *Felis wiedii* were based on the accounts written for the IUCN Mammal Red Data Book, Part 1 by Jane Thornback and Martin Jenkins (1982) and the account for *Equus zebra hartmannae* was based on a recently updated version of the sheet for *Equus zebra* included in the IUCN Red Data Book, Volume 1: Mammalia, new edition compiled by Harry A. Goodwin and Colin. W. Holloway (1972) and revised in 1978 by Jane Thornback.

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Background

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was drawn up in 1973 to control trade in wildlife. It does so by affording to species either of primarily two levels of protection. Those species (or smaller geographical populations) which are threatened with extinction are listed in Appendix I, and are thereby banned from international commerce under most circumstances. Species which are not currently threatened with extinction, but which may become so unless their trade is regulated, are listed in Appendix II. Such species may be traded internationally, but nations must ensure that the levels of trade do not endanger the remaining wild populations. This requirement is expressed formally in the text of the Convention in Article IV, paragraph 2a, which demands that the authorities in exporting countries must have advised that the export of specimens of such a species "will not be detrimental to the survival of that species". Article IV, paragraph 3 indicates that the trade in a species "should be limited in order to maintain the species throughout its range and at a level consistent with its role in the ecosystem in which it occurs and well above the level at which that species might become eligible for inclusion in Appendix I". The authorities in the exporting country must monitor the exports and take steps to limit them whenever they determine it to be necessary.

At the fourth meeting of the Conference of the Parties to CITES, held in 1983 in Gaborone, Botswana, it was recognised that many countries exporting Appendix II wildlife were unable, on their own, to determine whether the levels of trade were having a detrimental effect on the wild populations. Therefore it was recommended (CITES Resolution Conf. 4.7) that the CITES Technical Committee should provide assistance by identifying those Appendix II species which were currently being traded internationally in significant quantities, but for which there was insufficient scientific information on the capacity of the species to withstand such levels of trade to satisfy "the requirements of Article IV, paragraph 3, of the Convention as determined by the range states". It was recommended that once the species of particular concern had been identified, the Technical Committee, together with the range states involved, importing states and organisations experienced in the management of wildlife, "develop and negotiate measures required to ensure that continued trade in these species is within the terms of Article IV, paragraph 3".

Initial discussions of the means by which the Technical Committee could identify those species of particular concern (as recommended by Resolution Conf. 4.7) were based on the premise that a high volume of trade was sufficient evidence alone to justify concern. However, an unpublished report produced in 1984 by WTMU for the CITES Secretariat, on the perception of the issue of high trade-volume, came to the following conclusions:

- The concept of high trade-volume may be approached in two ways: high volume may be considered in absolute terms (i.e. large numbers), or in relative terms (i.e. large numbers in relation to the population and biology of the species).

- Absolute high trade-volume does not alone have any bearing on whether a species is threatened by trade. However, species traded in high absolute numbers are likely to be of considerable ecological significance.

- Relative high trade-volume is of direct relevance to the survival of the species involved, but there is no evidence that this is correlated with absolute high trade-volume. By virtue of their designation on the

Appendices, trade in all CITES-listed species is of concern, and should be monitored.

- Consideration of absolute high trade-volume as a major criterion for selecting species for special attention is thus not only irrelevant in terms of species conservation, but may divert attention from more important cases.

The Technical Committee Working Group on Significant Trade in Appendix II Species produced a paper, based on its meeting in Switzerland in December 1984, which aimed to formulate a procedure or course of action to enable the Technical Committee to fulfil the recommendations of Resolution Conf. 4.7. It was decided that the Group should restrict its attention to fauna, as a Plant Working Group was already in existence. The conclusions of the WTMU report on high trade-volume were endorsed, in that the Working Group agreed that it was not possible to identify those Appendix II taxa of greatest concern on the basis of trade data alone. Information on biological status, population trends and a whole range of other factors was needed in order to assess properly the impact of the trade in those taxa.

A five-part procedure was established as the most appropriate mechanism for implementing Resolution Conf. 4.7. This plan was presented to the fifth meeting of the Conference of the Parties which was held at Buenos Aires, Argentina in 1985 (Doc. 5.26). Steps 1-3 have already been carried out.

Step 1: Production of list "A"

It was acknowledged that, with a very few exceptions, all taxa listed in Appendix II should be able to withstand some degree of exploitation for international trade. The Working Group chose an arbitrary "safe" level of trade for any such taxon of an average of 100 individuals taken from the wild (globally) and entering trade per year. By eliminating all taxa traded at a level within that considered "safe", a list of "potential candidate" taxa could be produced (List "A"). These taxa were defined as those that might be the subject of significant international trade.

List A was prepared by WTMU on the basis of average trade volume over the period 1980-1982. Figures relating to live specimens (excluding those recorded as captive-bred), whole or substantially whole skins, skin flanks/sides, furskin plates, shells, trophies and other worked material were included in the analysis. Species never recorded in trade, with the exception of those included in Appendix II as part of a higher taxon or for look-alike reasons, were listed separately in order that consideration could be given to their deletion from the Appendices.

Step 2: Production of list "B"

The Working Group agreed that some taxa might be eliminated from consideration as "significant trade" species on the basis of knowledge readily available to the Group regarding their status. After this process, the remaining taxa constituted list "B", which contained those taxa which could be classified as a "possible problem". In addition, two species (*Tupinambis rufescens* and *Papustyla pulcherrima*) were added to this list under special circumstances where there was evidence of a problem despite only a low volume of trade being recorded.

Step 3: Production of list "C"

The next phase in the procedure was to assess the information available for each of the species in list "B", and to eliminate those species which

were, on the basis of expert knowledge, known not to be a problem. This part of the operation entailed the collection of information on as many aspects of each species as possible and the assessment of the impact of the known trade on the known population. The Working Group agreed that for each species the global situation should be of paramount importance, but that if a species were apparently being affected by trade on a national or regional scale, this fact should be noted in an addendum to the list. List "C" was to be divided into two groups: those species for which current information or knowledge of their biology and/or management indicated that the population was being detrimentally affected by international trade (List 1), and those species for which there is insufficient information available on which to base such a judgement (List 2).

Step 4: Development of remedial measures

The Technical Committee, or a working group of the Technical Committee, was to examine the lists "1" and "2" and establish priorities within each list. For species of high priority in list "1", workshops were to be convened to formulate recommendations for remedial measures. Such measures would include, but not necessarily be limited to: preparing proposals for transfer to Appendix I; establishment of additional management procedures both for wild populations (hunting quotas, seasons, size limits, etc.) and for trade controls (such as export quotas); and listing of taxa for look-alike reasons.

For species of high priority in list "2", projects were to be established to collect information on the biology and management of the species. Where such information indicated the need, the species were to be transferred to list "1".

Step 5: Implementation of remedial measures

The remedial measures identified were to be carried out by the range states involved on the basis of the recommendations arising from the workshops.

This five-step procedure was approved at the Buenos Aires meeting in 1985 and steps 1-3 were implemented by the IUCN Conservation Monitoring Centre. List "C" was prepared in time for the second meeting of the Technical Committee, held in June 1986 in Lausanne, Switzerland. For each species in list "C", a draft report was prepared presenting a summary of all available information, including a detailed analysis of available trade data and information on the population status and other factors thought to be of relevance. On the basis of this information, each species was assigned to the two recommended lists (list 1, problem species; list 2, possible problems). At this stage it was also discovered that some species, originally included in list "C", were probably not being significantly affected by the current levels of trade. These were assigned to a third group (list 3, no problem). The Significant Trade Working Group reviewed the information provided by CMC and the suggested listings, and made a number of recommendations for further action which are outlined below. The Technical Committee also decided that, after further review, the report prepared by CMC should be published.

Further action

The Significant Trade Working Group presented a paper at the second Technical Committee meeting outlining proposals for further action (WGR.TEC. 2.2). The recommendations of this report, some of which were amended at the Technical Committee meeting, are detailed below for the mammal species involved.

List 1 (No taxa)

List 2 (19 taxa)

The Working Group recommended that the following taxa should receive attention as priority species or groups of species for the collection of information (in order of importance):

1. South American cats (five species, i.e. *Felis colocolo*, *Felis geoffroyi*, *Felis pardalis*, *Felis tigrina* and *Felis wiedii*) - noting that some work has already started.

2. Asian pangolins (three species, i.e. *Manis crassicaudata*, *Manis javanica* and *Manis pentadactyla*).

List 3 (3 taxa)

It was agreed that available information indicated that these taxa were essentially unaffected by international trade.

METHODS

This report comprises the review of the biological and trade status of species included in list "C". It was carried out by the IUCN Conservation Monitoring Centre under contract to the CITES Secretariat over the period September 1985 to April 1986. As a first step, the CITES Secretariat circulated a request for information to all of the countries in which the species occurred, contacting the CITES Management Authorities in the countries party to CITES and designated wildlife management or equivalent authorities in others. The responses to this request were passed to CMC and are referenced in the following format: Name of country CITES MA, 1987. Comments received from wildlife management authorities in non-Party states are referenced by the name of the government department involved. Information was also solicited from relevant specialists (individuals or agencies), and amongst the major sources were the specialist groups of the IUCN Species Survival Commission. Trade organisations and other interested parties were also approached. A draft report was presented to the 2nd meeting of the CITES Technical Committee in June 1986. This report was discussed and amended by the Committee and review copies were again circulated by the CITES Secretariat to all range states and interested parties, including the Pet Industry Joint Advisory Council. Final modifications to the text and recent trade data were added by CMC during 1987.

In a small number of cases the designation of category of a species at the time of the second Technical Committee meeting has subsequently been amended in the light of new information, in particular the 1985 trade data which have been added to the reports.

Information was collected and collated under the following headings: distribution; population; habitat and ecology; threats to survival; international trade; conservation measures; and captive breeding.

CITES trade data were analysed for the years 1980 to 1985 using the Annual Reports of Parties to the Convention for which the statistics are held on computer at CMC. These data contain records of imports and exports of species listed in the CITES Appendices and of their products. They contain information on the species involved, a description of the type and quantity of product and, in the case of imports, the exporter or re-exporter and primary source country, and, for exports, the destination and original source. For trade between two CITES Parties, each transaction should therefore be reported

twice, once by the importer and once by the exporter. As suggested by the Significant Trade Working Group, the analysis was largely restricted to trade in live animals and unworked products, however, in a small number of exceptional cases worked products were included.

Various problems impair the value of CITES trade data in the assessment of levels of world trade. For example: not all trading nations are CITES Parties; not all CITES Parties produce annual reports; and the reports of those that do, vary in quality and regularity of submission. Some countries may report the number of specimens covered by the permits issued, while others report the actual number for which the permit was used. Furthermore exports from a country at the end of one year may arrive in the importing country early in the next and in such cases it is possible that the same transaction may be recorded in the trade tables for both years. These factors and others have to be taken into account when analysing CITES data, but for most species these statistics are the only detailed source of information on their international trade and generally CITES reports are of great value in assessing approximate levels of legal trade, the geographical patterns in such trade and the trends in volume and commodity preference over time.

In most cases the trade data are presented, in the following accounts, in two tables. The first (usually Table 1) details the net imports of importing countries, the total of which gives an estimate of the minimum volume of world trade for each year. The second (usually Table 2) shows the origin, or where no origin was given, the exporter, of specimens in trade. When specimens have been exported to an intermediate country and subsequently re-exported, the minimum net trade was calculated, ensuring that the numbers were only recorded once. The table therefore shows, for each year, the minimum number of items in trade from each country of origin. However, because some items may be re-exported without the country of origin being specified, they may be recorded twice in Table 2. The totals are therefore usually higher than those in Table 1.

INTRODUCTION

Informations générales

La Convention sur le commerce international des espèces de faune et de flore sauvages menacées d'extinction (CITES) a été élaborée, en 1973, pour contrôler le commerce des espèces de faune et de flore sauvages. Elle agit en offrant à ces espèces deux niveaux principaux de protection. Les espèces (ou de plus petites populations géographiquement isolées) qui sont menacées d'extinction sont inscritent à l'Annexe I, ce qui signifie que leur commerce international est interdit dans la plupart des cas. Les espèces qui ne sont pas actuellement menacées d'extinction, mais qui pourraient le devenir si leur commerce n'était pas réglementé, sont inscritent à l'Annexe II. Le commerce international de ces dernières espèces est autorisé, à condition que les pays s'assurent que le volume du commerce ne mette pas en danger la survie des populations sauvages restantes. Cette exigence est formellement énoncée à l'Article IV, paragraphe 2 a, du texte de la Convention, qui prévoit que les autorités des pays d'exportation émettent l'avis que l'exportation de spécimens de ces espèces "ne nuit pas à la survie de l'espèce intéressée". Le paragraphe 3 de l'Article IV indique que le commerce d'une espèce "devrait être limité pour la conserver dans toute son aire de distribution, à un niveau qui soit à la fois conforme à son rôle dans les écosystèmes où elle est présente, et nettement supérieur à celui qui entraînerait l'inscription de cette espèce à l'Annexe I". Les autorités des pays d'exportation doivent surveiller les exportations de façon continue et prendre les mesures qui s'imposent pour les limiter lorsqu'elles le jugent nécessaire.

Lors de la quatrième session de la Conférence des Parties à la CITES, tenue en 1983 à Gaborone, Botswana, il fut reconnu que maints pays exportateurs d'espèces de faune et de flore sauvages figurant à l'Annexe II étaient dans l'incapacité de déterminer par eux-mêmes si les niveaux de commerce avaient un effet nuisible sur les populations sauvages. C'est pourquoi, il fut recommandé (résolution CITES Conf. 4.7) que le Comité technique de la CITES assiste ces pays en identifiant les espèces de l'Annexe II faisant actuellement l'objet d'un commerce international important, mais pour lesquelles, selon l'avis des Etats de l'aire de répartition, les données scientifiques portant sur leur capacité à supporter le commerce à un tel niveau sont insuffisantes au regard des exigences de l'Article IV, paragraphe 3, de la Convention. Il fut recommandé que, une fois les espèces présentant un intérêt particulier identifiées, le Comité technique, en collaboration avec les Etats de l'aire de répartition intéressés, les Etats importateurs et les organisations ayant une expérience en gestion de la faune et de la flore sauvages, "mette au point et négocie les mesures nécessaires pour assurer le maintien du commerce continu de ces espèces dans les limites prévues à l'Article IV, paragraphe 3, de la Convention".

Les discussions initiales sur les moyens à utiliser par le Comité technique pour identifier les espèces représentant un intérêt particulier (selon la recommandation de la résolution Conf. 4.7) ont été fondées sur le principe qu'un volume de commerce important est, à lui seul, une indication suffisante pour justifier un intérêt. Toutefois, un rapport non publié, produit en 1984 par le WTMU pour le Secrétariat CITES et traitant de la manière dont il percevait la question du volume important du commerce, parvenait aux conclusions suivantes:

- Le concept du volume important du commerce peut être abordé de deux manières: un important volume peut être considéré en terme absolu (soit de grandes quantités) ou en terme relatif (soit de grandes quantités par rapport à la population et à la biologie de l'espèce).

- Un important volume de commerce, au sens absolu du terme, n'a pas en soi de rapport avec le fait qu'une espèce soit menacée ou non par le commerce. Toutefois, il est probable que les espèces dont de grandes quantités de spécimens, en terme absolu, sont commercialisés aient une importance écologique considérable.

- Un important volume de commerce, au sens relatif du terme, a un rapport direct avec la survie de l'espèce en question, mais rien ne prouve qu'il y ait corrélation avec un important volume de commerce au sens absolu du terme. Le seul fait que ces espèces soient inscrites aux annexes à la CITES signifie que leur commerce est motif à préoccupation et qu'il devrait faire l'objet d'une surveillance continue.

- Considérer un important volume de commerce au sens absolu du terme comme critère majeur de sélection des espèces nécessitant une attention particulière est donc non seulement hors de propos en ce qui concerne la conservation des espèces mais, qui plus est, risquerait de distraire l'attention de cas plus importants.

Le Groupe de travail du Comité technique sur le commerce important d'espèces de l'Annexe II a élaboré un document, fondé sur sa session tenue en Suisse en décembre 1984, session dont l'objectif était de formuler une procédure ou une ligne de conduite permettant au Comité technique de remplir ses obligations au titre des recommandations de la résolution Conf. 4.7. Il fut décidé que le groupe devait limiter ses discussions à la faune en raison de l'existence d'un Groupe de travail sur les plantes. Les conclusions du rapport du WTMU sur le volume important du commerce furent endossées, en ce sens que le groupe de travail convint qu'il n'était pas possible d'identifier les taxons les plus préoccupants de l'Annexe II sur la base des seules données commerciales. Des informations sur l'état biologique des taxons, sur les tendances de leurs populations et sur toute une série d'autres facteurs sont nécessaires pour évaluer correctement l'effet du commerce sur ces taxons.

Une procédure en cinq étapes, constituant le mécanisme le plus favorable pour l'application de la résolution Conf. 4.7, fut établie. Ce plan d'action fut présenté à la cinquième session de la Conférence des Parties qui eut lieu à Buenos Aires, Argentine, en 1985 (document Doc. 5.26). Les étapes 1 à 3 ont déjà été réalisées.

1ère étape: Production de la liste "A"

Il fut reconnu que, à très peu d'exceptions près, on peut raisonnablement assumer que tous les taxons inscrits à l'Annexe II peuvent supporter un certain niveau d'exploitation pour le commerce international. Le groupe de travail choisit un niveau de commerce arbitraire et "sûr" pour tout taxon, soit en moyenne 100 individus prélevés dans la nature (globalement) et entrant dans le commerce chaque année. En éliminant tous les taxons dont le commerce était considéré d'un niveau "sûr", une liste de taxons "candidats potentiels" (liste "A") put alors être établie. Ces taxons sont définis comme étant ceux qui peuvent faire l'objet d'un commerce international important.

La liste A a été établie par le WTMU sur la base d'un volume de commerce moyen couvrant la période 1980-1982. Les chiffres ayant trait aux spécimens vivants (sauf les spécimens enregistrés en tant qu'élevés en captivité), aux peaux entières ou substantiellement entières, aux flancs, aux nappes de peaux, aux carapaces, aux trophées et à d'autres articles travaillés ont été inclus dans cette analyse. Les espèces qui n'ont jamais été enregistrées dans le commerce, à l'exception de celles inscrites à l'Annexe II en tant que partie d'un taxon supérieur ou pour des raisons de

ressemblance, ont été énumérées séparément en vue de leur éventuelle élimination des annexes.

2e étape: Production de la liste "B"

Le groupe de travail convint que, sur la base des connaissances dont le groupe pouvait disposer aisément au sujet de leur état, certains taxons ne devaient plus être considérés comme des espèces faisant l'objet d'un "commerce important". Après cette opération, les taxons restants ont constitués la liste "B", laquelle contient les taxons qui pourraient être classés en tant que "problème possible". En outre, deux espèces (Tupinambis rufescens et Papustyla pulcherrima) ont été ajoutées à la liste dans des circonstances particulières: la mise en évidence d'un problème en dépit de l'enregistrement d'un faible volume de commerce.

3e étape: Production de la liste "C"

L'étape suivante de la procédure revenait à évaluer les informations disponibles pour chacune des espèces de la liste "B" et à éliminer les espèces qui, sur la base des connaissances des experts, ne posent pas de problème. Cette partie de l'opération fut réalisée en rassemblant des informations sur autant d'aspects que possible relatifs à chaque espèce et en évaluant l'effet du commerce connu sur la population connue. Le groupe de travail convint que, pour chaque espèce, la situation globale devait avoir une importance primordiale, mais que, si une espèce était apparemment affectée par le commerce à l'échelle nationale ou régionale, ce fait devait figurer dans un supplément à la liste. Les espèces de la liste "C" devaient être réparties en deux groupes: d'une part les espèces pour lesquelles les informations courantes ou la connaissance de leur biologie et/ou de leur gestion montrent que la population est affectée par le commerce international (liste 1) et d'autre part les espèces pour lesquelles les informations disponibles sont insuffisantes pour servir de base à un tel jugement (liste 2).

4e étape: Mise au point de mesures correctives

Le Comité technique, ou un groupe de travail du Comité technique, devait examiner les listes "1" et "2" annotées et établir des priorités au sein de chaque liste. Pour les espèces de la liste "1" ayant un ordre de priorité élevé, des sessions de travail devaient être convoquées dans le but de recommander des mesures correctives. De telles mesures devaient comprendre, sans nécessairement s'y limiter: la préparation de propositions de transferts de taxons à l'Annexe I; la mise en place de procédures de gestion supplémentaires, aussi bien en faveur des populations sauvages (telles que quotas de chasse, saisons de chasse, tailles limites des spécimens, etc.) qu'en ce qui concerne les contrôles du commerce (telles que quotas à l'exportation), et l'inscription de taxons pour des raisons de ressemblance.

Pour les espèces de la liste "2" ayant un ordre de priorité élevé, des projets devaient être élaborés afin de collecter des informations sur leur biologie et leur gestion. Lorsque ces informations en montraient la nécessité, l'espèce devait être transférée à la liste "1".

5e étape: Mise en vigueur des mesures correctives

Les mesures de correction identifiées devaient être prise par les Etats de l'aire de répartition intéressés, sur la base des recommandations formulées lors des sessions de travail.

Cette procédure en cinq étapes a été approuvée à la session de Buenos Aires, en 1985, et les étapes 1 à 3 ont été réalisées par le Centre UICN de surveillance continue de la conservation de la nature (CMC). La Liste "C" a été élaborée pour la deuxième session du Comité technique, qui s'est tenue à Lausanne, Suisse, en juin 1986. Pour chaque espèce de la liste "C", un projet de rapport a été rédigé, lequel présentait un résumé de toutes les informations disponibles, dont une analyse détaillée des données sur le commerce et des informations sur l'état des populations et d'autres facteurs jugés pertinents. Sur la base de ces informations, chaque espèce a été assignée à l'une deux listes recommandées (liste 1, espèces à problèmes; liste 2, problèmes possibles). A ce stade, on a également découvert que certaines des espèces figurant à l'origine sur la liste "C" n'étaient probablement pas affectées de manière significative par les niveaux actuels de commerce. Celles-ci furent assignées à un troisième groupe (liste 3, sans problème). Le Groupe de travail sur le commerce important d'espèces de l'Annexe II a étudié les informations fournies par le CMC, ainsi que les listes proposées, et a fait un certain nombre de recommandations quant aux activités futures qui sont décrites ci-après. Le Comité technique a également décidé que, après un nouvel examen, le rapport élaboré par le CMC devait être publié.

Activités futures

Le Groupe de travail sur le commerce important d'espèces de l'Annexe II a présenté un document à la deuxième session du Comité technique, document qui ébauchait des projets d'activités futures (WGR. TEC. 2.2). Les recommandations de ce rapport, dont certaines ont été modifiées lors de la session du Comité technique, sont présentées ci-dessous de façon détaillée en ce qui concerne les reptiles.

Liste 1 (Aucun taxon)

Liste 2 (19 taxons)

Le groupe de travail recommandé que l'on porte attention aux taxon suivants en tant qu'espèces prioritaires quant à la collecte d'informations (par ordre d'importance):

1. Félins d'Amérique du Sud (cinq espèces, soit *Felis colocolo, Felis geoffroyi, Felis pardalis, Felis tigrina* et *Felis wiedii*) - il est pris note du fait que certaines activités ont déja commencé.

2. Pangolins d'Asie (trois espèces, soit *Manis crassicaudata, Manis javanica* et *Manis pentadactyla*).

Liste 3 (3 taxons)

Le groupe admet que les informations disponibles montrent que ces taxons, pour l'essentiel, ne sont pas affectés par le commerce international.

METHODES

Ce rapport comprend l'examen de l'état biologique des espèces contenues dans la liste "C" et des données commerciales les concernant. Il a été élaboré par le Centre UICN de surveillance continue de la conservation de la nature, sur la base d'un contrat avec le Secrétariat CITES, au cours de la période septembre 1985 - avril 1986. Dans un premier temps, le Secrétariat CITES a adressé, par l'intermédiaire des organes de gestion CITES des pays Parties à la Convention ou des autorités responsables de la gestion de la faune ou

équivalentes des pays non-Parties, une demande d'informations à tous les pays dans lesquels se rencontrent les espèces de la liste "C". Les réponses reçues ont été envoyées au CMC et il y est fait référence en indiquant le nom de l'organe de gestion de la Partie CITES en 1987. Il est fait référence aux commentaires reçus des autorités responsables de la gestion de la faune dans les pays non-Parties en indiquant le nom du département gouvernemental intéressé. Des informations ont également été demandées aux spécialistes (personnes ou organisations), et les groupes de spécialistes de la Commission de sauvegarde des espèces de l'UICN en furent parmi les principales sources. Il a également été fait appel aux organisations du commerce et autres parties intéressées. Un projet de rapport a été présenté à la deuxième session du Comité technique CITES en juin 1986. Ce rapport a été examiné et amendé par lecomité et des versions révisées ont été transmises par le Secrétariat CITES aux Etats de l'aire de répartition et aux personnes intéressées, dont le Pet Industry Joint Advisory Council. Les modifications finales et des données commerciales récentes ont été ajoutées au texte, par le CMC, au cours de 1987.

Dans un petit nombre de cas, la catégorie à laquelle une espèce avait été attribuée lors de la deuxième session du Comité technique a, par la suite, été modifiée sur la base des nouvelles informations reçues, en particulier les données commerciales de 1985 qui ont été ajoutées aux rapports.

Les informations ont été recueillies et rassemblées sous les titres suivants: répartition; population; habitat et écologie; menaces pour la survie; commerce international; mesures de conservation; et élevage en captivité.

Les données commerciales CITES ont été analysées pour les années 1980 à 1985, sur la base des rapports annuels des Parties à la Convention dont les statistiques sont conservées sur ordinateur par le CMC. Ces données comprennent les importations et exportations des espèces figurant aux annexes à la CITES et de leurs produits. Elles contiennent des informations sur les espèces en question, une description du type de produits et leur quantité et, dans le cas des importations, mentionnent l'exportateur ou le ré-exportateur et le premier pays producteur, et, pour les exportations, la destination et la source d'origine. En ce qui concerne le commerce entre deux pays Parties à la CITES, chaque transaction devrait donc être enregistrée deux fois, une fois par l'importateur et une fois par l'exportateur. Ainsi que le Groupe de travail sur le commerce important d'espèces de l'Annexe II l'avait suggéré, l'analyse a été, pour l'essentiel, limitée au commerce des animaux vivants et aux produits non-travaillés; cependant, dans un petit nombre de cas exceptionnels, des produits travaillés y ont été inclus.

Divers problèmes réduisent la valeur des données commerciales CITES pour l'évaluation des niveaux du commerce mondial. Par exemple: toutes les nations faisant du commerce ne sont pas Parties à la CITES; les Parties à la CITES ne présentent pas toutes des rapports annuels; et les rapports présentés sont de qualité variable et le sont de manière irrégulière. Certains pays font état du nombre de spécimens couverts par les permis émis, tandis que d'autres indiquent le nombre réel de spécimens pour lesquels le permis a été utilisé. En outre, il se peut que des exportations ayant lieu en fin d'année arrivent dans le pays d'importation au début de l'année suivante et, dans de tels cas, il est possible que la même transaction soit enregistrée dans les tableaux relatifs aux données commerciales des deux années. Il s'agit de tenir compte de ces facteurs, et d'autres encore, dans l'analyse des données de la CITES; toutefois, pour la plupart des espèces, ces statistiques constituent l'unique source d'informations détaillées sur leur commerce international, et les rapports CITES sont en général précieux pour évaluer les niveaux approximatifs du commerce légal, la répartition géographique des voies empruntées par le commerce international et les tendances, au cours des ans, en ce qui concerne le volume du commerce et l'évolution des préférences à l'égard des produits.

Dans la plupart des cas, les données commerciales sont présentées en deux tableaux dans les exposés qui suivent. Le premier (le tableau 1 en règle générale) énumère, dans le détail, les importations nettes des pays d'importation dont le total donne une estimation du volume minimal du commerce mondial pour chaque année. Le second (le tableau 2 en règle générale) indique l'origine ou, dans les cas où l'origine n'a pas été indiquée, l'exportateur des spécimens commercialisés. Lorsque des spécimens ont été exportés vers un pays intermédiaire et réexportés par la suite, le commerce net minimal est alors calculé, en s'assurant que les quantités n'ont été enregistrées qu'une fois. Ainsi, le tableau indique, pour chaque année, la quantité minimaled'articles commercialisés à partir de chaque pays d'origine. Cependant, certains articles pouvant être réexportés sans que le pays d'origine ne soit spécifié, il est possible qu'ils soient enregistrés deux fois dans le tableau 2. C'est la raison pour laquelle les totaux du tableau 2 sont généralement plus élevés que ceux du tableau 1.

INTRODUCCION

Antecedentes

La Convención Sobre el Comercio Internacional de Especies Amenazadas de Fauna y Flora Silvestres (CITES) fue elaborada en 1973 con el objeto de controlar el comercio de vida silvestre. Ese control se efectua asignando a las especies dos niveles de protección. Aquellas especies (o pequeñas poblaciones geográficas) que se encuentran amenazadas de extinción están incluidas en el Apéndice I de la Convención, y su comercio internacional está prohibido, excepto bajo circunstancias excepcionales. Aquellas especies que no corren peligro de extinción, pero que podrían estar amenazadas si su comercio no estuviera reglamentado, se incluyen en el Apéndice II de la Convención. Dichas especies pueden comercializarse a nivel internacional, pero las naciones concernidas deben asegurarse de que los niveles de comercio no representan una amenaza para las poblaciones silvestres remanentes. Este requisito se explica formalmente en el texto de la Convención, Artículo IV, párrafo 2 a), que exige que las autoridades de los países exportadores informen que la exportación de especímenes de esas especies "no perjudicará la supervivencia de esa especie". En el artículo IV, párrafo 3 se indica que el comercio de esas especies "debe limitarse a fin de conservarlas, a través de su hábitat, en un nivel consistente con su papel en los ecosistemas donde se hallan y en un nivel suficientemente superior a aquel en el cual esa especie sería susceptible de inclusión en el Apéndice I". Las autoridades del país exportador deberán controlar las exportaciones y tomar medidas para limitarlas cuando así se lo estime conveniente.

Durante la cuarta reunión de la Conferencia de las Partes en CITES, realizada en 1983 en Gaborone, Botswana, se reconoció que varios países exportadores de especímenes de especies del Apéndice II no podían determinar por sí solos si los niveles de comercio perjudicaban a las poblaciones silvestres. Por lo tanto, se recomendó (por medio de la Resolución Conf. 4.7) "que el Comité Técnico de CITES identifique las especies del Apéndice II que son objeto de un comercio internacional considerable, para las cuales la información científica disponible sobre su capacidad de resistir a tales niveles de comercio resulta insuficiente como para satisfacer los requisitos estipulados en el Artículo IV, párrafo 3 de la Convención, según la opinión de los Estados involucrados en el area de distribución". Se recomendó que, una vez que determinadas especies se hayan identificado, el Comité Técnico, junto con los Estados involucrados en el área de distribución, los Estados importadores y las organizaciones que poseen una experiencia en el manejo de la fauna y de la flora, "elaboren y negocien las medidas necesarias para asegurar el mantenimiento del comercio continuo de esas especies dentro de los límites previstos en el Artículo IV, párrafo 3, de la Convención".

Las discuciones iniciales respecto a la manera como el Comité Técnico identificaría las especies en cuestión (tal como se recomienda en la Resolución Conf. 4.7) se basaron en la premisa de que un importante volumen de comercio era evidencia suficiente como para justificar la preocupación. Sin embargo, un informe no publicado, que fue realizado en 1984 por el WTMU para la Secretaría CITES, llegó a las siguientes conclusiones en lo que se refiere a la percepción del problema relativo al volumen significativo de comercio:

- El concepto de volumen significativo de comercio puede definirse de dos maneras: el volumen significativo puede considerarse en términos absolutos (i.e. grandes cantidades), o en términos relativos (i.e. grandes cantidades en relación con la población y la biología de la especie).

- El volumen de comercio significativo absoluto no implica por sí solo que la especie esté amenazada por el comercio. Sin embargo, la

comercialización de especies en números significativos absolutos puede tener un significado ecológico importante.

- El volumen de comercio significativo relativo está directamente ligado a la supervivencia de las especies concernidas, pero no se tienen pruebas de que esto este correlacionado con el volúmen de comercio significativo absoluto. Debido a su designación en los Apéndices, todo comercio de especies incluidas en CITES es de interés y debe ser vigilado.

- Considerar el volumen de comercio significativo absoluto como un criterio para la selección de especies para un cuidado especial es por lo tanto no solamente irrelevante en términos de conservación de especies, sino que puede también distraer la atención de casos más importantes.

El Grupo de Trabajo del Comité Técnico sobre el comercio significativo de especies del Apéndice II produjo un documento, basado en su reunión en Suiza en Diciembre de 1984, cuyo fin consistía en formular un procedimiento o una línea de conducta que permitiera al TEC cumplir con sus obligaciones en virtud de la Resolución Conf. 4.7. Se decidió que el Grupo debía limitar sus discusiones a la fauna, pues ya existía un Grupo de Trabajo para las plantas. Las conclusiones del informe del WTMU sobre gran volumen de comercio fueron endosados, y el Grupo convino en que no era posible identificar los taxa del Apéndice II más preocupantes basándose solamente en los datos comerciales. Para evaluar correctamente el efecto del comercio sobre esos taxa era necesario poseer información sobre la situación biológica, sobre la tendencia de las poblaciones y sobre toda una serie de otros factores.

Se convino en un procedimiento de cinco etapas como siendo el mecanismo más favorable para la aplicación de la Resolución Conf. 4.7. Dicho procedimiento se presentó durante la quinta reunión de la Conferencia de las Partes que se realizó en Buenos Aires, Argentina, en 1985 (Doc. 5.26). Los pasos 1-3 ya han sido realizados.

1ra. etapa: Elaboración de una lista "A"

Se reconoció que, salvo algunas pocas excepciones, se puede razonablemente asumir que un taxón incluido en el Apéndice II puede soportar un cierto grado de explotación con fines de comercio internacional. El Grupo decidió fijar una cantidad a un nivel "prudente" de comercio para todos los taxa del Apéndice II, en término medio, de menos de 100 ejemplares por año de un taxón incluido en el Apéndice II, que son obtenidos de la naturaleza (en forma global) y que entran anualmente en el comercio.
De esta forma, eliminando todos los taxa que no están concernidos por el comercio internacional o que están concernidos solamente a un nivel mínimo, se obtiene una lista de taxa "candidatos potenciales" (lista "A"). Esos taxa se definen como aquellos que podréan ser objeto de un comercio internacional significativo.

La lista "A" fue preparada por la WTMU, utilizando el promedio de las estadísticas comerciales CITES ofrecidas por las Partes en el período 1980-1982. Se incluyeron en el análisis los datos relativos a los especímenes vivos (excluyendo los especímenes criados en cautividad), las pieles enteras o substancialmente enteras, las pieles de los flancos/lados, las napas de pieles, los caparazones, los trofeos y otros artículos no trabajados, etc. Las especies que nunca fueron registradas en el comercio, con excepción de aquellas incluidas en el Apéndice II como parte de un taxón superior o por razones de semejanza, fueron listadas separadamente para que se tomara en consideración su retiro de los Apéndices.

2da. etapa: Elaboración de una lista "B"

El Grupo convino que algunos taxa pueden ser eliminados de las especies de "comercio significativo" basándose en los conocimientos disponibles relativos a su situación. Luego de este proceso, los taxa remanentes constituyen la lista "B", formada por aquellos taxa con "posibles problemas". Además, agregaron a esa lista dos especies (Tupinambis rufescens y Papustyla pulcherrima) bajo circunstancias especiales, donde se pone en evidencia un problema, a pesar del bajo volumen de comercio registrado.

3ra. etapa: Elaboración de una lista "C"

El paso siguiente del procedimiento consistía en evaluar las informaciones disponibles para cada una de las especies de la lista "B" y en eliminar las especies que, sobre la base de la opinión de expertos, no presentan problemas. Esta parte de la operación significaba tener que reunir el máximo de información posible con respecto a cada especie y evaluar el efecto del comercio conocido sobre la población conocida. El Grupo convino que, para cada especie, se debía acordar una importancia primordial a la situación global, pero que, si una especie estaba aparentemente afectada por un comercio a nivel nacional o regional, se lo debía mencionar en un suplemento anexado a la lista. Las especies de la lista "C" deberían distribuirse en dos grupos: en primer lugar las especies para las cuales las informaciones corrientes o el conocimiento de su biología y/o de su manejo demuestran que la población se halla afectada por la explotación debido al comercio internacional (Lista 1) ; y, en segundo lugar, las especies para las cuales las informaciones disponibles o los conocimientos son insuficientes como para servir de base a un juicio de ese tipo (Lista 2).

4ta. etapa: Elaboración de medidas correctivas

El TEC, o un grupo de trabajo del TEC constituido a ese efecto, debía examinar las listas "1" y "2", y establecer prioridades dentro de cada lista. Para las especies o grupos de especies de la lista "1" de gran prioridad, se debían convocar sesiones de trabajo con el objeto de recomendar medidas correctivas. Las medidas correctivas examinadas debían comprender, sin necesariamente limitarse a esto: la preparación de propuestas para transferir las especies en cuestion al Apéndice I, la elaboración de procedimientos de manejo suplementarios ya sea en favor de las poblaciones silvestres (tales como cupos de caza, temporadas de caza, tamaños límites de los especímenes, etc.) o bien en lo que se refiere a los controles del comercio, y la inclusión de taxa por razones de semejanza.

Para las especies de la lista "2", de gran prioridad, se deberían establecer proyectos con el objeto de recabar información sobre su biología y manejo. Cuando esas informaciones demuestren la necesidad, la especie debería transferirse a la lista "1".

5ta. etapa: Aplicación de las medidas correctivas

Las medidas correctivas deberían ser desarrolladas por los Estados del área de distribución concernida, sobre la base de las recomendaciones formuladas en las sesiones de trabajo.

Este procedimiento de cinco etapas fue aprobado en la reunión de Buenos Aires en 1985 y las etapas 1-3 ya fueron desarrolladas por el Centro UICN de Vigilancia Continua de la Conservación. La lista "C" fue preparada a tiempo

para la segunda reunión del Comité Técnico realizada en Junio 1986 en Lausanne, Suiza. Para cada especie incluida en la lista "C", se preparó un borrador presentando un resúmen de toda la información disponible, incluyendo un análisis detallado de referencias e información disponible sobre el comercio y sobre el estado de la población y otros factores que se consideraron importantes. Basado en esta información, cada especie fue asignada a las dos listas sugeridas (lista 1, especies con problemas; lista 2, problemas posibles). En esta etapa se descubrió también que era posible que algunas especies, originalmente incluidas en la lista "C", no se vieran afectadas en forma significativa debido a los presentes niveles de comercio. Dichas especies fueron incluidas en un tercer grupo (lista 3, sin problemas). El Grupo de Trabajo del Comité Técnico sobre el comercio significativo de especies revisó la información proporcionada por el CMC, así como los listados presentados, y preparó recomendaciones para una acción ulterior, las cuales se ennumeran a continuación. El Comité Técnico decidió asimismo que, después de revisión ulterior, el informe preparado por el CMC debía ser publicado.

Acción ulterior

El Grupo de Trabajo sobre el Comercio Significativo de Especies presentó un documento durante la segunda reunión del Comité Técnico en el que se delineaban propuestas para acciones ulteriores (WGR.TEC. 2.2). A continuación se describen las recomendaciones de dicho informe para las especies de reptiles concernidas, las cuales fueron modificadas durante la reunión del Comité Técnico.

Lista 1 (Sin taxa)

Lista 2 (19 taxa)

El Grupo de Trabajo recommendó que se diera priorided a las especies o al grupo de las siguitas tax con el objeto de recolectar información (en orden de importancia):

1. Felinos de Sudamérica (cinco especies, i.e., *Felis colocolo, Felis geoffroyi, Felis pardalis, Felis tigrina* y *Felis wiedii* - tomando en cuenta que ya se ha comenzado una parte del trabajo.

2. Pangolines Asiaticos (Las especies, i.e., *Manis crassicaudata, Manis javanica* y *Manis pentadactyla*.

Lista 3 (3 taxa)

Se acordó que la información disponible indicaba que estos taxa no se encuentran fundamentalmente afectados por el comercio internacional.

METODOS

Este informe incluye la revisión del estado biológico y comercial de especies que aparecen en la lista "C". Este informe ha sido realizado por el Centro UICN de Vigilancia Continua de la Conservación, bajo contrato con la Secretaría CITES, cubriendo el periodo Septiembre de 1985 a Abril de 1986. Como paso inicial, la Secretaría CITES circuló, a traves de las Autoridades Administrativas CITES de los Estados miembros en la Convención, o a traves de las Autoridades Administrativas responsables de fauna u otras autoridades equivalentes en los estados no Partes en la Convención, una solicitud de información a todos los países en los que se encuentran las especies de la lista "C". Los comentarios recibidos fueron enviados a la CMC y se clasificaron de la siguiente manera: Nombre del país de la Autoridad

Administrativa CITES, 1987. Los comentarios recibidos de las autoridades responsables de los Estados no Partes fueron clasificados por nombre de la autoridad gubernamental concernida. También se solicitó información de especialistas concernidos (personas o agencias), y entre las fuentes principales se encontraban los grupos de especialistas de la Comisión de Supervivencia de Especies de la UICN. También fueron consultadas algunas organizaciones comerciales y otras Partes interesadas. Un informe borrador se presentó en la segunda reunión del Comité Técnico CITES en Junio de 1986. Este informe fue discutido y corregido por el Comité y las copias, una vez revisadas, fueron nuevamente enviadas por la Secretaría CITES a todos los países concernidos y a las partes interesadas, incluyendo el Pet Industry Joint Advisory Council. Las modificaciones finales al texto, así como la información sobre el comercio reciente, fueron incluidas por el CMC durante 1987.

Por lo tanto, en la minoría de los casos, la designación de la categoría de una especie al realizarse la segunda reunión del Comité Técnico ha sido modificada a la luz de nueva información, en particular la información comercial de 1985 que ha sido agregada a los informes.

Se recolectó e incluyó la información bajo los siguientes títulos: distribución; población; habitat y ecología; amenazas a la supervivencia; comercio internacional; medidas de conservación; y cría en cautividad.

Los datos sobre el comercio CITES fueron analizados para los años 1980 a 1985, utilizando los Informes Anuales de las Partes de la Convención, cuyas estadísticas han sido procesadas en el computador del CMC. Esta información incluye el registro de importaciones y exportaciones de especies de los Apéndices de CITES, así como sus productos, y contienen información sobre las especies concernidas, una descripción del tipo y la cantidad del producto, y, en el caso de importaciones, el exportador o re-exportador y los principales países de origen, y, para las exportaciones, el destino y la fuente de origen. En lo que concierne al comercio entre dos Partes en CITES, cada transacción debería por lo tanto registrarse dos veces: una vez por el importador y otra por el exportador. Tal como sugirió el Grupo de Trabajo sobre el Comercio Significativo, el análisis se restringió al comercio de animales vivos o de productos no trabajados, sin embargo, también se incluyeron productos terminados en un número pequeño de casos excepcionales.

Varios problemas reducen el valor de la información comercial de CITES en la evaluación de los niveles del comercio mundial. Por ejemplo: no todas las naciones que realizan comercio son Partes en CITES; no todas las Partes en CITES elaboran informes anuales, y la presentación de los informes varían en calidad y regularidad. Algunos países pueden proporcionar información sobre lacantidad de especímenes que cubren los permisos expedidos, mientras que otros proporcionan información sobre la cantidad real por la cual se utilizó el permiso. Más aún, las exportaciones de un país al finalizar un año pueden arrivar al país importador al comienzo del año siguiente, y en tales casos es posible que, por la misma transacción, se registren en los cuadros comerciales para ambos años. Estos factores y otros deben tomarse en cuenta cuando se analizan los datos de CITES, pero para la mayoría de las especies, estas estadísticas representan la única fuente detallada de información respecto a su comercio internacional y generalmente los informes CITES son de gran utilidad al evaluar los niveles aproximados de comercio legal, así como los patrones geográficos en tal comercio y las tendencias relativas a los volúmenes de productos preferenciales, en un determinado lapso de tiempo.

En la mayoría de los casos, los datos comerciales son presentados en los dos cuadros siguientes. En el primero (normalmente Cuadro 1), se detallan las importaciones netas de países importadores, cuyo total nos proporciona una

cifra estimada del volumen mínimo de comercio mundial anual. El segundo (normalmente Cuadro 2) muestra el origen, o en los casos en los que el origen no se menciona, el exportador de los especímenes en cuestión. Cuando los especímenes han sido exportados a un país intermediario y posteriormente reexportados, el comercio mínimo neto ha sido calculado, asegurándose de que los números sólo fueron registrados una sola vez. Por lo tanto, el cuadro muestra, anualmente, la cantidad mínima de artículos de comercio de cada país de origen. Sin embargo, ya que algunos artículos pueden ser reexportados sin que necesariamente aparezca especificado el país de origen, éstos pueden ser registrados dos veces en el Cuadro 2. Por lo tanto, los totales son usualmente más altos que los que aparecen en el Cuadro 1.

RED-CHESTED MOUSTACHED TAMARIN
OR RED-BELLIED TAMARIN

Recommended list: 2*
[Possible problem]

Saguinus labiatus (E. Geoffroy, 1812)

Order PRIMATES

Family CALLITHRICIDAE

* but see last sentence of summary

SUMMARY AND CONCLUSIONS Found in the Amazonian region of South America in western Brazil, north-western Bolivia, and south-eastern Peru. May also occur in southern Colombia, but this requires confirmation. Two subspecies are recognised. No estimates of population size are available, though it is considered common near to Cobija in Bolivia. Hunting has been reported from Peru, and capturing for export from Bolivia; whether these threaten the species is not known. The amount and effect of habitat destruction is also undocumented. Protected by law in all the countries of its range, but does not occur in any reserve or national park. Used in biomedical research mainly for studies on Hepatitis A virus. Bred in small numbers in research institutes. Reports of a ranching operation in Bolivia require confirmation.

International trade reported to CITES fell from a peak of 2052 in 1981 to only 7 in 1985. The only source country known to have exported this species since 1980 is Bolivia, but direct exports appear to have ceased since 1982. The chief importer has been the USA.

No studies have been conducted on this species in the wild and little is known of its conservation status. The levels of trade reported in 1980 and 1981 may have been excessive, but if the reduced levels reported since 1982 are sustained no problems need arise.

DISTRIBUTION Not precisely known, but confirmed from western Brazil, north-western Bolivia, and south-eastern Peru. It may exist in Colombia, but confirmation is needed. Two subspecies are generally recognised:

S. l. labiatus

Bolivia Occurs in the north-west of the country in the departments of Pando and La Paz in the basins of the rivers Madre de Dios, Acre, Heath, Manuripi and Tahuamana south to the River Madidi (Bejarano, 1980).

Brazil Occurs south of the Rio Amazonas (Solimoes) between the Rios Purus and Madeira in the states of Amazonas and Acre, extending southward to the Bolivian border (Hershkovitz, 1977).

Peru Limited to Madre de Dios in south-eastern Peru between the upper Rios Madre de Dios and Purus (Hershkovitz, 1977; Encanacion and Castro, 1979, cited in Soini, 1982).

S. l. thomasi

Brazil Known only from the type locality in Amazonas State, the Rio Tonantins on the north bank of the Rio Amazonas below the mouth of the Rio Içá and a small area called Barreirinha on the west bank of the Rio Auati-Parana between the Rios Solimoes and Japura (Hershkovitz, 1977; Rylands and Mittermeier, 1982).

Saguinus labiatus

Colombia Hernandez-Camacho and Cooper (1976) in their review of Colombian primates mention that it is possible, although not too likely, that *S. l. thomasi* exists in Colombia; confirmation is needed.

POPULATION No estimates of population size are available. Since *S. l. thomasi* is only known from the type locality in Brazil, it may be quite rare, though nothing certain is known of its status (Mittermeier, Coimbra-Filho and Roosmalen, 1978). It may also occur in Colombia (see Distribution).

S. l. labiatus is believed to be common (Mittermeier, Bailey and Coimbra-Filho, 1978), though its status in Brazil (Mittermeier, Coimbra-Filho and Roosmalen, 1978) and Peru (Soini, 1982) remains unknown. It has been found to be common near to Cobija in Bolivia (Heltne *et al.*, 1976).

HABITAT AND ECOLOGY Forest. In Bolivia the species has been observed in evergreen, mesophytic, broadleaf forest on high ground in a white-water drainage (Freese *et al.*, in Wolfheim, 1983), whereas in Peru it seems to prefer high non-flooding forest with scarce underbrush (Encarnacion and Castro, 1979, see Wolfheim, 1983). No reports were located regarding its habitats in Brazil (Wolfheim, 1983).

THREATS TO SURVIVAL The species has been reported as heavily hunted in Peru (Encarnacion and Castro, 1978 in Wolfheim, 1983), though it is apparently seldom hunted in Bolivia (Freese *et al.* in Wolfheim, 1983). Bolivia is known to serve as an outlet for primates smuggled illegally from Brazil (Kavanagh and Bennett, 1984).

Heltne *et al.* (1976) noted that the species had recently been collected for export in fairly large numbers in Bolivia, but that populations there were abundant enough to supply 250 to 500 per year without significant reduction. Coates and Poole (1983) noted that *S. l. labiatus* was becoming increasingly important as a laboratory primate as a result of its high susceptibility to human Hepatitis A virus.

INTERNATIONAL TRADE A review of primate trade in the USA (Mack and Eudey, 1984) revealed that total imports of *S. labiatus* rose from 101 between 1968 and 1972 to 4296 between 1976 and 1980. CITES reports from 1980 to 1985 are summarised in Tables 1 and 2.

Table 1. Minimum net imports of live *S. labiatus* reported to CITES.

	1980	1981	1982	1983	1984	1985
Australia	16	-	-	-	-	-
France	-	3	1	-	-	-
Japan	-	11	-	12	-	6
New Zealand	-	1	-	-	-	-
Saudi Arabia	-	-	1	-	-	-
Sweden	-	-	2	-	3	-
Thailand	-	-	-	-	2	-
UK	-	16	-	-	-	-
UAE	-	-	-	-	-	-
USA	926	2018	270	-	-	1
TOTAL	942	2052	274	12	5	7

Table 2. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions in live *S. labiatus* reported to CITES.

	1980	1981	1982	1983	1984	1985
Countries having populations of *S. labiatus*						
Bolivia	942	2052	271	12	2	-
Countries without wild populations of *S. labiatus*						
Canada	-	-	-	-	-	1 *
Finland	-	-	1	-	1 *	-
Netherlands	-	-	1	-	-	-
UK *	-	3	1	-	2	1
USA	12	-	-	-	-	-

* reported as captive-bred.

The estimated minimum volume of world trade (Table 1) fell from a peak of 2052 in 1981 to 7 in 1985. The only range country to export this species was Bolivia (see Table 2), and direct exports reported from there have ceased since 1982.

CONSERVATION MEASURES The legal protection status of primates in source countries is summarised below (Fuller *et al.*, 1987; Kavanagh and Bennett, 1984). Since 1984, the species has been protected in all its countries of origin.

Bolivia All exports of live wildlife were banned in 1984. Prior to that the legislation was confused and large numbers of primates were exported.

Brazil The export of all wildlife has been illegal since 1967.

Colombia Capture and export of primates has been banned since 1974. Export licences can be granted for scientific purposes, but none has so far been issued.

Peru All hunting, capture of, and trading in, primates from the La Selva region (the Amazonian lowlands east of the Andes) have been illegal since 1973 except for scientific purposes. Since 1976 all legal exports have been carried out under the auspices of the Pan American Health Organisation.

S. l. labiatus occurs in Biological Reserve Abufari in Brazil on the east bank of the Rio Purus, whilst *S. l. thomasi* occurs in Ecological Station Juami-Japura (Rylands, 1985). No information was located as to the species's presence in reserves in Peru or Bolivia.

More precise information is needed on distribution, population size and conservation status.

CAPTIVE BREEDING The species is maintained in several zoological institutions (Olney, 1984) and laboratories, and is said to breed easily (R. Mittermeier, pers. comm., 1976). Small numbers are bred for biomedical

research in various user institutes. A survey of EEC countries recorded a total of 12 births in 1977/78 (Caldecott and Kavanagh, 1983). Only 20 young of all *Saguinus* spp. were born in biomedical institutes in the USA in 1981. Breeding of other species (*Saguinus mystax* and *Saguinus oedipus*) is reported to be difficult (Eudey and Mack, 1984).

A major primate ranching programme on an island in Bolivia was reported to have been established in 1981, receiving funds from an American breeding centre. Seven species of primate were said to be kept, including *S. labiatus*, and captive-bred animals were expected to be available by 1985 (Anon., 1984). No further confirmation of this scheme has been received, and it is thought unlikely that projected breeding and production targets have been achieved.

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BLACK-CHESTED MOUSTACHED TAMARIN

Recommended list: 3
[No problem]

Saguinus mystax (Spix, 1823)

Order PRIMATES

Family CALLITHRICIDAE

SUMMARY AND CONCLUSIONS Occurs in upper Amazonia in western Brazil and eastern Peru. Numbers unknown, though generally considered abundant. Three subspecies are recognised, of which only one, *S. m. mystax*, is used in biomedical research. Prefers primary forest, and is thus susceptible to habitat disturbance. Protected by law in all countries of origin. *S. m. mystax* has been the subject of considerable effort to establish captive and semi-captive breeding colonies in Peruvian Amazonia. To date, only the cropping of wild populations has proved successful, and studies have been undertaken to determine the effects of trapping and removal on resident populations and thus to discover the best cropping regime for sustainable yield. Occurs in a number of protected areas.

International trade reported to CITES from 1980 to 1985 fluctuated between 80 and 350 a year, all originating in Peru. The temporary ban on primate exports from Peru, imposed in 1973, appears to have been successful in curtailing the high levels of trade previously reported.

Given the abundance of the species, and the studies in progress of its numbers, behaviour, and effects of cropping programmes, it is considered that the species can sustain the existing trade.

DISTRIBUTION Western Brazil and eastern Peru south of the Rio Amazonas. Three subspecies are recognised.

S. m. mystax

Brazil South of the Rio Amazonas in western Brazil; from the left bank of the Rio Jurua in Brazil to the Peruvian border (Hershkovitz, 1977).

Peru South of the Rio Amazonas in eastern Peru; west to the right bank of the lower Rio Huallaga, thence south along the base of the Andes to the junction of the Urubamba and Ucayali (Hershkovitz, 1977).

S. m. pileatus

Brazil Western Brazil, south of the Rio Amazonas (Solimoes), between the Rios Jurua and Purus, State of Amazonas (Hershkovitz, 1977).

S. m. pluto

Brazil Western Brazil, south of the Rio Amazonas (Solimoes) on the right bank of the lower Rio Purus. According to Hershkovitz (1977), the range probably incorporates the entire basin between the Rios Purus and Madeira from their mouths at the Solimoes to at least 6°, possibly 8° or farther south. Hershkovitz (1977) mentions that specimens, including the type, reported from localities on the left bank of the Purus are regarded as having originated on the opposite bank.

POPULATION Total numbers have not been estimated. *S. m. mystax*, the subspecies used in biomedical research, is relatively abundant and adaptable

(Mittermeier and Coimbra-Filho, 1983; Mittermeier *et al.*, 1978). Dawson (in Mittermeier and Coimbra-Filho, 1983) found it to be common along the edges of fields in *terra firme* habitat around Fonte Boa in Brazilian Amazonia, and members of the Peruvian Primate Project have also found it to be common in several river basins in Peruvian Amazonia (Moya *et al.*, 1979). Nothing is known of the status of *S. m. pileatus* and *S. m. pluto* (Mittermeier *et al.*, 1978).

HABITAT AND ECOLOGY *S. mystax* seems to prefer tall, mature and relatively undisturbed forests (Castro and Soini, 1978; Ramirez, 1984). In Brazil it has been observed in primary *varzea* forest (periodically flooded by a white-water river) (Mittermeier and Coimbra-Filho, 1977). In many areas the species lives in permanent, or semi-permanent association, with Saddle-back Tamarins, *Saguinus fuscicollis* (Castro and Soini, 1978; Ramirez, 1984).

THREATS TO SURVIVAL The apparent preference of this species for primary forest makes it particularly susceptible to the effects of habitat destruction, and it is unlikely to survive in secondary forest (Ramirez, 1984). Hunting pressure on the animal is light, owing to its small size (Glander, 1983).

S. m. mystax is an important species in biomedical research, primarily in virology. The two other subspecies, *S. m. pileatus* and *S. m. pluto* have never been used in biomedical research. All commercial export of *S. m. mystax* temporarily ceased with the Peruvian export ban in 1973; however prior to that time large numbers had been exported (see below). The ban led to a working agreement between the Peruvian Ministry of Health and the Pan American Health Organization (PAHO). The resultant 'Peruvian Primate Project', initiated in 1975, aimed to combine local captive-breeding efforts, free-ranging island colonies, and cropping of wild populations in an attempt to develop a programme that would ensure a future supply of biomedically important species such as *S. m. mystax* (Dawson, 1975). The project has also conducted censuses and studies to determine basic ecological and behavioural data on as many primates as possible, and also attempts to evaluate the effects of trapping and removal of animals on wild populations (Mittermeier and Coimbra-Filho, 1983). Information on *S. m. mystax* has been gathered both in detail, and by census. In 1982 a two-month census of *S. m. mystax* was undertaken by Glander (1983) to determine the impact that previous trapping and removal efforts might have had on the resident population of a study area. His results led him to believe that *S. mystax* can be cropped on a regular basis (every three years) without affecting the population size or the interspecific relationships between *S. mystax* amd *S. fuscicollis*. A later 18-month detailed study by Ramirez (1984) slightly modified this conclusion since density of the pre-cropping population seemed to affect the recovery time. She concluded that if sustained yield at reduced densitites were to be adopted, then cropping a population of average to high density every three years was likely to give the best results.

INTERNATIONAL TRADE Intenational trade in *S. mystax* is much reduced since the levels prevailing in the 1960s and early 1970s. Imports of this species to the USA totalled 3706 from 1968 to 1972, but only 1683 from 1976 to 1980 (Mack and Eudey, 1984). A total of 24 077 were exported from Peru from 1964 to 1974 (Wolfheim, 1983). CITES reports of trade in *S. mystax* are summarised in Table 1. From 1980 to 1985, minimum world trade fluctuated between 80 and 350 animals, all reported as having originated in Peru, with the exception of one animal exported from the USA in 1985 which was recorded as captive-bred.

Table 1. Minimum net imports of live *S. mystax* reported to CITES. (All reported as origin Peru)

	1980	1981	1982	1983	1984	1985
Australia	4	-	-	-	-	-
Cameroon	-	-	-	8	6	-
Japan	50	-	69	-	20	-
Sweden	-	-	-	-	2	1 *
USA	246	100	161	72	122	96
USSR	50	-	-	-	40	-
TOTAL	350	100	230	80	190	97

* - captive-bred

CONSERVATION MEASURES The legal protection status of primates in source countries is summarised below (Fuller *et al.*, 1985; Kavanagh and Bennett, 1984).

Brazil The export of all wildlife has been illegal since 1967.

Peru All hunting, capture of, and trading in, primates from the La Selva region (the Amazonian lowlands east of the Andes) has been illegal since 1973 except for scientific purposes. Since 1976 all legal exports have been carried out under the auspices of the Pan American Health Organisation.

In Brazil, *S. m. mystax* is found in the Ecological Station Jutai-Solimoes. *S. m. pileatus* occurs in Biological Reserve Abufari on the west bank of the Rio Purus, whilst *S. m. pluto* occurs in the same reserve but on the east bank (Rylands, 1985). In Peru, Ramirez (1984) reports that the species is not yet protected in a natural reserve, and recommends the establishment of a nature reserve of about 500 sq. km. along the Blanco Stream, a small tributary of the Rio Tahuayo, which would protect not only *S. mystax*, but also the Red Uakari (*Cacajao calvus rubicundus*) and the Saddle-back Tamarin (*S. fuscicolis nigrifrons*).

The species was the subject of a detailed ecological-behavioural study by Ramirez (1984), from June 1981 to November 1982, at two sites in Peru: Blanco Stream and Rio Yarapa. Earlier less detailed studies (mainly censuses) were conducted by Castro and Soini (1978) in the early 1970s and by Glander (1983) in 1982. As an important species in biomedical research, *S. m. mystax* has been the subject of considerable effort to establish captive and semi-captive breeding programmes in Peruvian Amazonia, so far with little success (see above).

CAPTIVE BREEDING The species is reported to be difficult to breed in captivity (Eudey and Mack, 1984). None was reported to have been bred in research institutes in the EEC in 1977/78 (Caldecott and Kavanagh, 1984), although Spiegel (1981) reported that one institute in F.R. Germany had a colony of 6 breeding females which produced 10 offspring in 1982. In the USA, the Interagency Primate Steering Committee recommended in 1978 that 200 should be bred annually. Small-scale breeding programmes were initiated, with a goal

of producing 40-50 animals in 1982 and 1983 (Eudey and Mack, 1984). In 1981, a breeding colony of 54 *S. mystax* was kept at a viral research laboratory in the USSR (Balayan and Lebedeva, 1981).

The captive-breeding programme initiated in Peru to supply *S. m. mystax* for export has not been successful, and most of the animals exported up to 1983 were wild-caught; it has become clear that the cropping of wild populations will be the most important aspect of the project (Mittermeier and Coimbra-Filho, 1983).

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SQUIRREL MONKEY

Recommended list: 2
[Possible problem]

Saimiri sciureus (Linnaeus, 1758)

Order PRIMATES

Family CEBIDAE

SUMMARY AND CONCLUSIONS The Squirrel Monkey is widely distributed in South America from 17°S northwards. It is particularly prevalent in the lowland forests of the Amazon basin. The species is not threatened and is perhaps the most abundant monkey in all of Amazonia. It adapts well to the presence of man and may even prefer the secondary formations resulting from slash-and-burn agriculture. It is occasionally kept as a pet but total numbers involved are small; however it is extensively collected for use in biomedical research.

Numbers exported annually in the 1960s and early 1970s probably exceeded 40 000 animals, but export is now vastly reduced. Since 1980, total exports reported to CITES have been between 1786 and 5045 a year. Prior to 1984 the majority of exports were declared as originating in Bolivia, but in 1984 Guyana emerged as the major supplier, possibly as a result of the ban imposed on exports from Bolivia. The chief importers have been the USA, Japan and South Africa. Captive-breeding occurs in a number of user countries, and a ranching programme is in operation in Peru.

Monitoring of the trade in *Saimiri* spp. is complicated by the fact that the taxonomy of the genus has recently been revised twice. These revisions postdate the adoption by CITES of the standardised taxonomy of Honacki *et al*. Up to five species are now recognised, with numerous subspecies. There is a geographically disjunct population in Central America (*S. oerstedii*), but the distribution of the South American species is more or less continuous, and it is possible that the treatment of these as all *S. sciureus* (following Honacki *et al*.) is the simplest to implement for control purposes. However there is need for CITES to clarify its position with regard to the revised taxonomy. The South American populations are probably capable of sustaining a substantial level of trade, but the recent switch in supply from Bolivia to Guyana should be investigated. Further studies are needed to conduct accurate censuses of exploited populations and to assess sustainable harvest levels.

DISTRIBUTION The taxonomy of Central and South American squirrel monkeys has been in need of revision for some time. Honacki *et al*. (1982) recognised two species, *Saimiri oerstedii* from Central America, and *Saimiri sciureus* from South America. There have been two subsequent reviews of the genus. Hershkovitz (1984) published a new taxonomy in which he described four species of *Saimiri*: *S. sciureus*, *S. oerstedii*, *S. ustus* and *S. boliviensis*. Thorington (1985) recognised only two species, *S. sciureus* and *S. madeirae*, including *oerstedii* as a subspecies of *S. sciureus*. Since then, a new species from Brazil has been described by Ayres (in press). These revisions and discoveries postdate Honacki *et al*. (1982) and thus are not recognised by CITES; if recognised they would have implications for trade statistics. The following distribution refers to *S. sciureus* (*sensu* Honacki *et al*.), and therefore corresponds to *S. sciureus*, *S. ustus*, and *S. boliviensis* (*sensu* Hershkovitz) or *S. madeirae* and *S. sciureus*, excluding *S. s. oerstedii* (*sensu* Thorington). The distribution covers most of Amazonian Brazil, Colombia, Ecuador, Peru and Bolivia, in Suriname, Guyana and French Guiana, and south of the Rio Orinoco in Venezuela (Mittermeier and Coimbra-Filho, 1983). It also crosses the eastern Cordillera of the Andes to enter Huila, Colombia, extending as far south as Bolivia and possibly Paraguay.

Saimiri sciureus

Bolivia *S. boliviensis boliviensis* occurs in the upper Rio Madeira basin in the departments of Pando, Cochamba, El Beni, and Santa Cruz (Hershkovitz, 1984). (equivalent to *S. sciureus boliviensis sensu* Thorington).

Brazil *S. boliviensis boliviensis* occurs in the upper Amazon region, south of the Rio Amazonas-Solimoes, between the Rios Purus and Jurua in the States of Amazonas and Acre (Hershkovitz, 1984). (equivalent to *S. sciureus boliviensis sensu* Thorington).

S. s. sciureus is found north of the Rio Amazonas from the Rio Demini-Negro eastwards to the coast, and on the South bank from the Rio Xingu to the Rio Pindare; southern limits unknown, not beyond 6°S (Hershkovitz, 1984).

S. s. macrodon occurs in the upper Amazon, from the Rios Jurua and Japura westwards (Hershkovitz, 1984). (equivalent to *S. sciureus sciureus sensu* Thorington).

S. s. cassiquiarensis occurs north of the Rio Amazonas, from west of the Rio Demini-Negro into the Rio Orinoco-Cassquiarensis basin (Hershkovitz, 1984).

Saimiri ustus occurs south of the Rio Solimoes between the Rios Xingu-Iri and Purus, south through Amazonas, Para, Rondonia, and probably into Mato Grosso (Hershkovitz, 1984). (equivalent to *S. sciureus madeirae sensu* Thorington).

The new species described by Ayres (in press) is known only from three islands at the confluence of the Rio Japura with the Rio Solimoes near Tefé.

Colombia *S. s. macrodon* occurs in the Amazonian region, from the Rio Apaporis south, and the right side of the Rio Magdalena valley in Huila (Hershkovitz, 1984). (equivalent to *S. sciureus sciureus sensu* Thorington).

S. s. cassiquiarensis occurs in the east of the country, between Rios Apaporis and Inirida in the Intendencias of Vaupes, Guaviare and Guainia (Hershkovitz, 1984).

S. s. albigena occurs in the gallery forests of the Colombian Llanos, from the eastern slope of the Cordillera Oriental in the Intendencias of Arauca, Casanare and Guaviare and Guainia, and the departments of Boyaca, Cundinamarca and Meta (Hershkovitz, 1984). (equivalent to *S. sciureus sciureus sensu* Thorington).

Ecuador *S. s. macrodon* occurs in the Amazonian region (Hershkovitz, 1984). (equivalent to *S. sciureus sciureus sensu* Thorington).

French Giuana *S. s. sciureus* is found throughout the country (Hershkovitz, 1984).

Guyana *S. s. sciureus* is found in the East; western limits unknown (Hershkovitz, 1984).

Paraguay *Saimiri* sp. may possibly occur in Paraguay (Mittermeier and Coimbra-Filho, 1983), but this was not mentioned by Hershkovitz (1984) and requires confirmation.

Peru *S. boliviensis peuviensis* occurs in the Amazonian region, south of the Rio Maranon-Amazonas from the west bank of the Rio Tapiche to the lower Rio Huallaga basin, and South to about 10°S. Sympatric with *S. s. macrodon* between the Rios Ucayali and Tapiche (Hershkovitz, 1984). (equivalent to *S. sciureus boliviensis sensu* Thorington).

S. boliviensis boliviensis occurs in the Amazonian region from the departments of Madre de Dios and Cuzco north to the Rio Ucayali basin at about 10°S (Hershkovitz, 1984). (equivalent to *S. sciureus boliviensis sensu* Thorington).

S. s. macrodon occurs in the Amazonian region, in the departments of Amazonas, San Martin and Loreto. Sympatric with *S. b. peruviensis* between the Rios Ucayali and Tapiche (Hershkovitz, 1984). (equivalent to *S. sciureus sciureus sensu* Thorington).

Suriname *S. s. sciureus* is found throughout the country (Hershkovitz, 1984).

USA There are at least four introduced populations of squirrel monkeys in Florida, at Silver Springs, Monkey Jungle near Miami, Crystal River/Homosassa Springs tourist attraction and Bok Tower Gardens (USA CITES MA, 1987).

Venezuela *S. s. cassiquiarensis* occurs in the Rio Orinoco- Cassquiarensis basin (Hershkovitz, 1984).

POPULATION *Saimiri* is not considered threatened, and is perhaps the most abundant monkey in all of Amazonia. It adapts well to the presence of man, and like the callitrichids, it makes use of, and may even prefer, the secondary formations resulting from slash-and-burn agriculture, which is still the most common form of agriculture in much of Amazonia (Mittermeier and Coimbra-Filho, 1983). No estimates of numbers exist. No status information is available for Brazil, Ecuador, French Guiana, Guyana or Paraguay.

Bolivia Not affected by opening of forests, but populations have been much reduced and they appear to be already extinct in some areas of their past distribution owing to recent over-exploitation for trade (Tello, 1986).

Colombia Several researchers reported a decline of *Saimiri* populations in the immediate vicinity of Leticia, where trapping for export had been heavy (Mittermeier and Coimbra-Filho, 1983).

Peru At the beginning of the 1980s, the species was said to be abundant on Isla Iquitos, a large island right across from Iquitos itself, a major centre for export (Mittermeier and Coimbra-Filho, 1983).

Suriname Common, widespread and abundant (Baal *et al.*, 1988).

Venezuela Said to be very abundant in the wooded zones around the Orinoco and its tributaries (Venezuela CITES MA, 1987).

HABITAT AND ECOLOGY *Saimiri* is almost exclusively an animal of lowland forests, and rarely ranges higher than a few hundred metres in altitude (Mittermeier and Coimbra-Filho, 1983). The maximum altitude record is 800 m for *S. boliviensis*, or possibly up to 1000 m for *S. sciureus* (Hershkovitz, 1984). Throughout Amazonia, it is the characteristic species of the densely overgrown river margins and coastal swamp forests. Inland, it shows a strong preference for liane forest and secondary formations that are structurally similar to river edges, though it can be found at lower densities in many other forest types as well. The preference for this kind of densely-vegetated habitat appears to be closely linked to its diet, which includes high percentages of insects and other arthropods that abound in such formations (Mittermeier and Coimbra-Filho, 1983). It is diurnal, arboreal and occurs in troops ranging from several dozen to several hundred animals (Dukelow, 1983).

Saimiri sciureus

THREATS TO SURVIVAL As with all other New World monkeys, the Squirrel Monkey is affected by widespread clear-cutting of forest, but it adapts well to the presence of man and is one of the few species that regularly can be seen in forests at the edge of villages and towns in Amazonia. It is a small species (mean weight about 700 g) and consequently is far less persecuted as a food source than the larger monkeys (but more so than the callitrichids) (Mittermeier and Coimbra-Filho, 1983). It is occasionally kept as a pet in Amazonia, but is far less popular than *Cebus* or *Lagothrix*, and total numbers involved are quite small (Mittermeier and Coimbra-Filho, 1983). Over-exploitation for trade had reportedly been a major influence on population decline in Bolivia (Tello, 1986).

Table 1. Minimum net imports of live *S. sciureus* reported to CITES.

	1980	1981	1982	1983	1984	1985
Argentina	-	20	-	-	-	-
Australia	10	3	-	-	2	-
Austria	-	-	-	-	-	31
Belguim	-	-	-	35	17	-
Canada	93	87	54	39	35	25
Chile	-	50	-	-	-	-
China	-	-	-	4	-	-
Cuba	-	-	-	8	-	-
Czechoslovakia	2	-	-	5	-	2
Dominican Republic	-	-	-	-	-	7
Egypt	-	-	-	4	-	-
France	48	14	-	-	2	126
German D.R.	-	-	-	-	-	4
Germany F.R.	110	132	103	107	64	2
Greece	-	2	-	-	-	2
Hong Kong	8	-	-	3	-	-
Indonesia	-	-	-	-	3	6
Irish Republic	3	-	-	-	-	-
Italy	700	739	430	310	232	-
Japan	-	1072	99	1109	108	734
Korea Rep.	-	-	-	10	-	3
Mexico	1	20	-	-	-	-
Netherlands	-	-	-	-	5	14
New Zealand	-	-	2	-	-	-
Romania	-	-	-	-	-	2
Saudi Arabia	-	-	-	10	-	6
Singapore	6	-	-	-	-	6
South Africa	1046	982	-	-	-	-
Spain	-	-	-	4	-	-
Sri Lanka	-	-	-	8	-	-
Sweden	6	-	-	-	-	20
Switzerland	60	10	-	-	125	53
Taiwan	-	-	50	140	-	3
Thailand	-	-	-	6	10	-
UK	566	241	39	113	198	138
USA	1647	1673	1109	1338	985	1789
Country unknown	-	2	-	-	-	-
TOTAL	4306	5047	1886	3253	1786	2983

INTERNATIONAL TRADE For as long as 400 years, Squirrel Monkeys have been captured and traded as pets for homes in Europe and America (Dukelow, 1983). They were used in behavioural research in the 1930s; the first captive births were in the early 1940s, but it was only comparatively recently that the species has been extensively used in biomedical research, for a wide variety of uses, including, reproduction, cardiovascular and nutritional research. The subspecies occurring near Leticia and Iquitos are the most in demand for research because of the extensive baseline data on them (Eudey and Mack, 1984).

Some 20 000 to 40 000 *Saimiri* were exported annually during the 1960s from Iquitos in Peru alone, similar numbers went out from Leticia in Colombia (Dukelow, 1983). Imports of *S. sciureus* to the USA totalled 173 049 from 1968 to 1972, making it the most commonly imported primate, and constituting 37.5% of all primate imports. By 1976-1980 attention had switched to the macaques, and the proportion of Squirrel Monkeys had dropped to 9%, totalling 12 512 animals in the five years (Mack and Eudey, 1984).

CITES reports of trade since 1980 are summarised in Tables 1 and 2. The minimum volume of world trade (Table 1) has fluctuated between 1786 and 5045. The USA has been the major exporter, but most of the annual variation is attributable to varying imports to Japan and South Africa.

Table 2. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions in live *S. sciureus* reported to CITES.

	1980	1981	1982	1983	1984	1985
Countries with wild populations of *S. sciureus*						
Bolivia	2902	4465	1484	2199	224	-
Brazil	-	-	-	-	1	-
Colombia	82	-	-	-	1	-
French Guiana	-	-	27	-	-	15
Guyana	1263	364	264	709	1368	2587
Peru	75	215	100	210	205	306
Suriname	-	3	-	-	-	75
Countries without wild populations of *S. sciureus*						
Argentina	-	-	-	100	-	-
Australia	-	-	2	-	-	-
Canada	-	-	-	-	-	1
Germany, F.R.	-	-	-	-	-	7
Guatemala	-	-	-	34	-	-
Israel	3	-	-	-	-	-
Japan	1	-	-	-	-	-
Netherlands	-	-	14	-	3	9
South Africa	-	-	-	1	-	-
Sweden	-	-	-	-	11	-
Switzerland	-	-	-	-	-	6
UK	-	2	-	-	2	-
USA	5	3	-	18	10	26
Country unknown	61	1	-	12	-	-

Saimiri sciureus

The major countries of origin (Table 2) have been Bolivia and Guyana. Exports from Bolivia fell in 1984, possibly owing to the export ban imposed in 1984, and there is some indication that the exports from Guyana may have risen in compensation for this. The only other range country to be reported as an exporter of significant quantities is Peru, which has consistently been the source of 75-215 a year. Guyana is said to have an export quota in the region of 1000 a year, but this total was significantly exceeded in 1985.

Bans on export of primates from Peru and Colombia were instituted in the early 1970s. It is difficult to assess the long-term effect of the *Saimiri* trade because demographic data have never been collected. It seems, however, that upper Amazonian populations were remarkably resistant even to the heavy trapping pressure to which they were exposed during the peak years of the trade, although population declines were reported near Leticia, where trapping was heavy. Nonetheless, Mittermeier and Coimbra-Filho (1983) comment that, without adequate demographic data, it is impossible to determine how long such resistance and flexibility could have been maintained. The quantity of Squirrel Monkeys exported from South America is now much reduced.

The ban on export of the valued Squirrel Monkey led to a working agreement between the Peruvian Ministry of Health and the Pan American Health Organization (PAHO). The resultant Peruvian Primate Project, initiated in 1975, attempts to combine local captive-breeding efforts, free-ranging island colonies (see below), and cropping of wild populations in an attempt to develop a programme that will ensure a future supply of biomedically important species such as *S. sciureus* (Mittermeier and Coimbra-Filho, 1983). Considerable field work has been conducted but has consisted mainly of short-term surveys and experimentation with different trapping methods and with few exceptions there has been little emphasis on long-term field studies (Mittermeier and Coimbra-Filho, 1983).

CONSERVATION MEASURES The legal protection status of primates in source countries is summarised below (Fuller *et al.*, 1987; Kavanagh and Bennett, 1984).

Bolivia All exports of live wildlife were banned in 1984. Prior to that, the legislation was confused and large numbers of primates were exported.

Brazil The export of all wildlife has been illegal since 1967.

Colombia Capture and export of primates has been banned since 1974. Export licences can be granted for scientific purposes, but none has so far been issued.

Ecuador Export of indigenous wildlife has been prohibited since 1981. Prior to that, temporary bans on primate exports were in force.

French Guiana Listed in Article 2 of the Arrêté of 15 May 1986, which prohibits the purchase, sale, transport or taxidermy of certain mammals throughout the French national territory, allowing their transport within French Guiana but not their export. Professional hunting may be controlled under Arrêté Préfectoral No. 172 1D/2B. French Guiana is an Overseas Department of France and is therefore included in the EEC's joint ratification of CITES.

Guyana Guyana banned the export of all wildlife specimens in February 1987 but this measure was lifted in October 1987 and replaced by a quota system. The 1987/1988 quota for exports of *Saimiri sciurius* was 3000 animals (CITES Secretariat, pers. comm.).

Paraguay The hunting, commerce, importation and exportation of wildlife are prohibited.

Peru All hunting, capture of, and trading in, primates from the La Selva region (the Amazonian lowlands east of the Andes) have been illegal since 1973 except for scientific purposes. Since 1976, all legal exports have been carried out under the auspices of the Pan American Health Organisation.

Suriname All primate species (except *Cebus apella*) have been protected since 1954, and they cannot be hunted, captured or traded.

Venezuela All hunting and trade in native species has been prohibited since 1970.

CAPTIVE BREEDING *S. sciureus* is bred in a number of biomedical institutes for research purposes. In 1977-78, the EEC countries were reported to have bred a total of 39 of this species and to have used a total of 462 in research (Caldecott and Kavanagh, 1984). The numbers bred in the USA increased steadily from 121 in 1972 to 518 in 1981. The total number required for research was estimated to be 1800 in 1982, and the Interagency Primate Steering Committee recommended that a total of 600 should be bred annually (Eudey and Mack, 1984). Other user countries breeding *S. sciureus* include Switzerland, which bred 59 in 1980 (Caldecott and Kavanagh, 1984), Israel, which planned to breed 5 in 1981, Japan, which bred at least 6 in 1982 (Anon., 1984), and Argentina, which had a breeding colony of 170 in 1979 (Caldecott and Kavanagh, 1984).

In Peru, the Primate Reproduction and Conservation Station was built at Iquitos in 1976. By 1981 the stock amounted to 587 primates, mostly *S. sciureus* and *Saguinus mystax*. A free-ranging colony was also established in the adjacent Proyecto Islas. Few, if any, of the 300 or so primates exported annually by 1982 were believed to be captive-bred (Caldecott and Kavanagh, 1984).

A major primate ranching programme on an island in Bolivia was reported to have been established in 1981, receiving funds from an American breeding centre. Seven species of primate were said to be kept, including *S. sciureus*, and captive-bred animals were expected to be available by 1985 (Anon., 1984). No further confirmation of this scheme has been received, and it is thought unlikely that projected breeding and production targets have been achieved.

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SPOT-NOSED OR LESSER WHITE-NOSED MONKEY

Recommended list: 3
[No problem]

Cercopithecus petaurista (Schreber, 1774)

Order PRIMATES

Family CERCOPITHECIDAE

SUMMARY AND CONCLUSIONS Found along the southern coast of West Africa from Senegal through Guinea-Bissau, Guinea, Sierra Leone, Liberia, Ivory Coast, Ghana, Togo to Benin. No population estimates exist, though it is described as common in parts of Ghana and Ivory Coast. Although forest loss is prevalent throughout its range, this species is able to live in secondary forest, and may even reach highest densities there. It is hunted, but is not actively sought after. Also killed as an agricultural pest. It occurs in several reserves and national parks. Listed in Class B of the African Convention.

In the period, 1980-1985, the international trade in the species was minimal: the only appreciable quantity occurred in 1982, when there was a reported trade of 94 live animals and 225 skulls. The skulls were all reported as re-exports from the Federal Republic of Germany in two consignments.

Were it not for this apparently isolated trade in skulls, the species would never have been included in the analysis of significant trade. The available information suggests that the species can sustain the small trade that exists.

DISTRIBUTION

Cercopithecus petaurista buttikoferi Jentink (1886)

Guinea Recorded in the north near the borders of Guinea-Bissau and Senegal (Booth, 1958). Dupuy (1971) mentioned it as occurring in the country.

Guinea-Bissau Reported to occur (Dupuy, 1971).

Ivory Coast Booth (1958) recorded *C. p. buttikoferi* from the Cavally River westwards, being sympatric with *C. p. petaurista* along the Guiglo-Tai road. Reported from the Tai (Struhsaker, 1972; Anon., 1977).

Liberia Recorded throughout the country (Booth, 1958). Coe (1975) recorded it from the Mount Nimba area in the north-east.

Senegal Mapped by Booth (1958) as occurring in Casamance, south of the Gambia River. Dupuy (1972; 1973) recorded *C. nictitans* at Seleti, in Casamance; but Wolfheim (1983) believed these to be *C. petaurista*.

Sierra Leone Booth (1958) recorded it from a small area in the north-west and, in the south, from Freetown to the border with Liberia. Also recorded from the Kasewe Forest, 160 km east of Freetown (Tappen, 1964); and from Duguta in the Bombali District (Wilkinson, 1974); from the Kilimi region in the north-west (Harding, 1983); and from Tiwai Island in the Moa River near the Gola Forest (J.F. Oates, *in litt.*, 1983).

Cercopithecus petaurista petaurista (Schreber), 1774

Benin Few details. Booth (1958) mapped it occurring in this country. Sayer and Green (1984) note that it occurs in forest patches near Abomey.

Cercopithecus petaurista

Ghana Recorded throughout the south from the Ivory Coast in the west to Togo in the east (Booth, 1958), occurring in the Digya, Bia, Nini-Suhien National Parks; in the Shai Hills and Ankasa Game Production Reserves; in the Bomfobiri Wildlife Sanctuary and the Kogyae Strict Nature Reserve and at Willi Falls (Asibey, 1978).

Ivory Coast Booth (1958) recorded *C. p. petaurista* from the south of the country, from the Sassandra River eastwards to the border with Ghana. Reported from the south of the Comoe National Park (Geerling and Bokdam, 1973) and in the Banco National Park (Asibey, 1978).

Togo Mapped as occurring in the country (Booth, 1958).

POPULATION Very little information on abundance exists. It has been decsribed as common in parts of Ghana and Ivory Coast, but also rare in regions of these countries.

Benin No information.

Ghana Recorded as common in the Digya, Nini-Suhien and Bia National Parks, the Shai Hills and Ankasa Game Production Reserves, the Bomfobiri Wildlife Sanctuary and at Willi Falls and as rare in the Kogyae Strict Reserve (Asibey, 1978).

Guinea No information.

Guinea-Bissau No information.

Ivory Coast Recorded as 'abundant' in Tai National Park and 'rare' in the Banco National Park (Asibey, 1978).

Liberia No overall comment on status available. Apparently declining in the Mount Nimba area: described as rare by Coe (1975) although previously regarded as common.

Senegal No information.

Sierra Leone No information.

Togo No information.

HABITAT AND ECOLOGY A forest species which seems to prefer secondary forest (J.F. Oates, pers. comm., 25 March, 1986). Also noted as occurring in high forest and coastal scrub (Booth, 1956, see Wolfheim, 1983); and seen in, or near, cultivation (Oates, 1980). No studies have yet been conducted on this species and consequently little is known of its ecology.

THREATS TO SURVIVAL

Benin Sayer and Green (1984) mention a small export trade in the species.

Ghana Forests are rapidly disappearing and have been reduced by two thirds since the beginning of the century. Trees are felled for timber, and land cleared for agriculture (Asibey, 1978). Access roads built by timber operators open up forest, making it easy for farmer-settlers to move in. Hunting *C. petaurista* for food is common and widespread (Asibey, 1974). There was, in 1970, little awareness of the need for conservation and laws protecting game were almost totally ignored (Jeffrey, 1970). The species is considered a pest in maize crops (Jeffrey, 1975).

Guinea No information.

Guinea-Bissau No information.

Ivory Coast Forests are rapidly being destroyed and, by 1972, almost all valuable timber had been removed. Such exploitation is known to upset the primate species composition in the forests. Hunting is also a threat (Struhsaker, 1972).

Liberia In 1978-1979, hunting was extensive and there were no laws or regulations controlling it. Rifles and ammunition were easy to obtain and hunters killed everything they could, mainly for food (Jeffrey, 1977; Verschuren, 1983). At Mount Nimba, people working in the mines hunted monkeys; as a result all species had declined in number (Coe, 1975). Deforestation for farming and shifting cultivation is increasing; transport roads open up previously inaccessible areas for hunters (Jeffrey, 1977). Verschuren (1982) noted that the central strip, from Monrovia to Nimba, had been deforested and that large forest blocks remained only in the north-west and central south-east; subsequently (1983) he predicted that all monkeys would soon be extinct in Liberia.

Senegal No information.

Sierra Leone Habitat destruction appears to be the major threat (Wilkinson, 1974); Tappen (1964) noted that forests had been reduced to less than 4% of the country, and that arboricides were used on non-economic species. Oates (*in litt.*, 1983) noted that the Gola Forest, the largest remaining rain forest area in the country, was being severely damaged by timber exploitation and by heavy commercial hunting, mainly by Liberians. Davies (1984) reported that plans were being made to dam the Moa River and that settlers were moving into Gola West. The species was hunted for its meat, but not by the muslims, who predominate in the north of the country (Wilkinson, 1974); it used to be a common victim in monkey extermination drives in coffee and cacao growing regions (Tappen, 1964) and has lately been regarded as a pest (Oates, 1980). In the past, monkey meat was exported illegally to Liberia by poachers (Robinson, 1971).

Togo A few primates have been exported; it is not known if this includes *C. petaurista* (Kavanagh and Bennett, 1984).

Table 1. Minimum net imports of *C. petaurista* reported to CITES. (All figures refer to live animals unless otherwise stated).

	1980	1981	1982	1983	1984	1985
Australia	–	–	2	–	–	–
Belgium	–	–	160 skulls	–	–	–
Czechoslovakia	2	–	–	–	–	–
Germany F.R.	–	1	–	–	–	–
Italy	–	–	2	–	–	–
Japan	–	–	65 skulls	–	–	–
Mexico	3	–	–	–	–	–
Switzerland	–	–	–	1	–	–
UK	–	–	90	–	–	–
USA	–	–	–	–	1 trophy	2
TOTAL	5	1	94	1	1 trophy	2
	–	–	225 skulls	–	–	

Cercopithecus petaurista

INTERNATIONAL TRADE Minimum net trade reported to CITES for the years 1980 to 1985 was extremely small. The only appreciable quantity occurred in 1982, when there was a reported trade of 94 live animals and 225 skulls (Table 1). The skulls were all reported as re-exports from the Federal Republic of Germany in two consignments, one of 65 to Japan, with Liberia being stated as the country of origin, the other of 160 to Belgium, country of origin unknown. Were it not for this apparently isolated trade in skulls, the species would never have been included in the analysis of significant trade.

Table 2. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions of *C. petaurista* reported to CITES. (All figures refer to live animals unless otherwise stated).

	1980	1981	1982	1983	1984	1985
Countries having populations of *C. petaurista*						
Ghana	3	-	92	1	-	-
Liberia	-	-	65 skulls	-	1 trophy	-
Togo	-	-	-	-	-	2
Countries without wild populations of *C. petaurista*						
Austria	2	-	-	-	-	-
USA	-	-	2	-	-	-
Country unknown	-	1	160 skulls	-	-	-

CONSERVATION MEASURES All of the range states except Guinea Bissau, Sierra Leone and Ivory Coast are Parties to CITES.

Benin All primates except baboons are protected (Kavanagh and Bennett, 1984).

Ghana Export of most primates is illegal, though *C. petaurista* may be exported under licence (Kavanagh and Bennett, 1984). Occurs in the Digya, Bia, Nini-Suhien National Parks; in the Shai Hills and Ankasa Game Production Reserves; in the Bomfobiri Wildlife Sanctuary and the Kogyae Strict Nature Reserve and at Willi Falls (Asibey, 1978).

Guinea No information.

Guinea-Bissau Totally protected under LE/0029044 Hunting Regulations, dated 12 May 1980.

Ivory Coast Hunting, capture, and export of all wild animals is illegal except under special licence (Kavanagh and Bennett, 1984).

Liberia All primate exports are illegal unless a special permit has been issued (Kavanagh and Bennett, 1984). The species is not known to occur in any protected area. Partially protected under Wildlife Conservation Regulation. There are many national forests, but these have virtually no protection (Verschuren, 1982).

Senegal All primates other than chimpanzees may be trapped and exported for commercial and scientific purposes with a permit (Kavanagh and Bennett, 1984).

Sierra Leone Export of all wildlife and wildlife products was banned in 1982 (Kavanagh and Bennett, 1984), but this temporary ban was never constituted by written legislation (Sierra Leone Ministry of Agriculture, 1987). In the Bombali District, in the north, monkeys were considered not to be acceptable food and so were not hunted (Wilkinson, 1974).

Togo Not known if protected by law. Not known to occur in any protected area.

CAPTIVE BREEDING At least 10 were bred in captivity in 1982; these were in collections in the Soviet Union, the United States and in Europe (Olney, 1984).

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GUEREZA or BLACK AND WHITE COLOBUS

Recommended list: 2
[Possible problem]

Colobus guereza Rüppell 1835

Order PRIMATES

Family CERCOPITHECIDAE

SUMMARY AND CONCLUSIONS The Guereza is a very widespread species occurring in forests of Central Africa from Cameroon and Nigeria in the west to Ethiopia in the east: in Gabon, Congo, Central African Republic, Zaire, Sudan, Uganda, Tanzania, Kenya and possibly Equatorial Guinea. Formerly in Rwanda but probably extinct there now. Population size is difficult to determine because of the dense forests it inhabits.

The species has long been hunted for its attractive pelt, which is sought as decoration both locally and internationally. It is thought that at the height of the international trade, around the turn of the century, many thousands of skins were exported to Europe and North Africa, almost solely for the fashion market. More recently, the export of Colobus skins has been primarily to foreign tourists in the form of rugs. Oates in 1974-75 made a 'very crude' estimate that the annual turnover in Nairobi was about 20 000 skins. In Addis Ababa, Ethiopia, which with Nairobi and Mombasa was the chief market for Colobus skin sales to tourists, it was estimated in 1975 that there were 200 000 skins in shops, probably accumulated over five years. Shortly after these studies, the skin trade was largely curtailed, and in the six-year period 1980-1985 CITES parties recorded an annual international trade of between 1 and 314 skins. The annual live animal trade in the same period was between 5 and 86 individuals.

It is tempting to assume that the levels of trade following such a drastic cutback in trade can easily be sustained by the species; however there are no studies or population figures to support this. It is true that the species is very widespread and in some areas is quite common; however, in other areas, e.g. Ethiopia, it has greatly declined. Habitat destruction is now its greatest threat.

DISTRIBUTION Widespread in the forests of Central Africa from Cameroon and Nigeria in the west to Ethiopia in the east: in Gabon, Congo, Central African Republic, Zaire Sudan, Uganda, Tanzania, Kenya and possibly Equatorial Guinea. Formerly in Rwanda but probably extinct there now (Oates, 1977a).

Six sub-species have been described (Dandelot, 1971). *C. g. caudatus* occurs in montane forest on Mount Kilimanjaro and Mount Meru, Tanzania; *C. g. gallarum* in Galla country in Ethiopia; *C. g. guereza* in mountainous districts of Ethiopia and Kenya; *C. g. kikuyensis* on Mount Kenya and in the Aberdares, Kenya; *C. g. matschiei* on the Mau Escarpment, Mount Elgon, west of the Rift Valley, Kenya; *C. g. occidentalis*, in the western and north-western range of the species. Species and sub-species of *Colobus* monkeys are usually separated on variations in pelage, cranial morphology and geographical distribution. Oates and Trocco (1983) studied vocalizations and showed that these can be used to assess phylogenetic relationships; they concluded that *C. guereza* is a valid species.

Cameroon Found over most of Cameroon except in the western coastal area and the extreme north (Jeannin, 1936).

Central African Republic Once widespread in the west and south and in the Manova-Gounda-St Floris National Park in the north (S. Bahuchet *in litt.* to

Colobus guereza

J.F. Oates, 1975; Fay, 1985). Also in the Zone de Conservation de Bamingui-Bangoran (Anon., 1987).

Congo Formerly found in the north and east: in the Alima, Sangha and Likouala River Basins (Malbrant and Maclatchy, 1949; G. Bernard *in litt.* to J.F. Oates, 1975).

Equatorial Guinea Reported from the Mikomeseng area, but this needs confirmation (Oates, 1977a).

Ethiopia Scattered distribution in parts of the west, south-west and south (Dunbar and Dunbar, 1974a). Occurs from the border with Sudan northwards to the Simen Mountains and south-eastwards to the Awash River at least as far as Awash. Also found in the Arussi Mountains near the headwaters of the Webi Shebele southwards to Lakes Shamo and Abaya and to Lake Stefanie near the border with Kenya, and around Lake Rudolf and the Omo River. Probably once existed in Tigre and Eritrea Provinces in the north but forests in these areas were destroyed many years ago. Tolerates presence of man in some areas, frequently being seen near such towns as Jimma. Has disappeared from the environs of Addis Ababa (Bolton, 1973; Yalden *et al.*, 1977).

Gabon Formerly occurred over the north-east of the country; as far south as the Ivindo Basin and as far west as the Voung (Mvoung) River, and south to the confluence of the Ivindo and Ogooué River (Malbrant and Maclatchy, 1949). Also found on the Liboui River (Quris, 1976). Recently reported to occur in the east of the country (Gabon Direction de la faune et de la Chasse, *in litt.*, 1985).

Kenya Found in central and western parts of the country; at Limuru, Kakamega Forest, Mount Warges, Masai-Mara Game Reserve and in the national parks of Lake Nakuru, Aberdare, Mount Elgon and Mount Kenya (Oates, 1977a); also in the forests around the Kikuyu escarpment: at Kerita, Kinale (Kinare) and Molo (Kingston, 1971).

Nigeria Found only in the east in the Upper Benue River valley and nearby drainage (Oates, 1977a; Nigeria CITES MA, 1987).

Rwanda Once occurred in the north (Oates, 1977a); but probably now extinct.

Sudan Recorded in the south, south-west and south-east. Also found in the Imatong and Dindinga Mountains in the south-east and across to Lui (30°w) (Butler, 1966; Oates, 1977a).

Tanzania Occurs in the west and central parts, of the country (Kingdon, 1971).

Uganda Found in the west, south-west and in a small area along the border with Tanzania. Noted in the Bwamba, Semliki (Lumsden, 1951), Kibale (Struhsaker and Oates, 1975) and Budongo (Albrecht, 1977) forests in the west; on Mount Elgon Mount Zulia and Mount Kadam in the east (Uganda Game Department, *in litt.*, 1987). Also in the Kabalega (formerly Murchison Falls) National Park (Leskes and Acheson, 1971).

Zaire Widespread in the north and east (Rahm and Christiaensen, 1960).

POPULATION

Cameroon Reported in 1974 to be declining (J.S. Gartlan, pers. comm. to J. H. Wolfheim, 1974). Considered rare in the Dja Reserve (T.E. Rowell, pers. comm. to J.H. Wolfheim, 1978), and infrequent in the Bouba-Ndjida National

Park (Lavieren and Bosch, 1977). No recent population estimates available (Cameroon CITES MA, 1987).

Central African Republic Not often seen, but probably not rare (S. Bahuchet, *in litt.* to J.F. Oates, 1975). 'Common' in the gallery forest system in the south of the Manova-Gounda-St Floris National Park; also ranges to the isolated patches of dry forest along the major rivers in the north of the park. Population of the park numbers 'in the thousands'; on the Koumbala River drainage alone there were probably over 1000 in 1985 (Fay, 1985).

Congo No recent information. Malbrant and Maclatchy (1949) reported it to be 'locally abundant' in the north and east.

Equatorial Guinea No information.

Ethiopia Dunbar and Dunbar (1975) reported Guereza to be declining overall and considered that it might become extinct in Ethiopia by 1990. 'Abundant' in the south and south-west in the early 1970s (Bolton, 1973); 'abundant' on Mount Abaro, east of Lake Awasso (Bolton, 1974). In June 1972 there were 120 in the Bole Valley; this population was increasing at a rate of 7.6% per annum (Dunbar and Dunbar, 1974a). 'Very common' near the Godare Mission 7°26'N, 35°2'E (Brown and Urban, 1970). Reported to be 'common' in the proposed Mago National Park (Anon., 1977). In 1969, the total population was estimated to be 500 000 (Brown and Urban, 1970); this was based on a very small sample and is now thought to have been either too high (Oates, 1977a) or too low (Dunbar and Dunbar, 1975). Densities for the Bole Forest were calculated to be about 50-140 per sq. km (Dunbar and Dunbar, 1974a).

Gabon Population size unknown, but not thought to be under immediate threat (Gabon Direction de la faune et de la Chasse, *in litt.*, 1985)

Kenya In 1972 reported to be 'rather numerous' in the Kakamega Forest (Zimmerman, 1972). Kingston (1971) calculated population density at 40 groups per sq. km; mean group size was 4.47-5.47 resulting in a density of 2 individuals per ha (Oates, 1977a) or 180 per sq. km (Kingston, 1971).

Nigeria Reportedly rare and severely threatened (Nigeria CITES MA, 1987).

Rwanda Probably extinct.

Sudan No recent information. Butler (1966) considered it to be locally common in the Imatong and Dindinga Mountains and across to Lui; however the population was declining and believed to be in danger of extinction.

Tanzania No recent information. In the western Serengeti National Park, hundreds were reported in 1958 by Swynnerton (1958).

Uganda Oates (1977a) reported it to be declining in some areas; Struhsaker (1972) considered it to be 'common' in the Kibale forest. Tappen (1960) reported it to be 'locally common'. Population densities have been calculated for various areas; e.g. in the Kibale Forest Struhsaker (1972) gave a population density of 11.9 individuals per sq. km, whilst Oates (1977a) gave a density of 50-100 individuals per sq. km.

Zaire No recent information. Heymans (1975, cited in Wolfheim, 1983) reported it as common throughout the east and north-east Haut-Zaire Province.

Colobus guereza

HABITAT AND ECOLOGY Found in a variety of different forest types including riverine, primary, mature, swamp and flooded rain forest and less frequently in montane forest, *Acacia* and *Combretum* brushland, bamboo forest and thickets (Wolfheim, 1983). Particularly well adapted to relatively young secondary forest (Struhsaker and Oates, 1975). Densities are highest in colonizing and riparian forest situations (Oates, 1977a). In Ethiopia found at altitudes between 400 m to 3300 m (Yalden *et al.*, 1977). Guereza are herbivorous and eat leaves, fruits and shoots; *Celtis durandii* is the most commonly eaten species in the Kibale Forest, Uganda (Oates, 1977b; Struhsaker and Oates, 1975). Groups are cohesive (Oates, 1977a). A variety of studies reviewed by Wolfheim (1983) found group sizes between 2 and 18, the mean was usually in the range 4-10. There is usually only one adult male in a group, with several females, subadults and a few juveniles and infants. Solitary males and all male groups also occur (Marler, 1969; Dunbar and Dunbar, 1976). Studies summarised by Wolfheim (1983) showed home range to vary from 1.5 to 39 ha. Guereza move little on average during a day; e.g. 535.1 m/day (range 288-1004 m) (Struhsaker and Oates, 1975), 200-300 m (Dunbar and Dunbar, 1974a). Colobus monkeys communicate by a variety of different calls; these have been studied in four species in Uganda, Rwanda, Tanzania, Ghana, Cameroon and Ivory Coast (Oates and Trocco, 1983). Only one young is born; and may be carried by other members of the troop as well as the mother. Adult females have one young about every 20 months (Leskes and Acheson, 1971). Birds of prey, particularly Crowned Hawk-Eagle (*Stephanoaetus coronatus*) are the main predators (Oates, 1977a).

THREATS TO SURVIVAL

Cameroon In the early 1970s intensive logging was destroying *Colobus* habitat. The species was reportedly not hunted extensively (J.S. Gartlan, pers. comm. to J. Wolfheim, 1974). More recently reported not to occur in trade owing to its legal protection (Cameroon CITES MA, 1987).

Central African Republic Deforestation has reduced suitable habitat in the south (Oates, 1977a); in the north the drought in 1985 and the unrest in Chad resulted in large numbers of people and livestock encroaching on Manova-Gounda St Floris Park (Sayer, 1985). Poaching of Guereza in the park was not, however, considered a threat although it was thought that hunting had almost exterminated the species in the south of the country (Fay, 1985).

Congo In 1949 reported not to be extensively hunted (Malbrant and Maclatchy, 1949), though by 1977 was hunted for its fur and meat (Oates, 1977a).

Equatorial Guinea Struhsaker (1972) reported that virtually all commercially valuable timber had been removed from the country by 1972. The disturbance this caused is known to have upset the primate species composition of the forests (Oates, 1977a).

Ethiopia Habitat destruction was one of the major threats in the 1970s. Trees were felled and coffee and agricultural crops planted; overgrazing was also a problem (Bolton, 1970; Oates, 1977a). The species disappeared from the environs of Addis Ababa as indigenous forest was replaced with exotic *Eucalyptus* (Yalden *et al.*, 1977). Shooting for skins was also a major threat in the 1970s; many of the skins sold in Kenya were smuggled in from Ethiopia (Mittermeier, 1973; Ghiglieri, 1981, Oates, 1977a). The numbers of skins on sale in Ethiopia in the early 1970s were calculated to indicate a total of 40 000 animals killed each year. At this rate of hunting it was calculated that the species would become extinct in Ethiopia in 10-25 years (Dunbar and Dunbar, 1975). Severely hunted in the Illubabor Province in the

1970s (Duckworth, 1974). Ethiopia has been a major primate exporting country since at least 1964 (Kavanagh, 1984).

Gabon Thirty years ago it was reported not to be hunted extensively (Malbrant and Maclatchy, 1949). However, by 1977 it was commonly hunted (Oates, 1977a). The Direction de la faune et de la Chasse in Gabon reported in 1985 that the species's habitat was not threatened in the immediate future.

Kenya Habitat destruction appears to be the major threat; forests are decreasing rapidly and those below 2700 m in, or near, potential agricultural land are the most threatened. The forest on the Mau escarpment has been reduced by 30% since 1970 (Anon., 1984). In the 1970s, natural vegetation in much of the Kenyan Highlands was being replaced by exotics (Kingston, 1971); forests were also being cleared for tea plantations (Redfern, 1985). Logging and the activities of charcoal burners and agriculturalists have reduced Guereza habitat in the Kakamega Forest; its area has decreased from 230 sq. km. to only 100 sq. km. by 1984 (Anon., 1984; Zimmerman, 1972). Charcoal exports from Kenya increased from 2500 tons in 1967 to 32 300 tons in 1970 and to 80 000 tons in 1974, most going to Saudi Arabia (Anon., 1976). Guereza have also been shot for their skins in Kenya. As long ago as 1936 Guereza had been exterminated by Bugishu hunters in the Sipi Forests north-west of Mount Elgon (Leskes and Acheson, 1971). A survey of tourist shops in 1972 revealed rugs on display representing over 5000 Guereza; when undisplayed stock was taken into account, the total was about 27 500 animals. Many of these reportedly came from the Wajiri District in northern Kenya; with many smuggled in from Ethiopia (Mittermeier, 1973). In 1974 fewer skins were on sale (Oates, 1977a). Many Guereza were shot for allegedly damaging crops; in fact they probably do not do this, but associate with species (*Cercopithecus mitis*) which do (Mittermeier, 1973). Guereza are hunted for their meat in some areas (Leskes and Acheson, 1971). Many live 'monkeys' were exported in the early 1970s; these probably included some Guereza (Oates, 1977a).

Nigeria Hunting of all forest animals is common (Oates, 1977a).

Sudan No recent information. In 1966 Butler stated that it was in danger of extinction through overhunting for meat and skins (for ceremonial dress) (Butler, 1966).

Tanzania Poaching for its skins (used in traditional ceremonies) still occurred in 1977 (Oates, 1977a). Mittermeier (1973) did not find any for sale in curio shops. In 1982 less than 2% of the country had a natural closed forest cover, and this was decreasing, there was great pressure on these areas by the increasing human population (Rodgers, 1982).

Uganda In the early 1970s selective felling was practised in Ugandan forest reserves; if regeneration was permitted this practice may actually have benefited Guereza by promoting secondary growth and hence increasing its food supply (Struhsaker, 1972); but in many felled areas arboricides were used to kill undesirable trees (Oates, 1977a). Much of the Guereza habitat has now been cultivated and parts of the forest reserves planted with exotics. Guereza habitat in the Kabalega National Park is threatened by elephant (*Loxodonta africana*), and forests are disappearing. Many people in East Africa (such as the Batoro who live around the Kibale Forest) do not eat monkey meat (Oates, 1977a). During Amin's rule (1971-1979) poaching and human encroachment on reserves and national parks increased steadily (Malpas, 1980; Malpas, 1982); the impact this had on Guereza populations is not known. The Tanzanians, who moved in after Amin left, also exterminated much wildlife (Anon., 1979; Van Orsdol, 1980). Despite full protection the species continues to be threatened by local hunting for its skin to be used as

trophies or in traditional ceremonies (Uganda Game Department, *in litt.*, 1987).

Zaire No recent information. Hunting, rather than habitat destruction was the main threat in 1975. Hunting was most severe along roads and rivers and was largely uncontrolled (Verschuren, 1975).

INTERNATIONAL TRADE Between 1980 and 1985 an average of approximately 150 *C. guereza* per annum were reported in trade by CITES parties (Table 1). Trade was in live specimens (approx. 30/year) and in individual skins (approx 125/year). Many of the live specimens were reportedly captive-bred. The major importers during this period were Denmark, F.R. Germany, UK, Italy, Switzerland and the USA. A small number of trophies and manufactured skin items were recorded in trade, but they are excluded from the tables.

Imports of live specimens were mainly to the UK and the USA. These two countries accounted for over 75% of the live trade in the years 1980-1985. Imports of skins were largely accounted for by Denmark, F.R. Germany, Italy, Switzerland and the USA. Little use can be made of the data in Table 2 for years prior to 1983 when the majority of exports reported did not indicate the country of origin. However, since 1983 the export data has improved and suggests that Kenya and the Sudan were the major exporters. The overall level of reported trade shows a downward trend, but further years' data are required to confirm the validity of this impression.

Table 1. Minimum net imports of live animals (L) and skins (S) of *C. guereza* reported to CITES. pl. = skin plate

		1980	1981	1982	1983	1984	1985
Australia	L	–	5	5	–	–	–
Austria	S	–	–	20	–	–	–
Belguim	S	–	14	–	–	–	–
Canada	L	–	–	–	–	–	1
China	L	–	–	–	–	–	3
Denmark	S	216	–	–	–	1	–
Finland	S	–	–	–	20	–	–
France	L	2	2	–	–	–	1
	S	–	16	–	–	–	–
Germany F.R.	L	–	–	–	–	5	–
	S	–	–	73	–	–	–
Hong Kong	L	–	2	–	–	–	–
Italy	S	–	–	–	55	–	–
Japan	L	–	–	–	–	7	–
Korea Rep.	L	–	–	–	2	–	–
Sweden	L	–	–	–	–	8	–
Switzerland	S	54	–	32	–	1	–
UK	L	8	–	–	28	13	2
	S	–	–	1	–	–	1 pl.
USA	L	2	–	–	10	53	3
	S	44	–	–	–	66	–
Totals	L	12	9	5	40	86	10
	S	314	30	126	75	68	1 pl.

Table 2. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions in live animals (L) and skins (S) of *C. guereza* reported to CITES. pl. = skin plate

		1980	1981	1982	1983	1984	1985
Countries with wild populations of *C.guereza*							
Ethiopia	S	2	-	1	-	12	-
Kenya	L	-	-	-	40	86	2
	S	-	-	-	-	1	1 pl.
Nigeria	S	-	-	-	15	-	-
Sudan	S	-	-	20	60	-	-
Tanzania	L	10	-	-	-	-	3
Countries without wild populations of *C.guereza*							
Canada	L	2	-	-	-	-	-
Chad	S	1	-	-	-	-	-
Germany F.R.	L	-	-	-	-	2	-
Somalia	S	-	-	-	-	60	-
UK	L	2	7	5	2	-	-
USA	L	-	2	-	-	-	3
	S	54	-	-	-	-	-
Unknown	S	257	30	125	-	-	-

CONSERVATION MEASURES

Cameroon Fully protected from hunting but laws are difficult to enforce (Oates, 1977a). Totally protected under Order No. 2513/A/DGTOUT/DFPN of 29 July 1983. Found in the Dja Reserve (Gartlan and Struhsaker, 1972), the Faro, Benue (Oates, 1977a) and Bouba-Ndjida National Parks (Lavieren and Bosch, 1977). The Dja Reserve, the Korup and Pangar-Djerem areas have been proposed as national parks (Gartlan, 1982). Guereza should be found in all these areas. The species is not reported from the Douala Edea Reserve (along the Sanaga River) where *C. satanas* is found (Struhsaker, 1972).

Central African Republic Totally protected by law, licences are needed for trapping or export (Kavanagh and Bennett, 1984). Occurs in the St Floris National Park (S. Bahuchet, *in litt.* to J.F. Oates, 1975) and in the Zone de Conservation de Bamingui-Bangoran (Anon., 1987).

Congo Not known to occur in any protected area. Has been protected by law since 1962, but is still hunted (Oates, 1977a).

Equatorial Guinea There appears to be no legal protection for this species (Kavanagh and Bennett, 1984).

Ethiopia Guereza are protected by law, but trapping licenses could be bought at least until 1975 (Wolfheim, 1983). All skins sold should be stamped; in 1973, 7000 unstamped skins were confiscated (Anon., 1974). Skins can be exported under licence. Occurs in the Simen Mountains and Awash National Parks (Oates, 1977a), and occur in at least four of the national parks proposed in the mid-1970s; however, these did not include the best habitat for the species (Dunbar and Dunbar, 1975). In 1977, reportedly 'common' in the proposed Mago National Park in the eastern Rift (Anon., 1977).

Gabon May be exported under permit (Kavanagh and Bennett, 1984). Not known to occur in any protected area.

Colobus guereza

Kenya Protected by law. Exports are allowed only with permission from the Minister of the Environment and Natural Resources (Kavanagh and Bennett, 1984). Occurs in the national parks of Lake Nakuru, Aberdare, Mount Elgon and Mount Kenya and in the Masai-Mara Game Reserve (Oates, 1977a).

Nigeria Totally protected under Endangered Species (Control of International Trade and Traffic) Decree, 1985. Not known to occur in any protected area.

Rwanda Partially protected under Hunting Regulations (251/01) dated 31 December 1974.

Sudan A special license is required for export (Preservation of Wild Animals Act 1935); not known to occur in any protected area.

Tanzania Primates may be exported only under license, but no licences were issued after 1972 (Kavanagh and Bennett, 1984). Occurs in the Serengeti and Arusha National Parks and in the Kilimanjaro, Mount Meru and Ngurdoto Game Reserves (Groves, 1973; Oates, 1977a; Swynnerton, 1958).

Uganda Colobus monkeys are totally protected (Kavanagh and Bennett, 1984). In 1970-1974 found in several forest reserves (e.g. Kibale, Itwara, Budongo, Bugoma, Kalinzu and Kasyoha-Kitomi in the west; Bwindi in the south-west; and Mount Elgon and Mount Kadam in the east); two national parks (Ruwenzori and Kabalega) and in the Toro Game Reserve, Debasien Animal Sanctuary and Kigezi Gorilla Sanctuary. The forest reserves are exploited and when trees are felled, exotics are planted in their place, thus the structure and composition of many forests has changed in a very short time (Oates, 1977a). Several studies have been done: in the Kabalega (Murchison Falls) National Park in 1967 (Leskes and Acheson, 1971), and in the Kibale Forest Reserve in 1969-1970 (Dunbar and Dunbar, 1974b). In 1982 a survey was underway to develop conservation policies for Uganda (Malpas, 1982).

Zaire Legally protected, cannot be exported except under license (Kavanagh and Bennett, 1984). Occurred in 1971 in the Garamba National Park (on the border with Sudan) (Anon., 1971); *Colobus* spp. were recorded in the same area in 1985 (Anon., 1987). Probably in the Virunga National Park and the Huri Forest (Oates, 1977a).

CAPTIVE BREEDING In 1982 the following were bred in captivity in zoological collections in the United States and Europe: 25 *C. guereza*, 6 *C. g. caudatus*, 17 *C. g. kikuyensis* and 2 *C. g. occidentalis* (Olney, 1984).

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WESTERN BLACK-AND-WHITE COLOBUS

Recommended list: 2
[Possible problem]

Colobus polykomos (Zimmerman, 1780)

Order PRIMATES

Family CERCOPITHECIDAE

SUMMARY AND CONCLUSIONS A forest species found in West Africa: in Guinea-Bissau, Guinea, Sierra Leone, Liberia, Ivory Coast, Ghana, Togo, Benin, and Nigeria (where now probably extinct). No population estimates exist but the species is thought to be declining and has disappeared from parts of its range, e.g. Nigeria. Forest loss has been extensive throughout West Africa and although the species can adapt to secondary forest, it seems to prefer older, mature forests. It is especially sought by hunters for its skin, which is exported or used in traditional ceremonies, and for its meat. It receives full protection in some countries, partial protection in others, and no protections in some. Listed in Class B of the African Convention. Occurs in several protected areas.

In the six-year period, 1980-1985, trade in live animals was insignificant, and the main international trade was in skins. The estimated minimum trade volume declined from 993 in 1980 to 10 in 1985. Most of the skins were declared as re-exports from the UK, country of origin unknown, but in 1980, 389 were declared as originating in Kenya, suggesting possibly that the skins were of *Colobus guereza* rather than *C. polykomos*.

The level of trade in skins reported in 1984 and 1985 cannot be considered significant, and if this continues no problems need arise. Habitat loss and hunting for meat are likely to be greater threats, but as the species is declining in some of its range the international skin trade should not be encouraged. If further skins appear in trade, efforts should be made to ascertain their true source and specific identity.

DISTRIBUTION Widespread in West Africa, from Benin to Guinea Bissau and possibly Gambia and Senegal. Possibly extinct in Nigeria.

Species and subspecies of Colobus monkeys are usually separated on variations in pelage or cranial features. Oates and Trocco (1983) studied vocalizations and argued that these can also be used to assess phylogenetic relationships. Some authors include populations of *Colobus guereza* in *C. polykomos* (Napier and Napier, 1967 cited in Wolfheim, 1983) but generally these two taxa are treated as separate species (Rahm, 1970; Oates and Trocco, 1983). Within *C. polykomos*, three subspecies are usually recognised: *C. p. dollmani* from the Ivory Coast; *C. p. polykomos* from Gambia to the Ivory Coast; and *C. p. vellerosus* from Ivory Coast to Benin, Togo and Nigeria (Dandelot, 1971). Oates and Trocco (1983) concluded that *C. vellerosus* is a distinct species and suggested that it is an intermediate form between *C. polykomos* and *C. guereza*, but it is treated here as conspecific with *C. polykomos*.

Benin Occurs in the south (Rahm, 1970; Booth, 1958). In 1984 reported from most forested areas and gallery forests up to at least 10°N. A record does exist from 11°25'N, along the Alibori River, well to the north of previous records. Probably once occurred in the north but now exterminated (Sayer and Green, 1984). (*C. p. vellerosus*)

Burkina Protected but no definite evidence that it occurs.

Gambia The species has been noted as occurring in Gambia (Dupuy, 1971), however J.F. Oates (*In litt.*, 1986) noted that there is no reliable evidence of its occurrence in the country. (*C. p. polykomos*)

Colobus polykomos

Ghana Originally found over much of the country, but now extinct or rare in many areas (Booth, 1954; Asibey, 1978), particularly where human population density is high (Oates, 1977). (*C. p. vellerosus*)

Guinea In the south and east (Rahm, 1970; Booth, 1958). (*C. p. polykomos*)

Guinea-Bissau Monard (1938) recorded its presence. (*C. p. polykomos*)

Ivory Coast Reported to occur in the south and central parts (Rahm, 1970) though in 1973 recorded from the north-east, in the Comoé Valley (Geerling and Bokdamm 1973). (*C. p. dollmani* between the Sassandra and Bandama rivers, *C. p. polykomos* west of the Sassandra river and *C. p. vellerosus* east of the Bandama river (Dandelot, 1971))

Liberia In the 1950s was reported to occur throughout the country (Booth, 1958). Robinson (1971), however, noted that it was 'seldom seen except in remote areas'. More recently reported to be found in all high forest areas of the country, ranging from Grand Gedeh, Sinoe, and Maryland Counties in the east and south-east, to Lofa County in the west (Liberia CITES MA, 1986). (*C. p. polykomos*)

Nigeria In the 1970s some reports claimed it could still be found in the western part of the southern forest zone (Henshaw and Child, 1972; Rahm, 1970; Oates, 1977) although Happold (1972) reported that there had been no definite records 'for several years'. The species was not recorded during a survey in Bendel State in 1982 (Anadu and Oates, 1982); it may therefore to be extinct in Nigeria (J.F. Oates, *In litt.*, 1986); however the CITES M.A. reported that it still occurred in the west of the country. (*C. p. vellerosus*)

Senegal The species is occasionally noted as occurring in Senegal (Booth, 1958; Dupuy, 1971); however Oates (*In litt.*, 1986) noted that there is no reliable evidence of its occurrence in the country. (*C. p. polykomos*)

Sierra Leone No recent information. Formerly found in suitable habitat throughout the country (Booth, 1958; Robinson, 1971). In 1964 found in the Kasewe Forest (south central) (Tappen, 1964). Later recorded from the Outamba-Kilimi National Park in the north-west, on the border with Guinea (Harding, 1983). Reported from Tiwai Island, on the Moa River, in the south-east on the edge of the Gola Forest (Teleki, 1980) and in the Gola Forest Complex (Davies, 1987). (*C. p. polykomos*)

Togo Found only in the south (Booth, 1958). (*C. p. vellerosus*)

POPULATION The species has disappeared from parts of its former range (e.g. Nigeria), and is rare in others; however in some countries it is still regarded as abundant.

Benin No information.

Burkina No information.

Ghana In 1976, was reported to be abundant in areas of primary forest and in forest reserves which were undisturbed; however such areas were stated to have been disappearing (Olson, 1976). Locally common in 1970 along the Bia Tributaries North and South and the Sukusuku Forest Reserves; rare in other areas (Jeffrey, 1970). Abundant in the Boabeng-Fiema Monkey Sanctuary; common in the Bia and Nini-Suhien National Parks and the Ankasa Game Production Reserve; rare in the national parks of Mole, Digya, Bui and in the Kogyae Strict Nature Reserve, Kalakpa Game Production Reserve, Bomfobiri Wildlife Sanctuary and Willi Falls Reserve (Asibey, 1978).

Guinea No information.

Guinea-Bissau No information.

Ivory Coast Common in the Tai National Park in 1972 (Struhsaker, 1972). Common in the southern forests of the Comoé National Park (Geerling and Bokdam, 1973). Asibey (1978) recorded it as abundant in the Tai National Park, rare in the Banco National Park and the Asagny Reserve.

Liberia 'Seldom seen except in remote areas' (Robinson, 1971). This was apparently still the case in 1982 (Verschuren, 1982) and sightings of monkeys were 'extremely rare' in 1983 (Verschuren, 1983).

Nigeria In 1972 reported to be 'nowhere abundant' (Henshaw and Child, 1972). Possibly extinct, but reported by the CITES MA (1987) to be rare and severely threatened.

Sierra Leone Little information. In the Kilimi region they have been reported as not abundant (Harding, 1983). Reported to be 'rare' in 1980 (Lowes, 1970), but not critically endangered (Teleki, *in litt.*, 1980).

Togo Rare in the Keran and Malfacassa Reserves (Asibey, 1978).

HABITAT AND ECOLOGY A forest species, occupying all types of closed forest formations except thickets (Booth, 1958); found in fringing, gallery and rain forest (Geerling and Bokdam, 1973; Tappen, 1960); also in patches of riverine forest in the savanna zone (Asibey, 1978; Harding, 1983), and in wet evergreen, moist evergreen, moist semi-deciduous and dry semi-deciduous forest (Olson, 1976), also occurs in roadside secondary bush (Jeffrey, 1974), though according to Oates (*in litt.*, 1986) it seemed to prefer older, mature forests. Climbers are an important part of the diet all year (Olson, 1976). Very sociable and has a wide variety of troop sounds (Jeffrey, 1974). Group size 5-21; range size about 20 ha in Ghana (Olson, 1976).

THREATS TO SURVIVAL

Benin Very little forest remains in the south due to logging and agricultural settlement (Martin, 1976).

Ghana Habitat destruction is the major threat. Forests in Ghana have been reduced by two-thirds since the beginning of the century, (from 78 046 sq. km to 28 489 sq. km) and are under continual pressure. Trees are felled for their timber, and the land cleared for agriculture and cocoa (Asibey, 1978). Roads to felling sites encourage settlement and this leads to destruction of the forest (Jeffrey, 1970). Hunted for its skin (Asibey, 1972) and its meat (Asibey, 1978). Also killed as an agricultural pest in some areas although it reportedly does not damage crops (Robinson, 1971) but it associates with species that do. Hunted illegally in the Bia Tributaries National Park (Martin, 1976). This park was gazetted in May 1974 and covered 118 sq. miles; by 1976 this had been reduced to 30 sq. miles (Olson, 1976).

Guinea No information.

Guinea-Bissau No information.

Ivory Coast Habitat destruction through logging and slash and burn cultivation is one of the major threats (Lanley (1969) cited in Wolfheim, 1983). The meat of colobus monkeys (*C. polykomos* and *C. badius*) was a staple item of diet in the early 1950s (Booth, 1954). In 1982 settlement along the boundaries of the Tai National Park was increasing. Poaching was

heavy in the park and difficult to control and illegal timbering also occurred (Roth, 1983).

Liberia Hunted for its meat (Leutenegger, 1976; Robinson, 1983) almost to total extermination (Curry-Lindahl, 1969; Verschuren, 1983; Oates and Davies, 1985) and its skin (which fetched $3-$5 each in 1977) (Jeffrey, 1977). Monkey hunting, in 1986, was commercial, large-scale and well-organized (Oates and Davies, 1985), but primarily for local consumption. A trade in dried monkeys exists from Sierra Leone to Liberian mining camps and markets in Monrovia (Robinson, 1971) though this has been impeded by closure of the border (J.F. Oates, *in litt.*, 1986). Firearms are easily obtained and almost all adult men own one; ammunition is also easy to obtain (Verschuren, 1983). Deforestation for farming and shifting cultivation is increasing; transport roads open up previously inaccessible areas for hunters (Curry-Lindahl, 1969). The central strip, from Monrovia to Nimba, had been deforested by 1982; large forest blocks occurred only in the north-west and central south-east, both were diminishing (Verschuren, 1982).

Nigeria Heavily hunted for its skin (Happold, 1972). In the early 1970s game laws were devised for regulating sport hunting though were not very effective against hunting for bushmeat which was the major drain on wildlife populations. In 1972, however, the laws were reportedly due to be revised (Henshaw and Child, 1972).

Sierra Leone Hunted for its skin (Wilkinson, 1974), and also its meat (Lowes, 1970); particularly intensively in the south (J.F. Oates, *in litt.*, 1983). The country was once well forested but forest cover has been much reduced (Tappen, 1964). By 1983-84 the Gola Forest, the largest remaining rain forest area in the entire country, was being severely damaged by timber exploitation and by heavy commercial hunting, mainly by Liberians and diamond extraction. In 1984, plans were being made to dam the Mona River; at the same time, settlers were moving into Gola West. The species had reportedly been eliminated by hunting in some areas of the Gola forest by 1984 but it had survived moderate hunting levels in primary forest areas. It was thought probable that this species could adapt to live in logged forests, and that its abscence from logged forest in the Golas was more likely to have been a consequence of hunting than alteration of habitat (Davies, 1987). In the early 1960s there was a large export trade in monkeys (25 000-50 000 p.a.); *C. polykomos* was not usually captured however (Tappen, 1964).

Togo No information.

INTERNATIONAL TRADE CITES reports record trade in both skins and live animals of *C. polykomos*. These are summarised in Tables 1 and 2. Skins were the main commodity in trade; the minimum trade volume (Table 1) has fallen from 993 in 1980 to only 10 in 1985. Very few live animals have been reported, the peak trade being 34 in 1981. The main importing countries for skins were France, F.R. Germany, Liechtenstein, Japan and, to judge from reported re-exports, the UK.

The reported countries of origin are shown in Table 2. With the exception of two skins from Guinea, the only range country to export skins was Nigeria, where the species is believed to be extinct. 389 skins were reported as originating in Kenya in 1980, but the great majority were reported as country of origin unknown on re-export from the UK. The source of these is unclear, as the UK has never reported imports of comparable quantities of skins. They may have been old stock. *C. polykomos* does not occur in Kenya, and so it is possible that the skins reported in 1980 were of *Colobus guereza*. The level of trade reported in 1984 and 1985 cannot be considered significant, but it is too early yet to say whether this represents more than a temporary decline.

Table 1. Minimum net imports of live animals (L) and skins (S) of *C. polykomos* reported to CITES.

	1980	1981	1982	1983	1984	1985
Argentina	100 S	-	-	-	-	-
Austria	100 S	-	-	-	-	-
Denmark	-	-	38 S	-	-	-
Ethiopia	-	-	-	-	-	10 S
France	598 S	-	-	-	-	-
Germany D.R.	-	-	-	2 L	2 L	-
Germany F.R.	-	365 S	-	276 S	-	-
Hong Kong	-	2 L	-	-	-	-
Italy	4 L	30 L	2 L	15 S	-	-
Japan	40 S	200 S	-	-	-	-
Kenya	110 S	110 S	-	-	-	-
Korea Rep.	-	-	-	4 L	-	-
Liechtenstein	-	-	200 S	-	-	-
Spain	45 S	20 S	-	-	30 S	-
Sri Lanka	-	2 L	-	-	-	-
Taiwan	-	-	-	-	-	1 L
UK	3 L	-	-	-	-	-
USA	-	-	1 S	1 S	2 S	-
	-	-	10 L	-	-	-
Total	7 L	34 L	12 L	6 L	2 L	1 L
	993 S	695 S	240 S	292 S	32 S	10 S

Table 2. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions in live animals (L) and skins (S) of *C. polykomos* reported to CITES.

	1980	1981	1982	1983	1984	1985
Countries having populations of *C. polykomos*						
Guinea	-	-	1 S	1 S	-	-
Nigeria	-	-	-	15 S	-	-
Togo	4 L	14 L	-	-	-	-
Countries without wild populations of *C. polykomos*						
Canada	-	-	1 S	-	-	-
Ethiopia	-	-	-	-	1 S	10 S
Germany D.R.	3 L	-	-	-	-	-
Germany F.R.	-	1 L	2 L	-	-	-
Japan	-	1 L	-	-	-	-
Kenya	389 S	-	10 L	-	-	1 L
Liberia	-	-	-	-	1 S	-
Switzerland	-	1 L	-	2 L	2 L	-
Tanzania	-	1 S	-	-	-	-
USA	-	2 L	-	4 L	-	-
Unknown *	604 S	695 S	238 S	291 S	30 S	-
	-	15 L	-	-	-	-

* All skins declared as country of origin unknown were re-exports from the UK.

Colobus polykomos

CONSERVATION MEASURES Information on legislation has been extracted from IUCN Environmental Policy and Law Occasional Paper No. 3, *African Wildlife Laws* unless otherwise indicated.

Benin All primates (except baboons) are protected by law (Kavanagh and Bennett, 1984). Does not occur in any national park or game reserve.

Burkina Totally protected under Hunting Regulations dated December 1985.

Ghana Completely protected by law (Asibey, 1978) but still widely poached (Jeffrey, 1970; Asibey, 1978). Export is illegal (Kavanagh and Bennett, 1984). Around Boabeng and Fiema in the Ashanti Region, all animals have been protected by the local villagers for more than 100 years; monkeys benefit most from this protection and have become very tame. The area is now a national nature reserve (Laidler, 1982). Also protected by traditional beliefs, at least until 1976, in the Nkabin Hills (1150 acres), about 12 km north of Kumasi, capital of Ashanti. This area was proposed as a wildlife sanctuary, but present status not known (Merz, 1976a). Protected in the Bia Tributaries National Park, declared in 1974 (Jeffrey, 1975) where it has been studied (Martin, 1976; Olson, 1976). Recorded in the Ankasa Forest Reserve in 1976 (Merz, 1976b). Sport-hunting was banned 1974-1978, this led to an increase in poaching in the hunting reserves (Martin, 1976).

Guinea No information.

Guinea-Bissau Totally protected under Hunting Regulations 21/1980.

Ivory Coast Hunting, capture and export of all wild animals is illegal, except under special licence (Kavanagh and Bennett, 1984). Occurs in the national parks of Comoé, Banco (Geerling and Bokdam, 1973) and Tai (Monfort and Monfort, 1973), and in the Asagny Reserve (Asibey, 1978).

Liberia All primate exports are illegal unless covered by a special permit (Kavanagh and Bennett, 1984). Occurs in the Sapo National Park in the south-east (Robinson, 1983). Totally protected under the Wildlife Conservation Regulation.

Nigeria Totally protected under the Endangered Species (Control of International Trade and Traffic) Decree 1985. Occurred in Olokemeji Forest Reserve in 1970 (Hopkins, 1970) and in the Upper Ogun Game Reserve in 1974 (Geerling 1974); both of these are in the south-west.

Sierra Leone All exports of primates are banned (Kavanagh and Bennett, 1984), but this temporary ban was never constituted by written legislation (Sierra Leone Ministry of Agriculture, 1987). Traditional Muslim beliefs protect this species in some areas (Lowes, 1970; Robinson, 1971). In 1970 it was one of the species proposed for protection; at that time there were no active game laws and no conservation measures existed (Lowes, 1970). Occurs in the 12-sq. mile wildlife reserve set up in 1979 around Mamunta in the northern province, and occurs in the Outamba-Kilimi National Park (Harding, 1983). Enforcement of the 1972 Wildlife Conservation Act is weak (J.F. Oates, *in litt.*, 1983). Tiwai Island has been proposed as a sanctuary (Oates and Davies, 1985), and the species has been studied there (J.F. Oates, *in litt.*, 1983). Davies (1987) recommended the establishment of two strict nature reserves in the Gola Forest where hunting should be prevented.

Togo Partially protected under Ordinance on wildlife protection and hunting, dated 16 January 1968. Reported to occur in the Keran and Malfacassa Reserves where it is considered rare (Asibey, 1978).

CAPTIVE BREEDING: At least six were bred in captivity in 1982 in the USA, UK and Switzerland (Olney, 1984).

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CRAB-EATING MACAQUE

Recommended list: 3
[No problem]

Macaca fascicularis (Raffles, 1821)

Order PRIMATES Family CERCOPITHECIDAE

SUMMARY AND CONCLUSIONS Probably the commonest macaque in South East Asia, ranging from Bangladesh to Timor and the Philippines. Particularly associated with coastal, lowland and riverine habitats, but also recorded from mountains. The highest densities are achieved in disturbed forests, particularly along their margins, where it often comes into conflict with agricultural interests. It is primarily arboreal, and usually lives in groups of 10-48. It is omnivorous, eating principally fruits and foliage, but also taking crustacea and molluscs. One young is usually born; the gestation period is 160-170 days, and breeding may occur all year round.

It is traded mainly for biomedical research, CITES reports indicating a minimum world trade volume between 16 000 and 28 000 a year, averaging almost 23 000 a year over the period 1980-1985. The main exporting countries are Indonesia, the Philippines and formerly Malaysia, although the latter banned exports in 1984. Captive-breeding facilities are in operation in most of the consumer countries, and have recently been set up in Indonesia and the Philippines. It is thought that there is considerable potential for ranching operations in semi-wild conditions.

The current levels of trade do not seem excessive in view of the estimated population size. If any primate is to be trapped for biomedical research, this species is probably the best choice. It may even benefit from limited habitat disturbance, and is killed for crop-raiding. These animals could well be diverted into the live trade. Captive-breeding and particularly ranching should be encouraged.

DISTRIBUTION Widespread in in South East Asia from Bangladesh to Indonesia. Introduced to various islands in the Indian and Pacific Oceans.

Bangladesh Confined to a small area in Chittagong district at Whykeong and Jolirdia Island and along the River Naaf on the Burmese border (Khan, 1985).

Brunei Occurs all along the coast and up the major rivers (K.S. Mackinnon, pers. comm., 1986). Recorded from the nipa-mangrove islands off Bandar Seri Begawan (Mittermeier, 1982) and Ulu Temburong (Bennett *et al.*, 1984).

Burma Found in the south and on the Peninsula; also on Moscos Island, Mergui Archipelago (Wolfheim, 1983). Fooden (1971) provides records from Arakan, Elephant Point and the Pegu District.

China The species has not been recorded from China (Yong-Zu Zhang *et al.*, 1981) although it was erroneously reported to be present by Wolfheim (1983).

Hong Kong Introduced (Marshall, 1967). The majority of the population is congregated in one location with *M. mulatta* (UK, Hong Kong CITES MA, 1987).

India A separate subspecies, *M. fascicularis umbrosa*, is found in the Nicobar Islands, on the islands of Great Nicobar, Little Nicobar and Katchall, from the coast to an altitude of 1000 ft (300 m) (Devaraj, 1983).

Indonesia Found on Sumatra, Kalimantan, Java, Bali and throughout Nusa Tenggara eastwards to Timor (probably introduced by man to Timor); absent from

Macaca fascicularis

Sulawesi, Irian Jaya and surrounding islands (MacKinnon, 1983), although Roots (1976) reported erroneously that they have been introduced to Sulawesi. A distinct subspecies, *M. fascicularis fuscus*, inhabits Simeleue Island, Sumatra (Mitchell, 1983). Other subspecies have been recorded from other parts of the range, but their validity is questioned.

Kampuchea Found in the southern half of the country (Boonsong Lekagul and McNeely, 1977).

Laos Recorded from the southern half of the country. A specimen from the Plateau des Bolovens was recorded by Fooden (1971). The distribution is said to extend to the north of the country, especially the evergreen forest of the Annamite Chain and surrounding areas (Laos Forest Department, *in litt.*, 1986), but it seems likely that this results from a confusion with *M. mulatta*.

Malaysia Occurs throughout the Peninsula and also on many islands including Langkawi, Penang, Tioman, Pemanggil, Aur, Tinggi, and the Redang group (Medway, 1978). In Sarawak it ranges from the coast to 4500 ft (1400 m) on Gunung Penrisen (Medway, 1977). Recorded from many localities in Sabah, including the island of P. Banggi (Medway, 1977; Davies and Payne, 1982).

Mauritius Introduced prior to the Seventeenth Century. The pelage suggests that the original stock derived from Java (Sussman and Tattersall, 1980).

Palau Introduced to Ngeaur (Angaur) Island, at the southern end of the Palau Island chain, and subsequently to Babeldaop, Oreor (Koror) and Beliliou (Pelilu). It is thought that all derive from a single pair introduced from Indonesia or Mindanao between 1900 and 1914 (Poirier and Farslow, 1984). No resident populations occur on Babeldaop, Oreor or Beliliou but occasionally pets do occur (USA CITES MA, 1987).

Philippines Widely distributed; found on Luzon, Mindanao, Basilan, Mindoro, Samar, Leyte, Bohol, Siquijor, Camiguin, Cayagan, Sulu and Negros Islands (Napier and Napier, 1967; Rabor, 1968; Anon., 1979). There is a wide range of morphological variation in macaques in the Philippines and Alcasid (1970) has listed five separate species. These are now normally regarded as subspecies of *M. fascicularis*. The form occurring in the south is a distinctive grey colour.

Singapore Occurs truly wild, scattered throughout the island (Harrison, 1974; Medway, 1978).

Thailand Distributed throughout peninsular and coastal Thailand, and northwards into the Kamphengphet Province; also on the islands of Ko Tarutao, Ko Kut, Ko Chang, Ko Kram, Ko Phangan and Ko Samui. Said to be most common along the coast and on offshore islands. The population on Ko Kram is sometimes recognised as a separate subspecies, *M. fascicularis atriceps* (Napier and Napier, 1967; Boonsong Lekagul and McNeely, 1977; Bain and Humphrey, 1982).

USA Introduced to Guam from the Palau Islands (Poirier and Farslow, 1984). Free-ranging colonies have been established in North America on several occasions for tourism and research. One such colony is established in the Monkey Jungle near Miami, Florida, for tourism (Lever, 1985).

Viet Nam Found in the south of the country, including Con Son Island (Wolfheim, 1983).

POPULATION *M. fascicularis* is common throughout much of its wide range, often being described as the most abundant primate in the region. In several areas, such as Sumatra, populations may have declined, while in others, such as Sabah, increases are indicated. This could be associated with ability of the macaque to colonise recently disturbed and cultivated land, making it highly visible, and bringing it into conflict with farmers. Habitat alteration is often beneficial in allowing higher populations to develop, but this also increases the macaques' conflict with man, and therefore tends to promote their destruction. The world population is well in excess of four million, but habitat loss is proceeding at such a rate in much of the range that continued vigilance is considered necessary.

Bangladesh The most localised primate in Bangladesh (Khan, 1985). The population is estimated to be 500 in an area of about 20 km^2 (Bangladesh CITES MA, 1986).

Brunei There is reported to be a substantial population on the mangrove islands off Bandar Seri Begawan (Mittermeier, 1982). The population density in Ulu Temburong is low (Bennett *et al.*, 1984).

Burma No information.

Hong Kong Stable. Only a few dozens and some hybrids (*M. fascicularis* x*M. mulatta*) amongst a population of 200 *M. mulatta* (UK, Hong Kong CITES MA, 1987).

India A total of 136 macaques was counted in 1982 on three islands. The population had been reported to be declining rapidly (Devaraj, 1983).

Indonesia The total population in Indonesia is conservatively estimated to be 3 726 860, occurring in 112 121 km^2 of habitat at densities of 30 km^{-2} in primary habitat, and 40 km^{-2} in secondary forest. The density in good habitat ranges from 12 to 144 km^{-2}, with a mean of 55.6 km^{-2}. A conservative working density for the whole range would be 20 km^{-2}. The original area of habitat in Indonesia has been reduced by an average of 66%; population estimates for the different provinces are as follows. Sumatra: remaining habitat 29 906 km^2, habitat loss 66%, population density 30.6 km^{-2}, estimated population 1 437 420. Kalimantan: remaining habitat 56 807 km^2, habitat loss 54%, population density 35.0 km^{-2}, estimated population 1 988 175. Java and Bali: remaining habitat 1257 km^2, habitat loss 96%, population density 40 km^{-2}, estimated population 50 530. Nusa Tenggara: remaining habitat 4986 km^2, habitat loss 80%, population density 28 km^{-2}, estimated population 140 415. The population protected in reserves is estimated to be 310 040. Mackinnon's (1983) estimate of the population on Sumatra is substantially lower than that reported by Wilson and Wilson (1976), but this may be due to differing survey techniques.

Kampuchea No information.

Laos The species has become quite rare in the country, although there have been no population surveys (Laos Forest Department, *in litt.*, 1986).

Malaysia By far the commonest monkey in Malaysia (Tweedie, 1978). On the mainland, *M. fascicularis* is often common, ranging from beaches to hilltops, including forests, agricultural and built-up areas. May be a serious pest to crops (Medway, 1978). The population on the peninsula decreased by 23% between 1958 and 1975, from 415 000 to 318 000 (Khan, 1978). The density of *M. fascicularis* in Peninsular Malaysia in swamp and riverine forest was estimated to be 4.8 groups km^{-2} (mean group size was 23), and in other lowland forest sites 1.4 km^{-2} (Marsh and Wilson, 1981). In Sarawak, on the

Kelabit uplands it is common, and a serious pest to the rice crop (Medway, 1977). In Sabah the species range appears to be stable, and may be increasing in some recently cultivated areas, where it has become sufficiently common to be considered a pest. Its main habitat, riverine forest, is little damaged during logging, but there is no evidence to suggest that its numbers increase in logged forest. It is very rare above 1000 ft (300 m). It was thought that the species would persist at fairly constant densities throughout most of its current range (Davies and Payne, 1982). The population in Sabah is estimated to be in excess of 50 000, in a minimum of 20 000 km^2 of available habitat. In disturbed areas, the preferred habitat, the density is about one group in 20-30 ha. In tall dipterocarp forests, the most extensive natural habitat, the density is only about one group in 500 ha (Malaysia CITES MA, 1985).

Mauritius The introduced stock thrived and had become exceedingly abundant by the end of the Eighteenth Century, and it is now considered a pest species. The numbers have since declined, owing to human destruction of some of the natural vegetation (Sussman and Tattersall, 1980). The population is estimated to be between 25 000 and 35 000, spread over an area of 40 000 ha of suitable habitat. The population density ranges from 0.33 to 1.3 ha^{-1}, being higher at low altitudes than on the plateau (Mauritius CITES MA, 1985).

Palau The introduced population has increased markedly, and is considered a threat to crops in the South of Ngeaur Island. The population was estimated to be between 480 and 600 in 1973 (Poirier and Smith, 1974). An attempt to eradicate the macaques in 1975 did not succeed (Poirier and Farslow, 1984).

Philippines Listed as "threatened" in 1965, and said to have been greatly depleted in numbers by hunting for export to the USA (Rabor, 1968). In 1979, macaques were said to be common and to cause damage to crops (Anon., 1979).

Singapore Small troops are scattered throughout the catchment area and among the mangroves. There was an enormous community in the Botanic Gardens, maintained by food from visitors, which caused much damage to the gardens (Harrison, 1974), but this has now been eradicated by control measures. There are still animals left in the north of the Island (K. MacKinnon, pers. comm., 1986).

Thailand There are no estimates of the total population, but *M. fascicularis* is common over much of its wide range, and is the most abundant monkey in Thailand (Bain and Humphrey, 1982). The species appears to have been eradicated from Samui Island by intensive human colonisation, and is absent from much of its former range on the mainland. It has been forced into marginal mountainous areas (Wolfheim, 1983).

USA The introduced population at the Monkey Jungle establishment numbers about 100 (USA CITES MA, 1987). No other information.

Viet Nam Populations are thought to be declining. Near Mount Sontra the species was "common" in 1965-66 but "unusual" in 1967-69 (Peenen *et al.*, 1971).

HABITAT AND ECOLOGY An opportunistic species, *M. fascicularis* inhabits a very wide variety of habitats, from virgin forest to cities, and from the sea shore to the mountains. It has been described as an "edge" species, adapted to living on the periphery of forests, particularly riverine habitats, and thrives in secondary, logged forest and in agricultural areas. It is not common in high mountains, but may spread up river valleys and forage in the surrounding areas. Population densities are generally greatest near rivers (Boonsong Lekagul and McNeely, 1977; MacKinnon, 1983). It is primarily arboreal, but likes water and swims well. It is highly gregarious, and groups

of over 100 animals are sometimes seen, although 10-48 is more usual (Wolfheim, 1983). MacKinnon (1983) reported a mean group size of 20.8 in Indonesia, while Marsh and Wilson (1981) gave a value of 23 in Malaysia.

Longevity in captivity may be up to 27 years. The species is markedly sexually dimorphic; adult females usually weigh 3-4 kg, and males, 5-7 kg. Maximum adult head and body lengths are in the range 350-550 mm (tail lengths of 400-565 mm) (Boonsong Lekagul and McNeely, 1977; Medway, 1978).

M. fascicularis is omnivorous, preferring fruits, but also feeding on vegetative growth, including crop plants. Its name, the crab-eating macaque, derives from its liking for crustacea and molluscs, found particularly in mangroves and other coastal environments (Bain and Humphrey, 1982). Fishing behaviour has been described in the Nicobar Islands (Devaraj, 1983).

Breeding occurs all year round, but there is some evidence of seasonality, births peaking in June-July in Malaysia (Kavanagh and Laursen, 1984), and in March-May in Thailand. The menstrual cycle is 24-52 days, gestation lasting for 160-170 days. One young is usually born, which is carried by the mother until weaning (Bain and Humphrey, 1982).

THREATS TO SURVIVAL *M. fascicularis* tolerates and may even benefit from many forms of habitat disturbance, even colonizing cities (Bain and Humphrey, 1982). However in some areas, habitat destruction is a major cause of population decline. Where macaques colonise agricultural land they inevitably face pressure from the farmers as they are regarded as pests. MacKinnon (1983) points out that in Java over 90% of the forest habitat has been lost, and that although this species has previously been regarded as common, it will not remain so for long if current rates of deforestation are continued.

M. fascicularis is hunted both for food and for export. Consumption of monkeys is widespread, but may be restricted by religious beliefs, Hindus being forbidden to eat them (Ahmad, 1981) and most Moslems also reject them. They are considered sacred on Bali (Wolfheim, 1983), although this does not protect them from persecution where they conflict with man. Trapping for export is often combined with crop-pest control measures, and can be conducted in a sustainable manner. However there is evidence that it has led to the decline of *M. fascicularis* populations in Malaysia, Thailand and the Philippines. There are many reports of this species causing damage to agricultural crops, and they are frequently killed for this reason. This may be achieved by traps, shooting or poison (MacKinnon, 1983; Wolfheim, 1983).

Bangladesh There is said to be no trade in the species, and it is not used locally (Bangladesh CITES MA, 1986).

Brunei No information.

Burma No information.

Hong Kong No threat (UK, Hong Kong CITES MA, 1987).

India The main threat in the Nicobar Islands is habitat destruction. The islanders rarely harm the macaques, although animals are occasionally killed in response to crop-raiding (Devaraj, 1983).

Indonesia Although *M. fascicularis* can live in secondary forest, the areas of this cannot make up for the destruction of the original habitat, which has declined in area by 66%. It is particularly susceptible to habitat loss, as it normally inhabits riverine areas and alluvial plains, which are preferred for agricultural expansion. Forest is also lost to logging

operations. Clear-felling is particularly damaging, but selective logging may have less effect, as the fruit trees, preferred by the macaques, are often left. Initially even selective logging usually reduces primate population densities and the animals are dispalced to die in neighbouring habitats. The extensive transmigration schemes in Indonesia usually result in the large-scale destruction of habitat and eradication of its primates. It is planned to open another 2.5 million hectares for transmigration schemes between 1984 and 1989, which would result in the loss of some 500 000 *M. fascicularis* (MacKinnon, 1983).

Macaques are trapped as agricultural pests and also for export. Many of the exporters have their own trapping teams as they are able to supply animals of a consistently high quality. They trap whole troops at night and release the unwanted animals. Others obtain macaques from farmers, whom they pay US$1-5 an animal. This method is wasteful, as unwanted sized or sex animals are killed. There are three main dealers in Jakarta who often obtain animals from subsidiary dealers in Sumatra. Some of the dealers in Sumatra also export directly, mainly to Singapore. The main provinces supplying macaques are Lampung (4 registered suppliers supplying 250-300 *M. fascicularis* a month) and Sumatra Selantan (7 registered suppliers supplying 300 400 *M. fascicularis* a month in Palembang) with considerable numbers of animals coming from north and west Sumatra and a few from west Kalimantan. The Department of Forest Protection and Conservation of Nature (PHPA) sees primates as an important utilisable resource, and is keen to encourage the trade on a sustained-yield basis. It regulates the trade and decides a quota for each province. The quota for *M. fascicularis* declined from 50 000 in 1978 to 15 000 in 1982/83, 10 450 in 1984, 10 000 in 1985 and 8300 in 1987 (Indonesia CITES MA, 1987). Wastage in the form of deaths of captured primates is usually about 32% but may be as high as 71% in the case of trapping by farmers. As this accounts for the majority of primates trapped, it was estimated that in 1978, the 14 600 macaques exported represented a total of almost 60 000 captured. It has been argued that one of the chief factors wich contributes to this wastage is the low price of primates, and that this should be increased by international agreement. Crop-pest control measures also include poisoning, which is highly indiscriminate. Some of the macaques trapped may be eaten (MacKinnon, 1983), but this is not common, as most of the people are Moslems (Wolfheim, 1983).

Kampuchea No information.

Laos The chief threats to macaques are habitat destruction, animal trade, hunting for food and bombing during the war. Local people readily consume macaques, and they are also used for medicinal purposes. The is a large, illegal trade in monkeys (Laos Forest Department, *in litt.*, 1986). It is believed that Laos provides a route for smuggling wildlife out of Thailand (Kavanagh and Bennett, 1984).

Malaysia In Sabah, the chief threat is from hunting, as the species is little affected by logging or agricultural development. A few may be killed as pests of plantations and gardens (Davies and Payne, 1982). There is no evidence of illegal export (Malaysia CITES MA, 1985). There was formerly a large export trade of *M. fascicularis* from Peninsular Malaysia, but this was prohibited in 1984 (Kavanagh and Bennett, 1984). The species is most commonly kept as a pet (Harrison, 1974), and is occasionally hunted for food. It causes damage to crops, and is persecuted for this reason (Wolfheim, 1983).

Mauritius Habitat destruction is believed to have reduced the range and numbers of macaques on the island (Sussman and Tattersall, 1980). Some have been trapped for breeding and export, and the potential for expanding these activities is recognised (Caldecott and Kavanagh, 1984). The numbers exported

so far have been low. A negligible number of animals are killed for food, and a few may have been caught for breeding in captivity (Mauritius CITES MA, 1985). Antipathy to the introduced population of macaques derives from its depradation on the sugar cane plantations, and on its disputed role in eating the eggs of rare endemic birds, especially *Nesoenas mayeri* and *Falco punctatus* (Sussman and Tattersall, 1980; Lever, 1985).

Palau Legislation was introduced in 1975 "to effectively control the population of monkeys to the point of extinction". This attempt at eradication did not succeed, but the situation in Ngeaur is still precarious. It is illegal to introduce female monkeys to other islands. The forest habitat on Ngeaur Island has been devastated once by bombing, and twice by typhoons since 1941, but the macaque population survived. The gravest threat currently is hunting with guns. Usually mothers with infants are shot so that the young can be sold as pets in Oreor (Poirier and Farslow, 1984).

Philippines Said to have been greatly depleted by hunting for the export trade, aggravated by Government apathy in enforcing conservation practices (Rabor, 1968). Kavanagh (1984) pointed out that the numbers of *M. fascicularis* exported had risen dramatically since the Indian ban on the export of primates, imposed in 1978, and so this pressure is likely to have become worse. Habitat destruction is proceeding at alarming rates in the Philippines. It has been estimated that 80 000 ha of forest are destroyed annually, half of which is illegal. At this rate all lowland forest of commercial value will have been lost by the early 1990s (Anon., 1983).

Singapore The population of macaques in the Botanic Garden has been eradicated by poisoning (K. MacKinnon, pers. comm., 1986). There is no information indicating any trade in macaques originating in Singapore, although it is known to act as an entrepot for much wildlife trade from South East Asia.

Thailand Said to be the least threatened primate in Thailand, although it is susceptible to depletion by the export trade (Bain and Humphrey, 1982). It has been reported that this form of exploitation has resulted in population declines in the country (Nordin and Samian, 1981, *fide* MacKinnon, 1983). Until 1976, Thailand was a major exporter of primates. Since this was made illegal in 1975, the trade has continued at very much reduced rates (Kavanagh and Bennett, 1984). *M. fascicularis* is often trapped for pets and to star in the local "monkey shows" (Boonsong Lekagul and McNeely, 1977), and is occasionally hunted for food. It is widely blamed and periodically persecuted for crop raiding (Wolfheim, 1983).

Habitat loss and human population pressure has been blamed for the reduction in numbers of *M. fascicularis* in both mainland and island sites (Wolfheim, 1983).

Viet Nam There is some internal trade in macaques, mainly for biomedical research (Kavanagh and Bennett, 1984).

INTERNATIONAL TRADE An analysis of the international trade in primates has recently been published by Kavanagh (1984), with additional information on imports to the USA by Mack and Eudey (1984). The bulk of the information comes from Annual Reports to CITES, but a few additional export figures are available. All the reported trade was in live animals, and the great majority of this is believed to have been destined for biomedical research (Kavanagh, 1984).

The CITES reports are summarised in Tables 1 and 2; only trade in live animals was considered. The minimum volume of world trade in *M. fascicularis*,

indicated by CITES reports, fluctuated between about 16 000 and 28 000 in the years 1980 to 1985 (Table 1). The major net importing countries were Canada, France, F.R. Germany, Italy, Japan, Sweden, Taiwan, UK, USA, USSR and Yugoslavia. Many of the macaques originating in the Philippines are reported as having been re-exported from the USA. Formerly *M. mulatta* was the most important macaque used in biomedical research, and India was the chief exporter. This trade effectively ceased in 1978 when India banned the export of live primates, and the trade switched to *M. fascicularis*, whereupon Indonesia became the largest supplier (Kavanagh, 1984). From 1968-72 *M. mulatta* formed 28% of all primate imports to the USA and *M. fascicularis* only 2%. From 1976-1980 the respective proportions were 20% and 39% (Mack and Eudey, 1984).

Table 1. Minimum net commercial imports of live *M. fascicularis* reported to CITES.

	1980	1981	1982	1983	1984	1985
Australia	222	100	200	175	-	50
Belgium	40	170	160	15	-	292
Canada	1102	725	1302	1832	1248	1128
China	-	-	-	-	1	-
Colombia	-	-	-	-	-	30
Cuba	-	-	-	-	-	2
Cyprus	-	-	-	-	-	1
Denmark	-	-	-	-	8	-
France	18457	1701	1542	1062	532	1310
Gabon	-	64	-	-	-	-
Germany F.R.	280	227	610	411	123	280
Hong Kong	-	-	-	44	3	1
Hungary	-	-	-	-	-	4
India	-	-	-	-	-	2
Ireland	4	-	-	-	-	-
Iraq	20	-	-	-	-	-
Iceland	3	-	-	-	-	-
Italy	625	1385	720	1292	717	474
Japan	710	1715	1855	2977	1631	2239
Malta	-	-	-	-	-	31
Mexico	-	100	-	-	-	-
Netherlands	-	300	-	230	-	-
Poland	-	-	-	-	2	-
Romania	-	-	110	150	14	6
Singapore	-	-	10	15	9	-
S. Africa	-	32	-	-	-	-
S. Korea	-	-	-	2	-	-
Spain	-	40	33	46	60	80
Sweden	783	1020	523	375	451	512
Switzerland	12	20	12	26	-	-
Taiwan	-	762	1204	3857	3745	3206
UK	2185	929	2628	1596	1619	3729
USA	-	11731	7056	9414	5313	7781
USSR	-	990	430	830	325	320
Yugoslavia	-	550	640	660	370	600
Unknown	3104	2927	-	50	75	5
Total	28177	25491	19035	25059	16246	22020

Table 2a. Reported countries of origin or export for commercial exports of live *M. fascicularis* reported to CITES.

	1980	1981	1982	1983	1984	1985
Countries with wild populations of *M. fascicularis*						
Bangladesh	3	-	-	-	-	-
Hong Kong	-	-	-	-	1	-
India	50	475	-	-	41	-
Indonesia	7787	13337	10055	14419	7937	8508
Malaysia	4844	4757	3949	3150	568	2
Mauritius	-	-	-	-	-	50
Philippines	19185	7261	4033	7490	7698	13485
Singapore	7	-	-	-	1	-
Thailand	-	-	50	-	-	-
USA	62	18	259	1897	1352	1393
Countries without wild populations of *M. fascicularis*						
Canada	-	-	5	27	-	154
Ethiopia	-	10	-	-	-	-
Germany F.R.	-	-	150	-	-	-
Japan	-	-	27	3	-	-
Kenya	-	-	-	-	-	15
Netherlands	-	-	-	-	16	8
Sweden	-	-	-	-	8	13
Switzerland	17	-	-	-	25	30
UAE	-	-	-	-	-	1
UK	460	398	298	-	-	50
Unknown	719	640	2125	527	15	4

Table 2b. Exports of *M. fascicularis* reported from other sources.

1 - Department of Forest Protection and Nature Conservation, Indonesia (*in litt.* to CITES, 27 January 1986)
2 - MacKinnon (1983)
3 - Malaysian Federal Department of Wildlife and National Parks (Kavanagh, 1984)
4 - Ministry of Natural Resources, Philippines (*in litt.* to CITES, 10 March 1986)
5 - Ministry of Natural Resources, Philippines (Kavanagh, 1984).

		1980	1981	1982	1983	1984	1985
Indonesia	1	-	11568	7806	6830	8340	-
	2	14379	13263	14790	-	-	-
Malaysia	3	3104	2928	-	-	-	-
Philippines	4	-	-	-	-	11025	13399
	5	6138	5959	-	-	-	-

Macaca fascicularis

The reported countries of origin for *M. fascicularis* in trade are shown in Table 2a. The major exporting countries were the Philippines, Indonesia and Malaysia, although exports from the latter dropped sharply in 1984 after a ban was imposed. Exports apparently originating in countries without wild populations probably represent re-exports not specified as such, as do those originating in the USA. Very few of the animals in trade in any year were recorded as captive-bred.

Figures for exports of *M. fascicularis* have also been obtained from other sources, and these are shown in Table 2b. These indicate that the numbers of *M. fascicularis* exported may be even higher that those reported to CITES, particularly in the case of the Philippines. The CITES Management Authority of Mauritius (1987) stated that about 500 animals a year are trapped from the wild for export from there to the United Kingdom, but this trade is not reflected in the CITES data.

CONSERVATION MEASURES

Bangladesh The Bangladesh Wildlife (Preservation) Order 1973 bans the capture, possession and trade of all primates, but the ban is occasionally relaxed to allow export of *Macaca mulatta* (Kavanagh and Bennett, 1984).

Brunei *M. fascicularis* is not a protected species in Brunei, but the export of all primates is forbidden except under licence (Kavanagh and Bennett, 1984).

Burma The export of all live animals requires a licence, which is only granted for the purposes of exchange with foreign zoos (Kavanagh and Bennett, 1984).

Hong Kong Macaques are totally protected. The import, export and possession of all primates requires a licence (Kavanagh and Bennett, 1984).

India There has been a blanket ban on the export of all primates from India since 1978 (Kavanagh and Bennett, 1984). *M. fascicularis* is protected under the local Wildlife Act in the Nicobar Islands. It was suggested that conservation efforts should be initiated in the South of Great Nicobar Island to prevent further destruction of the rich evergreen forest (Devaraj, 1983).

Indonesia *M. fascicularis* is not protected in Indonesia, but permits are required for local transport and export (Kavanagh and Bennett, 1984). The Department of Forest Protection and Conservation of Nature (PHPA) sets quotas for the export of primates from different provinces, and issues permits to the dealers (MacKinnon, 1983). *M. fascicularis* occurs in most of the reserves within its range. Sumatra: occurs in several reserves, including Gunung Leuser, Kerinci and Way Kambas, total area of suitable habitat in reserves, 3542 km^2. Kalimantan: occurs in several reserves, including Kutai and Tanjung Puting, total area of suitable habitat in reserves, 3474 km^2. Java: occurs in several reserves, including Ujung Kulon, Pangandaran and Baluran, total area of suitable habitat in reserves, 179 km^2. Nusa Tenggara: occurs in several reserves, including Bali Barat, total area of suitable habitat in reserves, 330 km^2 (MacKinnon, 1983).

Kampuchea No information.

Laos A ban on all wildlife exports was imposed on 28 October 1986.

Malaysia Peninsular: *M. fascicularis* is protected and licences were only granted for export for scientific purposes (Kavanagh and Bennett, 1984). From June 1984, exports of all live primates have been banned (Anon., 1984a).

Sabah: trapping is regulated, and exports of primates are not allowed. Sarawak: primates may not be exported without a licence. No licences have been issued in recent years (Kavanagh and Bennett, 1984).

Mauritius Exports of *M. fascicularis* require a permit (Kavanagh and Bennett, 1984). It is felt that the macaque deserves protection especially because it provides an interesting example of genetic adaptation of a small founding stock to a new environment (Sussman and Tattersall, 1980; Lever, 1985).

Palau The islands, as part of the Pacific Trust Territory, are covered by the US accession to CITES. Official attitudes to the introduced macaques are broadly adverse, although the earlier attempts at eradication have been suspended. It is illegal to introduce female monkeys to other islands. It is thought that the macaques deserve protection as they provide an interesting subject for a genetic study of a colonising popularion (Poirier and Farslow, 1984).

Philippines *M. fascicularis* may be trapped and exported under licence (Kavanagh and Bennett, 1984).

Singapore Wildlife exports are allowed under permit (Kavanagh and Bennett, 1984).

Thailand The hunting, trading and export of all primates has been banned since 1975, except for approved scientific research. Individuals are allowed to keep a maximum of two animals of any indigenous species as pets, and this makes it difficult to prosecute wildlife traders (Kavanagh and Bennett, 1984).

Viet Nam No information.

Table 3. Legal prohibition on the hunting, internal trade and commercial export of *M. fascicularis*. Dates are those on which the legislation came into force. A - All live animals & parts; L - Live animals only; P - Allowed under permit; Z - Permits issued for zoological purposes only; ? - no information (Kavanagh and Bennett, 1984).

	Entry into force	Hunting	Internal trade	Commercial export
Bangladesh	1982	A	A	A
Brunei	-	?	?	A
Burma	-	?	?	Z
Hong Kong	1976	A	A	P
India	1976	A	A	A
Indonesia	1979	-	-	P
Kampuchea	-	?	?	?
Laos	-	?	?	A
Malaysia (Peninsular)	1978	?	P	P
Malaysia (Sarawak)	1978	?	P	P
Malaysia (Sabah)	1978	?	?	A
Mauritius	1975	?	?	P
Palau	1975	?	P	P
Philippines	1981	?	P	P
Singapore	-	?	?	P
Thailand	1983	?	A	A
USA	1975	P	P	P
Viet Nam	-	?	?	?

CAPTIVE BREEDING *M. fascicularis* is one of the primates most widely used for biomedical research, and since the ban on exports of live primates from India, imposed in 1978, it has been steadily supplanting *Macaca mulatta*, as the most commonly used Old World monkey. The numbers of *M. fascicularis* used and bred in biomedical research institutes in consumer countries are summarised in Table 4. It is clear that the great majority of macaques used are obtained from the wild, but there is perceived to be a trend towards increased breeding. Many research institutes breed their own primates, but surplus animals are often sold to other organisations. There are also a small number of organisations which specialise in the import or breeding of primates for resale. Most research institutes express a preference for captive-bred primates, because the quality is usually higher, they have fewer diseases, and they can be from known genetic strains. Captive-bred primates generally command higher prices than wild-caught animals for this reason, although there is still a substantial demand for much cheaper wild animals. In Japan, a captive-bred *M. fascicularis* costs US$5000. Even in Indonesia it is thought that captive-bred animals should fetch US$1250 as compared with US$40-100 for a wild-caught animal (MacKinnon, 1983; Caldecott and Kavanagh, 1984; Eudey and Mack, 1984). Macaques from the Philippines are generally cheaper, and even captive-bred ones may sell for as little as US$500. However the fact that many institutes are changing from *M. mulatta* to *M. fascicularis*, in spite of the fact that several breeding centres in the USA had already started large breeding programmes for *M. mulatta*, indicates that a steady and substantial supply of cheap wild-caught animals is more important. The USA is the world's largest user of primates for biomedical research, but so far has very few breeding facilities for *M. fascicularis*. In 1978 the Interagency Primate Steering Committee recommended establishing colonies capable of producing 3000-6000 animals annually, but this has not been implemented, probably because the ready supply of wild animals makes it unnecessary (Eudey and Mack, 1984).

Primate breeding centres exist in several producer countries to supply the export market. The centres all combine breeding with the supply of animals direct from the wild. Often the animals are held in captivity for a period prior to export for quarantine purposes and to allow them to gain condition. The operations are summarised below.

Indonesia There are thought to be three primate centres in Indonesia, all near Jakarta. Breeding is planned at one of these, located near Jakarta airport, which trades under the name of Cenkareng Primelab. In 1983, all the primates were wild-caught from near Lampung, but a breeding programme was expected to start later in the year. The centre had a stock of 200 *M. fascicularis*, 20 *Macaca nemestrina*, 10 *Presbytis cristata*, and 10 *Presbytis melalophus* (Anon., 1984b).

It has been suggested that macaques are very suitable for ranching operations in semi-wild conditions, as they can achieve high densities if provided with supplementary food. Costs of producing four-year-old animals can be as low as US$100 each. Small islands or areas of selectively logged forest, unsuitable for agriculture where proposed as potential sites for ranching in Indonesia (MacKinnon, 1983).

Malaysia There was only one primate breeding centre in Malaysia, Research Primates at Selangor. The operation started in 1976 and had a stock of 571 *M. fascicularis* in 1983. An average of 178 were bred annually at the centre from 1980 to 1982, and additional wild-caught macaques were also exported (Anon., 1984b). The operation is believed to have closed when the ban on primate exports from Malaya was implemented in 1984, and all the stock was released into the wild (Caldecott and Kavanagh, 1984).

Philippines A breeding centre for *M. fascicularis* was started in 1983, taking a stock of breeding females from the wild in 1983 and 1984. Additional wild-caught macaques were to be exported after a 6- to 8-week quarantine and conditioning period. Located at Tanay, SICONBREC (Simian Conservation Breeding and Research Centre) is owned by a British Company, Intersimian, which breeds and imports primates (Anon., 1984b). A commercial publicity brochure indicated that the stock at the end of 1986 comprised 1300 animals. Full capacity of 7000 females was expected to be attained by 1990.

Table 4. Approximate numbers of *M. fascicularis* used and bred in biomedical research institutes in consumer countries. a 1977; b 1978; c 1980; d 1981; e 1982; ? present, numbers unknown; - no information. Sources: Caldecott and Kavanagh, 1984; Eudey and Mack, 1984; Anon., 1984b.

Country	No used	No bred
Australia	>52 e	>14 e
Belgium	<200 a	0 a
Canada	ca 2400 b	?.b
Denmark	ca 90 a	0 a
France	2100 a	>95 e
Germany, F.R.	ca 475 a	371 a
Greece	?.b	-
Ireland	3 b	0 b
Italy	ca 450 c	?
Japan	2046 e	357 e
Mexico	?	-
Netherlands	ca 700 a	114 d
Sweden	1645 b	43 b
Switzerland	>64 c	2 d
Taiwan	?	0
UK	568 b	68 d
USA	6005 d	433 d

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CULPEO

Recommended list: 2
[Possible problem]

Dusicyon culpaeus (Molina, 1782)

Order CARNIVORA

Family CANIDAE

SUMMARY AND CONCLUSIONS A widespread species, occurring in the Andean and Patagonian regions of South America from Ecuador and possibly Colombia as far south as Tierra del Fuego, from sea level to around 4500 m. Although it is generally reported to favour open habitats, in Patagonia it is apparently more an animal of wooded areas, its place on the open plains being taken by *Dusicyon griseus*. A study in central Argentina found the Culpeo to be monoestrous, with births (3-8 young recorded, mean 5) in October-December after a gestation of c. 55-60 days. It is principally carnivorous, in Argentina feeding particularly on intoduced hares (*Lepus capensis*) and rabbits (*Oryctolagus cuniculus*); the extent to which it hunts larger prey is unclear, though in most parts of its range it is intensively persecuted (sometimes with official sanction) as an alleged killer of livestock, especially sheep. Despite such persecution, it appears to remain widespread and moderately abundant, though no detailed population figures are available. Although it has been argued that clearance of forests and woodland in Patagonia to increase areas of pasturage for livestock (principally sheep) has been detrimental to the species, elswhere land use changes may have actually favoured it, by increasing populations of hares and rabbits.

Virtually all trade reported to CITES since 1980 originated in Argentina; numbers traded were relatively low (maximum of c. 3500 in 1982), especially when compared with trade in the congeneric *D. griseus* (up to 150 000 per year). Argentinian customs statistics for the 1970s indicate a somewhat higher volume of trade (c. 12 600 per year) though this is also small compared to that in *D. griseus*; there was also some export from Chile until the late 1970s, but the species has been protected there since 1980.

From these figures, and the apparent absence of exports from other countries of its range, it seems very unlikely that international trade is a significant threat to the species, or even that the present level of trade has any deleterious effect on the population in Argentina, although it has been argued that its local scarcity (e.g. on Isla Grande of Tierra del Fuego) is a result of intensive hunting for the fur trade.

DISTRIBUTION Andean and Patagonian regions of South America in Ecuador, Peru, Bolivia, Chile, Argentina and possibly Colombia.

Members of the genus *Dusicyon* are sometimes included in *Canis* (Pine *et al.*, 1979; Langguth, 1975).

Argentina Recorded throughout mainland Patagonia (Chubut and Santa Cruz Provinces) and on Isla Grande of Tierra del Fuego, and further north throughout western Argentina on the slopes and foothills of the Andes (Cabrera, 1957; Crespo and DeCarlo, 1963; Olrog and Lucero, 1980). There appears to be a small disjunct population east of this in the Sierras Grandes, part of the Sierra de Cordoba, Cordoba Province at around 31°S (Cabrera, 1957; Crespo and DeCarlo, 1963). In Neuquen Province the fox was found down to an altitude of c. 700 m; the factors limiting its extension eastwards into the arid lowlands here were not known, though Crespo (1975) noted that during the past 40 years the species appeared to extend its range eastwards after seasons of high rainfall. Overall, its distribution in Argentina was estimated to encompass perhaps 1 100 000 sq. km (Argentina CITES MA, 1986).

Bolivia Apparently occurs in the Andean region though no details are available (Cabrera, 1957).

Chile The species is widespread, occurring from the extreme south, including Cabo de Hornos (Cape Horn) to the northern border with Peru. Found on Isla Grande of Tierra del Fuego and Isla Hoste in the Cabo de Hornos Archipelago, though apparently absent from Isla Navarino (Cabrera, 1957; Fuentes and Jaksic, 1979; Osgood, 1943). Within Chile, as in the rest of the its range, the species appears to be found at increasingly lower altitudes towards the south. Thus in central Chile it is recorded mainly from mountainous areas in the Cordillera de los Andes, though also in coastal hills near Valparaiso - north of this it appears absent from the coastal plains (Crespo and DeCarlo, 1963; Fuentes and Jaksic, 1979; Osgood, 1943). Further south, in Malleco, Greer (1965) stated it was found in the central valley as well as in more mountainous regions.

Colombia Honacki *et al.* (1982) give its distribution as extending into Colombia, and it is listed on Colombian legislation, though no other reference to its presence there has been located.

Ecuador Found in the Andean region, at least as far north as Cotopaxi in Pichincha Province (Cabrera, 1957).

Peru Grimwood (1969) reported it as ubiquitous throughout the Andean region up to at least 4500 m, being also found on the upper parts of the western slopes of the Andes, where it is known to descend to at least 1000 m. On the eastern slopes the species apparently never descended to true forest though was found in the drier parts of the 'ceja de selva' region (upper limit of forested areas down to around 2500 m).

POPULATION No figures are available, though the species appears to remain widespread and sometimes common; there is no evidence that it is threatened with extinction at present.

Argentina Overall estimates of abundance are not available, though Crespo (1975) noted that in general the species appeared to have maintained dense populations despite intensive persecution for many years. In 1986 it was described as most abundant in the south of the country (Argentina CITES MA, 1986). Crespo and DeCarlo (1963) estimated a density of 0.72 foxes per sq. km (over an area of 18 sq. km) at their study site in southern Neuquen in the early 1960s. They noted that, on the basis of anecdotal information, the species appeared to have undergone a significant and sustained increase in density in the province around 1910-1915 when there was a change in land use from intensive horse-rearing and a small amount of cattle-rearing to sheep-grazing, this coinciding with a marked increase in abundance of the introduced European Hare which, along with sheep, has become the most abundant food item (see Habitat and Ecology). To what extent this is paralleled elsewhere in the species's range is unclear. In 1981 it was described as rare and possibly in danger of extirpation in Salta Province, northern Argentina (Mares *et al.*, 1981) and it is apparently scarce on Isla Grande of Tierra del Fuego, though has been so at least since the 1930s (Jaksic and Yanez, 1983; Osgood, 1943).

Bolivia No information.

Chile It has been stated as becoming generally scarce in Chile, though there is little detailed information (Anon., 1978; Fuentes and Jaksic, 1979). Osgood (1943) noted that *D. culpaeus* appeared to be relatively scarce in the extreme south, where it had been persistently pursued for the fur market, and was very scarce on Tierra del Fuego; it did however seem to be quite common in

central Chile, while Greer (1965) stated it to be the most widespread canid in Malleco and Olrog (1950) described it as common on Isla Hoste in the Cabo de Hornos Archipelago. Pine *et al.* (1979) reported that the northern subspecies *D. c. andinus* did not appear to be abundant on the altiplano.

Ecuador No information.

Peru Grimwood (1969) reported it as abundant throughout its range, despite heavy persecution; he considered it to be in no need of protection at that time.

HABITAT AND ECOLOGY The species has been the subject of studies in both Argentina (Crespo and DeCarlo, 1963) and Chile (Fuentes and Jaksic, 1979; Jaksic *et al.*, 1980). The Culpeo is found in a wide variety of habitats. It has been stated to prefer more open country from the Patagonian plains at or near sea level in the far south to the Andean altiplano, at up to 4500 m, further north, where indications are it is absent from low-lying regions (Crespo, 1975; Fuentes and Jaksic, 1979; Grimwood, 1969; Osgood, 1943). Crespo (1975) notes that it may be found in dense forests of the Patagonian region though this is not a characteristic habitat, although Duran *et al.* (1985) considered Culpeo habitat in Southern Chile to be exploited or virgin forest and hill areas, open lowland areas being inhabited by the Argentine Grey Fox (*Dusicyon griseus*). Greer (1965) noted that in Malleco Province, central Chile, it was found in open or cultivated lands and wooded areas in the central valley and rocky slopes in mountainous regions. The species is very largely carnivorous. Crespo and DeCarlo (1963) found in their study site at Neuquen that diet consisted of c. 62% rodents and lagomorphs, 27% domestic animals (almost all sheep) and 6% wild birds. Hares (*Lepus europaeus*) were the most important single items, comprising c. 35% of the total diet, followed by sheep. Jaksic *et al.* (1980) in central Chile found that rodents were the most important prey items, accounting for 70-75% of the total, though rabbits (*Oryctolagus cuniculus*) were also important, comprising 18% of the total. Berries of the bushes *Cryptocarya alba* and *Lithraea caustica* were identified in around 12% of scats examined. It was thought likely the Culpeos fed on these opportunistically, although the proportion of berries consumed increased from spring to autumn, possibly compensating for a coincident decrease in availability of rodents. To what extent the Culpeo is a predator of larger animals, including domestic livestock, is unclear. Grimwood (1969) noted that in Peru its scats often contained large amounts of Vicuna wool, though it was not known if the Culpeos were actively hunting or feeding on carrion. In many parts of its range it is certainly regarded as a dangerous stock-killer, especially with regard to sheep, and particularly lambs (Allen, 1905; Crespo, 1975; Grimwood, 1969); Greer (1965), however, observed that local people in Malleco considered it did little harm to livestock except occasionally eating chickens. Crespo and DeCarlo (1963) found Culpeos to be monoestrus at their study site in Neuquen, with oestrus from August to October and births generally from October to December following a pregnancy of 55 to 60 days. In six pregnant females, from 3 to 8 embryos were recorded (mean 5.16). They found that 7-month-old young had the same weight and measurements as adults and that males were sexually mature at less that one year old, so can presumably breed the first season after they are born.

THREATS TO SURVIVAL The overall consequences of land-use changes on Culpeo populations are unclear. Duran *et al.* (1985) have argued that burning and clearing of forest areas in Chilean Patagonia for conversion to grazing lands for sheep has benefitted the Argentine Grey Fox (*Dusicyon griseus*) to the detriment of the Culpeo; however as noted above, change of stock in some areas from horses to sheep appears to have positively benefitted it, as does the increase in range and abundance of introduced hares and rabbits. Crespo (Argentina CITES MA, 1986) noted that in Argentina habitat condition in large

parts of its range was eminently suitable for the species. In areas where the Culpeo is reported scarce this is usually attributed to intensive persecution because of its (real or alleged) depradations on livestock or for the fur trade - its tameness and curiosity, attested to by early writers (Allen, 1905; Osgood, 1943), have apparently made it somewhat vulnerable in this regard, although whether this is the case throughout its range is unclear. In Chubut Province in Argentina poisoned carcasses are reportedly used as part of an officially sanctioned campaign against the Culpeo (Anon., 1985).

INTERNATIONAL TRADE This species is used extensively in the fur trade. Mares and Ojeda (1982) record that in the period 1972-79, 101 251 pelts of this species were legally exported from Argentina, an average of 12 656 per annum. They quote an export value of US$76 per pelt for 1979, when 4278 were exported. Figures provided by the Chilean CITES Management Authority in support of the proposal to list this species in Appendix II in 1979 detailed skin exports for 1975-77 as follows: 1975: 1400; 1976: 2800; and 1977: 5000. Since 1980 the species has been protected in Chile (see below); export figures for 1978-79 are not available. All CITES-recorded trade for 1980-83, except one transaction with country of origin unknown and one skin from Chile, originated in Argentina (Tables 1 and 2 below).

Table 1. Apparent minimum net imports of skins of *Dusicyon culpaeus* reported to CITES, 1980-85 [excluding the relatively few transactions recorded as plates].

	1980	1981	1982	1983	1984	1985
Chile	-	25	9	-	-	15
France	-	-	1000	-	-	-
Germany, F.R.	-	221	851	1040	-	120
Italy	-	1512	34	-	-	-
Japan	-	-	-	-	1	-
Peru	-	-	9	-	-	-
Spain	-	500	1460	100	300	-
Switzerland	3	-	-	-	-	-
USA	-	-	211	40	44	52
Total	3	2258	3574	1180	345	187

Table 2. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions in skins of *Dusicyon culpaeus* reported to CITES, 1980-85.

	1980	1981	1982	1983	1984	1985
Country of origin within range of *D. culpaeus*						
Argentina	2	2258	3526	1180	345	187
Chile	1	-	-	-	-	-
Country of origin unknown						
Unknown	-	-	48	-	-	-

Although these figures are clearly substantially lower than those quoted above for the whole period 1972-79, quantities for 1981 and 1982 are the same order of magnitude as that for 1979.

CONSERVATION MEASURES Reported to occur in several protected areas within its range (IUCN, 1982).

Argentina Not protected.

Bolivia Not protected, although Bolivia has introduced a blanket ban on all wildlife exports (Decreto Supremo No. 21312) valid until June 1989.

Chile Protected under Decreto No. 354 of 10 Dec 1980; hunting of this species for scientific purposes may be authorised by the Servicio Agricola y Ganadero.

Colombia Legally protected under Resolucion No. 848, 6 August 1973.

Ecuador Legal status unknown, though in 1985 it was reported that Ecaudor did not allow any commercial export of wildlife (Fuller *et al.*, 1987).

Peru Not protected.

CAPTIVE BREEDING No information.

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ARGENTINE GREY FOX or PATAGONIAN FOX

Recommended list: 2
[Possible problem]

Dusicyon griseus (Gray, 1837)

Order CARNIVORA

Family CANIDAE

SUMMARY AND CONCLUSIONS A small, predominantly Patagonian, South American canid found in Chile and Argentina in open areas and arid regions generally at low elevations. Overall population figures are not available, though a 1982 field study in southern Chile estimated around 37 000 to 66 000 in a total of c. 28 000 sq. km of suitable habitat. The species appears to be relatively opportunistic with respect to diet; a study in central Chile found rodents to be by far the most important prey, though it was also markedly frugivorous and will scavenge on carcasses of larger animals. Litters of five to six young have been observed.

The animal is extensively hunted as an alleged predator of livestock and for the fur trade. It is legally protected in Chile (where illegal hunting continues) and virtually all declared international trade originates in Argentina, which exported an average of some 100 000 per year for 1980-85. Exports during 1984 and 1985 were considerably smaller in volume than those recorded in earlier years. There is no evidence that habitat changes have adversely affected the species, and indeed clearance of forest and woodland in Patagonia to increase pasturage areas for livestock (principally sheep) is believed to have benefitted it.

In the absence of population data for Argentina it is not possible to comment with certainty on the effects of trapping for the fur trade on this species; however the area of suitable habitat is far larger than in Chile and if comparable population densities occur, the population in Argentina must be substantial (several hundred thousand at least). It seems certain that the population here can withstand a considerable harvest.

DISTRIBUTION Argentina and Chile; also introduced to the Falkland Islands (Islas Malvinas).

The classification of the Canidae at supraspecific level is controversial. Many authors prefer to include species normally designated *Dusicyon* in *Canis* (Langguth, 1975; Pine *et al.*, 1979); the generic epithet *Pseudalopex* has also been used for some species, including *griseus* (Nowak and Paradiso, 1983). *Dusicyon* is here retained, following Honacki *et al.* (1982).

Argentina Widespread throughout Patagonia from the Straits of Magellan north to Chubut Province and northwards, apparently in a relatively narrow strip (Crespo, 1975), in the lowlands of western Argentina, as far as Santiago del Estero and Catamarca (c. 26-28°S) (Cabrera, 1957) and possibly Salta Province (Mares *et al.*, 1981), though there do not appear to be any definite records from there. Introduced to Isla Grande of Tierra del Fuego (Jaksic and Yanez, 1983; Pine *et al.*, 1979). It has been estimated that the range covers perhaps 1 200 000 sq. km overall (Argentina CITES MA, 1986).

Chile Widespread from the Straits of Magellan northwards as far as the southern part of Atacama Province (28-29°S), mainly in lowlands and foothills of the coastal range (Osgood, 1943; Greer, 1965). Occurs on Chiloe Island - this population has been referred to a separate species (*D. fulvipes*), though is now considered a subspecies of *D. griseus* (Pine *et al.*, 1979). Introduced to Isla Grande of Tierra del Fuego (Jaksic and Yanez, 1983; Pine *et al.*, 1979).

Falkland Islands (Islas Malvinas) Following a release in the 1930s, this species is now found on several small islands (Weddell, Statts, Beaver, Tea, River and Split) off the west coast of West Falkland (Lever, 1985).

POPULATION Although no overall population estimates are available, harvest rates in Argentina and population density estimates in southern Chile indicate there must be several hundred thousands.

Argentina Olrog and Lucero (1983) described it as locally common although recently recorded as generally scarce (Argentina CITES MA, 1986). There are indications that in northern parts of its range, it is generally less common than the larger Culpeo (*D. culpaeus*), while in the south the reverse is true (Crespo and DeCarlo, 1963, Crespo, 1975). The species appears to be abundant on Isla Grande of Tierra del Fuego where 24 young animals were reportedly introduced in 1951 (Jaksic and Yanez, 1983; Pine *et al.*, 1979). If even half of the species's range in Argentina is occupied at similar densities to those estimated for southern Chile (c. 2 per sq. km - see below), the population will number at least several hundreds of thousands.

Chile Duran *et al.* (1985) produced population estimates of from 37 250 to 65 837 (favouring the latter) for southern Chile (the Magallanes region) on the basis of an estimated 28 310 sq. km of *D. griseus* habitat and a mean density of from 1.3 to 2.3 foxes per sq. km, depending on the estimating technique used. This was extrapolated from 1982 field surveys at 7 sites when a total of 165 individual foxes were observed. Highest density was on Riesco Island with a calculated average of 4.4 foxes per sq. km. There is little recent information for northern parts of its range, although in 1977 the species was said to be generally scarce throughout the country except in the extreme south (Anon., 1978). Osgood (1943) stated that it was very abundant in central Chile, even surviving within the City of Santiago. The species appears to be abundant on Isla Grande of Tierra del Fuego (see above) (Jaksic and Yanez, 1983) but very scarce on Chiloe Island (Pine *et al.*, 1979).

Falkland Islands (Islas Malvinas) No information.

HABITAT AND ECOLOGY Preferred habitat is generally agreed to be grasslands and arid areas at low altitudes (Allen, 1905; Crespo, 1975; Duran *et al.*, 1985; Osgood, 1943). Osgood (1943) noted that it was quite strictly limited to open grasslands and beaches, and scarcely even entered the foothills of the Andes, although it has been reported to occur at least as high as 1220 m in Malleco Province in Central Chile (Greer, 1965). In northern parts of its range in Argentina it occurs in what are essentially desert areas (Crespo, 1975), though Osgood (1943) observed that it did not penetrate the extremely arid Atacama desert in north-central Chile, which appeared to act as the northern limit of its distribution on the west of the Andes. They appear to be opportunistic feeders; Allen (1905) reported that in southern Patagonia they were chiefly scavengers, feeding mainly on sheep and guanaco carcasses, though also preying on smaller mammals and the eggs and young of birds. They would apparently take young lambs, but never attacked grown sheep, and were very fond of rhea eggs. A study in central Chile found rodents to be by far the most important animal prey, accounting for from 87% to 98% of prey items in scats examined; they were also markedly frugivorous, especially in autumn, with 39% of all scats examined containing berries, mostly of *Cryptocarya alba* and *Lithraea caustica* (Jaksic *et al.*, 1980). Rabbits (*Oryctolagus cuniculus*) and birds only accounted for some 3% each of animal prey. Allen (1905) observed litters of 5 to 6 young in earths dug under bushes or under rocks along rivers and on the coast; there appears to be no further information on breeding.

Dusicyon griseus

THREATS TO SURVIVAL Persecution as an alleged predator of livestock and for its fur appear to be the factors which have affected the species. Much of the habitat alteration in Chilean Patagonia, most notably clearing and burning of forest to increase areas of pasturage for sheep, appears to have benefitted the Grey Fox, although has brought it into increasing conflict with sheep farmers (Duran *et al.*, 1985). In Argentina habitat conditions are described as generally favourable for the species throughout much of its range (Argentina CITES MA, 1986).

INTERNATIONAL TRADE There is considerable trade in Grey Fox skins for fur, almost all from Argentina. The minimum trade recorded by CITES Parties for the years 1980-83 amounted to 600 174, or an average of 100 129 per year (Table 1). Virtually all (96%) of this was declared as originating in Argentina, with exports originating in Chile only accounting for 2%. The remainder were declared with country of origin unknown or outside the range of *D. griseus*, with most from Paraguay; it is likely that many of these also originated in Argentina. The export of over 7000 skins from Chile in 1983 was recorded, and therefore presumably authorised by, the Chilean Management Authority, although the species is apparently legally protected. None of the skins recorded in trade in 1984, declared as having originated in Chile, were reported to have been exported from Chile during that year.

Table 1. Apparent minimum net imports of skins of *Dusicyon griseus* reported to CITES, 1980-85.

	1980	1981	1982	1983	1984	1985
Austria	3	107	159	429	273	90
Belgium	64	-	712	183	-	500
Canada	-	717	4368	2100	1000	1531
Chile	-	-	42	-	-	44
China	-	-	-	-	-	3
Denmark	-	-	-	60	-	-
France	-	1362	2648	1305	85	1349
Germany, F.R.	65125	96621	108496	96588	48457	37201
Greece	847	-	-	-	-	-
Hong Kong	-	96	5500	3	-	-
Hungary	-	-	-	1	-	-
Israel	-	1530	1380	332	-	-
Italy	-	11687	8982	1016	194	709
Jamaica	-	30	-	-	-	-
Japan	-	2517	304	1	60	12
Korea, Rep. of	-	-	-	-	-	4
Malta	360	-	-	1207	-	-
Netherlands	-	1077	26	-	-	-
Norway	-	-	-	12	-	-
Peru	-	-	42	-	-	-
Spain	41	-	-	11989	11272	2848
Sweden	-	3	-	-	-	-
Switzerland	67	4308	14288	18094	1496	704
UK	-	4719	1831	1	-	-
USA	-	3714	1491	9597	-	3012
Uruguay	-	-	300	308	-	-
Yugoslavia	500	-	-	-	-	-
Total	67007	128488	150569	143226	62837	48007

The declared destination of over 70% of skins was F.R. Germany and a large proportion of the remainder were channelled through that country - in 1980 all trade transactions concerned F.R. Germany. Switzerland and Italy were the two next largest importers.

Ojeda and Mares (1982) record a trade in 'Zorro Gris' (Grey Fox) of 5 789 011 in the period 1972-79, giving an average of 723 626 per annum. The name Zorro Gris was applied to 3 species - *Dusicyon griseus, D. gymnocerus* and *D. thous*; it was assumed that most pelts were of *D. gymnocerus*.

Table 2. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions in *Dusicyon griseus* reported to CITES, 1980-85.

	1980	1981	1982	1983	1984	1985
Countries with wild populations of *D. griseus*						
Argentina	63477	126994	162399	133012	61669	48007
Chile	-	-	-	9703	2217	-
Countries without wild populations of *D. griseus* or country unknown						
Greece	-	-	-	511	-	-
Korea, Rep of	-	1	-	-	-	-
Paraguay	3530	6254	-	-	-	-
UK	331	-	-	-	-	-
Unknown	-	307	-	-	-	-

CONSERVATION MEASURES

Occurs in several protected areas within its range (Anon., 1982).

Argentina The species is not protected by Federal legislation. Hunting is banned throughout the year in Catamarca, Neuquen, Salta, Entre Rios, Tucuman and La Rioja, but it is listed as a harmful species in Ninguna and as a commercially important species in Rio Negro and Tierra del Fuego (Rabinovich *et al.*, 1987).

Chile The species is legally protected under Decreto No. 40 of 22 February 1972.

CAPTIVE BREEDING No information.

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PATAGONIAN HOG-NOSED SKUNK

Recommended list: 2
[Possible problem]

Conepatus humboldtii Gray, 1837

Order CARNIVORA

Family MUSTELIDAE

SUMMARY AND CONCLUSIONS A largely Patagonian species, found at low altitudes in southern Chile and Argentina. Taxonomy of the genus *Conepatus* is the subject of controversy and the limits of the range depend on the classification adopted. Biology little known; apparently prefers open country and is expected to be similar to other *Conepatus* species in being primarily nocturnal and insectivorous. Litters are probably small (two to four young). Little recent information on status is available and the species has recently been variously described as 'scarce' or 'locally common'. There are no strong indications that habitat destruction is an important factor affecting *Conepatus*. The species has been protected in Chile since 1972 and in Argentina since 1983.

Considerable numbers of skins appear to have been exported from Argentina up to 1983, although most available figures relate to *Conepatus* species in general, with c. 155 000 per year in the 1970s; the proportion of these being *C. humboldtii* is unknown. According to CITES data, the declared number of skins of *C. humboldtii* exported from Argentina in 1983 and 1984 was far lower (2000-3000) than that for 1982 (c. 44 000), coinciding with the instigation of legal protection for the species; there should theoretically have been no export of skins after 1983.

The other two or three *Conepatus* species occurring in Argentina are neither protected there nor listed on CITES and as the species are virtually indistinguishable it is possible that *C. humboldtii* skins are being exported as these species. This should be investigated, as there are indications that the species has been adversely affected by hunting. If such investigations indicate that such a problem does exist, it has been suggested that it may be useful to list the whole genus on Appendix II of CITES. This would allow the possible trade threat to be monitored more closely.

DISTRIBUTION Chile and Argentina.

Honacki *et al.* (1982) include *C. castaneus* (D'Orbigny & Gervais, 1847) in *C. humboldtii*; if this is followed, the range of the species is increased considerably northward. Several authorities consider all members of the genus *Conepatus* to be conspecific (Howard and Marsh, 1982; Hershkovitz, 1959). The range of the species would then extend from south-west USA through much of central and south America as far as Patagonia (Cabrera, 1957; Howard and Marsh, 1982). Kipp (1965) considered that *humboldtii* was not clearly seperable from *castaneus* and that existing morphological variation between the two is clinal.

Argentina Range of *C. humboldtii* excluding *C. castaneus* given by Osgood (1943) and Cabrera (1957) as from the Straits of Magellan north to Chubut Province and western Rio Negro, although Osgood notes that the northern limit of the range is unclear. The area of the range has been estimated to be around 550 000 sq. km (Argentina CITES MA, 1986). Absent from Tierra del Fuego. Cabrera (1957) gives distribution of *C. castaneus* as the sub-Andean region in the western part of Argentina, from Rio Negro and extreme south Buenos Aires as far north as La Rioja (c. 29°S).

Chile Southern part of the country from the south of Chiloe Province (c. 43°S) south to the Straits of Magellan (Cabrera, 1957). Absent from Tierra

del Fuego (Osgood, 1943).

POPULATION No quantitative population data are available.

Argentina Olrog and Lucero (1983) state that it is locally common. Noted as possibly scarce, but there was no concrete recent information (Argentina CITES MA, 1986). Allen wrote in 1905 that at that time it had become quite rare in southern Patagonia, having been affected by a contagious disease some years previously, although Osgood (1943) found it to be fairly numerous in the 1930s.

Chile In 1978 it was reported to have become scarce, as a result of intensive hunting for its pelt (Anon, 1978.); Osgood (1943) found it to be fairly numerous.

HABITAT AND ECOLOGY *Conepatus* species are generally found in open country, mainly pampas and rocky areas; they also occur in wooded areas but generally avoid dense forests. They are largely nocturnal, sheltering during the day in small burrows or among rocks or tree-roots, and are principally insectivorous, feeding especially on beetles and also on spiders and millipedes, though will also take small rodents and nestling birds and are known to raid hen houses for eggs and chicks; they may also take some fruit (Cabrera and Yepes, 1940; Howard and Marsh, 1982). Little is known of the breeding biology of *Conepatus* spp. although the presence of only three pairs of mammae in females implies that litters are small; meagre records of the North American *Conepatus mesoleucus* indicate a litter size of two to four young (Howard and Marsh, 1982). Gestation period in the latter species is reported as 42 days. No information on population density or dynamics has been located, though a study of the closely related Spotted Skunk (*Spilogale putorius* - considered by some to be congeneric with *Conepatus*) in North America estimated a density of 8.8 per sq. km (Howard and Marsh, 1982).

THREATS TO SURVIVAL The species does not appear to be threatened at present although there are no data on population trends. Its preference for open areas implies it is unlikely to be severely affected by habitat destruction; general habitat conditions could still be considered favourable for the species (Argentina CITES MA, 1986). There appear to be no further references to the disease which reportedly affected the species in southern Patagonia in the nineteenth century (see above). The effect of harvesting for the skin trade is unknown, though as noted below considerable numbers are reported in trade and overhunting has been blamed for its reported scarcity in Chile (Anon., 1978). There is some evidence that the fur quality of *humboldtii* is superior to that of the other *Conepatus* taxa (R. Wirth, *in litt.*, 23 November 1987).

INTERNATIONAL TRADE

Conepatus spp. are, or have been, used extensively in the fur trade. During the period 1972-79, 1 243 129 hog-nosed skunks were legally exported from Argentina, representing four commonly recognized species (*C. castaneus, C. chinga, C. humboldtii* and *C. rex*) (Ojeda and Mares, 1982); it is not known what proportion of these were *C. humboldtii*. The export value of the 1979 trade was US$2 156 187, representing 269 523 skins at US$8 each. Ojeda and Mares calculated that the hunter would probably receive the equivalent of US$0.50 per skin.

Osgood (1943) notes that dealers in raw furs in Punta Arenas in southern Chile reported handling c. 15 000 skins of this species in 1939. Iriarte and Jaksic (1986) noted skunk skin exports from Chile in the periods 1910-14 and 1930-1959 but no exports were recorded between 1959 and 1984.

Table 1. Apparent minimum net imports of skins of *Conepatus humboldtii* reported to CITES, 1980-85.

	1980	1981	1982	1983	1984	1985
Austria	-	-	-	500	-	-
Chile	-	-	45	-	-	-
Denmark	-	603	-	-	-	-
France	-	-	-	324	-	-
Germany, F.R.	-	1010	13520	505	10	250
Italy	-	1000	4585	2250	1300	-
	-	-	-	-	[+680 kg]	-
Japan	-	2	668	8	-	-
Spain	-	-	6400	-	20	-
Switzerland	-	-	18329	-	-	2317
USA	-	-	768	-	90	-
	-	[+18 kg]	-	-	-	-
Total	0	2615	44315	3587	1420	2567
	-	[+18 kg]	-	-	[+ 680 kg]	-

All skins of *C. humboldtii* reported in trade by CITES Parties for 1980-85 were recorded originating in Argentina. Over 95% of these were recorded by Argentina as exports; only Italy recorded imports. *Conepatus humbodltii* has been protected in Argentina since September 1983; this would explain the dramatic drop in numbers of skins exported between 1982 and 1983. The low numbers declared in 1980-1981 reflect the fact that CITES did not enter into force in Argentina until April 1981.

The 1982 figures, of over 44 000 represent only a fraction of *Conepatus* exports reported in the 1970s, with an average of some 155 000 per year. This implies either that *C. humboldtii* only comprised a small proportion of *Conepatus* trade in the 1970s, or that there was a significant decrease in trade in the early 1980s, or (perhaps most likely) that a large part of the trade in 1982 went unreported (possibly because skins were ascribed to one of the three other commonly recognized Argentinian species which are not listed on the Appendices to CITES). Suggestions that the fur of *humboldtii* may be more valuable than that of the other taxa in trade (R. Wirth, *in litt.*, 23 November 1987), imply that the latter explanation may be correct.

A small declared trade has evidently persisted since 1983; these may be skins declared as taken before legal protection was imposed. Considering the similarity in appearance of *Conepatus* species, it is possible that *C. humboldtii* skins are being exported illegally identified as one of the other species generally accepted as occurring in Argentina; this should be investigated.

CONSERVATION MEASURES

Argentina *Conepatus humboldtii* has been protected in Argentina since 11 March 1983 (Resolucion No. 144 in accordance with Ley No. 22.421 Of 12 March 1981). Known to occur in Los Glaciares National Park (Anon., 1982).

Chile All *Conepatus* spp. are protected in Chile under Decreto No. 40 of 22 February 1972. Known to occur in Torres del Paine National Park (Anon., 1982).

Conepatus humboldtii

CAPTIVE BREEDING No information.

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ASIAN SMOOTH-COATED OTTER

Recommended list: 2
[Possible problem]

Lutra perspicillata Geoffroy, 1826

Order CARNIVORA

Family MUSTELIDAE

SUMMARY AND CONCLUSIONS A large otter, widespread in the Indo-Malayan region, including Java and Sumatra and possibly Borneo. A disjunct population occurs in the Tigris marshes in southern Iraq. The species is semi-aquatic and apparently largely confined to lowlands, being mainly found in large rivers, though also in resevoirs, canals, creeks and in the open sea. Carnivorous, feeding largely on fish, though a variety of other prey will be taken. It has been hunted by man for its fur, for food and also as an alleged competitor for fish stocks. Tamed individuals are used by fishermen to catch fish in some areas. Many populations have been reportedly depleted though no population estimates are available. However the species does not appear to be threatened at present. It occurs in several national parks and reserves.

There is a negligible reported trade in live animals. Trade in skins (all recorded through CITES) in the period 1980-83 amounted to around 1300 per year, with no discernible trend and virtually all to F.R. Germany; three quarters of these were declared as origin Bangladesh, with a large proportion being re-exported by China. Export from Bangladesh is reportedly banned; thus a large proportion of trade in this species is likely to be illegal. Since 1983 no skins have been recorded in trade.

With most declared trade apparently originating in one country, comprising a small fraction of its range, it is unlikely that international trade is a significant factor in the conservation of the species, although it may be a cause of some concern with regard to populations in Bangladesh.

DISTRIBUTION Widely distributed in the Indo-Malayan region in Bangladesh, Bhutan, Burma, China, India, Indonesia (Java, Sumatra, perhaps Kalimantan), Kampuchea, Laos, Malaysia (Peninsular and perhaps Sabah), Nepal, Pakistan, Thailand, and Viet Nam; also found in the Tigris marshes in southern Iraq.

The species has been placed in a separate genus *Lutrogale*, though is now generally included in *Lutra* (Harris, 1968; Honacki *et al.*, 1982).

Bangladesh Said by Khan (1985) to be found in all parts of the country.

Bhutan No information, though has apparently been recorded (Ellerman and Morrison-Scott, 1951; Pocock, 1941).

Burma According to Salter (1983) the species is widely distributed. Yin (1967) notes records from Pegu, Toungoo, Kindat, the Chin Hills and Myitkyina District.

China Allen (1938) stated that it almost certainly occurred in south-west China (western Yunnan), though virtually nothing was known of it.

India Reported by Prater (1971) as widely distributed from the Himalaya and Sind to the extreme south at low elevations.

Indonesia Reported to occur in Java, Sumatra and perhaps Kalimantan - Medway quotes a record from Badang, S. Bahau, East Kalimantan; other writers have questioned the occurrence of this species in Borneo (Corbet, 1978; van der Zon, 1977).

Lutra perspicillata

Iraq A disjunct population, described in 1956 (Hayman, 1957) is found in the marshes of southern Iraq in the region of the Tigris River. Harrison (1968) quotes records from Abusakhair, 35 miles south-east of Amara (Al Amarah), and from the region of El Azair (Al'Uzayr). This population is some 2000 km west of the rest of the species's range which stretches to the Indus River in eastern Pakistan.

Kampuchea No information, though its presence in the Mekong basin in Laos and Thailand implies it undoubtedly occurs in Kampuchea.

Laos The species is found in the Mekon river basin (Delacour, 1940; Osgood, 1932; Laos Forest Department, *in litt.*, 1986; Van Peenen *et al.*, 1969).

Malaysia Recorded in estuaries and large rivers on the mainland of West Malaysia as far south as Selangor and also from Pulau Salanga in Malacca (Medway, 1969). Medway (1977) records the species from Sabah in Borneo on the basis of a nineteenth century specimen from the vicinity of Sandakan and reports from Darvel Bay; some authors however regard its presence on Borneo as doubtful (Corbet, 1978). Furthermore surveys in 1979 found no definate evidence of this species in Sabah (Malaysia, Sabah CITES MA, 1985).

Nepal Apparently confined to low altitudes (500-1000 m, maximum 1500 m) (Frick, 1968; Mitchell, 1975).

Pakistan Noted by Roberts (1977) as essentially a plains species found throughout the lower Indus riverine system and up to the outer foothills of the Punjab, sometimes also entering tidal waters, having been seen at Keti-bunder.

Thailand Reportedly occurs throughout (Bain and Humphrey, 1980; Boonsong Lekagul and McNeely, 1977).

Viet Nam No recent information, though is definitely recorded from Annam (Pocock, 1941).

POPULATION No population estimates are available.

Bangladesh Noted by Khan (1985) as being commoner in southern and eastern areas than in the north and west, west of Jamura.

Bhutan No information.

Burma No information.

China No information.

India Depleted in certain regions and almost exterminated from areas of human settlement and agricultaural areas (India CITES MA, 1987).

Indonesia No information.

Iraq No information.

Kampuchea No information.

Laos The species had reportedly become fairly rare as a result of the heavy human settlement of the Mekong basin (Laos Forest Department, *in litt.*, 1986).

Malaysia Wayre (1978), on the basis of a brief study in 1974, concluded that the species did not appear to be in any way threatened at that time. Reportedly rare in Sabah (Malaysia, Sabah CITES MA, 1985).

Nepal Dinerstein (1979) found it to be common along the Gerwa and Khoraha Rivers in the Royal Karnali-Bardia Wildlife Reserve.

Pakistan Although Pilleri (1980) described the species as 'very common' on the Indus, Roberts (1977) observed that it had become comparatively rare through increased human settlement and reduction in habitat as a result of irrigation barrages across the Indus and drawing off of water for irrigation schemes. He had found it plentiful in recent years only on the Chenab River upstream of Marala, and around Sundari Lake (Dhand) in the east Nara swamps of Sind, as well as about 25 km upstream of Sukkur Barrage and near Tando Muhammad Khan.

Thailand Said to be generally commoner than the Eurasian Otter (*Lutra lutra*) (Boonsong Lekagul and McNeely, 1977) although in 1979 all otters were declared to be threatened in Thailand, having undergone a dramatic reduction in numbers since the mid-1960s, almost all of this attributed to overhunting (Pong Leng-EE, 1979). Osgood (1932) had stated it to be the most abundant otter on the Mekong.

Viet Nam No information.

HABITAT AND ECOLOGY In the western part of its range at least, *L. perspicillata* appears to be essentially a plains animal though is also found in hills at low elevation (Roberts, 1977; Prater, 1971); it can reportedly adapt to arid and semi-arid regions, such as the north-western Indian desert and the dry zone of central India and the Deccan (Prater, 1971). Generally it lives by the margins of lakes and streams and in large tanks and canals, though also along the coast, hunting in flooded fields, creeks and estuaries and in the open sea (Boonsong Lekagul and McNeely, 1977; Prater, 1971; Roberts, 1977; Wayre, 1978). Roberts (1977) noted that it was generally found in conditions where the water was heavily silt-laden and smooth-flowing. According to Prater the species can apparently adopt a terrestrial lifestyle in dry regions, at least seasonally when pools and streams dry up, hunting on land and lying up in burrows in hill-sides. Wayre (1978), however, stated that in Malaysia the species required undisturbed forest, scrub or mangrove swamp in the immediate vicinity of water, and was confined to the coast or large river systems, being absent from small streams, paddy fields and irrigation canals, its place here being apparently taken by the smaller Short-clawed Otter (*Aonyx cinerea*). Like all otters, *L. perspicillata* is carnivorous, feeding mainly on fish - Roberts (1977) noted that in the Indus these otters would hunt for every species of fish occurring there, though were particularly fond of Murrel (*Ophiocephalus striatus*) and Cat Fishes (Siluridae species); a wide variety of other prey will also be taken - in the Indus the crayfish *Machrobrachium malcolmsonia* is sought after and Wayre (1978) noted that crabs formed an important part of the diet of those living on the coast in Malaysia. The species is social, hunting in family groups which may occasionally join together to form large hunting parties. Wayre (1978) considered that a pair may require from 7 to 12 km of river for its territory and a longer stretch of coastline if living along the shore. Individuals may reportedly travel extensive distances, often over dry land, during the year, except the female when she has young cubs.

Little is known of breeding in the wild, though Wayre (1978) notes that in this, unlike in most other otters, the male appears to play an important part in rearing the young, both in collecting bedding material for the breeding holt and in bringing food to the young. Prater observed that in India most

young appeared to be born in the early part of the year, though Roberts (1977) quotes a record of young estimated to have been born in late August in Pakistan; gestation in captivity has been measured as 61-63 days (Yadav, 1967), with delayed implantation apparently not occurring. There appear to be few records of litter sizes, though Roberts refers to a litter of five kittens captured in southern Sind. A female born in captivity first opened her eyes at 10 days, weaning began at 3 months, first mating at 3 years and first offspring were born at 4 years (Yadav, 1967). Captive individuals have lived as long as 16 years (Dover, 1932).

THREATS TO SURVIVAL The species is still widespread and does not appear to be threatened overall at present. It has, however, undoubtedly been affected by many adverse factors in different parts of its range and many populations have evidently been reduced. Large rivers such as the Indus and Mekong tend to be very heavily settled and used by people and are thus generally disturbed. As well as being hunted for its fur (Roberts, 1977; Laos Forest Department, *in litt.*, 1986; Pong Leng-EE, 1979), and, in Laos at least, for food (see below) it is also sometimes persecuted by fishermen as an alleged competitor (Bain and Humphery, 1980; Roberts, 1977). There appear to be few concrete data on the effects of disturbance and possible depletion of food sources through over-fishing on this species, although Bain and Humphrey (1980) report that destructive fishing methods such as the use of explosives, electric shocks and poisons (usually pesticides) are a serious threat to otters in Thailand, and may be expected to be so elsewhere in the species's range.

Trained otters of this species are used for fishing in various regions; the practice certainly still continues in the Sind (lower Indus valley) in Pakistan (Pilleri, 1980) and in the Sunderbans region in Bangladesh (Whitaker, 1984); earlier reports also mention Orissa (Prater, 1971), Cochin and part of Bengal (Kipling, 1891) in India, and also Malaysia (Cantor, 1846). Murray (1884) implies that along the Indus considerable numbers were used, as they observed them tethered in 20s and 30s near fishermen's boats; Roberts (1977) noted that more recently only occasional individuals were encountered. Whether this practice has a significant effect on wild population levels is unknown, though it appears unlikely. Singsouriya (Laos Forest Department, *in litt.*, 1986) notes that otters are actually eaten in Laos, and they are hunted for their fur in many parts of their range (see below). No records of trade in this species in Indonesia (Indonesia CITES MA, 1986).

INTERNATIONAL TRADE

All information on international trade in *Lutra perspicillata* is derived from annual reports to CITES and is summarised in Tables 1 and 2 below.

Table 1. Apparent minimum net imports of *Lutra perspicillata* reported to CITES, 1980-85 [skins unless otherwise stated] L = live

	1980	1981	1982	1983	1984	1985
Australia	-	-	-	-	[1 L]	[2 L]
Austria	-	210	-	-	-	-
Germany, F.R.	3558	-	427	1100	-	-
Italy	-	[10 L]	-	-	-	-
Total	3558	220	427	1100	1	2

Table 2. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions in *Lutra perspicillata* reported to CITES, 1980-85 [skins unless otherwise stated] L = live

	1980	1981	1982	1983	1984	1985
Country of origin within range of *L. perspicillata*						
Bangladesh	3558	-	427	-	-	-
China	-	210	-	-	-	-
India	-	-	-	1100	[1 L]	[2 L]
Pakistan	-	[10 L]	-	-	-	-

The destination of the great majority of skins (96%) was F.R. Germany; the UK and Belgium feature as re-exporting or processing countries.

Trade in skins reported to CITES during the period 1980-85 involved a minimum of 5295 skins and 13 live individuals. Three-quarters of these were declared as originating in Bangladesh, though none was reported by Bangladesh (which has submitted annual reports to CITES for 1982 and 1983) and all bar 350 were reported as re-exports by either the exporting or importing country. China was reported in 1980 as a major re-exporter of skins originating in Bangladesh; it is thus possible that those reported in 1981 as origin China also originated in Bangladesh.

Export of *Lutra perspicillata* from Bangladesh and India is banned. If the declared country of origin of skins in trade is accurate, then a large proportion of this trade is evidently illegal. However, after 1983 reported trade has been negligible.

CONSERVATION MEASURES The species occurs in a number of protected areas within its range.

Bangladesh The species is protected; internal and external trade, and local consumption, are banned (Bangladesh CITES MA, 1986).

India All Indian otter species are included under Part II of Schedule II (special game) of the revised list of schedules to the Wildlife Protection Act 1972 and may be hunted under licence but may not be traded in.

Indonesia Otters are not protected by law in Indonesia.

Malaysia Otters are classified as Protected Wild Animals under the Protection of Wildlife Act 1972 (laws of Malaysia Act 76).

Pakistan Legally protected (Pakistan CITES MA, 1986).

Thailand All otters in the genera *Lutra, Lutrogale* (= *Lutra*) and *Amblonyx* (=*Aonyx*) are classified as Protected Wild Animals of the first category in Thailand. Capturing live animals is allowed, but killing of them is not except under authorisation of a collecting permit issued only for educational or scientific purposes (Jintanugool *et al.*, 1982).

Legal status elsewhere in its range unknown.

Lutra perspicillata

CAPTIVE BREEDING The species appears to be relatively easy to maintain in captivity and has bred (Harris, 1968; Yadav, 1967) though it is not known how many are held in zoos at present.

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PAMPAS CAT

Recommended list: 2
[Possible problem]

Felis colocolo Molina, 1782

Order CARNIVORA

Family FELIDAE

SUMMARY AND CONCLUSIONS An inhabitant of western and southern South America, found in a variety of habitat types. Very little specific information is available describing the size and status of populations of this species and the threats to its future survival have only been described in general terms. Habitat alteration and destruction has been reported as a major threat in some areas; however the extent of this has been poorly documented. Hunting pressure has also been mentioned as a threat although skins have been reported to have been of little value in at least one area. Protected throughout most of its range by legislation.

In the late 1970s, exports from Argentina averaged almost 20 000 skins each year. The number of skins reported in trade by CITES Parties was 11 000 in 1980 and 4299 in 1981; however the volume of trade decreased sharply after 1981 and in later years, trade involving this species seems to have been negligible. Considerable old stocks of skins of this species were exported from Argentina in early 1987, but otherwise exports from that country have ceased. In the past the major market for skins of this species was western Europe.

In light of the lack of population information and the large number of skins traded in the past, it is not possible to state that the threat of exploitation for the skin trade has ceased, despite the apparent decline of the volume of trade reported in recent years. Imports into the EEC of skins of all of the commercially important neotropical cat species, with the exception of *F. colocolo* were banned in late 1986. Therefore, if a legal source of these skins does reopen, this species may be of particular interest to the European market.

DISTRIBUTION Mountain areas of Ecuador and northern Peru; inland regions of Brazil, at least as far north as the Matto Grosso plateau; southern Peru, west of the Andes; parts of Bolivia; central Chile from Coquimbo to Concepcion; Paraguay; Uruguay; Argentina from Jujuy, Salta and the Chaco to southern Patagonia (Guggisberg, 1975).

Sometimes classified as generically distinct from *Felis*, as *Lynchailurus pajeros* (P. Leyhausen, *in litt.*, 1987), but included within *Felis* by Honacki *et al.* (1982). Cabrera (1957) identified seven subspecies of *Felis colocolo*; an eighth *Felis colocolo munoai*, was described more recently and may be valid.

Felis colocolo braccata Cope, 1889. The southern interior of Brazil as far north as the Mato Grosso plateau and district of Goias, extending into Paraguay (Cunha Vieira, 1955).

Felis colocolo budini Pocock, 1941. Montane zone of north-west Argentina, from Jujuy to the centre of La Rioja, possibly extending north into the south of Bolivia (Cabrera, 1957).

Felis colocolo colocolo West central Chile from Coquimbo south to Concepcion, (Osgood, 1943).

Felis colocolo crespoi Cabrera, 1957. North-west Argentina in the humid selva zone of eastern Salta and Tucuman, perhaps extending into the west of

the southern chaco in the areas adjoining Bolivia (Cabrera, 1957).

Felis colocolo garleppi Matschie, 1912 The Andes of southern Peru (Grimwood, 1969), western Bolivia (Cabrera, 1957), and probably the extreme north of Chile (Miller *et al.*, 1983).

Felis colocolo munoai Ximenez, 1961. Described as separate from the northern range of *F. c. pajeros*, inhabiting the subtropical zone including Uruguay (Ximenez, 1970), and by implication the far south of Brazil in the Rio Grande do Sul and the north-east of Argentina, where the population had formerly been referred to as *F. c. pajeros* by Cunha Vieira (1955).

Felis colocolo pajeros Desmarest, 1816. In Argentina from the Pampas region to southern Patagonia (Cabrera, 1957), and perhaps southern Chile in the Patagonian/Fuegian forest (Taber, 1974).

Felis colocolo thomasi Lönnberg, 1913. The sierra zone of Ecuador and northern Peru (Cabrera, 1957). The boundary in Peru between this subspecies and *F. c. garleppi* is unknown.

POPULATION There are no population estimates for any of the countries where this species occurs; only general comments on status and abundance are available.

Argentina Rare to endangered in Salta province in the north-west (Mares *et al.*, 1981), and generally scarce although widespread in other regions (Argentina CITES MA, 1986). Listed as vulnerable in national wildlife protection legislation (Resolution No. 144).

Bolivia Widely distributed, but information on status has proved difficult to obtain. Recorded as "insufficiently known" by Tello (1986).

Brazil Population and status unknown.

Chile Increasingly uncommon in Chile; both *F. c. garleppi* and *F. c. colocolo* were reported to be rare (Miller *et al.*, 1983) and *F. c. pajeros* was inadequately known (Taber, 1974).

Ecuador Population and status unknown.

Paraguay Population and status unknown.

Peru Reported to have been unaffected by commercial hunting owing to the low value of skins, and, although it was thought likely that the increase of the human population had depleted the natural food supply in some areas, the species was reported to survive in significant numbers in all areas (Grimwood, 1969).

Uruguay Reported to have been scarce in the early part of this century (Sanborn, 1929), no more recent information available.

HABITAT AND ECOLOGY Found in a variety of habitats. In Argentina it was reported to inhabit open grasslands in most parts of the country, hiding in the pampas or "pajero" grass, while in northern regions it was found in humid forests (Guggisberg, 1975). In Peru it was reported to be typically an animal of Andean valleys, but it was also found in the ceja de selva zone and on the western slopes of the Andes in the coastal region at elevations of 100 m to 200 m (Grimwood, 1969). In the montane zone of north-west Argentina the species was found at an altitude of 2000 m (Ximenez, 1970). It is a mainly terrestrial and nocturnal animal, preying on small mammals, especially guinea

pigs, and ground-inhabiting birds. It has also been known to attack domestic poultry (Guggisberg, 1975).

THREATS TO SURVIVAL Very little information available.

Argentina Thought to have been naturally quite rare; however hunting pressure was believed to be a major threat and the species was becoming increasingly uncommon (Ojeda and Mares, 1982). The extent of habitat destruction and alteration varied considerably from region to region (Argentina CITES MA, 1986). Significant numbers of skins were exported from Buenos Aires during the 1970s, although this trade represented less than one percent of the total value of wildlife exports (Mares and Ojeda, 1984).

Bolivia No information.

Brazil No information.

Chile Threatened primarily by loss of habitat and also by exploitation for meat and skins, sport hunting and predator control (Miller *et al.*, 1983).

Ecuador No information.

Paraguay Potentially threatened by the skin trade (Acevedo, 1987).

Peru Not subject to commercial hunting owing to the low value of skins, thought to be quite tolerant of the effects of human population increase (Grimwood, 1969).

Uruguay No information.

INTERNATIONAL TRADE This species was not included in the recent study of the trade in neotropical cat skins (Melquist, 1984). However considerable numbers are known to have entered international trade. A total of 78 239 specimens was reported to have been exported from Buenos Aires, Argentina, between 1976 and 1979 inclusive, with a value of US$1.8 million; this represented less than one percent of the total value of wildlife exports during this period (Mares and Ojeda, 1984). The trade reported by CITES Parties is detailed below.

Table 1. Apparent minimum net imports of *F. colocolo* skins reported to CITES, 1980-85. A skin plate (pl.) is made up of an unspecified number of skins which may, from examples involving other species, include about ten skins.

	1980	1981	1982	1983	1984	1985
Germany, F.R.	9150	4296	-	361	-	-
Spain	1240	-	11 pl.	-	-	-
Switzerland	649	2	42	-	-	-
USA	7	1	-	-	-	-
Total	11046	4299	42+11 pl.	361	0	0

It can be seen that the number of skins in trade decreased sharply over this period. The only skins reported to have been traded after 1982 were 361 which were re-exported from France to the Federal Republic of Germany and then apparently returned to France in 1983. After 1981 the number of skins reported to have been traded was negligible.

Table 2. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions in skins of *Felis colocolo* reported to CITES. The figures in parentheses show for countries with wild populations of the species, the number of specimens reported to have been exported directly by that country.

	1980	1981	1982	1983	1984	1985
Countries with wild populations of *Felis colocolo*						
Argentina	2180 (2132)	3866 (3866)	42 + 11 pl (0)	-	-	-
Bolivia	7 (7)	-	-	-	-	-
Paraguay	8201 (8201)	433 (433)	-	-	-	-
Uruguay	10 (0)	-	-	-	-	-
Countries without wild populations of *Felis colocolo*						
Canada	648	-	-	-	-	-
Unknown	1388	2	-	-	-	-

Table 2 shows that after 1981 the number of skins reported to have been traded was negligible. This is coincident with the instigation of legal protection in Argentina. Before this the main sources of skins were Argentina and Paraguay. The main importing countries were Federal Republic of Germany and, to a lesser extent, Switzerland and Spain.

Although it is likely that a large number of skins of this species did enter trade during the 1970s, there is no evidence that large scale commercial trade existed before that time and the trade seems to have declined sharply since the species was protected in Argentina. In early 1987, the trade ban in Argentina was lifted for three months to allow traders to dispose of old stocks of felid skins (Villalba-Macias, *in litt.*, 1986). During that period exports of 15 865 *F. colocolo* skins were authorised, but the actual number which left the country remains unknown (Broad, 1987). Two sources of information in the German skin trade reported that this species had never been of great importance to the fur trade (Fehns, *in litt.*, 1986; Langenberger, *in litt.*, 1986). However, the import into the EEC of all of the commonly traded small neotropical cats except *Felis colocolo* was prohibited in October 1986 (Anon., 1987). Therefore, if exports from Argentina are resumed in the future, this species may be subject to increased demand from the European market.

Felis colocolo

CONSERVATION MEASURES

Table 4. Legal prohibition on the hunting, internal trade and commercial export of *Felis colocolo*. Dates are those on which the legislation came into force. ? - no information (Fuller *et al.*, 1987).

	CITES	Hunting	Trade	Export
Argentina	1981	1981	1981	1981
Bolivia	1979	1979	1979	1979
Brazil	1975	?	1967	1967
Chile	1975	1972	1972	1972
Ecuador	1975	-	-	1972
Paraguay	1977	1975	1975	1975
Peru	1975	1973*	1977	1977
Uruguay	1975	1978	1978	1978

* - within the Selva region only.

The effectiveness of these controls varies greatly from country to country. The enforcement of the export ban in Paraguay, in particular, was erratic for a number of years; however controls improved significantly in 1982 (Fuller *et al.*, 1987). The species is known to occur in a large number of protected areas (Anon., 1982).

CAPTIVE BREEDING An total of 8 animals were bred between 1972 and 1981 in collections reporting to the International Zoo Yearbook. In 1982 there were 19 animals in 7 collections, 10 of which were stated to have been captive-bred (Duplaix-Hall, 1974-1975; Olney, 1976-1983).

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GEOFFROY'S CAT

Recommended list: 2
[Possible problem]

Felis geoffroyi D'Orbigny and Gervais, 1844

Order CARNIVORA

Family FELIDAE

SUMMARY AND CONCLUSIONS A mainly terrestrial, nocturnal inhabitant of scrub woodland and open bush country, with a varied diet of small mammals and birds. Its distribution is largely within Argentina and it has been described as quite common throughout much of its range. Population sizes are however unknown, and status information is largely based on general comments. Reportedly threatened by habitat destruction and alteration and to a lesser extent over-harvest. The species is protected throughout its range although the extent to which these controls are effective is difficult to assess.

Exports from Argentina in the late 1970s averaged over 80 000 skins each year. Large numbers of skins have been reported in trade by CITES Parties in recent years, averaging almost 55 000 each year between 1980 and 1984, although the number reported as direct exports from countries with wild populations of the species decreased significantly over the period. By 1984 the number of skins in trade with origin Paraguay, previously the major source country, had decreased considerably, however large numbers of skins were reported to have been exported from Bolivia. The number of skins reported in trade by CITES Parties in 1985 dropped to under 2000, therefore it seems likely that the trade is in decline. A large stock-pile of skins was exported from Argentina in early 1987, but otherwise no legal source of skins of this species remains.

There are no detailed assessments of the population inhabiting any of the countries in the range of this species, therefore the effect of such trade cannot easily be assessed. The 1986 ban on imports of this species into the EEC effectively cuts off the major market from the source countries. The volume of trade is likely to continue to decline and, at present, insufficient information us available upon which to assess the potential for sustainable harvest and trade.

DISTRIBUTION From the Bolivian Andes and the mountains of north-western Argentina, through the Gran Chaco to Uruguay and southern Rio Grande do Sul in Brazil, south through the length of Argentina to the Rio Gallegos in Patagonia (Guggisberg, 1975). A great deal of confusion has surrounded the designation of subspecies. Ximenez (1975) recognises four, distributed as follows.

Felis geoffroyi euxantha Pocock, 1940. Andes of Bolivia (Cabrera, 1957)

Felis geoffroyi geoffroyi In Argentina from south of Azul in the province of Buenos Aires south through pampas and forest areas to the far south of Patagonia (Ximenez, 1975). Marginally in the pampas of southern Chile along the border with Argentina (Miller *et al.*, 1983). This includes the fifth subspecies *leucobapta* claimed by Cabrera (1957).

Felis geoffroyi paraguae Pocock, 1940. Substantially extended by Ximenez (1973) to include the chaco of northern Argentina and the areas of Santa Fe and Entre Rios west of the border with Uruguay. The far south of the state of Rio Grande do Sul in Brazil (Cunha Vieira, 1955). Throughout the chaco (Wetzel and Lovett, 1974) and southern regions (Ximenez, 1975) of Paraguay and the whole of Uruguay (Ximenez, 1973).

Felis geoffroyi salinarum Thomas, 1903. Montane zone of north-west Argentina from Jujuy and Salta to Mendoza and San Luis (Cabrera, 1957).

POPULATION There are no estimates of the population inhabiting any of the countries where this species occurs; only general comments on status and abundance are available. Melquist (1984) reported that the species was generally considered common and widespread in all countries except Chile, although it was also recognised that populations were decreasing throughout the range. Koford (1973) described the species as fairly common.

Argentina Uncommon in Salta province in the north-west (Mares *et al.*, 1981) and in general scarce but widespread (Argentina CITES MA, 1986), although Melquist (1984) reported it to be quite common throughout most of the country and the national wildlife conservation legislation (Resolution 144) lists this species as 'in no danger'.

Bolivia Population and status unknown.

Brazil Described by Koford (1973) as generally common. However the population size and status are otherwise unknown.

Chile Status inadequately known although possibly vulnerable due to intensive hunting in the past (Miller *et al.*, 1983). The amount of favourable habitat was reported to be minimal (Melquist, 1984).

Paraguay The most common spotted cat in the chaco (Melquist, 1984).

Uruguay Relatively common throughout the country, certainly the most common cat species (Ximenez, 1973).

HABITAT AND ECOLOGY An inhabitant of mountainous terrain (Denis, 1964), of scrub woodlands and open bush country in both plains and foothill areas (Guggisberg, 1975). It is mainly, but not exclusively, terrestrial (Koford, 1973) and has few predators other than man. Reported to be largely nocturnal, preying on birds such as *Myiopsitta monachus* and *Nothura maculosa* and mammals such as *Oryzomys* and *Cavia*. Recorded between sea level and 3300 m in Bolivia. A single litter is produced each year usually of two or three young, births having been recorded between December and May in Uruguay (Ximenez, 1975).

THREATS TO SURVIVAL Reported to be versatile and tolerant of moderate deforestation (Koford, 1973). Respondents to a questionnaire survey covering most South American countries suggested that habitat disturbance, followed by overharvest and human disturbance, were the main threats to the species. The clearing of large tracts of Chaco forest for cattle ranches in Paraguay was emphasised as a problem. Heavily harvested in the past throughout its range, however hunting has reduced in recent years (Melquist, 1984). Melquist concluded that sustainable harvesting of *Felis geoffroyi* was probably feasible.

Argentina A total of 341 558 specimens of this species were exported from Beunos Aires between 1976 and 1979 inclusive, with a value of US$8.7 million; this represented about four percent of the total value of wildlife exports during this period (Mares and Ojeda, 1984). Gonzalez (Argentina CITES MA, 1986) reported that the species inhabited a wide variety of habitat types and that the extent of habitat destruction and alteration varied from region to region.

Brazil Likely to be dependent on gallery forests in Rio Grande do Sul; poaching and habitat loss were the major threats (Melquist, 1984).

Chile Reported to have the most valuable pelt of the Chilean cats; intensively hunted in the past wherever it occurred (Miller *et al.*, 1983).

Felis geoffroyi

Paraguay Hunting and commercial trade were extensive until the late 1970s. It has been suggested that Paraguay may remain a centre of illegal trade although the harvest was believed to have reduced considerably. Habitat loss remained a problem, especially in the east of the country (Melquist, 1984). Potentially threatened by the skin trade (Acevedo, 1987).

Uruguay A number of garments made of skins of this species were identified in shops in Montevideo. Retailers stated that the skins were obtained in the north and north-east of the country (Melquist, 1984). In March 1986 large numbers of skins were confiscated from fur shops in Motevideo when it was found that identification stamps were false (Anon., 1986).

INTERNATIONAL TRADE Exports from Argentina of skins of this species totalled over 341 000 between 1976 and 1979 (Mares and Ojeda, 1984). A study of the German trade reported that *Felis geoffroyi* seemed to have been increasingly heavily exploited since 1978, when Paraguay began to replace Brazil as the main supplier of cat skins to the world market. In 1981 over 70 000 skins of this species were imported into F.R. Germany alone. The report noted that in 1982 there was a marked decrease in the number of these skins reported by CITES Parties as imports from Paraguay (Caldwell, 1984).

Table 1. Apparent minimum net imports of *F. colocolo* skins reported to CITES, 1980-85. Figures represent numbers of skins unless otherwise indicated.

	1980	1981	1982	1983	1984	1985
Argentina	-	3491	-	-	-	-
Austria	79	237	318	331	66	67
Belgium	2327	-	79	-	1000	-
Cyprus	-	-	22	-	-	-
France	5	-	-	-	14844	1683
Finland	-	-	-	10	-	-
Germany, F.R.	51612	76802	15874	77605	3544	-
Greece	3819	-	5412	-	-	-
Italy	6470	2861	32	-	2365	-
Japan	-	-	-	1	363 kg	-
Luxembourg	-	-	32	-	-	-
Malta	7	-	-	-	-	-
Monaco	-	-	-	25	-	-
Netherlands	-	-	-	2	-	-
Singapore	-	-	-	1	-	-
Spain	424	908	761	302	653	-
Switzerland	-	-	-	-	-	1
UK	1871	-	-	-	-	-
USA	1	601	3	1	1	-
Total	66615	84900	22533	78278	22473	1751
	-	-	-	-	+ 363 kg	

According to CITES data (tables 1 and 2), the volume of world trade during these years can be seen to have fluctuated considerably. The number of skins recorded in trade in 1985 was far lower than that recorded in any of the other years. Further years' data are required to assess whether this indicates a real decline in the trade in this species. The major source of the skins in trade was Paraguay and to a lesser degree Argentina. The decline to 1982, noted by Caldwell (1984), was not sustained, and large numbers of skins of Paraguayan origin were reported in trade in 1983.

Table 2. Reported countries of origin (or exporting country if no origin reported) and numbers of skins of *F. colocolo* reported to CITES. The figures in parentheses show, for countries with wild populations of the species, the number of skins reported to have been exported directly by that country.

	1980	1981	1982	1983	1984	1985
Countries with wild populations of *Felis geoffroyi*						
Argentina	8124	1233	3126	8	2024	-
	(7351)	(1233)	(1)	(8)	(0)	
Bolivia	-	1	-	3310	13844	1751
		(1)		(3310)	(13844)	(1683)
Paraguay	58767	81871	21137	84921	4500 + 363 kg	-
	(58667)	(72725)	(8500)	(3000)	(363 kg)	
Countries without wild populations of *Felis geoffroyi*						
Belize	-	-	2	-	-	-
Canada	151	10	-	-	-	-
France	28	-	-	-	-	-
Germany, F.R.	349	14	-	-	-	-
Nicaragua	-	-	-	1	-	-
UK	-	2079	-	-	-	-
United States	-	-	-	-	1000	-
Unknown	1388	1633	843	10130	4319	-

Since 1982 the number of skins reported each year as direct exports from countries with wild populations of the species has decreased considerably, despite a large number having been exported from Bolivia in 1984.

It can be seen that the Federal Republic of Germany was the major consumer of skins during these years. The decrease in the numbers of skins imported in 1984 and 1985 reflects the lack of legal sources to supply the trade in those years. In early 1987 Argentina authorised exports of old stocks of felid skins, including over 65 000 skins of *Felis geoffroyi*. However the number of skins which were finally exported is not known (Broad, 1987).

CONSERVATION MEASURES

Table 4. Legal prohibition on the hunting, internal trade and commercial export of *Felis geoffroyi*. Dates are those on which the legislation came into force. ? - no information (Fuller *et al.*, 1987).

	CITES	Hunting	Trade	Export
Argentina	1981	1981	1981	1981
Bolivia	1979	1979	1979	1979
Brazil	1975	?	1967	1967
Chile	1975	1972	1972	1972
Paraguay	1977	1975	1975	1975
Uruguay	1975	1978	1978	1978

The effectiveness of these legislative controls varies greatly from country to country. The enforcement of the export ban in Paraguay was erratic for a number of years; however controls improved significantly in 1982 (Fuller *et al.*, 1987). On the basis of the declared countries of origin of skins in trade (Table 2), the majority of the trade has been illegal. In October 1986 the EEC prohibited the import of skins of *Felis geoffroyi* (Anon., 1987).

Known to occur in a large number of protected areas (Anon., 1982).

CAPTIVE BREEDING An annual average of 12 animals were bred between 1972 and 1981 in collections contributing to the International Zoo Yearbook (Duplaix-Hall, 1974-1975; Olney, 1976-1983).

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EURASIAN LYNX

Recommended list: 2
[Possible problem]

Felis lynx Linnaeus, 1758

Order CARNIVORA

Family FELIDAE

SUMMARY AND CONCLUSIONS A widely distributed forest predator found throughout large areas of Europe and temperate Asia restricted in many parts of its range by human activity to remaining mountainous and wooded areas. Extensively persecuted by man for its valuable fur and because it has been considered a pest of game animals and livestock. It has been over-hunted in the past in many areas, especially in Europe, where remaining and reintroduced populations are small but now largely protected and stable.

Between 1980 and 1984 the number of skins in trade averaged just over 2000 each year. However, net trade reported for 1985 totalled over 12 000 skins. The main source countries were China and the USSR; exports from both of these countries increased markedly in 1985. A small number (< 30) of live animals were recorded in trade each year, mostly for zoological purposes and many recorded as captive-bred.

In most areas hunting, both legal and illegal, has been identified as a threat to the species; however most of the skins in international trade originated in China and USSR, where the population sizes are unknown but probably large, while the number of skins traded has been comparatively small. The population in the USSR has been described as stable while the Chinese population is thought to have declined somewhat. Little is known of the management of the harvest of the species in either country. Considering the decreasing number of felid species now available to the fur trade and the apparent increase in the number of *Felis lynx* skins in trade in 1985, the harvest of and trade in this species should be closely monitored in the future.

DISTRIBUTION Distribution encompasses the entire taiga forest from Scandinavia to east Siberia, montane forest in Europe (formerly widespread but now confined to Balkans and Carpathians), Caucasus, Asia minor, Kopet Dag and east to Manchuria, Kansu, Tsaidam and south-east Tibet; the island of Sakhalin and perhaps Sardinia (Corbet, 1978).

The taxonomy of the lynx is a matter of some controversy, both at specific and generic level. Many authorities include lynx in the genus *Felis* (subgenus *Lynx*) (Corbet, 1978) though others consider *Lynx* a separate genus (Honacki *et al.*, 1982; Werdelin, 1981). The lynx has generally been considered monospecific, as *Felis lynx* or *Lynx lynx*, (Corbet, 1978; McCord and Cardoza, 1982), although both the Nearctic and Iberian populations are sometimes treated as separate species, *canadensis* and *pardina* respectively (Honacki *et al.*, 1982). Recent research by Werdelin (1981) supports the use of these separate species. CITES recognizes three species, all as *Felis*, and therefore this usage is followed here, *Felis lynx* thus being taken to comprise Eurasian Lynx populations except that in Iberia.

A large number of subspecies have been described by a variety of authors and there is certainly a good deal of evidence to suggest that clear differentiation between geographical populations should be possible (H. Hemmer, *in litt.*, 1987). However, a satisfactory review of the nomenclature is not yet available, therefore Corbet (1978) is followed here. Excluding *pardina*, Corbet tentatively recognizes three subspecies: *Felis lynx lynx* (boreal forest and Carpathians); *Felis lynx sardiniae* Mola, 1908 (Sardinia); and *Felis lynx isabellina* Blyth, 1847 (Mountains of Central Asia); however he considers *F. l. isabellina* to be possibly invalid, and the

existence of any lynx on Sardinia is considered doubtful by many (Festetics, 1978).

Felis lynx lynx

Albania Occurring in mountainous areas along the eastern border (Kratochvil, 1968c).

Austria Not found in the province of Vorarlburg in the past century. The most recent record for Oberösterreich was in 1980 but it is generally considered extirpated from the country (Austria CITES MA, 1986). Reintroduction was attempted in the Steiermark area (Festetics, 1978).

China Bangjie (1984) reported that in the north the lynx was found in the Greater and Lesser Xinan-ling ranges in the northern parts of Inner Mongolia and Manchuria; to the west it was found in the Altai and Tianshan mountains in Xinjiang; to the south it occurred in the Himalayas in Tibet and the mountains in western Sichuan. It was also found in Chinghai, Gansu, Ningxia, Shanxi, Shaanxi, Habei and eastwards to Jilin (this description included *Felis lynx isabellina*). Some controversy surrounds the designation of the populations in China. Some Chinese zoologists believe that all of the animals in the country are *F.l. isabellina* while others state that the populations in Manchuria, Inner Mongolia and north-west China should be *F.l. lynx*.

Czechoslovakia Reported to occur in eastern regions in the Carpathians, Slovakia (Kratochvil, 1968a). Reintroduced into the south-west of the country in the early 1980s (U. Wotschikowsky, *in litt.*, 1987).

Federal Republic of Germany Occasional occurence reported in Bavaria of animals from Czechoslovakia, but no resident population remains (F.R. Germany CITES MA, 1986). There have been a number of unsuccessful reintroduction attempts, most recently in the Bayerischer Wald National Park, Bavaria (Kempf *et al.*, 1979).

Finland Occurred sporadically throughout much of the country (Pulliainen, 1968). The main population was reported to occur in the eastern and north eastern parts of the country (L. Blomquist, *in litt.*, 1987).

France A few isolated populations have been reported in the Pyrenees (Fayard *et al.*, 1984). Reintroduced in 1983 and 1987 in Vosges (V. Herrenschmidt, *in litt.*, 1987; U. Wotschikowsky, *in litt.*, 1987). The species also occurs in the Jura region (départements of Haute-Savoie, Ain, Jura and Douns) and in the French Alps (départements of Savoie and Haute-Savoie); these animals are thought to have originated from the reintroduced population in Switzerland (V. Herrenschmidt, *in litt.*, 1987).

German Democratic Republic A few were reported to remain in the south and east of the country (Festetics, 1978), but no recent records are known and it is unlikely that the species still occurs in the country (U. Wotschikowsky, *in litt.*, 1987).

Greece A few remained in the northern areas bordering Albania and Yugoslavia (Festetics, 1978).

Iran Believed to occur, as skins were abundant in the Tehran fur market (Lay, 1967).

Iraq It was reported to be found in the mountains of Kurdistan in the north (Harrison, 1968).

Felis lynx

North Korea Reported to occur (Won Pyong-Oh, 1976).

Norway Widely distributed (Myrberget, 1968).

Poland Described as occurring in restricted areas of the north-east and more abundantly in areas along the south-eastern border (Haber and Matuszewski, 1968).

Romania Found throughout the Carpathian mountain areas (Kratochvil, 1968b).

Spain Possibly found in the Pyrenees (Festetics, 1978). This record was reportedly based upon observations of tracks and its validity is open to question (Spain CITES MA, 1987). It has been suggested that, if a relict population does occur in the Pyrenees, it may represent an intermediate race between *Felis lynx* and *Felis pardina* (H. Hemmer, *in litt.*, 1987).

Sweden Recorded in 1968 as present throughout most of the country (Curry-Lindahl, 1968). More recently described as fairly widespread but declining (Sweden CITES MA, 1986).

Switzerland Reintroduced populations now exist in the Jura and Alpine regions (Switzerland CITES MA, 1985).

Syria Possibly present (Harrison, 1968), though not listed by Kumerloeve (1975) for that country.

Turkey Widespread but thinly distributed, more common in the east of the country (Mursaloglu, 1981). Reported by Turan (1987) to occur in regions south of the Sea of Marmara, in central and eastern regions bordering the Black Sea, in northern and western parts of central Anatolia, in the Mediterranean region and in southern Anatolian forests. Perhaps also found in west Anatolia and north Anatolia.

USSR Throughout the whole forest area, from the western border to the Pacific coast, although not always to the northern forest limit, and also in some areas of the Soviet Carpathians and Caucasus mountains (Novikov, 1968).

Yugoslavia Reported to occur sporadically in the south (Kratochvil, 1968c). Lynx were reintroduced in 1973 in Kocevje in the north-west (Kempf *et al.*, 1979). This reintroduced population now covers parts of Slowenia, Croatia and Bosnia (U. Wotschikowsky, *in litt.*, 1987).

Felis lynx sardiniae

This subspecies was based on a report in 1908 in Sardinia (Mola, 1908); however some authors suggest that the specimen may have been misidentified, being in fact *Felis libyca sarda*, Sardinian wild cat (Festetics, 1978).

Felis lynx isabellina

Afghanistan Reported to occur in the Hindu Kush, Nuristan, Wakhan and the Pamirs (Anon, 1981a). Naumann and Niethammer (1973) noted two skins of *Felis lynx* from south of Sarhad, Wakhan and near Shaur, Greater Pamir.

Bhutan Reported to occur (Festetics, 1978).

China Reported as occurring in the Qiangtang plateau region of Tibet (Zheng Zuoxin *et al.*, 1981), however the division northwards with *Felis lynx lynx* was unclear. Bangjie (*in litt.*, 1987) reported that many Chinese zoologists treat the whole Chinese population as *F.l. isabellina* but that others

believe that only the southern populations should be classified as this subspecies.

India Reported to occur in Gilgit and Ladakh in North Kashmir (Anon, 1981b).

Mongolia Stated to be distributed in the taiga forest of the Hentei and Hovsgol and the Hangaii mountains, the mountains of Transaltai, Gobi and Hinguan (Mallon, 1985).

Nepal Reports were restricted to the Dhauligiri region (Fox, 1985) and Mustang district (Mitchell and Derksen, 1976).

Pakistan Described as very thinly distributed throughout the northern regions of Chitral and inhabiting most districts of Gilgit as well as Balistan; it was also reported to probably occur in the Indus Kohistan region and into the northern alpine region of Hazara district (Roberts, 1977).

USSR Map in the USSR Red Data Book shows it as occurring in the highlands of eastern Turkestan, extending into the Tien Shan and the Pamirs (Bannikov and Sokolov, 1984).

POPULATION There are no estimates of the total world population of *Felis lynx*, and the availability and quality of information for each country vary considerably.

Afghanistan No population estimate, lynx were reported to be rare and in some areas severely threatened. Although reported to be of relatively minor importance to the skin trade (Rodenburg, 1977), populations have been depleted by hunting (Habibi, 1977).

Albania Miric (1978) estimated a combined total of 100 animals in Albania and Greece and Kempf *et al.* (1979) estimated a population of about 100 individuals. No other status information is available.

Austria A reintroduction of nine animals in 1977 in the Steiermark area (Kempf *et al.*, 1979) has been reported to be near failure due to over-hunting of the lynx and their dispersal into neighbouring countries (Wotschikowsky, 1983).

Bhutan No information.

China No overall population estimate. Bangjie (*in litt.*, 1987) reported that illegal hunting was not a great threat and that, although the population had undoubtedly declined, the species was not seriously endangered. The overall level of decline was thought to have decreased in recent years.

Czechoslovakia Hell (1968) stated that the lynx was not endangered in Czechoslovakia; that on the contrary, the population had increased excessively and losses to lynx of domestic livestock had increased. Kempf *et al.* (1979) reported a population of 500. The European Lynx Group stated that the Carpathian forests were fully inhabited with a total population in the country of about 400, now increasing following a decline in the early 1970s (Jackson, 1984). The reintroduced population of 5 animals in the south-west was reportedly doing well (U. Wotschikowsky, *in litt.*, 1987).

Federal Republic of Germany Lynx were reintroduced in 1970/71 in Bavaria but this population has reportedly declined due to illegal hunting and dispersal into Czechoslovakia (Kempf *et al.*, 1979). Occasional single animals reportedly enter Bavaria from Czechoslovakia (F.R. Germany CITES MA, 1986). In 1986 and 1987 one or two specimens were recorded in the Bavarian

Forest National Park which were thought to have originated in Czechoslovakia (U. Wotschikowsky, *in litt.*, 1987).

Finland The most recent population estimate was 550-600 in 1986, the population having recovered under protection from only about 100 animals in the late 1960s (L. Blomquist, *in litt.*, 1987). Some animals are thought to have migrated into Finland from the east due to a healthy population in the USSR (Pulliainen, 1968), but the numbers are thought to have been very small. The Ministry of Agriculture and Forestry hopes to allow the population to increase to 900-1000 animals (L. Blomquist, *in litt.*, 1987).

France The population in Jura is estimated as 5-15 animals, and a very small population remains in the Pyrenees. The growing Jura population was thought to have originated from reintroductions in Switzerland. In 1987 there were 7 animals in Vosges (V. Herrenschmidt, *in litt.*, 1987), about 5 were reintroduced in 1983 and 4 more in 1987 (U. Wotschikowsky, *in litt.*, 1987).

German Democratic Republic Festetics (1978) estimated the population to have been 10-15 in 1972; Kempf *et al.* (1979) reported 10-20 individuals, but no records are known from recent years and it is doubtful that the species still occurs in the country (U. Wotschikowsky, *in litt.*, 1987).

Greece Population size and status is unknown. Reportedly very rare in Greece with a combined total population of 100 in north-west Greece and eastern Albania (Miric, 1978). Kempf *et al.* (1979) estimated a population of no more than 20.

India No population estimate is available. Lynx were reported to be rare in Ladakh and Gilgit due to habitat destruction and human persecution (Anon, 1981b). Osborne *et al.* (1983) stated that lynx were local and rare in Ladakh, few live animals were observed but some pelts were on sale. A recent survey found evidence of lynx in Markha Valley, Ladakh; sizeable areas of suitable habitat reportedly remained (H.S. Panwar, *in litt.*, 1987).

Iran No population estimate. In the 1960s pelts were abundant in the Tehran fur market (Lay, 1967).

Iraq No information.

North Korea No information.

Mongolia Reported as rare in some parts of its range, although the population size was unknown (Mallon, 1985).

Nepal No information available.

Norway Lynx were practically extinct in 1930 (Merberget, 1968). Recent estimates of population size vary from 150 to 700 animals (Jackson, 1984).

Pakistan No estimate of the population size is available. Described as rare (Pakistan CITES MA, 1986). Roberts (1977) reported that lynx were uncommon, even in remote regions, and that the skins were highly prized by hunters.

Poland Population estimates vary; Haber and Matuszewski (1968) reported an increase from extreme rarity in the 1940s up to about 330 individuals twenty years later; Kempf *et al.* (1979) estimated the population to be around 400-500 and more recently Jackson (1984) described a 'healthy' population of 600 animals. However, Wotschikowsky (*in litt.*, 1987) thought that the latter estimate was too high.

Romania The population size was thought to be about 1000 individuals by the 1960s, and in 1962 hunting was permitted to control the growing population (Kratochvil, 1968b). No recent population estimates are available.

Spain The occurrence of *Felis lynx* in the Spanish Pyrenees is uncertain (Festetics, 1978).

Sweden The population was reported to have increased from near extinction in 1930 to 400 animals in the early 1960s owing to total protection during the 1930s and 1940s and more recently up to about 700 (Jackson, 1984). A recent report, however, suggested that the population had probably declined somewhat in the early 1980's (Sweden CITES MA, 1986).

Switzerland Two reintroductions of animals from Czechoslovakia in the 1970s are thought to have been succesful (Wotschikowsky, 1983). Dollinger (Switzerland CITES MA, 1985) estimated the population in the Jura region to be 30-50, with a further 50-100 animals in the Alps. However, Wotschikowsky (*in litt.*, 1987) cited an estimate of 50 for the alpine population and claimed that 30-50 in Jura was an over-exaggeration.

Syria No information.

Turkey No information.

USSR The USSR has the largest lynx population, spread from the Pacific coast to the western border, with isolated populations in the Carpathians and central Asia. The total population size was estimated as 36 000 animals with the bulk of of this number distributed in Asia (Festetics, 1978). Novikov (1968) detailed the distribution and population of lynx in the western regions of the USSR, and stated that the species often reached high population density and did not seem to have been declining in overall numbers despite exploitation for the fur trade.

Yugoslavia Kempf *et al.* (1979) estimated a natural population of 220-300 in the south-east which was reported by Wotschikowsky (*in litt.*, 1987) to be increasing because the poisoning of wolves had been stopped. A reintroduction attempt in 1973 in Slovenia has been reported to have been successful, the population in the area was reported to have reached 40-50 animals (Kempf *et al.*, 1979) despite over 100 animals having been hunted, trapped or killed by traffic by 1985 (U. Wotschikowsky, *in litt.*, 1987).

HABITAT AND ECOLOGY The lynx is a forest predator reported to have a preference for old high-timbered forest with dense undergrowth, however it is known to colonize a variety of other habitat types (Guggisberg, 1975). In Pakistan, for example, the lynx is associated with alpine slopes above the treeline in mountainous areas (Roberts, 1977). A solitary animal, pair formation only taking place for a brief period during the mating season. It is territorial, territories ranging in size between 1000 ha and 10 000 ha (Kempf *et al.*, 1979) and sometimes as large as 20 000 ha (Pfeffer, 1979), depending on prey abundance and habitat type. Telemetry studies in the Alps indicated that territories may be far larger than previous reports had suggested; certainly larger than 100 000 ha (Haller and Breitenmoser, cited by Wotschikowsky, U., *in litt.*, 1987). In the Carpathian mountains of eastern Europe the species has been seen at altitudes ranging from 150 m to 2000 m, however 700-1100 m was thought to be optimal (Kempf *et al.*, 1979). In the Gobi Altai range it is not found much higher than the timberline at 1800 m (Guggisberg, 1975); however in Tibet, northern India, and Pakistan *Felis lynx isabellina* is reported to migrate in summer to high alpine slopes up to 4500 m (Guggisberg, 1975; Roberts, 1977). The lynx is very discreet, largely nocturnal and rarely seen. Peak activity is in the early morning and late

evening, lynx are rarely seen in broad daylight (Kempf *et al.*, 1979). Diet seems to vary greatly, including hares, rabbits, other carnivores such as foxes, feral cats, pine and stone martens, rodents and larger mammals especially roe and fallow deer (Pfeffer, 1979) and chamois (Wotschikowsky, U., *in litt.*, 1987). In northern Sweden, the main prey was the reindeer (Bjärvall and Lindström, 1984). Birds make up a significant proportion of the diet in some cases. It is also widely recognised that domestic sheep and goats make up part of the diet of some animals, the extent of this habit is reported to be minimal (Pfeffer, 1979); however this is one of the main reasons for human persecution. Breeding takes place from the end of February to early April. Gestation takes 67 to 74 days and one to four, usually two, young are produced. Sexual maturity is reached after 21-30 months and the average life-span in the wild is 10-15 years (Kempf *et al.*, 1979).

THREATS TO SURVIVAL *Felis lynx* was formerly distributed over all of Europe and most of temperate Asia (Guggisberg, 1975), however in many parts of its range populations have been restricted by human activity to remaining mountainous and wooded areas. Prey abundance related population trends are reported to be common, although mainly on a local scale (Guggisberg, 1975). The lynx, being mainly a forest dweller, is sensitive to deforestation, and has lost a large amount of habitat due to clearance for agriculture, construction and fuel. It has also been hunted extensively for its valuable fur and persecuted by hunters and farmers, being considered a pest of game animals and livestock (Smit and Wijngaarden, 1976). Hunting is reported to involve shooting, steel leg-hold traps and poisoning (Hell, 1968; Festetics, 1978). In many of the northern and eastern European countries where natural lynx populations survive, hunting, where allowed, seems to have been mainly a control stategy rather than a large scale collection of furs (Kratochvil, 1968; Myrberget, 1968). Internal trade within many countries, for example the USSR, is significant (Novikov, 1968) but cannot easily be quantified. There have been various reports descibing trade in individual countries.

Afghanistan A survey in 1976 of skin dealers in Kabul found skins and garments thought to represent 111 animals. One shop owner estimated a total annual trade in the area of 200-250 skins. Afghanistan exported 943 skins between 1971 and 1974, when a three year export ban was implemented (Rodenburg, 1977).

Austria Reintroduction attempts have been disrupted by illegal hunting (Wotschikowsky, 1983).

China Furs were reported to command higher prices than those of other small felids, the annual collection in the early 1950s was estimated to have been 1000-1500 skins (Bangjie, 1984), which is quite similar to the more recent gross exports from the country reported by CITES Parties. Despite legal protection, illegal hunting is reportedly widespread. Bangjie (*in litt.*, 1987) found at least 10 skins on sale in December 1986 near Xining, Qinghai Province. Prices varied between Y800 to Y1000 (US$220-270).

Czechoslovakia In recent years about 30 animals were reported to have been shot legally each year, however this number sometimes reached 100 per year (Wotschikowsky, 1983; *in litt.*, 1987).

Federal Republic of Germany Reintroduction attempts have been threatened by illegal hunting (Wotschikowsky, 1983).

Finland Special hunting licences are granted in some areas where over-population is diagnosed; controlled hunting of an average of 10-20 animals is allowed each year (L. Blomquist, *in litt.*, 1987).

India Reportedly threatened by hunting and widespread removal of scrub for fuel in Ladakh (Osborne *et al.*, 1983).

Mongolia The annual trade was reported to involve 450 skins (Mallon, 1985).

Norway Wotschikowsky (1983) reported that licensed hunting was allowed of about 50 animals each year. More recently only about 20 animals a year have been killed during the hunting season (Norway CITES MA, 1987).

Pakistan Skins are highly prized by traders, and hunting is reported in the Gilgit and Chitral areas (Roberts, 1977).

Poland About 35 animals are hunted legally each year; the numbers allowed are based on local population estimates (Wotschikowsky, 1983).

Romania Legal hunting amounted to about 100 animals annually in the 1970s (Festetics, 1978).

Sweden Legal hunting during the open season numbers about 50 animals each year (Wotschikowsky, 1983; Sweden CITES MA, 1987); however in the early 1980s only 10-20 animals were shot annually. Hunting pressure and perhaps sarcoptic mange, which is common in the red fox (*Vulpes vulpes*), were reported to be the main causes of the recent population decline (Sweden CITES MA, 1986). A 10-year study in the northern boreal region of Norrbotten, which started in 1974 concluded that the main cause of the decline in that area had been hunting pressure; no evidence of sarcoptic mange was found. It was hoped that the reduced hunting season introduced in 1983 might remedy the decline (Bjärvall and Lindström, 1984).

Switzerland About 15 animals died during the late 1970s as a result of poaching, defence of property and road and rail accidents (Switzerland CITES MA, 1985).

Turkey Hunted for its valuable fur. Such hunting is allowed throughout the year (Turan, 1987).

USSR Novikov (1968) described a considerable skin trade in the western regions of the USSR, concluding that on the whole the population was not declining as a result. Advertisements in Fur Review of the skins on sale at the Leningrad International Fur Auctions, held three times each year, indicate that in 1986 and 1987 between 1000 and 1500 lynx skins were offered at each auction. These skins may have been obtained in other countries as well as within the USSR; the actual number sold at each auction is unknown.

Yugoslavia The poisoning of wolves was a considerable threat to the population in the south-east however this practice was stopped (U. Wotschikowsky, *in litt.*, 1987).

INTERNATIONAL TRADE The only information obtained on trade involving *F. lynx* was contained in the reports of CITES Parties. Owing to changes of the adopted nomenclature, CITES trade data for *Felis lynx* for the years 1980-83 include many transactions which in fact refer to *Felis canadensis*. To exclude these, all transactions with Canada or the United States as the reported exporter or origin were deleted from the data analysed. It is, however, possible that some transactions could still refer to this taxon.

Recorded trade included live specimens, skins and skin plates of this species. Only the trade in skins has been analysed in detail in this account. An average of approximately 25 live animals were recorded in trade each year, most of which were reported to be for zoological purposes and many were

reported to have been captive-bred. Skin plates were excluded from the analysis as they were quite small in number.

Table 1. Net skin imports reported for the years 1980-1985. The total of these net imports can be used as an estimate of the minimum volume of world trade.

	1980	1981	1982	1983	1984	1985
Australia	-	-	-	17	-	-
Austria	46	45	-	34	-	44
Belgium	-	-	421	74	-	11
Bulgaria	-	53	-	-	-	-
Canada	-	-	-	-	590	2547
China	-	-	-	-	228	-
Denmark	10	32	-	4	7	85
Finland	85	-	227	-	615	2108
France	162	95	67	25	44	256
Germany, F.R.	94	642	1424	666	256	725
Greece	42	-	-	-	-	-
Hong Kong	-	-	-	-	242	758
Ireland	-	-	-	1	-	-
Italy	62	48	980	172	143	254
Japan	-	6	-	-	-	201
Luxembourg	-	31	9	-	-	-
Norway	-	-	-	80	1	1
Panama	75	-	-	-	-	-
South Africa	-	-	8	-	-	-
Spain	-	-	23	-	-	-
Sweden	-	18	-	-	-	79
Switzerland	107	-	-	-	-	2385
Taiwan	-	-	-	-	1	866
UK	238	508	-	241	-	-
USA	30	609	86	419	1372	1775
Unknown	-	-	-	-	-	44
Total	951	2087	3245	1733	3499	12139

Net imports in the years 1980-1984 fluctuated below 3500 skins per year but the numbers recorded in trade increased markedly in 1985. Over the six-year period the major importers were the USA, Canada and a number of western European countries (F.R. Germany, Italy, the UK and Switzerland).

The volume of trade reported was far smaller than that recorded for *Felis canadensis* by CITES Parties in recent years.

The main source countries were China and the USSR. Small numbers of skins originated in other countries with wild populations of the species. The increase in the volume of world trade in 1985 was apparently caused by significant increases in exports from both China and the USSR.

Some trade was reported to sub-specific level but as there was no obligation for Parties to do so, it is not worthwhile analysing these data seperately to any greater extent than recognising that skins of *Felis lynx isabellina* were in trade.

Table 2. Recorded origin, or where no origin was given, the exporter, of the skins in trade. When skins have been exported to an intermediate country and subsequently re-exported, the minimum net trade was calculated, ensuring that the numbers were only recorded once. The table therefore shows, for each year, the minimum number of skins in trade from each country of origin. The figures in parentheses show, for countries with wild populations of the species, the number of skins reported to have been exported directly by that country.

	1980	1981	1982	1983	1984	1985
Countries with wild populations of *Felis lynx*						
Albania	-	-	-	8	1	1
				(4)	(1)	(1)
China	-	1253	936	769	2355	7860
		(375)	(936)	(769)	(2034)	(7632)
Finland	8	-	-	-	1	11
	(4)				(1)	(11)
German D.R.	13	-	-	-	-	-
	(0)					
Germany, F.R.	-	41	-	-	-	-
		(41)				
Mongolia	183	73	20	-	20	-
	(0)	(0)	(9)		(0)	
Sweden	1	-	-	-	39	1
	(1)				(39)	(1)
Switzerland	1	-	1	-	555	-
	(1)		(0)		(0)	
Turkey	-	-	-	-	-	2
						(2)
USSR	864	800	1488	337	1051	4114
	(833)	(687)	(1388)	(255)	(1015)	(4114)
Countries without wild populations of *Felis lynx*						
Belgium	-	332	-	71	-	-
Denmark	-	23	-	-	213	121
Italy	156	747	-	-	-	-
UK	-	-	-	-	1	54
USA	-	-	7	-	-	-
Unknown	59	119	1168	715	361	233

CONSERVATION MEASURES In much of Europe the main conservation measure for lynx has been reintroduction into suitable areas. Such projects have created considerable interest in lynx conservation. Several symposia have been held covering surviving populations and reintroduction schemes (Wotschikowsky, 1978; Festetics, 1978; Magniny, 1979). Opposition to reintroduction projects has mainly come from local hunters, due to traditional distrust of big game and its effects on other game populations (Novakova, 1979) and from farmers fearing loss of livestock (Pfeffer, 1979). Participants at symposia, and a number of government hunting authorities, have however stressed the fact that the presence of lynx has minimal effect on game populations and little effect on domestic livestock. Furthermore the susceptibility of lynx to rabies is believed to be low (Pfeffer, 1979). The lynx has been protected to varying degrees in a number of countries, those measures that are known are detailed below.

Felis lynx

Afghanistan A three-year ban on the sale and export of predator species and their remains was introduced in 1973 under Presidential Decree 628 of 26 December. It was reported that trade continued despite this ban (Rodenburg, 1977). No further controls since this ban are known.

Albania No information.

Austria Fully protected in Oberösterreich (Austria CITES MA, 1986). Reintroduction has been attempted in the Steiermark region (Kempf *et al.*, 1979).

Bhutan No information.

China The lynx was included on the list of protected species, however hunting has been reported to have continued without intervention as the protected status lacks legislative back-up (Jackson, 1984).

Czechoslovakia The lynx was reported to have been originally protected in 1934, in 1955 a closed season from 1 March to 31 July was declared in Slovakia (Hell, 1968).

Federal Republic of Germany Protected by the Game Law, with a closed season all year (Smit and Wijngaarden, 1976).

Finland The lynx has been protected since 1962 except in communes along the eastern border (Pulliainen, 1968). In 1968 the species was fully protected throughout the country and the population has recovered significantly since then. Special hunting licences may be obtained from the Ministry of Agriculture and Forestry in cases where local over-population is apparent (L. Blomquist, *in litt.*, 1987).

France Protected by law throughout the country (V. Herrenschmidt, *in litt.*, 1987). A number of groups are reported to be actively involved in promoting reintroductions (Kempf *et al.*, 1979). One reintroduction project was implemented in 1983 in Vosges (V. Herrenschmidt, *in litt.*, 1987). The 4500 ha Pyrenees National Park covers part of the range of lynx in the area (Fayard *et al.*, 1984).

German Democratic Republic No information.

Greece The lynx does not seem to be legally protected but it is reported to occur in the 450ha Paranest-Dramas National Park (Festetics, 1978).

India Fully protected from hunting by inclusion in Schedule I of the Wildlife Protection Act 1972. The hunting ban was reported to be difficult to enforce in Ladakh. A number of protected areas have been proposed in the area, which if implemented would provide further protection for the lynx (Osborne *et al.*, 1983; H.S. Panwar, *in litt.*, 1987).

Iran No information.

Iraq No information.

Mongolia Hunting was reported to be allowed from October 15 to March 1 under the Game Law of 1962 (Hibbert, 1967).

Nepal Protected from hunting and trade under an amendment to the National Parks and Wildlife (Protection) Act 1973.

Norway Lynx could be hunted throughout the year, although leg-hold traps

were not allowed. A bounty was reported to be paid for all lynx killed (Myrberget, 1968) but such payments are no longer made (Wotschikowsky, U., *in litt.*, 1987). Since 1982 hunting has only been allowed between 1 November and 15 April (Norway CITES MA, 1987).

North Korea No information.

Pakistan Totally protected from hunting (Pakistan CITES MA, 1986).

Poland Protected throughout the year by an order of the Minister of Forestry of 17 August 1954, with an open season from 1 November to 10 February, extended since 1961 to 31 March. Poison baits were reported not to be allowed (Haber and Matuszewski, 1968).

Romania The lynx was fully protected in 1933, however in 1962 as a result of increasing numbers, hunting authorities permitted shooting again (Kratochvil, 1968b).

Spain No information.

Sweden The lynx was totally protected from 1928 to 1942 and from 1943 it was protected by a ten-month closed season (Curry-Lindahl, 1968). The hunting season was moved forward and reduced to 1.5 months in 1983 (Sweden CITES MA, 1987) and from 1986 hunting was limited to reindeer herding areas (Sweden CITES MA, 1986).

Switzerland Reintroduction was reported to have been succesful. The lynx is totally protected under the Federal Hunting Law (Dollinger, *In litt.* 1985).

Syria No information.

Turkey Unprotected. Turan (1987) suggested that the species should be protected in the country.

USSR Hunting is controlled in some areas (Bannikov and Sokolov, 1984).

Yugoslavia Reintroduction schemes were reported to have been succesful (Kempf *et al.*, 1979).

CAPTIVE BREEDING An annual average of 56 lynx were bred between 1972 and 1981 in collections contributing to the International Zoo Yearbook (Duplaix-Hall, 1974-1975; Olney, 1976-1983).

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PALLAS' CAT, MANUL

Recommended list: 2
[Possible problem]

Felis manul Pallas, 1776

Order CARNIVORA

Family FELIDAE

SUMMARY AND CONCLUSIONS Distributed sporadically in the steppes and deserts of Central Asia. It is a solitary and secretive animal, population size and status are largely unknown throughout its range. Reported to be rare in a number of countries, mainly threatened by hunting and trapping however the relative importance of habitat destruction is poorly documented and therefore difficult to assess.

Annually, around 2000 skins have been reported in international trade in recent years, the vast majority of these originating in Mongolia, with a few from USSR and China.

No details of the size of the population in Mongolia are available; however the species has been reported as widespread in the country and the volume of recent exports is considerably lower than that reported in the 1960s. The extent of domestic exploitation and the success or otherwise of protective measures are largely unknown in countries where the species has been identified as rare.

DISTRIBUTION Steppe and semi-desert, especially montane, from the eastern shoreline of the Caspian Sea through Turkmenistan, Uzbekistan, eastern and central Kazakhstan, Tibet and Dzungaria to the Altai, Tuva, Transbaikalia, Mongolia, Kansu and Szechwan, south to Iran, Afghanistan and eastern Ladakh (Guggisberg, 1975). Three sub-species have been suggested: *F. m. manul* in Mongolia and China other than Tibet, *F. m. ferruginea* (Ognev, 1928) in south-west Turkestan, Afghanistan and Iran, and *F. m. nigripecta* (Hodgson, 1842) in northern India and Tibet; however their validity is doubtful and they were not recognised by Corbett (1978).

Afghanistan Montane steppes and deserts, stony plateaus and rocky slopes in central and north-east highlands (Rodenburg, 1977). Skins brought to the Kabul fur market were reported to have mainly come from the Salang Pass and Panjsher Valley of the central Hindu Kush range. In northern Badakhshan it was reported to occur in the Wakhan Corridor and the Zebak valleys (Habibi, 1977).

China From Xinjiang, Chinghai, Gansu, Sichuan and Inner Mongolia up to the western border of Manchuria, where it has been identified in Jilin province and in the vicinity of Manchouli; also reported to occur in Tibet and Kashmir (Bangjie, 1984).

India Only found in Ladakh, northern Kashmir (Anon., 1981a), where it was apparently restricted to the lower Indus valley (Osborne *et al.*, 1983).

Iran Reported to occur only in the Mashhad area in the north-east of the country (Lay, 1967).

Mongolia Widespread throughout the country except in the taiga, alpine and desert zones; reported to be most common on the steppes (Mallon, 1985).

Pakistan It was reported that *Felis manul* may be extinct in Pakistan (Nawaz, 1983). Roberts (1977) reported that it could occur in two areas: in Balistan in the extreme north of the country occurrence was suggested by fur traders and the proximity of the known population in Ladakh, India, and there

were a number of unconfirmed sightings in Baluchistan, near the western border with Afghanistan. In 1977 a specimen was captured near Ziarat in Baluchistan suggesting that a very small population still survived (Roberts, 1984). Also reported to occur in Chitral (Pakistan CITES MA, 1986).

USSR Distributed sporadically in arid, treeless uplands, deserts and steppes from Zakavkaz, western Turkmenii, on the eastern shore of the Caspian Sea, to Zabaikal on the Chinese border east of Mongolia. Discontinuous, fragmented areas of distribution merge along the southern border of the country. Reported to occupy areas least affected by human activities. The most densely populated areas were southern parts of Kazohsk, south-eastern Altai and certain regions of Tuve and Zabaikal; however it was thought to be close to extinction near the western and north-western limits of its distribution in western Turkmenii and Priaral'e (Bannikov and Sokolov, 1984).

POPULATION There is very little specific information available on populations of *Felis manul*; however there are some general accounts describing population trends and status.

Afghanistan Nowhere abundant (Rodenburg, 1977) but, according to a representative of Kabul Zoo, it was not uncommon in the vicinity of Kabul (Roberts, 1977). Formerly common in montane habitats but hunting and trapping were reported to have caused its retreat to isolated valleys, where significant populations remained. Its status was described as vulnerable (Habibi, 1977).

China No information on population or status. Reported to be much more numerous than the Chinese Desert Cat (*Felis bieti*), which was itself reported not to have been particularly rare, although the number of skins of *F. manul* in trade seemed to be declining (Bangjie, 1984). Although the population was generally thought to be declining the species was described as not seriously endangered (Tan Bangjie, *in litt.*, 1987).

India Included in an account of the rare and endangered animals of India, although nothing definite was known and its status was reported as 'Indeterminate' (Anon., 1981b). A survey in the early 1980s in Ladakh found *Felis manul* to be very rare and restricted to the lower Indus valley. Recent records include one skin for sale in Leh and two live captures (Osborne *et al.*, 1983). No more recent information is available on the status of this species in India, but sizeable areas of suitable habitat are reported to remain (H.S. Panwar, *in litt.*, 1987).

Iran No information.

Mongolia Reported to be widespread and most common on the steppes (Mallon, 1985); however no details of population or status are available.

Pakistan The rarest cat in Pakistan, a very small population was thought to survive (Roberts, 1977). Not sighted at all during surveys over a five-year period in the 1980s; described as very rare (Pakistan CITES MA, 1986).

USSR Generally rare although locally quite common in some areas. Owing to its secretive nature, investigations into the population size were reported to be impractical. It was estimated, from the annual take of skins and the species's wide distribution, that the population was probably in the thousands; however the sharp decline in state purchases of skins in the 1970s was thought to suggest a decrease in population size (Bannikov and Sokolov, 1984).

Felis manul

HABITAT AND ECOLOGY An inhabitant of steppes and deserts, especially rocky plateaus and treeless, rocky mountain-sides. Found up to 3000 m altitude and in some cases in Ladakh, India as high as 4000 m (Guggisberg, 1975). In Afghanistan, *Felis manul* was reported to occur between 1500 m and 3500 m (Habibi, 1977). It is reported to be a solitary and secretive animal, mainly nocturnal, but sometimes encountered in daylight (Guggisberg, 1975). In Ladakh, however, it was described as a diurnal hunter, pikas (*Ochotona* spp.) being the main prey, while in Baluchistan it was thought probable that Rock Partridges (*Alectoris graeca*) would form a large part of the diet (Roberts, 1977). In China, *Felis manul* was found to consume large numbers of rodents (Bangjie, 1984), and in Transbaikalia the diet was made up mostly of pikas and to a lesser degree murines, ground squirrels, hares, insectivores and birds (Guggisberg, 1975). Reproduction was reported to take place in April and May in Transbaikalia, and captive specimens have produced litters of five to six kittens (Guggisberg, 1975).

THREATS TO SURVIVAL Very little has been written concerning the threats to this species. It has, however, been reported to be subject to hunting and trapping for skins in most of the countries in which it occurs.

Afghanistan Trapping has caused its retreat to isolated valleys (Habibi, 1977). A census in late 1976 of the furs for sale in shops in Kabul, thought to account for 50% of the local trade, found skins and products estimated to represent 463 animals. At the time, the total annual harvest was estimated to be 7000 animals, 1.8% of the total national annual production of furs. The price per skin asked by furriers was 250-400 afghanis ($US5-8) (Rodenburg, 1977).

China Known to be hunted for skins, but no details of the extent or affect of this or other threats are available. The total annual catch was estimated in 1953 to have been about 5000 animals in south-west China, and about 5000 in north-west China excluding Inner Mongolia and Manchuria. In 1980 the catch in Sichuan was 'about 100' (Bangjie, 1984). Although illegal hunting continued it was not thought to be a major threat to the species (Tan Bangjie, *in litt.*, 1987).

India Threatened by trapping, shooting and probably by the widespread removal of scrub (for use as fuel) which supports prey populations (Osborne *et al.*, 1983).

Iran No information.

Mongolia Between 1958 and 1968 the annual production of skins was estimated to have been about 6500, mostly from regions in the east of the country (Mallon, 1985).

Pakistan Exploited in large numbers in the past for its fur (Pakistan CITES MA, 1986). Little recent information; however the few live animals that have been captured in recent years are reported to have entered trade, and hunters in northern regions seemed to have been familiar with the species (Roberts, 1977).

USSR Shooting, trapping and hunting with dogs have been stated as the main threats to surviving populations, which have been restricted to areas which have not been substantially altered by human activities. The number killed annually was estimated rarely to amount to hundreds (Bannikov and Sokolov, 1984).

INTERNATIONAL TRADE The trade reported by CITES Parties mainly involved skins; however a total of 15 live animals was recorded in trade during the period 1980-1985.

Table 1. Net imports of skins and skin plates, 1980-1985. A skin plate is made up of an unspecified number of skins which may, from examples involving other species, include about ten skins.

	1980	1981	1982	1983	1984	1985
Austria	-	-	-	-	998	37
Canada	-	-	-	218	-	-
Denmark	-	-	49 pl.	-	-	-
Finland	-	-	-	-	938	-
France	-	-	-	200	-	-
Germany, F.R.	290	2806	-	3431	-	348
Italy	849	-	-	-	415	111
Switzerland	-	-	-	-	65	-
UK	-	-	-	-	585	-
Total	1139	2806	49 pl.	3849	3001	496

Table 2. Origin, or where no origin is given, the exporter, of the skins recorded in trade 1980-1985.

	1980	1981	1982	1983	1984	1985
Countries with wild populations of *F. manul*						
China	-	-	49 pl.	-	20	-
Mongolia	625	2562	-	3849	2964	459
USSR	239	244	-	-	37	37
Countries without wild populations of *F. manul*						
Unknown	275	-	-	-	-	-

The average minimum world trade during these years can be estimated (Table 1) as about 2000 skins per year. The main net importing country was the Federal Republic of Germany, however Austria, Finland and Italy also imported significant numbers of skins in some years.

It can be seen from Table 2 that Mongolia was consistently the largest source of skins in trade. The live animals reported in trade were exported by Mongolia, China and the USA. Most of these animals were reported to be in trade for zoological purposes and some were stated to have been captive-bred.

CONSERVATION MEASURES The species is largely unprotected by legislation in the source countries. It is included in CITES Appendix II, and all of the countries in which it occurs except Mongolia have ratified the Convention. These controls entered into force in 1976 for all of the other countries except Afghanistan (January 1986) and China (April 1981). Other conservation measures taken by individual countries are detailed below.

Felis manul

Afghanistan A three-year ban on the sale and export of predator species and their remains was introduced in 1973 under Presidential Decree 628 of 26 December. It was reported that trade continued despite this ban (Rodenburg, 1977). No further controls since this ban are known.

China Reported to be included on the protected list as a second class protected animal, owing to its consumption of large numbers of rodents considered to be agricultural pests. Hunting was reported to continue owing to poor implementation of the legislation (Bangjie, 1984).

India Fully protected from hunting by inclusion in Schedule I of the Wildlife Protection Act 1972. The hunting ban was reported to be difficult to enforce in Ladakh (Osborne *et al.*; 1983).

Iran No information.

Mongolia Hunting was reported to be allowed from October 15 to March 1 under the Game Law of 1962 (Hibbert, 1967).

Pakistan Protected from hunting for any purpose (Pakistan CITES MA, 1986).

USSR Hunting has been banned in some areas since 1976. It was recommended that a number of sanctuaries should be created in southern Altaya, Tuve, Zabaikal'e, and southern Siberia (Bannikov and Sakalov, 1984).

CAPTIVE BREEDING An annual average of 9 animals were bred between 1972 and 1981 in collections contributing to the International Zoo Yearbook. In 1982 there were 57 animals in 20 collections, 38 of which were stated to have been captive-bred (Duplaix-Hall, 1974-1975; Olney, 1976-1983).

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OCELOT

Recommended list: 2
[Possible problem]

Felis pardalis Linnaeus, 1758

Order CARNIVORA

Family FELIDAE

SUMMARY AND CONCLUSIONS Widely distributed from southern Texas to northern Argentina, although depleted in many areas due to over-harvest and habitat loss. No population estimates are available; however general comments on status throughout much of its range indicate that populations have declined. Large areas of habitat have been destroyed but the effect of this on Ocelot populations is poorly documented. Knowledge of Ocelot ecology was very poor until recent years when a number of research projects have produced new information. The species has been heavily exploited for the skin trade, and in many areas it has been the most frequently hunted cat. Protected by legislation throughout much of its range; however the level of implementation of these controls has varied considerably.

The main spotted cat species in trade until the mid-1970s but replaced by other species during the latter half of that decade. Recent CITES data, totalling over 130 000 skins during 1980-1985, suggest that the number of skins of this species in trade has reduced since the heavy exploitation in the late 1960's. The number of skins in trade declined steadily from over 30 000 in 1980 to 4500 in 1984 and only 550 in 1985, with the exception of 1983 when large numbers were re-exported by France. Paraguay has been the major source of skins, but the number reported to have been directly exported from Paraguay each year had decreased significantly by 1985. The population size in Paraguay has not been estimated, and, as the only subspecies reported to occur in the country is included in CITES Appendix 1, no skins of this origin should have been traded.

Melquist (1984) concluded that, if properly controlled, the harvest of this species was probably feasible. Certainly the species occurs over a wide area and in a wide variety of habitats, however without population data and more detailed knowledge of the extent of habitat loss, the feasibility of a sustainable harvest is difficult to assess. The concensus of opinion among experts with knowledge of this species is that far more data are required before such decisions can safely be made. Ecological and population data are being gradually collected by a number of research projects, but, if sustainable trade is to be envisaged in the near future, considerable resources must be committed to the coordinated collection of further information as soon as possible. The listing of subspecies in CITES Appendix I should be reviewed.

DISTRIBUTION Widely distributed from Arizona and south-west Texas to Paraguay and northern Argentina (Guggisberg, 1975). Many subspecies have been described; at least eleven are currently recognised (Cabrera, 1957; Hall, 1981). However they have been largely based on the pelage of limited numbers of specimens and geographical evidence. A study of the cranial dimensions of individuals assigned to a number of subspecies found that they were virtually indistinguishable (Ximenez, 1974), thus the validity of many of them seems doubtful. *F. p. mearnsi* and *F. p. mitis* are listed in CITES Appendix I.

Felis pardalis aequatorialis Mearns, 1902. Northwest South America, throughout the montane zone of Colombia, Ecuador (Cabrera, 1957) and Peru in the low selva Amazon zone south towards the Bolivian border (Grimwood, 1969). Populations in Panama and Costa Rica which have been referred to *aequatorialis* are generally included in *F.p. mearnsi*.

Felis pardalis albescens Pucheran, 1855. Eastern and southern Texas, USA, south along the Gulf coast into the north-eastern states of Mexico (Hall, 1981). However a recent study concluded that this subspecies was probably extinct and that the Texas population probably represented another subspecies, *F. p. limitis*, previously treated as a synonym of *F. p. albescens*. It was thought likely that the species was restricted in Texas to habitat south of 30°N (Navarro, 1985).

Felis pardalis maripensis Allen, 1904. North-east South America, from the Orinoco basin to the lower Amazon (Cabrera, 1957), including by implication northeast Brazil, French Guiana, Guyana, Suriname and eastern Venezuela.

Felis pardalis mearnsi Allen, 1904. Nicaragua (Hall, 1981), most of Costa Rica (Vaughan, 1983) and Panama, almost certainly extending into Colombia (Hall, 1981).

Felis pardalis mitis Cuvier, 1920. Central and eastern Brazil, south of the Amazon basin to the Rio Grande do Sul (Cunha Vieira, 1955), the Chaco of Paraguay (Wetzel and Lovett, 1974) and Argentina from Misiones and Corrientes to Tucuman (Cabrera, 1957).

Felis pardalis nelsoni Goldman, 1925. Tropical strip along the western Pacific coast of Mexico, from Puerto Angel, Oaxaca north to Escuinapa, southern Sinaloa (Hall, 1981).

Felis pardalis pardalis From northern Veracruz and Oaxaca to the Yucatan Peninsula, Mexico, through Belize, Guatemala and El Salvador into Honduras (Hall, 1981).

Felis pardalis pseudopardalis Boitard, 1842. Northern Colombia and Venezuela (Cabrera, 1957). The population of Trinidad and Tobago (Bacon and ffrench, 1972) may be of this subspecies.

Felis pardalis pusaea Thomas, 1914. South-west Ecuador in coastal regions (Cabrera, 1957), extending into coastal north-west Peru (Grimwood, 1969).

Felis pardalis sonoriensis Goldman, 1925. Southern Sonora, Mexico, north into south-eastern Arizona, USA, although absent in the arid plains of western Sonora (Hall, 1981).

Felis pardalis steinbachi Pocock, 1941. Known only in central Bolivia, however it may well extend north into Brazil (Cabrera, 1957).

POPULATION - A study in 1972 of the status and distribution of the spotted cats in Central and South America reported, that although no precise population estimates existed, the species was known to be threatened in parts of its range. It had become rare where heavily hunted, along rivers, roads and near towns, and where forest and scrub had been replaced by grasslands and crops. Populations were reported to survive in a wide variety of habitats, such as large areas of the Amazon rainforest (Koford, 1973b). Listed as 'Vulnerable' in the IUCN Mammal Red Data Book (Thornback and Jenkins, 1982). Very little specific information is available describing the populations of individual countries.

Argentina Rare to uncommon (Anon., 1976); listed as endangered in the national wildlife protection legislation (Resolution No. 144).

Belize More common than *Felis wiedii*, the population of which was described as fairly high (Florence, 1986).

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Bolivia Described in 1981 as endangered (Thornback and Jenkins, 1982). However, Tello (1986) reported that the species was widely distributed and by then "out of danger". He considered that, if the species had indeed been endangered in the past, populations must have increased considerably in recent years. Vargas (cited in Tello, 1986) of the Centro de Desarrollo Forestal reported that the species was scarce in the provinces of Cercado, Marban and Vacadiaz and abundant in the provinces of Itenes, Mamoré, Yacuma and Vallivan.

Brazil The population was thought to have remained stable despite heavy hunting pressure (Smith, 1976), although it was described as vulnerable by Ayres and Best (1981 cited in Thornback and Jenkins, 1982).

Colombia No information.

Costa Rica Numbers greatly reduced, listed as endangered (Mena Moya, 1978). Population estimates vary from 200 (Lopez, cited in Melquist, 1984) to 2000-3000 in large forest areas alone (Vaughan, 1983).

Ecuador All of the spotted cats were considered rare (Melquist, 1984).

El Salvador Endangered (Serrano, 1978). A report in 1979 indicated that the species was rare and confined to two forests: Montecristo and El Imposible (Boursot, 1979 cited in Thornback and Jenkins, 1982).

French Guiana Probably similar to Suriname (q.v.) (Melquist, 1984). Reported to be slowly declining by Berger and Portal (1982).

Guatemala No information.

Guyana Probably similar to Suriname (q.v.) (Melquist, 1984).

Honduras All of the felids were considered threatened or endangered (Aguilar, 1978). The population was described as small and available habitat had declined markedly (Honduras CITES MA, 1985).

Mexico Endangered (Ceballos and Navarro, in prep.).

Nicaragua Endangered (Salas, 1978).

Panama Endangered (Vallester, 1978)

Paraguay Field scientists noted a reduction in numbers in the Chaco region during the 1970s owing to the rapid destruction of native vegetation in favour of introduced pasture grass, and the great increase in the number of roads, which allowed easier access by hunters and settlers to once remote areas (Thornback and Jenkins, 1982).

Peru Reported to have been under considerable threat owing to over-harvest, however it was still plentiful in some areas (Grimwood, 1969). Although relentlessly hunted in the 1960s, populations were thought to have recovered somewhat after the introduction of protective legislation in the Amazon region in 1973 (Pacheco, 1983). Reported to be common in the Cocha Cashu area of the Manu National Park (Terborgh *et al.*, 1984).

Suriname Melquist (1984) was informed that the species was still reasonably common, with extensive areas of suitable habitat remaining. Described in 1977 as not endangered (Thornback and Jenkins, 1982).

Trinidad and Tobago Of uncertain status although considered common in some areas (Anon., 1984).

USA Population estimates vary, but the total number is probably less than 100, mostly in Texas; the species was reported to be very rare (Anon., 1980b) and possibly extinct (Emmons pers. comm., 1987) in Arizona . Reported to have been a quite popular pet in the USA, although there was no indication of the numbers involved (Guggisberg, 1975).

Venezuela Considered moderately common by several Venezuelan biologists (Melquist, 1984). Hoogersteijn (*in litt.*, 1987) described the species as still common in forests and on private ranches with good gallery forest, and in some heavily forested national parks north of the Orinoco. South of the Orinoco there is reportedly little human settlement or habitat disturbance and populations were expected to be good.

HABITAT AND ECOLOGY Found in a variety of habitats including humid tropical and subtropical forests, savannas, semi-arid thorn scrub, coastal mangroves, swamp forests and other kinds of dense cover (Koford, 1973b). Often associated with gallery forest around streams and rivers (J.F. Eisenberg, *in litt.*, 1987). Described as more adaptable than the Jaguar (*Panthera onca*), persisting in partly-cleared forests, dense cover near large towns, secondary growth woodland and abandoned settlements (Koford, 1973a). It is generally but not exclusively nocturnal, normally solitary and territorial (Navarro, 1985).

Estimates of home range size vary from 252 ha for males and 207 ha for females (Navarro, 1985), to 600 ha for males and 150 ha for females (Sunquist and Ludlow, 1985). These areas are considerably smaller than those estimated for Lynx (*Felis canadensis*) and Bobcat (*Felis rufus*) (Navarro, 1985). Adult females defend an exclusive territory, while the territories of males overlap one or more female territories. In riparian habitats with high carrying capacity, it can exist at densities of approximately three per square kilometer (J.F. Eisenberg, *in litt.*, 1987), but it only reaches such high densities in areas of dense vegetation cover. Other density estimates include 0.4 per square kilometer in the mosaic of habitats in Venezuela and 1 adult per square kilometer in forests in Peru (M. Sunquist, *in litt.*, 1987).

It will rest in trees, but most hunting is terrestrial (J.F. Eisenberg, *in litt.*, 1987). Certainly less arboreal than the Margay (*Felis wiedii*) (Koford, 1973a). Diet has been found to consist of mainly of small rodents under 1 kg (L. Emmons, *in litt.*, 1987), but reptiles, birds and small mammals such as young deer and peccaries, monkeys, coatis, agoutis and pacas are also taken (Guggisberg, 1975). A study of scats in Venezuela indicated that it fed primarily on rodents but maintained a flexible diet (Sunquist and Ludlow, 1985). The species has been identified as a pest of poultry production in the Amazon basin (Smith, 1976), but in Venezuela it has been recognised as a predator of pest species such as rodents (Zawisza, 1984).

There does not seem to be a fixed breeding season in the tropics (Denis, 1964). Young have been recorded to have been born at different times of the year in different areas, June to November in Texas, USA, January in Yucatan, Mexico, and April in South America (Navarro, 1985). Gestation lasts about 70 days (Guggisberg, 1975), and litter size varies from one to two, usually one (L. Emmons, *in litt.*, 1987). The interbirth interval is thought to be at least one year. One of the major unknowns in present knowledge of Ocelot ecology is the dispersal ability of sub-adults. If mortality among dispersers is high then the number of animals recruited into the population each year may be far smaller than might be suggested by the basic reproductive data (M. Sunquist, *in litt.*, 1987). Sexual maturity has been estimated at 16 to 18 months in the wild, but in captivity this may occur after 10 to 12 months (Navarro, 1985).

Felis pardalis

THREATS TO SURVIVAL Hunting and habitat loss. The most frequently hunted cat in Latin America, supplying the demand of the fur trade, this species has provided the majority of spotted cat skins in trade except in some southern areas, such as Argentina, where *Felis geoffroyi* has been most heavily exploited (Koford, 1973a). Smith (1976) estimated that, in the 1960s, around 80 000 animals were killed each year in the Amazon region for the skin trade, but that by the early 1970s the take had reduced by half to approximately 30 000-40 000. The USA was importing over 100 000 skins each year in the late 1960s (Smith, 1976). The species has also been reported to have been utilised for the pet trade, animals fetching as much as US$800 (Domalain, 1977). The animals entering the pet trade are usually kittens obtained after the female has been killed for its skin (USA CITES MA, 1987).

Prime ocelot habitat has been eliminated by cultivation of coastal lowlands, largely for cotton, cane and bananas, notably in Central America, Colombia and Venezuela (Koford, 1973a). In many areas clearing of suitable habitat for agriculture has been described as a major threat to the species (Thornback and Jenkins, 1982). Often persecuted because of alleged livestock (mainly poultry) depredation (USA CITES MA, 1987).

Argentina Garments made from skins of this species continued to appear in fur shops in Buenos Aires during 1986 (J. Villalba-Macias, *in litt.*, 1987).

Belize Although relatively large areas of habitat remain, pressure for land was reportedly increasing in Belize (Florence, 1986).

Bolivia Reportedly not threatened by habitat loss, except, perhaps, locally in areas of intensive farming, where natural vegetation is totally destroyed. Large-scale professional hunting was thought to be the greatest potential threat, but no such activity was thought to continue in the mid-1980s (Tello, 1986).

Brazil Poaching and habitat loss remain major threats despite legal protection (Melquist, 1984).

Colombia Formerly a major exporter of skins of this species, but commercial hunting ceased in the early 1970s (Foote and Scheuerman, 1973). No information available on recent threats.

Costa Rica Illegal skin trade had greatly reduced numbers (Mena Moya, 1978). From 1940 to 1977 over 50% of the suitable dense forest habitat was destroyed (Vaughan, 1983).

Ecuador No information.

El Salvador No information.

French Guiana There is a flourishing trade in wildlife products with French Guiana (J. Villalba-Macias, *in litt.*, 1987), but there is no evidence to suggest that this poses any threat to the native fauna at present.

Guatemala No information.

Guyana Persecuted by farmers (Melquist, 1984).

Honduras Subject to intense hunting pressure in the past (Barquero, 1976). More recently there has been no large-scale commercial hunting, but occasional animals are captureed as pets (Honduras CITES MA, 1985).

Mexico Ramos (1986) indicated that hunting of spotted cats remained a major problem in Mexico.

Nicaragua Reported in 1977 to have been a source of live animals for the pet trade. Young were captured by killing the mother (Thornback and Jenkins, 1982).

Panama No information.

Paraguay Hunting and commercial trade were extensive until the late 1970s. It has been suggested that Paraguay may remain a centre of illegal trade although the harvest was believed to have reduced considerably. Habitat loss remained a problem, especially in the east of the country (Melquist, 1984).

Peru Relentlessly hunted for its valuable pelt. Over 138 000 skins were exported from Iquitos between 1946 and 1966 (Grimwood, 1969). Around 12 000 skins were reported to have been exported each year in the 1960s. Hunters reported that it was becoming more difficult to obtain skins (Hvidberg-Hansen, 1970). Melquist (1984) reported that some commercial trade, although illegal, was believed to continue and habitat had been threatened by as a consequence of extensive oil exploration. Furthermore Pacheco (1983), noting some recovery in wildlife populations since the introduction of protective legislation in 1973, reported that illegal trade persisted.

Suriname No information.

Trinidad and Tobago No information.

USA Habitat destruction and degradation from brush-clearing operations were thought to have been primarily responsible for the status of the population. Also affected by predator control activities and persecution (Anon., 1980b).

Venezuela Decline caused by over-harvest and loss of habitat (Melquist, 1984). Hoogersteijn (*in litt.*, 1987) reported that trade was not a problem in Venezuela, although some small scale smuggling persisted. The main problem was thought to be loss of habitat, on the scale of 50 000 ha per year in the western plains and 100 000 ha per year in the country as a whole. This land is largely being converted to agriculture. Ocelot are sometimes hunted as chicken raiders, but there is no active hunting, such as formerly existed in the past.

INTERNATIONAL TRADE During the 1960s this species supplied the vast majority of the spotted cat skins in international trade (Broad, 1987). In the late 1960s over 100 000 skins were imported into the USA each year, most of which were from Brazil and Colombia, however virtually every country with a population of the species was involved in the trade to some extent (Paradiso, 1972). In 1975, the United Kingdom alone imported 76 838 skins (Burton, 1976). Most of these skins supplied the market for exotic furs, for the production of expensive fashion articles such as coats and collars. In 1980 coats of this species sold for up to US$ 40 000 in the Federal Republic of Germany (Anon., 1980a). CITES trade data provide evidence of recent trends in the trade in skins of this species. The only significant trade involving this species was in skins. A small number of live animals were traded, many of which were declared to have been in trade for zoological purposes, however some were traded commercially and as personal items.

Felis pardalis

Table 1. Apparent minimum net imports of *F. pardalis* skins reported to CITES, 1980-85. Figures represent numbers of skins unless otherwise indicated.

	1980	1981	1982	1983	1984	1985
Argentina	300	-	-	-	-	-
Australia	-	1	-	-	-	-
Austria	1851	843	150	62	11	16
Belgium	4887	59	17	95	-	-
Brazil	28	-	-	-	-	-
Canada	-	72	140	301	111	-
China	-	-	54	-	-	-
Denmark	574	-	-	2	-	-
Finland	24	-	14	-	1	-
France	48	14	-	-	4100	-
Germany, F.R.	16418	7885	7941	67281	-	-
Greece	202	-	-	-	-	-
Hong Kong	180	108	416	395	-	140
Ireland	4	4	-	-	-	-
Israel	140	12	68	24	124	-
Italy	4680	4639	657	593	-	195
Japan	98	587	84	40	5	120
Lebanon	-	-	26	-	-	-
Liechtenstein	765	-	-	-	-	-
Luxembourg	-	98	12	12	-	-
Mexico	39	-	-	-	-	-
Netherlands	59	-	-	-	-	-
Norway	-	29	14	-	-	-
St Lucia	-	-	-	2	2	-
Spain	227	3292	-	201	14	-
Switzerland	-	-	-	128	99	-
Turkey	-	-	-	41	18	26
USA	39	87	77	117	89	-
Unknown	-	-	-	-	-	58
Total	30563	17730	9676	69294	4574	556

The CITES data show a general decline after 1980. An analysis of CITES data for earlier years (Broad, 1987) indicated that the trade had been decreasing since 1978. The total net trade of almost 70 000 skins recorded in 1983 is notable discrepancy in the general decline in trade; in fact this is the highest nuber of skins of this species reported to CITES in any year since 1976.

The Federal Republic of Germany was the major importer of skins during this period, although in 1984 and 1985 it was a net exporter and France emerged as the main importer. Generally the majority of the trade went to western European countries.

Table 2. Reported countries of origin (or exporting country if no origin reported) of skins of *F. pardalis* reported to CITES. The figures in parentheses show, for countries with wild populations of the species, the number of skins reported to have been exported directly by that country.

	1980	1981	1982	1983	1984	1985
Countries with wild populations of *Felis pardalis*						
Argentina	47	1	1	–	–	–
	(0)	(0)	(0)		–	
Belize	181	–	68	28	1	–
	(181)		(1)	(2)	(1)	
Bolivia	–	2	–	4	1500	–
		(2)		(4)	(1500)	
Brazil	–	114	50	10	–	–
		(2)	(0)	(0)		
Colombia	6	15	12	13	1	–
	(6)	(15)	(12)	(9)	(1)	
Costa Rica	1	–	–	–	–	–
	(1)					
Ecuador	3	8	23	3	3	–
	(3)	(7)	(21)	(2)	(1)	
El Salvador	–	1	–	–	–	–
		(1)				
Guatemala	1	–	–	–	1	–
	(1)				(1)	
Guyana	–	1	–	1	–	–
		(1)		(1)		
Honduras	15	3	2	2	2	–
	(1)	(3)	(2)	(2)	(2)	
Mexico	2	15	14	6	3	–
	(2)	(3)	(0)	(4)	(2)	
Nicaragua	–	2	7	–	1	–
		(2)	(7)		(1)	
Panama	2765	–	–	3	–	–
	(2765)			(1)		
Paraguay	25390	17069	9370	68928	2741	315
	(25390)	(9414)	(3199)	(2500)	(2600)	(0)
Peru	1884	38	2	9	–	–
	(1884)	(20)	(2)	(6)		
Venezuela	–	–	–	–	–	9
						(9)
South America	299	103	–	–	196	112
	(0)				(0)	(0)
Countries without wild populations of *Felis pardalis*						
Austria	152	–	–	–	–	–
Belgium	–	450	35	69	–	–
Canada	99	14	–	–	79	–
France	1250	–	–	–	–	–
Germany, F.R.	–	12	–	40	–	–
Italy	158	–	–	–	–	–
South Africa	–	1	–	16	–	–
Switzerland	–	–	–	–	–	120
UK	191	–	–	–	–	–
Unknown	494	740	1518	398	208	–

Felis pardalis

Paraguay can be seen to have been the major source of skins in trade. The number of skins reported as direct exports from countries with wild populations of the species decreased significantly over these years. The large number of skins traded in 1983 were exported from France to the Federal Republic of Germany, these may have been in stock for some time and certainly without these skins a steady decline of the number in trade over this timespan is clear.

An important point to be made about this trade is that the only Ocelot which occurs in Paraguay is *Felis pardalis mitis* which is listed on CITES Appendix I. Therefore if the skins really did originate in Paraguay they should not be in trade. Paraguay is known to feature as a re-exporter for large numbers of wildlife skins smuggled out of Brazil, and, in any case, all exports of wildlife products have been illegal in Paraguay since 1975 (Fuller *et al.*, 1987).

CONSERVATION MEASURES

Table 4. Legal prohibition on the hunting, internal trade and commercial export of *Felis pardalis*. Dates are those on which the legislation came into force. R - Regulated; * - This territory is an Overseas Département of France; # - This legislation only covers the northern settled region of the country; ? - no information.

Sources - Latin America (Fuller *et al.*, 1987), Trinidad and Tobago (James, 1983), United States (Anon., 1982a).

Those countries in parentheses are only inhabited by the subspecies included in CITES Appendix I.

	CITES	Hunting	Trade	Export
(Argentina)	1981	1981	1981	1981
Belize	1981	1981	1981	1981
Bolivia	1979	1979	1979	1979
Brazil	1975	-	1967	1967
Colombia	1981	1973	1973	1973
(Costa Rica)	1975	1984	1984	1984
Ecuador	1975	-	-	1981
El Salvador	1987	-	-	-
French Guiana *	1978	1975	1975	1975
Guatamala	1980	1970	1970	1970
Guyana	1977	-	-	1987
Honduras	1985	-	1978	1978
Mexico	-	R 1951	?	1982
(Nicaragua)	1977	1977	1977	1977
(Panama)	1978	1980	1980	1980
(Paraguay)	1977	1975	1975	1975
Peru	1975	R 1977	R 1977	1977
Suriname	1981	# 1970	# 1970	# 1970
Trinidad and Tobago	1984	1933	1933	?
USA	1975	1982	1982	1982
Venezuela	1975	1970	1970	1970

The effectiveness of these controls varies greatly from country to country. The enforcement of the export ban in Paraguay was erratic for a number of years however controls improved significantly in 1982 (Fuller *et al.*,

1987). On the basis of the declared countries of origin of skins in trade (Table 2) the majority of exports in recent years have been illegal. In October 1986 the EEC prohibited the import of skins of *Felis pardalis* (Anon., 1987).

Known to occur in a large number of protected areas (Anon., 1982b).

CAPTIVE BREEDING An annual average of 22 animals were bred between 1972 and 1981 in collections contributing to the International Zoo Yearbook. In 1982 194 animals were held in 71 collections, of which 125 were reported to have been captive-bred (Duplaix-Hall, 1974-1975; Olney, 1976-1983).

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LITTLE SPOTTED CAT, TIGER CAT
or ONCILLA

Recommended list: 2
[Possible problem]

Felis tigrina Schreber, 1777

Order CARNIVORA

Family FELIDAE

SUMMARY AND CONCLUSIONS An inhabitant of subtropical forests, widely distributed from southern Central America to northern Argentina. Poorly known throughout its range, diet and habitat preference are thought to be varied. The species seems to be quite rare and threatened by deforestation and heavy exploitation for the skin trade. Protected by legislation throughout much of its range.

Large numbers of skins were reportedly traded in recent years, averaging over 50 000 each year between 1980 and 1984, and although the number originating from Paraguay, the major source country, declined significantly after 1982, the number reported to have been exported in 1984 from there, and from Bolivia, where the occurence of the species has never been confirmed, was still considerable. By 1984 there were reportedly still over 35 000 skins of this species in trade, more than of any of the other spotted cats, despite the fact that the species is apparently protected in Paraguay. Trade in this species reported to CITES in 1985 decreased to only just over 2000 skins, but further years' data are required to confirm this decline.

Melquist (1984) concluded that, if properly controlled, a sustainable harvest of this species was probably feasible. At present there seems to be insufficient information describing the size and status of populations to ensure a sustainable harvest, and, in light of the large number of skins recently in trade, and of the fact that they all appear to have been illegally exported, there seems to be considerable need for better implementation of present national and international trade controls. The decline in trade volume in 1985 may indicate delayed response to such legislative measures; furthermore the recent ban on imports into the EEC effectively cuts of the major market for skins of this species. However, the lack of biological information must be redressed before legal trade in this species can sensibly be envisaged.

DISTRIBUTION From Costa Rica to the Andean zone of western Venezuela, Colombia and Ecuador, possibly northern Peru and through eastern Venezuela, the Guianas and Brazil to Paraguay and northern Argentina (Guggisberg, 1975). Throughout this range the species is poorly known and often confused with the Margay (*Felis wiedii*) (Cabrera, 1957).

Four subspecies are recognised (Hall, 1981; Cabrera, 1957), although in a study of *Felis tigrina oncilla* Gardner (1971) stated that he would hesitate to distinguish this subspecies from *Felis tigrina pardinoides* were it not for the apparent absence of the species in the intervening area of Panama. Melquist (1984) suggested that the species probably occurred in Bolivia in tropical moist forest areas, although it has never been confirmed as a resident of the country and a recent survey could find no evidence whatsoever of its occurrence in the country (Tello, 1986). *Felis tigrina oncilla* is listed in CITES Appendix I.

Felis tigrina guttula Hensel, 1872. Central to southern Brazil (Cunha Vieira, 1955), Paraguay and northern Argentina from Misiones to the Chaco of Salta province (Cabrera, 1957).

Felis tigrina oncilla Thomas, 1902. Throughout most of **Costa Rica**, except the Atlantic zone (Mena Moya, 1978) and probably northern **Panama** (Hall, 1981). It was also included in the list of the endangered mammals of **Nicaragua** (Salas, 1978), but is not recorded by Hall (1981) as occurring in that country.

Felis tigrina pardinoides Gray, 1867. The Andean zone from the Coastal Cordillera and Andes of western **Venezuela** (Mondolfi, 1976), **Colombia** (possibly confined to the montane and cloud forests of the Andean slopes (Melquist, 1984)), and **Ecuador** (Cabrera, 1957) and possibly as far as northern **Peru** (Grimwood, 1969). Probably extending north into southern **Panama** (Gardner, 1971).

Felis tigrina tigrina North-east **Brazil** (Cunha Vieira, 1955), and **French Guiana**, through **Suriname** and *Guyana* (Cabrera, 1957) to eastern and southern **Venezuela** (Zawisza, 1984)

POPULATION No estimates available. In 1973 the species was described as rare in most areas and common in none (Koford, 1973b). Very little specific information describing the status of populations exists.

Argentina Reported to be rare to endangered in Salta province in the extreme north-west of the country (Mares *et al.*, 1981). Listed in the national wildlife protection legislation (Resolution No. 144) as endangered.

Brazil Probably declining in most regions, with the exception of isolated areas and large protected areas (Melquist, 1984). Koford (1973b) described it as rare in most parts of its range.

Colombia No information.

Costa Rica Listed as endangered (Mena Moya, 1978).

Ecuador All of the spotted cats were considered rare (Melquist, 1984).

French Guiana Reichart (cited in Melquist, 1984) described it as rarer than the other small spotted cats in Suriname and reported that this was probably also true for French Guiana.

Guyana Reichart (cited in Melquist, 1984) suggested that this was probably the least common of the small spotted cats throughout the Guianas.

Nicaragua Endangered (Salas, 1978).

Panama Very rare (Koford, 1975).

Paraguay No information.

Peru Grimwood (1969) found no definite record of the occurrence of this species, but expected it to occur in the Amazon region.

Suriname Perhaps rarer than the other spotted cats, but large areas of undisturbed habitat remain (Reichart cited in Melquist, 1984).

Venezuela Endangered (Zawisza, 1984). Much rarer than the Ocelot (*Felis pardalis* (R. Hoogersteijn, *in litt.*, 1987).

HABITAT AND ECOLOGY Largely unknown, the species apparently favours subtropical forests (Koford, 1973b). Reported to occur in a variety of habitat types in Venezuela, including dense humid forests within a wide

altitude range from low plains to montane areas up to at least 2500 m (Zawisza, 1984). In Colombia the species has been recorded at elevations up to 4500 m (Melquist, 1984). Diet was thought to consist of birds and small mammals (Zawisza, 1984). Analysis of stomach contents suggests that this cat takes smaller vertebrate prey than does the Ocelot (*Felis pardalis*); thus some resource partitioning may occur where the two species live in sympatry (J.F. Eisenberg, *in litt.*, 1987).

In captivity the gestation period averaged 75 days, and litters of one or two young were produced (Leyhausen and Falkena, 1966).

THREATS TO SURVIVAL Deforestation has greatly reduced the area of suitable habitat available. Furthermore the species has been widely hunted for the fur trade throughout its range (Koford, 1975), despite the low value of skins compared with those of the Ocelot (*Felis pardalis*) (Koford, 1973b). Listed as 'Vulnerable' in the IUCN Red Data Book (Thornback and Jenkins, 1982).

Argentina A survey of the spotted cats in the early 1980s found no evidence of recent commercial skin trade, although the species had been exploited in the past (Melquist, 1984). Threatened by human destruction and degradation of favourable habitat (Argentina CITES MA, 1986).

Brazil In 1971 about 28 000 skins of this species were counted in Brazilian warehouses. Much of the area of favourable habitat in subtropical forests had been largely destroyed to grow coffee (Koford, 1973a). Poaching and habitat loss were identified as the major causes of decline, despite legal protection (Melquist, 1984).

Colombia It was reported that the montane and cloud forests of the Andean slopes were rapidly being destroyed for agricultural use, especially for coffee plantations (Melquist, 1984).

Costa Rica From 1940 to 1977 over 50% of the suitable dense forest habitat was destroyed (Vaughan, 1983).

Ecuador No information.

French Guiana There is a flourishing trade in wildlife products with French Guiana (J. Villalba-Macias, *in litt.*, 1987), but there is no evidence to suggest that this poses any threat to the native fauna at present.

Guyana Persecuted by farmers (Melquist, 1984).

Nicaragua The spotted cats were subject to intense hunting for their skins during past decades (Barquero, 1976).

Panama No information.

Paraguay Hunting and commercial trade were extensive until the late 1970s. It has been suggested that Paraguay may remain a centre of illegal trade although the harvest was believed to have reduced considerably. Habitat loss remained a problem, especially in the east of the country (Melquist, 1984).

Peru Some commercial trade was believed to continue and habitat was threatened as a consequence of extensive oil exploration (Melquist, 1984).

Suriname No information.

Venezuela Decline caused by over-harvest and loss of habitat; some poaching was thought to continue (Melquist, 1984). Hoogesteijn (*in litt.*, 1987) reported that habitat loss has been the main threat to the native spotted cats in Venezuela in recent years.

INTERNATIONAL TRADE Skins of this species have often been confused with other spotted cat skins in trade, especially those of Margay (*Felis wiedii*). It is however quite certain that large numbers of these skins were traded among the vast quantities of other small spotted cat skins in trade in the 1960s and 1970s (Paradiso, 1972).

Analysis of CITES annual reports for 1977 showed that the trade comprised at least 13 000 skins (Anon., 1980). A report on South American cats in trade between 1976 and 1982 showed that this species was one of the four most heavily exploited small cats. Around 20 000 skins were reportedly exported from Paraguay in 1978, and the number increased each year since then. By 1982 this species apparently supplied the great majority of the spotted cat skins in trade, replacing *Felis geoffroyi* which had been most heavily exploited until then (Caldwell, 1984).

Recent CITES data are summarised below. The only significant trade reported involved skins; a small number of live animals did appear in trade, most of them recorded as zoological specimens.

Table 1. Apparent minimum net imports of *F. tigrina* skins reported to CITES, 1980-85. Figures represent numbers of skins unless otherwise indicated.

	1980	1981	1982	1983	1984	1985
Austria	80	1998	288	1423	269	417
Belgium	22624	242	1050	-	-	-
Canada	-	-	-	-	-	-
France	-	-	-	-	22647	1635
Germany, F.R.	811	31128	65645	80068	11274	-
Greece	9588	-	-	-	-	-
Italy	376	58	1000	2850	-	-
Japan	-	-	-	-	606 kg	-
Luxembourg	7	10	-	13	-	-
Mexico	-	92	-	-	-	-
Netherlands	-	-	-	36	-	-
Spain	-	186	180	-	815	-
Sweden	3	-	-	-	2	-
Switzerland	-	1295	-	102	-	1
UK	-	-	-	1	-	-
USA	-	49	-	-	-	-
Total	33489	35058	68163	84493	35007	2053
	-	-	-	-	+ 606 kg	

Felis tigrina

Table 2. Reported countries of origin (or exporting country if no origin reported) of skins of *F. tigrina* reported to CITES. The figures in parentheses show, for countries with wild populations of the species, the number of skins reported to have been exported directly by that country.

	1980	1981	1982	1983	1984	1985
Countries with wild populations of *Felis tigrina*						
Argentina	1450 (1450)	1377 (0)	-	-	-	-
Bolivia	-	-	-	-	15482 (15482)	2039 (1635)
Brazil	-	1 live (1)	-	-	-	-
Panama	145 (145)	-	-	-	-	-
Paraguay	32675 (31894)	35068 (34986)	68163 (51560)	84492 (28375)	19167 + 606 kg (606 kg)	7 (0)
Venezuela	-	1 (1)	-	-	-	-
South America	-	-	-	-	-	-
Countries without wild populations of *Felis tigrina*						
Germany, F.R.	-	40	-	1 live	-	-
UK	3	-	-	-	-	-
Unknown	1 body	71	1197	2084	358	-

The number of skins in trade reached a peak in 1983 when the total net trade reported was 84 493 skins; this number declined to 35 007 in 1984 and 2053 in 1985. The vast majority of the skins in trade were imported into western Europe, with F.R. Germany the major importing country. Belgium imported a large number of skins in 1980, and France imported a large number in 1984 and 1985, most of which were reported to have been imported from Bolivia, which probably does not have a wild population of the species.

Paraguay was the reported source of the majority of the skins in trade. Although the total number of skins in trade each year reported as originating in Paraguay increased until 1983, the number of skins reported as direct exports from Paraguay in each year decreased. After 1982 a large number of the skins reported with this origin were in fact re-exports from third countries. Those recorded by weight (606 kg in 1984 imported by Japan from Paraguay) are likely to comprise part of the 12 000, reported by number of skins, as re-exported from Japan to F.R. Germany in that year, in which case they can be deducted from the total.

An important point to note is the emergence of Bolivia as a major source of skins in 1984 and 1985 as there is no evidence that the species even occurs there, and in any case, all cat species are protected in the country (Fuller *et al.*, 1987). Exports of stockpiled skins authorised in Argentina in early 1987 included 1010 skins of *Felis tigrina* (Broad, 1987).

CONSERVATION MEASURES

Table 4. Legal prohibition on the commercial hunting, internal trade and commercial export of *Felis tigrina*. Dates are those on which the legislation came into force. * - This territory is an Overseas Département of France; # - This legislation only covers the northern settled region of the country; ? - no information (Fuller *et al.*, 1987). Those countries in parentheses are only inhabited by the subspecies included in CITES Appendix I.

	CITES	Hunting	Trade	Export
Argentina	1981	1981	1981	1981
Brazil	1975	-	1967	1967
Chile	1975	1972	1972	1972
Colombia	1981	1973	1973	1973
(Costa Rica)	1975	1984	1984	1984
Ecuador	1975	-	-	1981
French Guiana *	1978	1975	1975	1975
Guyana	1977	-	-	1987
(Nicaragua)	1977	-	-	-
(Panama)	1978	?	?	?
Paraguay	1977	1975	1975	1975
Peru	1975	-	-	-
Suriname	1981	# 1970	# 1970	# 1970
Venezuela	1975	1970	1970	1970

The effectiveness of these controls varies greatly from country to country. The enforcement of the export ban in Paraguay was erratic for a number of years; however controls improved significantly in 1982 (Fuller *et al.*, 1987). On the basis of the declared countries of origin of the skins in trade (Table 2), all exports of this species since 1981 appear to have been illegal. In October 1986 the EEC prohibited the import of skins of *Felis tigrina* (Anon., 1987). Known to occur in a large number of protected areas (Anon., 1982).

CAPTIVE BREEDING An total of 6 animals were bred between 1972 and 1981 in collections contributing to the International Zoo Yearbook (Duplaix-Hall, 1974-1975; Olney, 1976-1983).

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MARGAY

Recommended list: 2
[Possible problem]

Felis wiedii Schinz, 1821

Order CARNIVORA

Family FELIDAE

SUMMARY AND CONCLUSIONS Widely distributed from Mexico to northern Argentina. No population estimates exist but the species is generally regarded as rare. Little is known about its habits in the wild although it is thought to be more arboreal than the other spotted cats and therefore more sensitive to deforestation. Habitat loss and alteration are believed to represent threats, and the species has been heavily exploited for the skin trade in the past. The levels of exploitation in the past are difficult to estimate as the Margay has not often been distinguished from the other spotted cats in trade. Protected by legislation in most countries where it occurs.

Traded in large numbers in the late 1970s. CITES data show that the number of skins reported in trade decreased during the period 1980-1985 from 19 918 skins in 1980 to 138 skins in 1985. The major source country was Paraguay, although by 1985 there were very few skins reported to have been exported from countries with wild populations of the species. No information has been found describing the size or status of the population in Paraguay.

A report on the status of the spotted cats concluded that, if properly controlled, the harvest of this species was probably feasible (Melquist, 1984). Although the trade in this species seems to have responded to legislative controls and there is little evidence that illegal trade continues, a large amount of biological and population information should be collected before consideration is given to the relaxation such trade controls. The listing of subspecies in CITES Appendix I should be reviewed.

DISTRIBUTION From Mexico through Central and South America to Patagonia, Argentina; not recorded in Chile. Eleven subspecies were described by Cabrera (1957) and Goldman (1943) although in general their ranges were poorly defined. *Felis wiedii nicaraguae* and *Felis wiedii salvinia* have both been listed in CITES Appendix I.

Felis wiedii amazonica Cabrera, 1917. Inhabiting the upper Amazon area of Brazil, in the basins of the Solimoes and Maranon Rivers and their tributaries (Cabrera, 1957), perhaps extending into the low Selva of Peru (Grimwood, 1969).

Felis wiedii bolivae Pocock, 1941. The Department of Santa Cruz, Bolivia, Mato Grosso state, Brazil and probably the north of Paraguay (Cabrera, 1957).

Felis wiedii cooperi Goldman, 1943. Known only from a single specimen taken at Eagle Pass, Texas, USA, prior to 1852 (Goldman, 1943). This animal was probably an aberrant vagrant in which case the subspecies would be invalid (Thornback and Jenkins, 1982).

Felis wiedii glaucula Thomas, 1903. Western Mexico from Jalisco north to Sinaloa and Chihuahua (Hall, 1981).

Felis wiedii nicaraguae Allen, 1919. Much of Costa Rica, Nicaragua and into adjoining areas of Honduras (Hall, 1981).

Felis wiedii oaxacensis Nelson and Goldman, 1931. In Mexico from Oaxaca north through Veracruz to Tamaulipas (Hall, 1981).

Felis wiedii

Felis wiedii pirrensis Goldman, 1914. The Sixaola region of **Costa Rica** (Mena Moya, 1978), **Panama** (Hall, 1981) then through the Andean zone of **Colombia** (Cabrera, 1957), the coastal side of the Andes of **Ecuador** (Baker, 1974) and into **Peru** where a specimen was recorded as far south as the Department of Puno (Grimwood, 1969).

Felis wiedii salvinia Pocock, 1941. Little known. Recorded from Vera Paz, **Guatemala** (Hall, 1981) and perhaps **Belize** (Goldman, 1943). Specimens taken in 1961 from Mt Cocaguatique and Colinas de Jucuaran, **El Salvador** were also ascribed to this subspecies (Hall, 1981).

Felis wiedii vigens Thomas, 1904. North-east South **America** from the Orinoco basin to the lower Amazon including by implication **Guyana, Suriname** and possibly **French Guiana** (Cabrera, 1957). Recorded from the east of the state of Para, **Brazil** (Cunha Vieira, 1955), scattered lowland localities in north and south **Venezuela** (Handley, 1976).

Felis wiedii wiedii Northern **Argentina** from Misiones to Tucuman (Cabrera, 1957), southern and eastern **Brazil** from Bahia, and perhaps further north, south to the Rio Grande do Sol (Cunha Vieira, 1955), eastern **Paraguay** (Cabrera, 1957) and throughout much of **Uruguay** (Ximenez *et al.*, 1972).

Felis wiedii yucatanica Nelson and Golman, 1931. Recorded near Uaxactun, **Belize**, in northern **Guatemala**, and the Yucatan Peninsula, northern Chiapas and eastern Oaxaca, **Mexico** (Hall, 1981),

POPULATION No details available. A general survey of the status of the spotted cats concluded that the species was rare in most areas and common in none (Koford, 1973).

Argentina Rare to uncommon (Anon., 1976). Reported to be rare to endangered in Salta Province in the north-west (Mares *et al.*, 1981).
Considered by national authorities to be too poorly known to justify legal exploitation (Melquist, 1984) and the species was listed as vulnerable in the national wildlife protection legislation (Resolution No. 144).

Belize The population is still fairly high, though lower than that of *Felis pardalis* (Florence, 1986). Although little known, it had been found to be extremely common in a number of locations (Weyer, 1982).

Bolivia Reported as endangered in 1981 (Thornback and Jenkins, 1982). Tello (1986) considered that the species had made a very good recovery in sub-tropical and tropical areas, and he strongly believed that it was out of danger in rural areas and common in forest areas, including the savanna-forest mosaic country, particularly below 1500 m.

Brazil Considered by respondents to a questionnaire survey as common and widespread in the Amazon basin, but rare with isolated populations in the central and southern parts of the country (Melquist, 1984).

Colombia No population information available but significant areas of suitable habitat remain for the spotted cats (Melquist, 1984).

Costa Rica Endangered (Lopez, 1978).

Ecuador All spotted cats were generally considered rare (Melquist, 1984).

El Salvador Boursot (cited by Thornback and Jenkins, 1982) reported in 1979 that this species was much more common than *Felis pardalis*. Described as

vulnerable (Serrano, 1978).

French Guiana Status probably similar to Suriname (q.v.) (Melquist, 1984). Reported by Berger and Portal (1982) to be slowly declining.

Guatemala The species has apparently always been very rare (Saunders *et al.*, 1950).

Guyana Status probably similar to that in Suriname (q.v.) (Melquist, 1984).

Honduras No specific information though in 1978 all felidae were reported as reduced in number or threatened (Aguilar, 1978).

Mexico Rare in Mexico (Guggisberg, 1975).

Nicaragua Recorded as endangered (Salas, 1978).

Panama In imminent danger of extinction (Vallester, 1978). Reportedly the rarest wild cat in Panama (Panama CITES MA, 1985).

Paraguay No information.

Peru Largely unknown, but generally regarded as uncommon (Grimwood, 1969).

Suriname Still reasonably common, extensive areas of suitable habitat remain (Melquist, 1984).

United States Record of occurrence based upon a single specimen (Hall, 1981).

Uruguay Probably very rare (Melquist, 1984), described in 1981 as endangered, the least abundant Uruguayan cat (Thornback and Jenkins, 1982).

Venezuela Quite restricted and threatened (Zawisza, 1984). Much rarer than the Ocelot (*Felis pardalis*) (R. Hoogersteijn, *in litt.*, 1987).

HABITAT AND ECOLOGY Largely arboreal and thus restricted to forest habitat (Guggisberg, 1975). Found in humid forests up to 1500 m elevation in Venezuela (Zawisza, 1984), and in arid regions in Oaxaca and the Yucatan Peninsula, Mexico (Hall, 1981). Most strogly associated with moist forest habitats (J.F. Eisenberg, *in litt.*, 1987). The extent of the dependence of this species on dense forest cover is a matter for further investigation. Sunquist (*in litt.*, 1987) reported that it had more specialised habitat requirements than any of the other small neotropical cats, but Tello (1986) found it to be reasonably tolerant of habitat disturbance in Bolivia. Thought to be primarily nocturnal (Alvarez del Toro, 1952), although possibly more diurnal than the ocelot. Generally appears to have a lower population density than the Ocelot (*Felis pardalis*), but in areas of prime habitat it can more nore abundant than the Ocelot. Hunting is almost exclusively arboreal (J.F. Eisenberg, *in litt.*, 1987); prey consists of small and medium-sized mammals, birds and perhaps lizards (Guggisberg, 1975). Data from Belize indicates that about 10% of the diet consists of fruit (J.F. Eisenberg, *in litt.*, 1987). Very little reproductive information available.

THREATS TO SURVIVAL Likely to be particularly sensitive to deforestation, owing to its arboreal habits (Koford, 1973). However, in Bolivia, Tello (1986) found it to be far more tolerant of habitat disturbance than previously considered. One of the four most heavily exploited spotted cats (Caldwell, 1984). The species has been heavily exploited for the fur trade and this, combined with habitat alteration and destruction, was believed to have caused

populations to decrease throughout much of its range. However, it was thought probable that this effect may have stabilized recently owing to a reduction in commercial trade (Melquist, 1984). Listed as 'Vulnerable' in the IUCN Mammal Red Data Book (Thornback and Jenkins, 1982).

Argentina Threatened by human destruction and degradation of favourable habitat (Argentina CITES MA, 1986).

Belize Although relatively large areas of habitat remain, pressure for land was reportedly increasing in Belize (Florence, 1986).

Bolivia Tello (1986) found that it survived well in forests subject to selective cutting for timber, on farms with patches of forest and thicket as well as in regions of shifting farming where the forests are partially destroyed in a mosaic pattern. In conclusion he stated that the species did not seem to be endangered by habitat changes, with the exception of areas where forest and thickets had been totally destroyed. The major threat in Bolivia was thought to be professional hunting.

Brazil Poaching and habitat loss remain major threats despite legal protection (Melquist, 1984).

Colombia Formerly a major exporter of skins of this species, but commercial hunting ceased in the early 1970s (Foote and Scheuerman, 1973). No information available on recent threats.

Costa Rica From 1940 to 1977 over 50% of the suitable dense forest habitat was destroyed (Vaughan, 1983).

Ecuador It was reported that the best habitats for this species had virtually disappeared because of massive deforestation, particularly in the Costa region (Melquist, 1984).

El Salvador No information.

French Guiana There is a flourishing trade in wildlife products with French Guiana (J. Villalba-Macias, *in litt.*, 1987), but there is no evidence to suggest that this poses any threat to the native fauna at present.

Guatemala No information.

Guyana Persecuted by farmers (Melquist, 1984).

Honduras No information.

Mexico Ramos (1986) indicated that hunting of spotted cats remined a major problem in Mexico.

Nicaragua No information.

Panama The population has been severely reduced by human destruction and alteration of suitable habitat (Panama CITES MA, 1985).

Paraguay Hunting and commercial trade were extensive until the late 1970s. It has been suggested that Paraguay may remain a centre of illegal trade although the harvest was believed to have reduced considerably. Habitat loss remained a problem, especially in the east of the country (Melquist, 1984).

Peru Some commercial trade was believed to continue and habitat has been threatened as a consequence of extensive oil exploration (Melquist, 1984).

Suriname No information.

United States No information.

Uruguay Threatened by deforestation and illegal hunting (Thornback and Jenkins, 1982).

Venezuela Decline caused by overharvest and loss of habitat (Melquist, 1984).

INTERNATIONAL TRADE An analysis of the international trade in felidae in 1977, found that the trade during that year involved at least 30 000 skins of *Felis wiedii*, though the precise number was impossible to estimate owing to the large amount of unrecorded trade and smuggling (Anon., 1980). Large numbers of skins of this species were believed to have been traded during the 1960s and 1970s although the actual volume involved cannot be estimated as these skins were not distinguished from those of other spotted cats (Paradiso, 1972). In 1976 Margay skins from Brazil were less than a quarter the individual value of Ocelot (*Felis pardalis*) skins (Smith, 1976). Data based on imports from Paraguay during 1978 to 1982 illustrated an overall decline in the trade in skins of this species (Caldwell, 1984). CITES data are analysed below. A few live animals were recorded, but the majority of reported trade concerned skins.

Table 1. Apparent minimum net imports of *F. wiedii* skins reported to CITES, 1980-85. Figures represent numbers of skins unless otherwise indicated.

	1980	1981	1982	1983	1984	1985
Argentina	774	-	-	-	-	-
Australia	-	-	-	-	-	-
Austria	773	789	110	1399	811	138
Belgium	-	-	102	42	-	-
Canada	-	630	500	809	3	-
Denmark	936	-	-	2377	-	-
Finland	-	-	-	-	-	-
France	286	116	-	-	3257	-
Germany, F.R.	5655	6363	7079	-	-	-
Greece	1373	-	-	-	-	-
Hong Kong	435	46	-	-	70	-
Israel	24	44	-	-	-	-
Italy	8496	8375	5379	3062	-	-
Japan	68	128	-	-	-	-
Luxembourg	-	-	-	-	-	-
Mexico	111	-	-	-	-	-
Morocco	-	-	-	-	-	-
Netherlands	24	-	-	-	-	-
Norway	24	-	-	-	-	-
St Lucia	-	-	-	-	2	-
Spain	990	1016	12	838	-	-
South Africa	-	-	-	-	-	-
Switzerland	-	-	-	-	-	-
Turkey	-	-	-	40	-	-
UK	-	-	-	-	-	-
USA	12	19	18	23	12	-
Total	19981	17526	13200	8590	4155	138

Felis wiedii

Table 2. Reported countries of origin (or exporting country if no origin reported) of skins of *F. wiedii* reported to CITES. The figures in parentheses show, for countries with wild populations of the species, the number of skins reported to have been exported directly by that country.

	1980	1981	1982	1983	1984	1985
Countries with wild populations of *Felis wiedii*						
Belize	160	2	-	-	-	-
	(160)	(2)				
Brazil	1	-	-	1	-	-
	(1)			(1)		
Colombia	286	116	5	2	-	-
	(0)	(0)	(5)	(2)		
Costa Rica	-	-	-	1	1	-
				(1)	(1)	
Ecuador	-	1	3	-	-	-
		(1)	(3)			
Honduras	1566	7	-	-	-	-
	(0)	(7)				
Mexico	3	2	2	6	9	-
	(3)	(2)	(2)	(4)	(9)	
Nicaragua	-	1	-	-	-	-
		(1)				
Panama	1171	20	-	-	-	-
	(1171)	(20)				
Paraguay	16693	17488	13071	8558	4068	138
	(14902)	(8534)	(7200)	(500)	(0)	(0)
Peru	1638	-	1	-	-	-
	(625)		(1)			
South America	-	-	-	-	72	-
					(0)	
Countries without wild populations of *Felis wiedii*						
Belgium	-	-	-	8	-	-
Canada	910	-	-	-	-	-
UK	916	-	-	-	-	-
Unknown	303	5	156	15	507	-

Over 20 000 skins of this species per year were reported in trade in 1977 and 1978 (Broad, 1987), but data for the following years show a steady decline to the total of only 138 skins recorded in 1985. The main source of skins in all years is reported to have been Paraguay.

The bulk of the skins in trade were imported by western European countries. Up to 1982 the Federal Republic of Germany and Italy were the major importing countries, however in 1983 the number of skins in trade decreased considerably. In 1984 France was the main importer and in 1985 Austria was the only recorded importer.

CONSERVATION MEASURES

Table 4. Legal prohibition on the hunting, internal trade and commercial export of *Felis wiedii*. Dates are those on which the legislation came into force. R - Regulated; * - This territory is an Overseas Département of France; # - This legislation only covers the northern settled region of the country; ? - no information (Fuller *et al.*, 1987). Those countries in parentheses are only inhabited by the subspecies included in CITES Appendix I.

	CITES	Hunting	Trade	Export
Argentina	1981	1981	1981	1981
Belize	1981	1981	1981	1981
Bolivia	1979	1979	1979	1979
Brazil	1975	?	1967	1967
Colombia	1981	1973	1973	1973
Costa Rica	1975	1984	1984	1984
Ecuador	1975	-	-	1981
(El Salvador)	1987	-	-	-
French Guiana *	1978	?	?	?
Guatamala	1980	1970	1970	1970
Guyana	1977	-	-	1987
(Honduras)	1985	-	1978	1978
Mexico	-	R 1951	?	1982
(Nicaragua)	1977	1977	1977	1977
Panama	1978	1980	1980	1980
Paraguay	1977	1975	1975	1975
Peru	1975	R 1977	R 1977	1977
Suriname	1981	# 1970	# 1970	# 1970
USA	1975	-	-	-
Uruguay	1975	1978	1978	1978
Venezuela	1975	1970	1970	1970

The effectiveness of these controls varies greatly from country to country. The enforcement of the export ban in Paraguay was erratic for a number of years, however controls improved significantly in 1982 (Fuller *et al.*, 1987). In October 1986 the EEC prohibited the import of skins of *Felis pardalis* (Anon., 1987).

Known to occur in a large number of protected areas (Anon., 1982).

CAPTIVE BREEDING An annual average of 6 animals were bred between 1972 and 1981 in collections contributing to the International Zoo Yearbook (Duplaix-Hall, 1974-1975; Olney, 1976-1983).

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NARWHAL

Recommended list: 2
[Possible problem]

Monodon monoceros (Linnaeus, 1758)

Order CETACEA

Family MONODONTIDAE

SUMMARY AND CONCLUSIONS The Narwhal inhabits circumpolar arctic seas principally between 70°N and 80°N. The best studied stock, west of Greenland and in the Canadian Arctic, is estimated to number 29 000. The number of population units within the region is not resolved, this having implications for management as it affects the calculation of mortality rates caused by hunting. Narwhals east of Greenland are believed to constitute a distinct population; knowledge of them is poor and studies are needed. There is no indication of any population decline, in spite of the long history of traditional exploitation.

Narwhals are exploited mainly for human consumption and as food for dogs. In the eastern Canadian Arctic, they are hunted only by Inuit in support of a subsistence economy. Annual hunting mortality in the Canada/West Greenland stock totals approximately 1000 animals. Tusks are sold as ornaments, either whole or carved. From 1975–1984 an estimated 313 Narwhal were landed each year in Canadian Inuit communities, of which approximately half are estimated to be tusk-bearing males. Quotas set by the Canadian Department of Fisheries and Oceans (DFO) are not generally exceeded. During the same period an estimated 454 Narwhals were landed annually in Greenland. Between 1980 and 1985 (inclusive), an average of 113 Narwhal tusks a year have been reported in international trade by CITES parties. The majority have come from Canada (mean 79 per annum), but in 1985 Greenland was the reported source of the largest number of tusks in trade. 108 tusks were exported from Greenland in 1986, and the lower exports prior to 1984 are probably artefacts of inadequate reporting. A ban on Narwhal imports to the EEC from all countries except Greenland was imposed in January 1984 and yet CITES still recorded 40 Narwhal tusks imported to EEC countries from outside Greenland in 1984. No such apparently illegal imports were recorded in 1985.

Estimates of natural mortality and recruitment rates are not sufficiently precise to predict reliably whether the current exploitation rate is sustainable and opinions are divided. Nevertheless, the two Management Authorities involved believe that net recruitment is positive on the basis of available information. Better data on parameters of population biology are, however, required to confirm this; the collection of such data is the objective of ongoing Canadian research.

DISTRIBUTION Largely confined to arctic waters between 70°N and 80°N. Within this range the species is best known to the west of Greenland, in the Baffin Bay, Davis Strait, Hudson Strait and eastern Canadian arctic region, frequenting both coastal and pelagic waters. During the summer months, Narwhals are common along the west coast of Greenland, north from Kuvdlorssuaq (c. 74° 30'N) (Denmark, Greenland CITES MA, 1986) to Kane Basin, located between Greenland and Ellesmere Land. From Kane Basin the summer distribution extends westwards to Cornwallis Island and thence south to Foxe Basin, Southampton Island and Hudson Strait (Mansfield *et al.*, 1975; Sergeant, 1978). In the summer, concentrations of Narwhals occur in separate areas of the region described above. It has been suggested that these aggregations remain segregated in the winter months, when the distribution contracts owing to the advancing ice but there is no evidence to substantiate such an hypothesis (Anon., 1979c). Precise locations of the wintering animals remain vague but they have been seen in the close pack ice of the Davis Strait and Baffin Bay (McLaren and Davis, 1981; 1982; 1983). Small numbers may also

winter in eastern Hudson Strait (Anon., 1979a; 1979b). Narwhals also occur north of the drifting ice boundary off the coast and in the fjords of east Greenland during the summer months (Kapel, 1977; Boyd, 1932; Pedersen, 1931). They may well also occupy the fjords of Kialineq and Kangerdlugssuaq throughout the year (Dietz *et al.*, 1985). Their distribution is believed to be continuous between Scoresbysund and Nordost Rundingen but they are rarely seen in the Dove Bugt area (Dietz *et al.*, 1985). From the coast of East Greenland their range extends eastwards to Svalbard, Franz Josef Land, Novaya Zemlaya, Severnaya Zemlya and the New Siberian Islands, USSR. Distribution of the populations east and west of Greenland is thought to be disjunct; Narwhals are very rarely seen south of Sukkertoppen (65°N c.) on the west Greenland coast (Kapel, 1977). However, exchange between stocks could theoretically occur via the Polar Basin (Reeves and Tracey, 1980) but there is no evidence to support this hypothesis.

Few sightings between 70°N and 80°N exist for the Chukchi and Beaufort Sea areas but occasional strandings have been reported (Geist *et al.*, 1960; Tomilin, 1957).

Outside the 70°N to 80°N circumpolar region, records of the species are infrequent but include sightings to the north of 85°N, including the birth of a calf at this latitude (Rutilevski, 1958). To the south, there are records of sightings and strandings off the coasts of north and west Norway (Collett, 1911-12), north-west (Saemundsson and Degerbol, 1939) and south-west (Einarsson and Jonsson, 1976) Iceland, the Netherlands (Aguayo, 1978), the UK (Fraser, 1974) and in the mouth of the Elbe River in F.R. Germany (Aguayo, 1978). Confirmed as an extremely rare visitor to these countries (Iceland, Nature Conservation Council, *in litt.*, 9 February 1987; Netherlands CITES MA, 1986; UK CITES MA, 1986; F.R. Germany CITES MA, 1986; Norway CITES MA, 1986). One doubtful record exists from the Baltic coast of F.R. Germany (Mohr, 1931). A stranding (Geist *et al.*, 1960) and entrapment by ice (Mercer, 1973) have also occurred on the Alaskan and Newfoundland coasts respectively, both well south of 70°N.

POPULATION Recent population surveys have concentrated mainly on the Baffin Bay-Davis Strait stock that summers in north-western Greenland, in the Smith Sound-Kane Basin region and in the Canadian high Arctic. In 1984 almost simultaneous surveys were conducted in these areas (Anon., 1986). In north-west Greenland daily movements of Narwhal were seen from a 78-m cliff-top observation post on the north-west of Qeqertat Island at the head of Inglefield Bay. Observations were made between 31 July and 1 September 1984 and the highest daily count was on 18 August, when a minimum of 4043 Narwhals were seen (Born, 1985). In the eastern Canadian Arctic aerial surveys were conducted between 15 and 29 August 1984 over Peel Sound, Prince Regent Inlet, Admiralty Inlet and Eclipse Sound where an estimated 23 700 Narwhals were seen (95% c.l. 18 100-29 500). Similar aerial surveys were conducted between 27 and 29 July 1984 in the Repulse Bay-Frozen Strait area of northern Hudson Bay giving an estimate of 1200 Narwhals (95% c.l. 700-1600) giving a best estimate of 24 900 (95% c.l. 18 800-31 100) for the eastern Canadian Arctic. This estimate coupled with the minimum population of 4043 Narwhals from Inglefield Bay, Greenland gives a best estimate for summering populations in these two areas of approximately 29 000 Narwhals in 1984. This number does not include any Narwhals that may have been in the Foxe Basin, other regions of the Canadian archipelago or along other sections of the west and north-west coasts of Greenland.

Long-term population trends in the Canadian Arctic are elucidated by two related studies on Narwhals migrating westwards through Lancaster Sound in the summers of 1957 (Tuck, 1957) and 1976 (Greendale and Brousseau-Greendale,

1976). The number of Narwhals seen in each survey was approximately 6000 but the data need statistical analysis for periods during both surveys when inclement weather obscured visibility. Similarly, 9700 Narwhals were reported in Admiralty Inlet in July 1975 (Fallis *et al.*, 1983) which concurs with the DFO surveys in 1984 cited above.

The first estimate of abundance for Narwhals from the East Greenland-Spitzbergen stock was made in September 1983 when an estimate of 176 Narwhals was determined for the Scoresbysund Sound area (Anon., 1985a). A smaller number was recorded in 1984 possibly due to the Narwhals having started to migrate out of the area prior to the survey (Anon., in press). A kayak expedition recorded 194 Narwhals north of Scoresbysund between 16 July and 29 August 1984 (Dietz *et al.*, 1985).

Yablokov (1979) quoted earlier estimates of the size of the Narwhal stock from northern Europe to eastern Siberia as being several thousand.

HABITAT AND ECOLOGY Circumpolar arctic seas. Seasonal movements of the species occur and are controlled by sea ice conditions and currents (Vibe, 1950; Vibe, 1967). Entrapment by ice also occurs (Reeves and Tracey, 1980) restricting movement to a limited open water area or 'savssat' that is kept open by the animals for breathing. Predators include man, Killer Whales (*Orcinus orca*) (Steltner *et al.*, 1984), and Polar Bears (*Ursus maritimus*) (Reeves and Tracey, 1980). Greenland Sharks (*Somniosus microcephalus*) are known to scavenge on carcasses (Denmark, Greenland CITES MA, 1986).

Diet consists of a variety of fish (Tomilin, 1957), cephalopods and crustaceans. When close to shore the staple diet consists of Polar Cod (*Boreogadus saida*), Greenland halibut (*Rheinhardtius hippoglossoides*) and decapod crustaceans (Mansfield *et al.*, 1975; Pedersen, 1931; Vibe, 1950).

The tusk of male Narwhals is an eruption of the left anterior tooth. It is reportedly used in aggressive encounters between males (Silverman, 1979; Silverman and Dunbar, 1980) and consequently may be of secondary sexual significance. It was previously suggested that it might be important as a focusing mechanism for echolocation signals for navigation and food location and could be used in breaking ice to provide breathing holes (Mansfield *et al.*, 1975; Reeves and Mitchell, 1981; Best, 1981). Tusks up to 315 cm in length (Bruemmer, 1971) and weighing 9 kg (Silverman, 1979) have been recorded. Occasionally females with tusks have been reported and animals with two tusks have been recorded (Mitchell and Reeves, 1981).

Narwhals are gregarious and normally observed in small groups. A group size of 3-8 was most commonly observed in the migrations of Narwhals at Bylot Island in 1976 (range: 1-21) (Greendale and Brousseau-Greendale, 1976). The composition of groups is variable; comprising single sex groups (Scoresby, 1820; Scoresby, 1823; Greendale and Brousseau-Greendale, 1976) to mixed groups of males, females and juveniles (Pedersen, 1931; Vibe, 1970) and females with juveniles only (Greendale and Brousseau-Greendale, 1976).

Limited data are available on breeding biology (Hay, 1984) although ageing techniques are not reliable. Males are sexually mature at lengths exceeding 3.9 m and when 16-17 growth layers of dentine and mandibular bone are deposited in the teeth and jaw respectively. Females are sexually mature at lengths exceeding 3.4 m and when 12 growth layers are deposited. The gestation period is estimated at 15.3 months with mating in March-May and calving in July-August the following year. Lactation exceeds 12 months and the interval between successive conceptions is normally three years, though

about 20% of females conceive at their first breeding season following birth of their calves.

The birth rate has never been satisfactorily determined and there is disagreement on techniques for assessing recruitment rates. Information can be inferred from extrapolations of inter-species relationships between physical measurements such as brain weight or body length and the value of life history variables. Results from the closely related White Whale (*Delphinapterus leucas*) may also be applicable to Narwhal. Hay (1984) estimated Narwhal population birth rate from analyses of 79 female sexual organs collected over a wide span of years to be between 0.06 and 0.15, but assigned a representative figure of 0.07. However, Born (Denmark, Greenland CITES MA, 1986) questioned this conclusion and offered an alternative estimate based on the neonate to all-age-group ratio observed subsequent to the peak birth period, citing the following observations of neonate percentages: 10% in August (Silverman, 1979), 11% in September (Larsen, 1984), 9% in late August/early September (Koski, 1980) and 9-10% also in late August/early September (Koski and Davis, 1979). In the White Whale, annual population birth rates have been calculated at 9% (Brodie, 1971) and 11-14% (Sergeant, 1973) and aerial surveys after the birth period showed that 12% of populations were neonates (Heyland, 1974). This leads Born to the conclusion that the annual birth rate in Narwhals is nearer 0.1 and could be higher. Kingsley (1986) also suggested 10% gross reproductive rate (neonates/Narwhal).

THREATS TO SURVIVAL There is little evidence of threats to Narwhal populations other than human predation. The Narwhal is currently hunted by Inuit people in both Canada and Greenland for its nutritional value, providing for human consumption the prized skin, known as muktuk, which is high in vitamin C (Davis *et al.*, 1980) and dark red meat, which is normally used as dog food. In Greenland, the intestines are also eaten either fresh or, commonly, after drying (Denmark, Greenland CITES MA, 1986). In the past oil from the head end blubber was used as a fuel but this use is now discontinued in Canada (Reeves and Mitchell, 1981). Other products include sinew which is used as thread for sewing or binding. The tusk is also an item of value and trade records pre-date the 12th Century (Mitchell and Reeves, 1981).

Canada A quota system operates in the 21 Inuit communities where Narwhal are regularly encountered and hunt statistics have been kept by the Department of Fisheries and Oceans (DFO) since the 1950s with quotas and regulations in effect since 1976. The total number of Narwhal landed are reportedly recorded (see tag scheme under Conservation Measures) and the 10-year average to 1984 was 313 Narwhals, well within the quota of 542 set by the DFO for the 21 communities. If the figure of 313 is corrected for animals killed but lost during the hunt, the average annual mortality due to hunting by Canadian Communities is estimated as 492 Narwhals (Canada CITES MA, 1986). This correction is determined through an analysis of the three hunt types: floe edge, ice crack and open water, their respective kill-landed to kill-lost ratios, and their relative frequency of use amongst the 21 communities.

In recent years, Inuit hunters are said to have become increasingly conscious of world opinion and of the high kill-lost ratios associated with floe edge hunts in particular, and to be modifying hunting practices to reduce losses (Canada CITES MA, 1987).

Individual community quotas have been exceeded on 10 occasions in the 21 communities since the inception of regulations in 1976 (Canada CITES MA, 1986), usually when Narwhals have been killed at breathing holes in fast ice, known as 'savssat'. For example, 120 and 53 animals were killed at 'savssats' in 1979 and 1981 respectively and there are instances of large kills prior to the DFO's recordings (Mitchell and Reeves, 1981; Anon., 1983).

Monodon monoceros

Of the Narwhals landed, it is reported that 30% may be females and 20% may be tuskless juveniles of either sex leaving approximately 50% of the catch as tusk-bearing males (Mitchell and Reeves, 1981). Tusk yield therefore averages 150-160 a year.

Greenland The catch statistics for Greenland have been split into three regions, (Table 1) north, west and east. Catches from the north and west are deemed to be taken from the Baffin Bay-Davis Strait stock that also summers in the Canadian Arctic. The methods and sources of data collection are outlined below.

(a) *Reported catches (R).* In each settlement one person is responsible for collecting information on each hunter's catch; recorded by the hunter on a special recording form. These data comprise the Hunters' Lists of Game.
(b) *Other sources on catches (O).* Not all hunters complete the forms; so the individual charged with the task of collating data in (a) also records his own observations and information from other informants and sources such as newspapers and scientists.
(c) *Estimates* (E). Where no information relating to (a) or (b) is received an estimate is often made after consultations between the Statistical Department of the Ministry for Greenland (SDMG) and an official of the Greenland Fisheries and Environment Research Institute. From 1985 the Statistical Department of the Home Rule Government (SDHRG) will undertake the task in place of the SDMG.

Table 1. Reported Narwhal catches in Greenland from 1975-84 (Anon., in press; Anon., 1983; Anon., 1984; Anon., 1985b; Denmark, Greenland CITES MA, 1986; Anon., 1975-1984). Figures in parentheses are upgraded estimates (Anon., 1983).

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1975-1984[1]
NORTH GREENLAND (Thule)											
R	1	9	2	-	-	-	88	77	17	233	43
E	-	-	-	90	10	130	-	-	25	20	
O	-	-	14	20	110	-	30	87	93	31	
Total	1	9	16	110	120	130	118	164	135	284	109
	(150)	(150)	(150)								(151)
WEST GREENLAND (All districts)											
R	116	106	222	502[2]	239	193	400	207	230	339	255
E	-	-	-	-	-	98	10	45	40	25	
O	-	-	15	-	18	41	81	45	34	18	
Total	116	106	237	502	257	332	491	297	304	382	302
EAST GREENLAND (All districts)											
R	4	9	21	3	7	48	22	48	23	55	24
E	-	-	-	-	10	10	15	35	20	10	
O	8	15	-	-	1	-	106	16	10	-	
Total	12	24	21	3	18	58	143	99	53	65	50

1. Annual Average 2. 199 taken at 'savssat'

Table 1 demonstrates that reporting from Thule District has been particularly poor (Denmark, Greenland CITES MA, 1986) and as such the figures may be under-representative. Estimates for the Thule District have been assigned for the years 1975, 1976 and 1977 in a report to the International Whaling Commission (Anon., 1983), when each annual catch was upgraded to 150. Without the upgraded estimates for Thule in Years 1975-1977 the average annual catch (R+E+O) for North and West Greenland is 411 Narwhals but with upgraded estimates, as in Anon. (1983), the annual average catch is 453 Narwhals. The latter figure is adopted here.

The figures in Table 1 do not include Narwhals killed-but-lost and, unlike Canada, detailed assessments of kill-lost to kill-landed ratios do not exist. Until such information is provided it is impossible to provide anything other than a rough estimate of total mortality due to hunting. A tentative overall loss rate of 20% is proposed for the North and West Greenland hunt (Born and Reimers Olsen, 1986). This figure is based on the reported loss rates in the Canadian open water and ice crack hunts (predominately employed in Greenland) which are scaled down due to more traditional and animal-efficient hunting techniques used in Greenland (see Conservation Measures below). Therefore, annual hunting for North and West Greenland of 454 Narwhals/year should be increased by 20% to give total estimated hunting mortality of around 550 Narwhals/year.

For East Greenland, the comparable total hunting mortality is around 60 Narwhals/year. Population estimates for the Scoresbysund Sound area of East Greenland (Anon., 1985a; Anon., in press) are available; however, there is not sufficient information for the whole East Greenland-Spitzbergen stock with which to produce estimates of mortality rates due to hunting.

Figures are not available for the proportion of the catch that is tusk-bearing; so it is not possible to assign an annual tusk yield from the Narwhal hunt of Greenland, although it may be similar to the 50% yield suggested for Canada.

Summary of Canada/West Greenland utilization The annual estimated hunting mortality for a Baffin Bay-Davis Strait-Hudson Bay stock (est. pop. 29 000) is the combined total of Canadian and West Greenland kills, or around 1000 animals. Therefore an estimate of the proportion of the population killed per annum as a result of hunting activities is 0.034. The worst-case estimate based on a population of 22 800 (Anon., 1986) would be an annual hunting mortality rate of 0.044. However, as both population estimates are based on incomplete coverage of the summer range of narwhals, particularly in West Greenland, the true hunting mortality will probably be lower. An alternative approach is to consider separately the Canadian population, for which more complete surveys were carried out. The reported kill of 492 Narwhals would represent 2% of the estimated population of 24 900. However, this calculation may not be justified as Born (Denmark, Greenland CITES MA, 1986) has pointed out that some of the West Greenland harvest is conducted in the winter and may have been taken from populations included in the Canadian survey. Assessing the impact of the West Greenland hunt separately is much more difficult, owing to the less complete population estimates; however Born suggested that it might be more appropriate to apply the average annual catch in Thule (i.e. 150/yr) to the estimate of the summering stock (i.e. minimum 4000 animals). The annual hunting mortality would then be at maximum 0.04, on the unsupported assumption that the Narwhals summering in the Thule area represent an isolated stock.

It is impossible to assess the impact of hunting on the Narwhal population without accurate data on birth rate and natural mortality, neither of which is available. If one assumes a birth rate of 0.1 as argued by Born (Denmark,

Greenland CITES MA, 1986) and a worst-case hunting mortality of 0.044 then natural mortality would need to be less than or equal to 0.056 for harvesting to be sustainable. Such a level of natural mortality is consistent with those determined for other relatively long-lived small cetaceans (i.e. in the region of 0.04-0.05), although Kingsley (1986) considered that adult mortality of Narwhals probably lay in the region of 0.05-0.08. However, if the annual population birth rate is as low as was indicated by Hay (1984) (0.07), even the lower estimates of natural mortality would predict a population decline. It must be stressed that there is no field evidence for population declines, and all arguments about the sustainable hunting rate must remain speculative in the absence of firm biological data. On the basis of their calculations the Canadian CITES Management Authority (1986) consider that the harvest is sustainable and that net recruitment is positive. Confirmation of this view must await the results of further research.

INTERNATIONAL TRADE

CITES reports of trade in Narwhal tusks are summarised in Tables 2 (imports) and 3 (origin). These transactions do not necessarily relate to tusks taken from Narwhals in the year stated, as many refer to re-exports, but they do give some idea of the volume and pattern of international trade. Table 2 shows that the minimum net trade has declined from a peak of 250 in 1980 to fewer than 100 in 1985. Most of the 1980 trade was attributable to the UK having imported 211 tusks from Canada.

Table 2. Minimum net imports of tusks of *Monodon monoceros* reported to CITES.

	1980	1981	1982	1983	1984	1985
Australia	-	-	3	-	-	-
Austria	-	-	-	-	2	3
Belgium	-	-	-	2	-	-
Canada	1	1	-	-	1	-
Chile	-	-	4	-	-	-
Denmark	-	1	-	-	-	40
France	5	4	1	4	3	-
Germany, F.R.	-	1	1	1	4	-
Guadeloupe	-	-	-	-	2	-
Ireland	-	-	1	-	-	-
Italy	26	13	11	21	1	-
Japan	3	6	10	20	18	19
Monaco	-	-	1	-	-	-
New Caledonia	-	-	-	-	1	-
New Zealand	-	-	-	1	-	-
Saudi Arabia	1	-	-	-	-	-
Spain	1	-	-	-	-	-
Switzerland	-	3	13	10	6	2
UK	211	36	39	63	37	-
USA	2	5	6	1	3	4
Total	250	70	90	123	78	68

Table 3. Reported countries of origin, or exporter where no country of origin is given, of *Monodon monoceros* tusks reported to CITES.

	1980	1981	1982	1983	1984	1985
Canada	221	41	49	91	58	15
Denmark	-	-	1	5	-	-
France	-	-	3	-	-	-
Greenland	3	5	8	6	14	50
United States	-	-	-	-	2	-
Unknown	11	8	6	1	3	3

Table 3 shows the declared origin of the tusks; exports from Denmark probably originated in Greenland. More recent reports show that exports from Greenland in 1986 totalled 108 whole tusks, 79 carvings, 3 skulls and 1 fur (Denmark, Greenland CITES MA, 1987). The apparently low numbers of exports from Greenland before 1985 (fewer than ten per annum) are a result of the lack of reporting of trade between Greenland and Denmark during those years. Greenland withdrew from the EEC in February 1985 and since that time trade between Greenland and Denmark has been subject to regulation and monitoring (Denmark, Greenland CITES MA, 1987). The increase in exports from Greenland in 1985 and 1986 therefore represents the introduction of a new recording procedure rather than an increase in actual trade.

It should be noted that exports of tusks in any one year are not necessarily representative of the number of Narwhal tusks harvested in that year. Exports depend on import demands. In Canada, the major exporters, Arctic Enterprises and the Hudson Bay Company buy all tusks offered locally through the Inuit Cooperatives. All tusks purchased from the Inuit may not necessarily be re-sold or exported in the year of the original purchase and both companies carry inventories of tusks that are represenative of the harvest of several years. For example in 1985 over 100 tusks were stockpiled by these companies, representing surplus of purchases over sales from 1981-1984. Any previous surplus was cleared in 1980 when there was an unusually high demand for Narwhal tusks.

The volume of trade in ivory carvings, skin products and meat was so low that transactions in these items were excluded from Tables 2 and 3. Although several transactions in ivory carvings may have occurred in any one year, the number of Narwhal tusks required is low as several carvings may originate from one tusk.

International trade in tusks therfore appears to be in the order of 50-100 a year from Canada and probably about 100 a year from Greenland. As the annual recovered harvest in these two countries is around 700 Narwhals a year, of which 350 may bear tusks, it must be assumed that the remainding tusks are consumed in domestic trade, because logic dictates that no tusk will be thrown away, even if it is the by-product of a subsistence hunt. Therefore domestic and international trade may account for about equal proportions of the world supply of tusks.

CONSERVATION MEASURES Conservation measures affecting the trade and hunting of the Narwhal consist of the following.

Canada Narwhal Protection Regulations under the Fisheries Act exist to limit hunting to permit-holding Inuit on a quota system for each settlement

where Narwhal regularly occur. The regulations also set minimum fire power for weapons and confer complete protection for mothers and calves. The quota system is operated by the DFO which issues hunter's tags which have to be attached to each tusk or carcass of tuskless females and immature males (Reeves and Mitchell, 1981). Export of any part or derivative (i.e. tusk) from the North West Territories of Canada requires a Marine Mammal Export Permit. Export from Canada requires a CITES export permit.

Inuit communities involved in Narwhal hunting work cooperatively with the Department of Fisheries and Oceans to assist in the development of management regimes for Narwhals and other marine mammals. Negotiations with Greenland are being undertaken to establish joint management and research plans for the Baffin Bay/Davis Strait stock of Narwhals and the Department of Fisheries and Oceans is continuing research on the species to improve the knowledge on population structure and dynamics. Moreover Inuit have voluntarily undertaken conservation measures to reduce the kill-lost ratio.

Greenland

(a) General. When animals are trapped in 'savssat' any wounded or killed Narwhals must be harpooned immediately. No one is allowed to kill more animals at a 'savssat' than can be transported back to the villages immediately after the hunt. All meat and blubber must be removed from a kill and flensing should begin as soon as the animal is hauled up on the ice (Anon., 1958). Commercial export from Greenland of whalemeat (from all species) is prohibited. This ban was previously issued by the Danish state and it has since been restated under Greenland Home Rule Law: Bekendtgorelse nr. 33, December 19, 1985 (Denmark, Greenland CITES MA, 1987).

(b) Thule District, North-west Greenland. The use of motor boats for Narwhal hunting is prohibited in the summer (Rudge *et al.*, 1981). Animals must be harpooned before killing.

(c) North Upernavik District, West Greenland. Use of motorised vessels when Narwhal hunting is prohibited (Anon., 1980).

(d) Uummanaak District, West Greenland. Harpoon *guns* are forbidden when hunting Narwhals and White Whales. Boats longer than 30 ft (9.1 m) are prohibited. All animals killed must be transported back to the villages (Anon., 1981).

European Economic Community Commercial importation of Narwhal products is banned from all countries except Greenland, under EEC regulation No: 3626/82.

Norway Under the Act of 16 June 1939 on the Taking of Whales (Amended), the Narwhal may be hunted without a permit (Marashi, 1982).

United Kingdom In theory protected by the Whaling Industry (Regulation) Act 1934, which makes it illegal to take any cetacean in British waters. In addition, stranded whales usually belong the the Crown further restricting exploitation (UK CITES MA, 1986).

United States of America Importation of Narwhal products into the USA is prohibited under the Marine Mammal Protection Act 1972. However, exemption is given to U.S. Aboriginal people of the Aleutian Islands, Bering Sea and Arctic Ocean.

CAPTIVE BREEDING Narwhals have been captured and kept in aquaria on several occasions but with little success (Breummer, 1969; Newman, 1971; Newman, 1977), death resulting within at most four months. No attempts have been made to breed the species in captivity.

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HARTMANN'S MOUNTAIN ZEBRA

Recommended list: 2
[Possible problem]

Equus zebra hartmannae Matschie, 1899

Order PERISSODACTYLA

Family EQUIDAE

SUMMARY AND CONCLUSIONS This subspecies occurs in Namibia in the mountainous escarpment along the eastern boundary of the Namib Desert, extending north just into south-west Angola. Furthermore a small number of animals have been introduced into the Hester Malan Nature Reserve, near Springbok, South Africa marginally within the former range of the subspecies. In 1987 total numbers were estimated at 6000-7000, nearly all in Namibia, and the species was generally believed to be well managed. This population size represents a serious decline from that of over 50 000 estimated for this subspecies in 1950. This reduction was apparently caused by widespread persecution by farmers, owing to the competition between zebras and domestic livestock for water resources and grazing. Population estimates indicate that the population has been reasonably stable since 1970.

International trade in skins of this subspecies reported to CITES in the six-year period 1980-1985 fluctuated between 97 and 1565 specimens a year. Between 9 and 117 trophies were reported in trade in different years; small numbers of live animals were also recorded. Other sources indicate that the annual take of this subspecies in Namibia in recent years has been 500-1000 animals a year.

Various reports indicate that the population is stable and that utilisation is under strict control. The estimated take represents between 8% and 17% of the population each year. Without some indication of whether the granting of permits is carried out under a management plan, it is impossible to state whether the existing harvest and trade is sustainable.

DISTRIBUTION Formerly had a continuous range from about 130 km north of Mocamedes in Angola southwards along the mountainous transition zone of Namibia to the northern Cape Province, South Africa (Joubert, 1972b). Its southern limit was probably the Kamiesberg Highland, RSA (Sidney, 1965) but all zebra had disappeared from this region by 1931 (Gill, 1931 cited in Shortridge, 1934). Smithers (1983) states that it is impossible to say whether the zebras formerly found in the Kamiesberg region, were one of the two subspecies or an intermediate between them. Their recent distribution from north to south has been described as discontinuous and largely restricted to Namibia, with a marginal extension into the arid south-west of Angola; they have been introduced to two reserves in South Africa (Smithers, 1983). The only other subspecies is the nominate form which numbers only a few hundred and is restricted to a small number of protected areas in South Africa.

Angola In the early 1980s found in the Iona National Park (on the border with Namibia) and the Mocamedes Game Reserve (Horsten, 1982).

Namibia Discontinuous distribution in the mountainous escarpment along the eastern boundary of the Namib desert from the Kaokoland border with Angola south to about the Ugab River and eastwards to farms in the Outjo District. South of this there is an isolated occurrence in the Erongo Mountains of north-western Damaraland. Further south still there is a much more extensive occurrence, on the escarpment, south from the Swakop River to the Naukluft Mountains and eastwards along the Kusieb and Gaub drainages to the Khomas Highland. There is another break in the distribution before they occur again in the Fish River Canyon and the Huns Mountains near the Orange River, and the border with South Africa (Smithers, 1983). Recently introduced to the

northern and eastern parts of the country in the Groontfontein, Tsumeb and Gobabis districts. These animals were mainly obtained from the Etosha National Park (Namibia Department of Agriculture and Nature Conservation, *in litt.*, 1987).

South Africa Re-introduced into the Hester Malan Nature Reserve near Springbok, north-western Cape Province and introduced into the Cape Point Nature Reserve, from which they have recently been removed. There are several extra-limital populations on private nature reserves and game farms in various areas of the country (South Africa CITES MA, 1987).

POPULATION The population size has apparently reduced considerably since the early 1950s when it was estimated at over 50 000 animals (Joubert, 1973). Estimates since then have declined to 15 000 in 1960 (Joubert, *in litt.*, 1974) and 7000 in 1968 (Joubert, 1973) and 1977 (de la Bat, *in litt.*, 1979). The most recent report obtained stated that there was a widespread and stable population of 6000-7000 animals (South Africa CITES MA, 1987).

Angola Reportedly common on the plains near Mocademes in the late 19th Century (Bocage, 1890 cited in Sidney, 1965). Recently the only significant numbers in Angola were reported to occur in Iona National Park which was within a war-zone, therefore it was thought probable that few animals remain in the area (R. Souter, pers. comm., 1986).

Namibia In the early 1950s the main concentration of the population was in Namibia and thought to number 50 000-75 000 (Joubert, 1973), but by 1960 the estimate was only 15 000, 10 700 of which were in agricultural areas (Joubert; *in litt.*, 1974). A survey carried out in 1968 indicated a total population in Namibia of approximately 7000 animals, 75% of which were concentrated in the Khomas highland escarpment. 5500 of these animals were found in farming areas (Joubert, 1973). Questionnaire surveys in 1972 and 1982 were used to estimate populations on farmland of 16 400 and 13 300 respectively (Namibia Department of Agriculture and Nature Conservation, *in litt.*, 1987). However, Boomker (South Africa CITES MA, 1987) reported that the authorities in Namibia had given a conservative total population estimate of 6000-7000 animals in 1987.

Recent population estimates for Nature reserves in Namibia

Source: Namibia Department of Agriculture and Nature Conservation, *in litt.*, 1987. Year of estimate given in parentheses.

Etosha National Park (1984)	- 620
Namib Naukluft Park (1985)	- 1793
Daan Viljoen Nature Reserve (1985)	- 40
Von Bach Nature Reserve (1984)	- 56
Hardap Nature Reserve (1985)	- 109
TOTAL	- 2618

Berry (Namibia Department of Agriculture and Nature Conservation *in litt.*, 1986) stated that a maximum limit of 800 specimens of this subspecies had been stipulated in the 1985 management plan for Etosha N.P.

South Africa Never likely to have been particularly numerous in South Africa (Joubert, 1973). Small populations occurred in the Hester Malan (Provincial) Nature Reserve and extralimitally in the Thomas Baines (Provincial) Nature Reserve in 1979, from the latter of which they have subsequently been removed. There are several other extralimital populations on private nature reserves and farmland, inluding about 100 animals in the Transvaal (South Africa CITES MA, 1987).

Equus zebra hartmannae

HABITAT AND ECOLOGY The principal habitat is the Arid mountainous escarpment zone which is rich in permanent waterholes (Joubert, 1973). Seasonal use of sand flats was reported by Smithers (1983). Hartmann's Zebra are gregarious, their social organisation usually based on a family group of one stallion with a small number of mares and foals (Penzhorn, 1979). Stallion groups and solitary stallions occur less frequently (Joubert, 1972b). Under certain circumstances family groups may come together to form herds of over 30 animals (Smithers, 1983). Shortridge (1934) reported the occurrence of groups of over 50 individuals. Zebras are predominantly grazers but will browse occasionally. They graze primarily in the mornings or late afternoons and rest in the shade during the heat of the day (Joubert, 1972a). Females reach maturity at three years of age and one foal is born after a gestation period of about 12 months (Millar, 1968). Joubert (1972b) found that most foals were born from November to April and that their survival rate was high, probably owing to the protection afforded by other members of the family group.

THREATS TO SURVIVAL Competition with man and his livestock has resulted in increasing habitat loss and persecution. Zebra compete with domestic stock for grazing and water holes, especially during drought years; much land is now fenced, often cutting off access to preferred grazing or waterholes. In attempts to reach these, zebra will break down fences and be classed as a nuisance by farmers. Much former grazing land has now been cultivated. As a consequence of such conflict Hartmann's Zebra was systematically hunted throughout much of its range and was described as having been, since the 1950s, the most ruthlessly persecuted large mammal in southern Africa (Joubert, 1973). In the 1960s and 1970s water extraction schemes in the Namib Desert, particularly from the Kuiseb River, threatened the future of the Hartmann's Zebra population of the area. It was realised that tapping of underground water supplies was affecting the habitat; this had most impact on the zebra, the most water-dependent species occurring in the Namib. Restrictions on the utilization of underground water have subsequently been introduced and the situation is being monitored (Nussey, 1979). The 1982/1983 drought in Namibia reportedly resulted in heavy mortality among the Hartmann's Zebra; many migrated from the Kaokoveld to the Etosha National Park where they were captured and removed to other areas. Some were sent to the Canyon Colorado Equid Sanctuary, USA for captive breeding (Anon., 1983). Disease, for example anthrax which broke out in Namibia in the late 1970s (Anon., 1978), is also a major threat.

Hunting and culling has been strictly controlled in Namibia by a permit system since 1933 (Joubert, 1973). These controls, which depend on farmers submitting reliable estimates of the zebra population on their land, have reportedly been difficult to police. Over-exploitation in the 1950s and 1960s was aggravated by abuse of the permit system and illegal culling (Baxter, 1967). These controls have reportedly been improved in recent years and Boomker (South Africa CITES MA, 1987) reported that the annual legal take in Namibia during the 1980s was around 1000 animals a year. Records supplied by the Namibian Department of Agriculture and Nature Conservation indicated that, in 1985, 40 animals were taken live by game dealers, 63 were shot by farmers for their own use, 207 were shot or sold for protection of pastures and 170 were used for trophy hunting.

INTERNATIONAL TRADE During the period 1980–1985 an average of just over 550 Hartmann's zebra per year can be estimated to have been involved in international trade either as skins (c. 500 per year), trophies (ca 50 per year) or live animals (c. 10 per year) (Tables 1 and 2). The estimate of the minimum number of animals in trade each year varied from 124 in 1980 to 1575 in 1982. No obvious trend appeared in the data.

Table 1 Minimum net imports of live animals (L), skins (S), and trophies (T) of *Equus zebra hartmannae* reported to CITES, 1980-1985. Small numbers of skin plates and skulls were recorded in trade but they are not included below.

		1980	1981	1982	1983	1984	1985
Argentina	S	-	-	4	-	-	2
Australia	S	-	2	1	3	1	2
	T	-	-	-	-	-	4
Austria	L	-	-	-	2	-	-
	S	1	-	1	1	1	7
	T	-	-	-	-	-	3
Belgium	S	-	-	1	2	-	3
Botswana	S	-	-	735	-	336	-
Brazil	S	-	-	-	-	1	-
Canada	S	-	1	-	11	2	5
	T	-	-	-	-	-	1
China	L	-	-	-	-	2	-
Cuba	L	-	-	-	-	2	-
Denmark	S	-	-	4	-	-	2
Dominican Rep.	L	-	-	-	2	-	-
Finland	S	-	1	1	14	-	-
France	S	-	-	3	1	1	18
	T	-	-	-	-	-	4
Germany D.R.	S	-	-	-	-	8	-
	T	-	-	-	-	1	-
Germany F.R.	L	-	2	-	-	3	4
	S	61	72	82	54	17	87
	T	-	-	8	1	1	6
Greece	S	-	-	-	1	8	7
Ireland	S	-	-	-	2	-	-
Israel	S	-	-	3	10	-	1
Italy	L	2	-	-	-	-	-
	S	-	1	675	-	2	16
Japan	S	-	-	6	-	1	-
Mexico	S	3	-	-	-	-	-
	T	-	-	-	2	-	-
Netherlands	L	1	-	-	-	-	-
Norway	S	-	-	2	-	-	-
Peru	S	-	-	1	-	-	1
Singapore	S	-	-	-	1	-	-
South Africa	S	-	-	-	-	-	230
Soviet Union	S	-	-	-	-	1	-
Spain	S	-	-	-	60	1	1
Sweden	S	1	1	-	-	-	1
Switzerland	S	3	12	16	2	6	1
	T	-	-	-	-	4	3
Thailand	S	-	-	-	-	-	1
UK	L	-	-	1	-	-	-
	S	1	6	1	2	3	14
USA	L	4	-	-	23	-	-
	S	27	85	29	16	30	148
	T	22	67	1	36	27	96
Total	L	5	4	1	27	7	4
	S	97	181	1565	180	419	549
	T	22	67	9	39	35	117

Equus zebra hartmannae

Table 2. Reported countries of origin (or exporting country if no origin reported) and quantities of transactions in live animals (L), skins (S) and trophies (T) of *E. zebra hartmannae* reported to CITES.

		1980	1981	1982	1983	1984	1985
Countries having or possibly having wild populations of the species							
Namibia	L	2	1	–	22	–	–
	S	70	103	107	170	418	607
	T	18	57	8	10	7	79
S. Africa	L	–	–	–	2	–	–
	S	12	81	1456	21	35	194
	T	4	9	1	3	5	48
Countries without wild populations of the species							
Botswana	S	–	1	1	25	–	8
	T	–	–	–	1	–	–
Canada	L	–	–	–	1	2	–
	S	–	–	1	–	–	–
Czechoslovakia	L	–	–	–	–	3	1
Germany, F.R.	L	1	1	–	2	–	–
Hong Kong	S	–	–	–	–	–	1
Indonesia	S	–	–	–	1	–	–
Japan	L	–	–	–	–	1	–
Malaysia	T	–	–	–	1	–	–
Nepal	S	–	–	2	–	–	–
Netherlands	L	–	1	–	–	–	–
Switzerland	L	1	4	–	–	–	3
Tanzania	T	–	–	–	1	–	–
UK	L	1	–	1	–	–	–
USA	L	–	–	–	1	–	–
Zaire	S	–	–	4	–	–	–
Zambia	S	15	1	–	–	–	1
	T	–	–	–	1	2	–
Zimbabwe	S	–	–	–	1	–	1
	T	–	1	–	–	1	2
Unknown	L	–	2	–	–	1	–
	S	–	–	1	7	1	–
	T	–	–	–	–	4	2

Major net importers during the period included Botswana, F.R. Germany, Italy, United States and in 1985 alone South Africa. In most years the original source of most of the animals was recorded as Namibia. However, substantial quantities of specimens, including 1456 skins in 1982, were recorded as having originated in South Africa where the species reportedly occurs only in very small numbers. As the majority of the trade from Namibia, in both skins and trophies, is routed through South Africa (Namibia Department of Agriculture and Nature Conservation, *in litt.*, 1987), it seems likely that the large numbers of specimens originating in South Africa were in fact from Namibia, but incorrectly recorded in CITES reports. Importing countries may not have recognised Namibia as a politically separate entity, recording imports from there as having originated in South Africa. The Customs Union applying to all of southern Africa may also cause confusion. One other explanation is that the specimens may have been mis-identified, as other species of zebra, which are not listed in the CITES Appendices, do occur in South Africa in large numbers.

CONSERVATION MEASURES Included in Class B of the African Convention (1969) (i.e. it may be hunted, killed, captured or collected only under special authorisation granted by the competent authority).

Angola Totally protected from hunting trade and export by the statutory Hunting Regulations of 1957 (Anon., 1986). Reported from the Iona National Park and the Mocamedes Game Reserve in 1982 (Horsten, 1982).

Namibia Listed as 'specially protected game' in 1933, thus hunting requires a special permit, normally granted by the administration only if crops or grazing are endangered (Joubert, 1973). Occurs in a number of protected areas in the country (see Population section).

South Africa Reported to occur in the Hester Malan Provincial Nature Reserve. Those which were introduced to the Thomas Baines (Provincial) Nature Reserve and the Cape Point Nature Reserve were removed as they were extralimital to the former range (South Africa CITES MA, 1987).

CAPTIVE BREEDING In 1982, 30 male and 85 female Hartmann's Zebra were held in 26 zoological collections; most had been bred in captivity (Olney, 1983). A group of 15 captured in Djivasandu in 1982 are reported to be breeding well at the Canyon Colorado Equid Sanctuary in New Mexico, United States (Lloyd, *in litt.*, 1986).

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GUANACO

Recommended list: 2
[Possible problem]

Lama guanicoe (Muller, 1776)

Order ARTIODACTYLA

Family CAMELIDAE

SUMMARY AND CONCLUSIONS The most widespread of the South American camelids, occurring in the Andean and Patagonian regions from Peru south to Tierra del Fuego in a wide variety of habitats from sea level to around 4250 m altitude. Most characteristic habitat is the cool shrubland or grassland of Patagonia. Total world population estimated at around 600 000, 95% of these in Argentina, though it is noted that the status of the species in Argentina has yet to be fully clarified; this represents a tiny fraction of the estimated pre-Hispanic population as vast areas of the species's range have been appropriated for stock raising. The species has been ruthlessly hunted for its pelt (particularly that of the young or chulengos), for meat and as an alleged competitor with livestock and has become rare in the northern parts of its range. Outside Argentina, the largest population is believed to be on the Chilean side of Isla Grande of Tierra del Fuego, where some 12 000 were believed to survive in 1982. It is fully protected in all countries in which it occurs other than Argentina where it is only protected in some provinces.

In Argentina the species is still intensively hunted and up to 86 000 pelts are exported annually, either as skins or as worked items; the population is believed to be declining in some areas. There are indications that the level of exports has fallen since 1982 but it is unclear whether this reflects a real decline in numbers taken or not.

Preliminary modelling on the basis of population studies in Chile indicates that sustained harvesting could be maintained at the rate of 15% of young and 40% of males from adult and sub-adult bachelor groups each year. At present harvesting in Argentina appears to be unselective and is unlikely to be sustainable at present levels in the long term.

DISTRIBUTION South and south-west South America in Argentina, Bolivia, Chile, Peru and perhaps Paraguay. Two subspecies are generally recognised, *Lama guanicoe cacsilensis* from the montane zone of southern Peru and adjacent areas in Bolivia and *L.g. guanicoe* from the Andean zone of southern Bolivia to Patagonia and Tierra del Fuego (Cabrera, 1960).

Lama guanicoe cacsilensis

Bolivia According to Franklin (1982) Guanaco still existed in Bolivia though no breeding population survived. Torres (1985) reported that a very small number were located on the Mochara Range and in the zone comprising the Estancia Perforacion Chaco.

Peru The species is rare and thinly distributed. The principal and northernmost population is on the Hacienda Calipuy in the District and Province of Santiago de Chuco, Department of la Libertad at ca 8°S (Franklin, 1975; Grimwood, 1969). Grimwood (1969) noted other, small populations from around 12°S southwards, scattered through the Departments of Lima, Ayacucho, Ica, Apurimac, Arequipa and Taina.

Lama guanicoe guanicoe

Argentina Guanaco appear to be widespread in Patagonia, south of c. 42°S and also further north along the eastern slopes of the Andes as far north as Salta Province (Franklin, 1982; Olrog and Lucero, 1982).

Chile The species survives in two distinct regions in Chile - in the north on the western facing slopes and coastal ranges of the Andes Chain south to around 35°S and in the Magallanes region including Tierra del Fuego in the extreme south, south of 50°S (Franklin, 1982). Torres (1985) indicated that the population of the extreme northern tip of Chile may be of *L.g. cacsilensis*.

Paraguay Guanaco have been reported as occurring in the Chaco region, though Verschuren (1980) regarded this as unlikely. A more recent account by Torres (1985) indicated that a small population was indeed located in the northern part of the boreal Chaco in the Paulo Lagerenza area, Nueva Asuncion Department.

POPULATION In 1982 estimated to be over half a million, the great majority in Argentina. This is a tiny fraction of the likely original (pre-Hispanic) population, which Raedeke (1979) considered could have been as high as 30-50 million, based on the numbers of domestic livestock currently supported on original Guanaco habitat. Franklin (1982) considered the species to be still declining (Franklin, 1982) but Torres (1985) described the population as reasonably stable.

Argentina Franklin (1982) notes that the status of Guanaco in Argentina has yet to be clearly and fully defined; he quotes an estimate of around 550 000 for 1981, this constituting over 95% of the estimated world population. The species is under heavy pressure in Argentina and was definitely declining (Franklin, 1982). Cajal (1983, cited in Torres, 1985) estimated the Argentinaian population at 578 700 animals.

Garrido (1985 cited in Rabinovich *et al.*, 1987) gave the following estimates for the populations of various provinces.

Tierra del Fuego	14 000 - 20 000
Santa Cruz	130 000 - 170 000
Chubut	160 000 - 200 000
Rio Negro	90 000 - 140 000
Neuquen	75 000 - 110 000
Mendoza	50 000 - 80 000
San Luis	9 000 - 15 000
La Pampa	12 000 - 20 000
Rest of country	12 000 - 16 000
TOTAL	552 000 - 771 000

Overall national population trends have yet to be ascertained, however some studies have indicated a net increase in some areas, while other reports suggest continuing decline (Rabinovich *et al.*, 1987).

Bolivia Franklin (1982) reported that perhaps 200 survived; however Cardozo (1985, cited in Torres, 1985) estimated a total of only 54.

Chile An estimate of 20 000 was made in 1982, some 12 000 of these being on the Chilean side of the island of Isla Grande, Tierra del Fuego; this was stated to be one of the largest remaining Guanaco populations (Franklin, 1982). An estimate given by Rottmann (cited in Torres, 1985) indicated a population size of 22 500 in 1985. The species had reportedly been declining rapidly in Chile until the mid-1970s when a protection programme was initiated for populations at Torres del Paine National Park and on Isla Grande, Tierra del Fuego (Franklin, 1982). Recorded as 'Vulnerable' by Miller *et al.* (1983).

Paraguay Torres (1985) stated that the population consisted of about 53 animals in 1982.

Peru Grimwood (1969) thought there may have been perhaps 5000, though certainly decreasing in number. However, Franklin (1982) also quoted an estimate of 5000 but a more recent estimate totalled only 1600 animals (Ponce del Prado, 1985 cited in Torres, 1985). The largest single population was reportedly at Hacienda Calipuy which, in 1975, was thought to number 400-500, having maintained itself at this level since the mid-1960s. A population near Pampa Galeras was reported in 1982 as increasing (Franklin, 1982).

HABITAT AND ECOLOGY The Guanaco occupies the widest range of habitat types of any of the South American camelids, occurring from sea level to nearly 4250 m altitude in hardpan deserts, semi-deserts, shrublands, grasslands, savanna and scrublands, on plains, high pampas, plateaus, foothills and mountains. It avoids areas of steep slopes, cliffs and rock (Franklin, 1982; Grimwood, 1969). The most characteristic habitat, or at least that in which Guanacos have been most abundant, is that of the cool Patagonian shrubland or grassland.

The Guanaco is both a grazer and a browser, though appears to be preferentially the former - Franklin observed in the Andean foothills of northern Peru that Guanacos there highly preferred grasses and forbs over the more abundant shrubs, while Raedeke (1979), working in Tierra del Fuego, found annual diet in meadow-forest areas to be 62% grasses, 15% browse, 11% forbs, 7% epiphytes and 5% lichens and fungi. Selectivity indices suggested that forbs, lichens, epiphytes and fungi were most highly preferred, followed by grasses and grass-like plants with browse least preferred at all seasons. He also showed that Guanacos adjust their diet when competing with sheep, by moving off preferred meadowlands into the forest where they fed mainly on browse and other non-grasses. They appear to be more efficient at digesting forage than domestic livestock.

Although Gaunaco are found in extremely arid areas (such as the Peruvian Atacama desert), they apparently require at least occasional access to free water in such regions, and have been observed drinking from saline lagoons and ocean tidepools. In damper areas such as Tierra del Fuego they can apparently satisfy water needs from moisture in the vegetation.

Guanaco populations can be sedentary or migratory, the latter showing either altitudinal or lateral shifts in range owing to snow cover or drought. Social ecology of Guanaco has been studied in southern Chile and northern Peru (Franklin, 1982; Fritz and Franklin, 1985); they may form a variety of social units, including family groups, male groups, female groups, solo males and mixed groups. Family groups consist of one adult male with females and their young less than 15 months of age. In sedentary populations, such groups have a territory (varying in size from 2 to 46 ha and averaging 29.5 ha at study sites in Tierra del Fuego) stongly defended by the male throughout the year; however many of the females, both with and without young, leave these areas in winter. During summer months, family groups are likely to be relatively spread out and fragmented on the territories, in contrast to Vicuna which show much greater social cohesion. Young males and females are forcibly evicted from the groups by the adult male at around 13 to 15 months of age. Male groups are mostly immature and non-territorial males; solo males may or may not have territories. Female groups consist of females with their young in sedentary populations that stay together during the winter months while the territorial males remain on their territories. Mixed groups are aggregations of males and females of all ages in migratory populations that have come together during the winter months (Franklin, 1982).

Fritz and Franklin (1985) carried out a detailed study of population dynamics of a population of Guanaco in Torres del Paine National Park in southern Chile, in an attempt to obtain estimates for sustainable harvests. Mean natality rate was 0.74 offspring per female over 2 years old. Of males over one year old, 37% possessed territories; of these, 45% had family groups and 55% were solitary. Most 1- to 3-year-old males spent the summer in male groups and became territorial when 4 years old. Females reach maturity at one year while males are sexually mature at 3 or 4 years (Raedeke, 1979).

THREATS TO SURVIVAL Guanaco numbers have declined dramatically in historical times - vast areas of their range have been settled for agriculture and stock-raising and Guanacos have been rigorously hunted for their skins and for alleged competition with livestock (Franklin, 1982). In the early 1900s they were still sufficiently numerous in Patagonia that sheep ranchers in Santa Cruz called for their complete eradication on the grounds that they were detrimental to sheep raising and thus a national plague; wholesale hunting reportedly still continues in much of Patagonia. Traditional Guanaco migration routes have reportedly been disrupted by the construction of livestock fences (Franklin, 1982). Disease has certainly affected populations locally - for example at Hacienda Calipuy (qv) in nothern Peru where foot-and-mouth is reported to have halved the Guanaco population in the early 1960s (Grimwood, 1969); it is unclear, however, whether disease has had a serious impact on populations on a larger scale.

Gilmore (1955, cited in Torres, 1985) equated the relationship between the South American Indians and the Guanaco with that which developed between the North American Indians and the Bison and Caribou, 'an ethnozoological culture without domestication'. The Guanaco was exploited for a wide variety of products, forming an integral part of the early culture of South America. This relationship changed considerably after colonisation when utilisation became almost exclusively focussed on hunting for pelts, especially those of 'chulengos' (young Guanacos).

Franklin (1982) described studies from Chile that concluded that Guanacos are best utilized for production of meat, because of their wide distribution, adaptablility to marginal habitats and production of good quantities of usable meat (55% dressed weight from 120-kg animals). Pelts were considered of secondary commercial value, while the short length and very low production rate of wool (250 g per animal) limited its commercial applications. Guanaco leather was of similarly limited interest and regarded as best used for durable shoe products where appearance was not important. Cunazza (1984) described studies carried out in the Magallanes region of Chile which indicated that sustainable utilisation of Guanaco was technically feasible. In addition to exploitation for meat and pelts, tourist viewing was indicated as significant economic factor.

The Guanaco is widely recognised as a species with potential for sustainable harvest. However, Fritz and Franklin (1985) have concluded, on the basis of their study of population dynamics of the species, that unselective harvesting cannot be realistically sustained. Preliminary modelling indicated that 15% of juveniles (chulengos) and 40% of males from male groups could be harvested while maintaining the population at a constant level. Further research on sustainable harvest was described by Rabinovich *et al.* (1987).

INTERNATIONAL TRADE Large quantities of Guanaco pelts were exported from Chile in the early 20th Century. Iriarte and Jaksic (1986) detailed legal exports between 1910 and 1944 of a total of 38 263 skins. The majority of these skins were exported in the period 1925-1929, after which the species was legally protected. No legal exports of Guanaco skins from Chile were recorded

after 1944. Tens of thousands of pelts have been exported annually from Argentina: during the period 1972-79, 443 655 (not including wool) were legally exported from Buenos Aires, generating some 3 million dollars (U.S.) of tax revenue (Ojeda and Mares, 1982). Official statistics describing exports of Guanaco skins from Argentina for 1976 to 1984 were compiled by Cajal (1986, cited in Rabinovich *et al.*, 1987) (numbers of skins): 1976 - 22 397; 1977 - 42 894; 1978 - 86 062; 1979 - 86 324; 1980 - 35 256; 1981 - 73 875; 1982 - 30 978; 1983 - 13 157; 1984 - 10 250.

CITES annual report data describing trade involving Guanaco is categorised into: live animals; bodies; skins; worked items. Trade in the first two categories is insignificant compared to that in the second two. Trade in live animals is almost certainly all of captive-bred specimens and the highest volume in one year totals fewer than 40 (in 1983), all except 4 declared as captive bred, and none originating in countries with wild Guanaco populations. Trade in bodies is presumably for the meat trade; the highest volume in one year (1982) totalled just over 300, or less than 1% of the overall trade for that year. (Interestingly most of these were recorded as originating in Argentina and being re-exported to Argentina from F.R. Germany.) These two categories are excluded from the tables below and are not discussed further.

Accurate analysis of trade figures is somewhat hampered by the number of different categories used in records, aside from evident errors and inconsistencies in annual reports to CITES. Skins are recorded by number, weight and as plates, with no information available to allow conversion of the last two into numbers of skins; worked items are generally recorded as items of cloth or garments, again by number or weight. The recorded trade in 'skin or leather items' is sufficiently small to be excluded from the discussion. Although items of cloth and garments have been lumped together in tables 2a and 2b, transactions recorded under these categories were kept separate for the purposes of calculating net trade figures. It is likely that the same items may have been differently recorded by importing and exporting countries on some occasions.

Overall, recorded trade was largest in 1981 and 1982 (see tables 1a and 1b). The increase in apparent trade volume from 1980 to 1982 probably reflects the improvement of reporting by CITES Parties rather than a real increase in trade. After 1982, a steady decline in net trade of both skins and cloth items is apparent.

Until 1984 virtually all trade in Guanaco skins, items of cloth and garments was reported to have originated in Argentina (see tables 2a and 2b). The only major exception was in 1980, when 5340 of the skins in trade skins apparently originated in Paraguay. As the species is considered unlikely to occur in Paraguay, these skins almost certainly originated elsewhere, and Argentina is the most likely source, holding as it does over 90% of the world population. 30 skins were recorded as originating in Peru in that year. For the years 1981-1983, almost 100% of the skins, cloth items and garments recorded in trade can be accounted for as originating in Argentina. The relatively large number of skins recorded as origin unknown (Table 2a) can clearly be almost entirely accounted for as re-exports of skins originating in Argentina.

In contrast to the data for years up to 1984, records for 1984 and 1985 include large numbers of skins and cloth items originating in Bolivia and records for 1984 include substantial trade in cloth items which reportedly originated in Peru. Such trade is extremely surprising, considering the small population remaining in Peru and the almost near extinction of this species in Bolivia. Furthermore Guanaco have been fully protected in Bolivia and Peru

for many years. Almost all of records of trade from Bolivia and Peru were reported as imports into the USA. It is likely that these skins and garments in fact originated in Argentina and were incorrectly recorded by the USA, but it is also possible that the transactions represent illegal exports or re-exports from Bolivia and Peru. CITES data indicate exports from Argentina significantly smaller in number than those indicated in the official export statistics which were quoted by Cajal (1986, cited in Rabinovich *et al.*, 1987). This discrepancy remains unexplained.

The great majority of recorded trade was with Europe, and F.R. Germany was by far the most important net importing country (see tables 1a and 1b), accounting for over 40% of skins and almost 60% of garments and items of cloth (excluding plates and those recorded by weight). Switzerland and Italy together accounted for a further 40% of skins and almost 30% of garments and cloth. Of the remaining countries, only France, Malta and the USA accounted for substantial numbers of skins and cloth items. Trade involving Malta was entirely with F.R. Germany and it is likely that skins and cloth are sent to Malta from F.R. Germany for processing and are then re-exported to F.R. Germany.

Table 1. Apparent minimum net imports of *Lama guanicoe* products reported to CITES.

a. Skins

	1980	1981	1982	1983	1984	1985
Austria	65	-	86	60	44	40
Belgium	-	90	-	30	-	-
Chile	-	-	10	-	-	-
Denmark	-	100	-	-	-	-
France	677	219	775	1036	25	383
Germany, F.R.	2894	7161	14944	3269	3122	-
Hong Kong	-	26	-	-	-	-
Ireland	-	-	1	-	-	-
Israel	-	-	-	-	500	-
Italy	4994	7455	2525	2	977	20
Japan	-	2	-	-	1	57
Korea	60	-	-	-	-	-
Malta	1018	779	774	70	-	-
Monaco	-	-	1	-	2	-
Norway	-	-	2	-	-	-
Portugal	22	-	-	-	-	-
Spain	-	38	-	15	63	40
Sweden	1	1	-	-	-	-
Switzerland	132	767	9843	-	-	42
UK	-	218	-	-	-	-
USA	-	3	1670	519	999	47
Total	9863	16859	30631	5001	5733	629

Table 1. (continued) Apparent minimum net imports of *Lama guanicoe* products reported to CITES.

b. Garments and items of cloth

	1980	1981	1982	1983	1984	1985
Australia	-	-	-	-	1	-
Austria	49	90	17	2	4	6
Belgium	18	3	1	-	-	-
Canada	1	76 8 kg	-	18	-	-
Denmark	-	12	8	1	-	-
Finland	-	20	-	-	-	-
France	5	3725 38 kg	2243	579	93	260
Germany, F.R.	-	18599	8310 1589 kg	7154	621	-
Hong Kong	-	27	-	-	-	-
Israel	-	-	20	-	-	-
Italy	99	7589	-	-	51 750 kg	79 150 kg
Japan	2	97 444 kg	197 332 kg	62 400 kg	-	14 300 kg
Luxembourg	-	-	1	16	-	-
Mali	5	-	-	-	-	-
Malta	-	82	-	-	3	-
Netherlands	26	-	1	2	-	-
Norway	-	6	8	3	-	-
Peru	-	-	26	-	-	-
Portugal	-	4	-	-	-	-
Saudi Arabia	-	-	-	-	1	-
Spain	-	-	-	10	-	-
		67 kg	105 kg			
Sweden	2	5	18	2	-	-
Switzerland	95	2080	2992 885 kg	2873	-	56
UK	-	174	-	-	-	-
USA	62	95 3 kg	796	586	9457 49 m	1703
Total	364	32684 560 kg	14638 2911 kg	11308 400 kg	10249 750 kg 49 m	2118 450 kg

Table 2. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions in *Lama guanicoe* products reported to CITES.

a. Skins

	1980	1981	1982	1983	1984	1985
Countries with wild populations of *L. guanicoe*						
Argentina	4473	16859	30606	5001	4751	581
Bolivia	-	-	-	-	958	63
Peru	30	-	-	-	24	3
Countries without wild populations of *L. guanicoe* or country unknown.						
Canada	52	-	-	-	-	-
Germany, F.R.	74	26	-	-	-	-
Paraguay	5340	-	-	-	-	-
Unknown	66	283	4107	2	-	-

b. Garments and cloth

	1980	1981	1982	1983	1984	1985
Countries with wild populations of *L. guanicoe*						
Argentina	239	32678	14618 2716 kg	11295 -	904 750 kg 49 m	546 450 kg
Bolivia	1	-	1	-	6686	1650
Peru	-	-	30	-	2015	-
Countries without wild populations of *L. guanicoe* or country unknown						
Belgium	-	444 kg	-	-	-	-
Canada	-	16	1	1	-	-
Denmark	-	-	1	-	-	-
France	-	5	-	-	-	-
German D.R.	-	1	-	-	-	-
Germany, F.R.	8	-	1	-	-	-
Korea	45	-	-	-	-	-
Paraguay	-	2	5	-	-	-
Puerto Rico	-	-	-	-	-	3
Switzerland	-	-	39	-	-	-
UK	-	-	332 kg	-	-	-
Uruguay	1	-	-	-	-	-
USA	20	-	-	-	-	-
Unknown	-	22	2	-	82	9

CONSERVATION MEASURES Occurs in a total of 21 protected areas in Argentina, Chile and Peru which cover a total of 4 446 682 hectares (Torres, 1985). All of the range states are CITES Parties.

Lama guanicoe

Argentina The Guanaco is not protected under national Argentinian law, although export of raw skins is forbidden under Resolucion No. 134 of 13 May 1976. It is, however, fully protected in the provinces of Catamarca, Chubut, Salta, Tucuman and Tierra del Fuego, but listed as a pest species in Ninguna (Rabinovich *et al.*, 1987).

Bolivia Protected under Decreto Supremo No. 11238 of 3 December 1973.

Chile Fully protected since 1929 (Iriarte and Jaksic, 1986).

Paraguay All wildlife is protected from commercial or sport hunting under Decreto No. 18.796 of 1975.

Peru Protected since 1940 by Law No. 9147 which prohibited hunting and exportation. Listed as an endangered species under Resolucion Ministerial No. 01710-77-AG/DGFF of 4 October 1977.

CAPTIVE BREEDING The Guanaco breeds readily in captivity and many are held in zoos throughout the world. In 1980, at least 130 were successfully bred in over 100 different collections (Anon., 1981). An experimental herd of about 70 is kept at Trelew, Chubut Province, by INTA (Instituto Nacional Tecnologico Agropecuario) (Anon., 1984). Breeding was successful in 1983.

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INDIAN PANGOLIN	*Manis crassicaudata* Gray, 1827	Recommended list: 2 [Possible problem]
MALAYAN PANGOLIN	*Manis javanica* Desmarest, 1822	Recommended list: 2 [Possible problem]
CHINESE PANGOLIN	*Manis pentadactyla* Linnaeus, 1758	Recommended list: 2 [Possible problem]
Order PHOLIDOTA		Family MANIDAE

SUMMARY AND CONCLUSIONS The three species of Asian pangolins occupy together much of the Indo-Malayan region from Pakistan to southern China, the Philippines and the Greater Sundas. The limits of the ranges of the three species in northern South East Asia are ill-defined and should be clarified. Details of the distribution and population status of each species are presented separately in the text of the present account; habitat and ecology, threats to survival, international trade and conservation measures are described for all three species together.

M. crassicaudata occurs in the Indian sub-continent from eastern Pakistan, through much of India south of the Himalaya, Bangladesh and Sri Lanka, possibly also in Burma and extreme western China.

M. javanica occupies tropical South East Asia including much of Indonesia, Malaysia, Palawan in the Philippines, at least the southern half of Indo-China and north through Thailand and Burma, possibly as far west as Bangladesh and conceivably into south-west China.

M. pentadactyla is found in the Himalayan foothills in Nepal, Bhutan and northern India, across Burma to northern Indo-China and through southern China (south of the Chiangjiang) to Hainan and Taiwan.

These species are nocturnal, solitary and secretive; their habits are little known and the scanty available information appears to apply equally to all three. They are found in a wide variety of habitats, including primary and secondary forest and cultivated areas, such as gardens and plantations; in some areas they are apparently recorded more frequently in secondary than primary forests, though it is not clear if this represents a true habitat preference or simply increased frequency of encounter. However it does seem that habitat destruction is unlikely to be a major threat to any of the species. Diet consists of termites and ants. One (occasionally two) young is the norm; births may be seasonal. No quantitative information on population levels or trends is available, though pangolins are thought to have decreased in many areas through hunting. They are sought after for their meat, which is apparently eaten locally (there is no evidence for trade); for their scales, which are very widely used in traditional (particularly Chinese) medicine, and in which there is substantial trade; and for their skins which are used for leather goods, primarily in the USA.

There is evidence that skins in trade are misidentified as to species, and it appears that scales in trade are not generally ascribed to individual species; it is thus impractical to consider trade in the three species separately. There is, or has been, a substantial trade in scales originating in Kalimantan (Indonesian Borneo); scales collected here are smuggled across the border to Sarawak (Malaysia) and exported to Singapore and Hong Kong, it is believed largely for re-export to China. This trade has involved several thousand pangolins per year. Trade in Asian *Manis* species in 1980-85 reported to CITES amounted to some 185 000 skins, almost all (90%) to the USA. There was

a marked decline in trade from 1981 (over 60 000) to 1984 (fewer than 6 000). However, reported trade in 1985 increased to over 30 000 skins. Thailand and Indonesia are the two most important declared countries of origin (despite pangolins being protected in both these). If country of origin is accurate, the great majority of skins in trade are likely to be *M. javanica*.

In the absence of adequate population data for any of the three species and the lack of certainty regarding the origin and identification of skins in trade, it is not possible to draw conclusions regarding the effect of trade on the Asian pangolins. More information is required on: the geographical origin and identification of pangolin skins in trade; pangolin population levels; the relation between trade in pangolin products for traditional medicines, in skins for the leather trade and in collecting for food. Furthermore, considering the increase in reported trade in 1985, it is important to clarify how such large quantities of pangolin products continue to appear in trade, with reported countries of origin where populations are protected by national legislation or are too small to account for the numbers appearing in CITES reports.

INDIAN PANGOLIN ***Manis crassicaudata***

DISTRIBUTION The Indian sub-continent, Sri Lanka, perhaps Burma and China.

Bangladesh Khan (1985) stated that the species was widely distributed over the country excluding the coastal parts of Khulna, Barisal, Pauakhali, Noakhali and Chittagong Districts. It had possibly disappeared from Kushtia, Jessore, Pabna, Bogra, Rangpur, Dinajpur, Rajshahi and most parts of Dhaka and Comilla.

Burma Allen (1938) quotes nineteenth century sources which record it as occurring in low country around Bhamo and outlying spurs of the Kakhyen Mountains in north-east Burma and the adjacent part of China (see below); this appears to be considerably to the east of other records of this species and it is not mentioned as occurring in Burma by Salter (1983) or Yin (1967). It seems possible that these records in fact refer to *Manis javanica*.

China Allen (1938) stated that this species extended into extreme western Yunnan, but see above.

India Reportedly widely distributed through the plains and lower slopes of hills south of the Himalaya to the southern extremity of India (Tikader, 1983).

Pakistan The species is apparently very locally distributed in Pakistan and, according to Roberts (1977), prefers more barren, hilly areas. He recorded it as found in Sialkot, Jhelum and Gujrat Districts in the north-west of the Punjab, extending across the Salt Range into Kohat District, and from Campbellpur District up to Mardan and Peshawar in the North West Frontier Province; it was found in the Potwar Range and extended up to 750 m elevation in the Rawalpindi foothills. Further south it appeared to be absent from the Indus riverine plain but did occur on the right bank of the Indus in the hilly regions in the western part of the Dadu and Larkana deserts (Baluchistan) and extended southward through Las Bela and Mekran; it also occurred east of the Indus in Hyderabad district and Tharparkar, extending eastwards to Kutch (Roberts, 1977).

Sri Lanka Reported by Phillips (1981) as locally distributed throughout the whole of the lowlands, ascending to around 3500 feet (1100 m) in hill regions. Its range appeared to coincide with that of the termites on which it fed.

Manis spp.

POPULATION Virtually no information is available on population levels of this species or any of the other Asian pangolins. Being highly secretive, solitary and nocturnal they are rarely observed, and certainly not regularly enough to allow assessment of population densities.

Bangladesh The species was reported in 1985 as currently found in small numbers in sal, evergreen and semi-evergreen forests (Khan, 1985). Described in 1986 as rare (Bagladesh CITES MA, 1986).

Burma No information.

China No information.

India Tikader (1983) noted its status as indeterminate, but considered that the population had been greatly reduced by hunting.

Pakistan Roberts (1977) stated that judging from the limited records of its occurrence the Pangolin seemed relatively uncommon in Pakistan. Described by Shirazi (Pakistan CITES MA, 1986) as rare.

Sri Lanka Has been reported to be of variable abundance, but to be nowhere common (Phillips, 1981).

MALAYAN PANGOLIN ***Manis javanica***

DISTRIBUTION South East Asia, including Palawan and much of Indonesia. Western and northern limits of the range are unclear, although western limit is likely to lie in Burma; may perhaps occur marginally in China.

Bangladesh Khan (1985) noted that the species could possibly occur in Bangladesh, though there were no specimens or site records; Husain (1974) listed it for the country but gave no details. Sarker (Bangladesh CITES MA, 1986) suggested that it was likely to occur but no reliable records were known.

Burma Noted by Salter (1983) as probably widespread, though no recent data on status were available.

China Although there are no definite records, reference in Allen (1938) to the presence of *M. crassicaudata* (see above) in the region of Bhamo and adjacent mountains in north-east Burma and extreme western Yunnan seems more likely to refer to this species.

Indonesia Van der Zon (1977) notes its distribution in Indonesia as: Sumatra, Kiau and Lingga archipelago, Bangka and Belitung, Nias and Pagi islands, Kalimantan, Java and Bali. Habitat was given as lowland rainforest but also near human settlements, up to 1000 m.

Kampuchea Although no definite records have been located, the species almost certainly occurs there, being recorded from all adjacent countries.

Laos There are records from throughout the Mekong Valley at least as far north as Luang-Prabang Province (Deuve and Deuve, 1963); it is not clear whether the range overlaps in northern Laos with that of *M. pentadactyla*. Singsouriya (Laos Forest Department, *in litt.*, 31 January 1986) noted that pangolins were generally confined to the plains and lower slopes of hills.

Malaysia Medway (1977) stated it to be widespread throughout the mainland of West Malaysia, primarily in forest but also in gardens and plantation, including rubber; also on the island of Penang. The species is reportedly

widespread on Borneo, from sea level to an altitude of at least 4500 m on Gunung Kinabalu in Sabah, though Proud (*in litt.* to N. Duplaix, 9 May 1981) noted that it appeared to be absent from the extensive peat swamp forests of Sawarak. In Sabah, Davies and Payne (1982) note that the species is rarely seen though was evidently widely distributed, being known by local people throughout Sabah. In particular it was reliably reported to be present in the cultivated areas between Tawau and Merotai (to the south-west of the Tawau Hills national park) and sightings were made in gardens in the Sandakan area and in Sepilok Nature Reserve.

Philippines Occurs on the main island of Palawan and on the islands of Busuanga and Culion in the Calamian Group in northern Palawan Province (Anon., 1979; J.B. Alvarez, *in litt.* to R.L. Jachowski, 19 October 1982). Confirmed in 1986 as endemic within the Philippines to Palawan (Philippines CITES MA, 1986).

Singapore According to Doggett (*in litt.* to N. Duplaix, 24 June 1981) the species was still found in the wild in Singapore though in very small numbers.

Thailand *M. javanica* occurs throughout Thailand, preferring forest but also found in rubber plantations and other more settled areas (Boonsong Lekagul and McNeely, 1977).

Viet Nam There are locality records from Kontum Province, Tay Ninh Province and Quang Nam Province (van Peenen, 1969); Bourret (1942) noted that the species was often found in Cochinchina.

POPULATION Virtually no information is available on population levels of this species or any of the other Asian pangolins. Being secretive, solitary and nocturnal they are rarely observed, and no population estimates appear to have been derived.

Bangladesh Khan (1985) noted that the species could possibly occur in Bangladesh, though there were no specimens or site records.

Burma Noted by Salter (1983) as probably widespread, though no recent data on status were available. Previously described as common (Hopwwod, 1929).

China No information.

Indonesia Reported by van der Zon (1977) as common.

Kampuchea No information.

Laos Singsouriya (Laos Forest Department, *in litt.*, 31 January 1986) stated that, although no surveys had been carried out, experienced observers agreed that pangolins had become rare due to trapping and hunting for food and for its scales.

Malaysia Medway (1969) considered it to be widespread and not uncommon in suitable habitats in Peninsular Malaysia. On Sabah the species was nowhere reckoned to be common; although more often recorded in cultivated areas than forest, it is not clear whether it was more abundant in the former, or simply more often seen (Davies and Payne, 1982). Large areas of suitable habitat reportedly remained (Malaysia, Sabah CITES MA, 1985).

Philippines No information.

Singapore According to Doggett (*in litt.* to N. Duplaix, 24 June 1981), the species was still found in the wild in Singapore though in very small

Manis spp.

numbers.

Thailand No information.

Viet Nam No information.

CHINESE PANGOLIN ***Manis pentadactyla***

DISTRIBUTION Southern China and the northern part of the Indo-Malayan region from northern India to Laos and Viet Nam; also Taiwan.

Bangladesh Khan (1985) stated that the species was possibly present, though noted that there were no sight records or specimens. If present the most likely areas were the forest of Sylhet, Comilla, Chittagong and Hill Tracts districts. Sarker (Bangladesh CITES MA, 1986) confirmed that it was likely to occur, but no records were known.

Bhutan The species may be expected to occur in Bhutan, being recorded from adjacent countries (Nepal and India) (Ellerman and Morrison-Scott, 1951).

Burma Noted by Salter (1983) as probably widespread though with no recent data on status.

China Described by Allen (1938) as found throughout south-east China from the southern border as far north as Changjiang (the Yangtze River); also found on the island of Chusan at the mouth of the Changjiang. Further west the northern limit of the range appeared to follow the Changjiang Valley, though the species apparently did not extend to eastern Sichuan (Szechwan). It was generally absent from higher country in western China but did occur in southern Yunnan. Also occurs on Hainan (Allen, 1938).

Hong Kong Marshall (1967) noted that it was found on Hong Kong Island, Kowloon Peak and various other places in the New Territories. Proud (*in litt.* to N. Duplaix, 9 May 1981) stated that the species was extant in the New Territories at least up to 1975 and Cheung (Hong Kong CITES MA, 1987) stated that it occurs in many parts of Hong Kong.

India Recorded from north-eastern India (Assam and Sikkim) (Prater, 1971; Tikader, 1983).

Laos Occurs in the northern part of the country (Delacour, 1940; Deuve and Deuve, 1963; Ellerman and Morrison-Scott, 1951). It is not clear if the range overlaps with that of *M. javanica*.

Nepal Recorded as present, though apparently confined to elevations below around 1500 m (Frick, 1968, Mitchell, 1975).

Taiwan Recorded as present (Ellerman and Morrison-Scott, 1951).

Thailand The only record is from Doi Inthanon in Changwat Chiang Mai sometime in the 1930s (Allen and Coolidge, 1940).

Viet Nam All records located are from the northern half of the country, as far south as Quang Tri Province (Bourret, 1942; van Peenen, *et al.*, 1969).

POPULATION Very little information is available on status anywhere in the species's range.

Bangladesh No information.

Bhutan No information.

Burma No information.

China Believed to have suffered to some extent from overhunting for its meat and scales (Wang Sung, *in litt.* to R.L. Jachowski, 8 October 1982).

Hong Kong No information.

India Tikader (1983) considered its status indeterminate, noting that it was rarely seen but that it had certainly been reduced in numbers by hunting.

Laos Singsouriya (Laos Forest Department, *in litt.*, 31 January 1986) stated that, although no surveys had been carried out, experienced observers agreed that pangolins had become rare due to trapping and hunting for food and for its scales.

Nepal No information.

Taiwan Stated in 1974 to be in need of complete protection (Anon., 1974), but San-Wei Lee (Taiwan Council of Agriculture Executive Yuan, *in litt.*, 14 February 1986) stated that a 'good size of population' remained.

Viet Nam No information.

HABITAT AND ECOLOGY All Asian pangolins are little known, there appearing to have been no autecological study of any of the three species. Such information as is available seems to be based largely on incidental observation. Pangolins are reported to occur in a wide variety of habitats, including primary and secondary forest and cleared and cultivated areas including gardens and rubber plantations (Boonsong Lekagul and McNeely, 1977; Davies and Payne, 1982; Foenander, 1953; Harrison, 1974; Medway, 1969; Medway, 1977; Prater, 1971; K. Proud, *in litt.* to N. Duplaix, 9 May 1981). Roberts (1977) noted that in Pakistan, *M. crassicaudata* seemed to prefer more barren, hilly districts. Asian pangolins appear to be generally nocturnal, spending the day in shelters among rocks and boulders or burrows which they dig themselves; such burrows may reach down for 6 m or more (Boonsong Lekagul and McNeely, 1977; Prater, 1971; Roberts, 1977). They are reportedly largely terrestrial, though are fully capable of climbing trees, making use of their prehensile tails. Food consists of the eggs, young and adults of termites and ants; there is evidence that they are selective in their choice of food species - Phillips (1981) noted that a specimen kept in semi-captivity would 'not eat those termites which live under logs and stones, or touch the small red ants commonly found in gardens, but black ants were licked up....It was particularly attracted by the large leaf nests of the big red tree ant which hold swarms of adults, young and eggs.' Allen (1938) noted that in China there appeared to be a close correlation between the distribution of two termite species (*Coptotermes formosanus* and *Termes (Cyclotermes) formosanus*) and that of *M. pentadactyla*; it was assumed that these formed a major component of the pangolin's diet. Where water is available, pangolins are reported to drink freely. Allen (1938) quotes reports stating that in Hainan (China), *M. pentadactyla* may be largely inactive during the winter season. Little is known of breeding, though young (one, occasionally two) appear to be produced at different times of year. In China, young (of *M. pentadactyla*) are reportedly born in spring (Allen, 1938) while in central peninsular India (the 'Deccan' region) the season for *M. crassicaudata* is given as between January and March and there is a record of one born in July in southern India (Prater, 1971). A large female from Sri Lanka killed in

early July contained a medium-sized embryo (Phillips, 1981). Gestation may be around 65-70 days (Roberts, 1977).

THREATS TO SURVIVAL Evidence suggests that pangolins can adapt well to modified habitats provided their termite food source remains abundant and they are not unduly persecuted. In some areas (e.g. Borneo and West Malaysia), they appear to be recorded more frequently in such habitats than in primary (Davies and Payne, 1982; Foenander, 1953), though it is not clear if they are seen more often here or are actually more abundant. From this it would seem that the principal factor affecting the species is exploitation for meat, for medicinal purposes or for the leather trade (see below).

Pangolin scales are highly valued, especially by Chinese communities, for their alleged medicinal value, particularly for treating a wide variety of skin diseases (Harrisson and Loh, 1965). They are believed to be antiseptic, effective in reducing high body temperature induced by septic wounds or skin trouble and in stimulating blood flow to diseased areas; they also reportedly act as catalysts, increasing the effectiveness of other medicines. Scales may be used externally or internally. In the former, raw scales are used for scratching the skin; in the latter, scales are ground to powder and then mixed with herbs boiled in water to form a decoction which when drunk is said to be particularly effective at curing skin trouble caused by venereal disease (Harrisson and Loh, 1965). In Hong Kong charms made from four particular pangolin scales are used to scare away ghosts and in India the scales are made into rings as a charm against rheumatic diseases (Webster, 1977). In Pakistan, Hakims (practitioners of country medicine) consider various parts of its body to be a valuable source of medicines (Roberts, 1977). In the 1970s there were unconfirmed reports that the Chinese had discovered a cancer cure from a pangolin derivative (Webster, 1977).

Pangolins are also much sought-after as food by indigenous peoples in most of S.E. Asia; they are a favoured food of the Dayak in Borneo and the Orang Asli in West Malaysia and of hill tribes in India (J. McNeely, *in litt.* to N. Duplaix, 18 May 1981; S.M. Md. Idris, *in litt.* to N. Duplaix, 1982; Prater, 1971; K. Proud, *in litt.* to N. Duplaix, 9 May 1981). Groombridge (pers. comm.) noted that the Kadars of the Anaimalai Hills in Kerala, southern India, regard pangolins as a favourite food, though catch them infrequently. In Laos many local people depended largely on wildlife for their daily nourishment, and many game species, including pangolins, have become scarce (Laos Forest Department, *in litt.*, 31 January 1986). Furthermore it is regularly collected in hill forest areas of Bangladesh for consumption of the meat and collection of scales (Bangladesh CITES MA, 1986).

INTERNATIONAL TRADE Trade in Pangolin products generally involves two commodities - skin and scales. Scales, as noted above, are used for medicinal purposes, largely by Chinese communities, while skins are imported into Europe and the USA (mainly the latter) for the manufacture of leather goods, principally boots. Trade in live animals appears negligible by comparison.

1. Skins Virtually all information on trade in pangolin skins is derived from annual reports to CITES. Over 99% of trade in pangolins recorded in annual reports to CITES for the period 1980-84 is ascribed to one of the three Asian species; summaries of each of these are given in A to C below.

The great majority of the trade is reported either as individual skins or as linear measurements of skins. A conversion rate of 0.3 m per skin has been used to derive numbers of skins from lengths, this being the rate used by traders in a series of transactions between Japan and the USA.

Some 879 kg of pangolin skins were recorded by weight during 1980-84; no conversion factor is available for estimating number of skins from this and such transactions are not included below. This is very unlikely to introduce significant distortions into the analyses; even a parsimonious estimate of 0.2 kg per skin leads to a total of just over 4000 skins, or less than 3% of the minimum total in trade. As some or all of these will almost certainly have already been recorded under numbers of skins or lengths of skin, the percentage of skins completely unrecorded by ignoring transactions by weight will be even lower than this, although there may be some distortion in declared final destinations.

Transactions involving worked products have been ignored; most of these involved exports of leather goods (mainly shoes) from Mexico to the USA, evidently made from skins exported to Mexico from the USA for the purpose.

A. *M. crassicaudata*

Table 1a. Apparent minimum net imports of skins of *Manis crassicaudata* reported to CITES, 1980-1985.

	1980	1981	1982	1983	1984	1985
France	-	-	-	6	-	-
Japan	-	-	-	694	-	-
USA	2810	1818	395	-	-	-
TOTAL	2810	1818	395	700	0	0

Table 2a. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions in *Manis crassicaudata* skins reported to CITES, 1980-1985.

	1980	1981	1982	1983	1984	1985
Country of origin within range of *M. crassicaudata*						
India	-	252	-	-	-	-
Country of origin outside range of *M. crassicaudata* or origin unknown						
Indonesia	1553	-	-	-	-	-
Japan	400	817	-	-	-	-
Malaysia	-	673	395	-	-	-
Singapore	385	76	-	-	-	-
Thailand	-	-	-	700	-	-
Unknown	472	-	-	6	-	-

All CITES-reported trade ascribed to *M. crassicaudata* from 1980 to 1983 was in skins and involved a minimum of c. 5700 skins (Table 1a). All reported transactions involved Japan, with, in almost all cases (c. 88% of skins reported in trade) Japan exporting to the USA. The exception was in 1983 when 700 skins were recorded as having been imported to Japan from Singapore and 6 skins were reported as having been exported from Japan to France; no imports

to the USA were reported in that year. Only 252 skins (originating in India, recorded in 1981) or 4.4 % of the minimum total give a country of origin within the range of the species (Table 2a). No trade in skins of this species was reported by CITES Parties in 1984 or 1985.

B. *M. javanica*

Table 1b. Apparent minimum net imports of skins of *Manis javanica* reported to CITES, 1980-1985.

	1980	1981	1982	1983	1984	1985
France	-	-	5	-	12	-
Italy	-	-	1200	1500	-	-
Japan	-	-	13377	-	-	8310
Mexico	-	-	-	-	-	431
Thailand	-	-	-	-	-	171
USA	20179	40885	12055	8949	5938	20787
Total	20179	40885	26637	10449	5950	29699

Table 2b. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions in *Manis javanica* skins reported to CITES, 1980-1985

	1980	1981	1982	1983	1984	1985
Country of origin within range of *M. javanica*						
Indonesia	6636	9013	1106	448	1079	3570
Malaysia	4631	5290	4624	422	500	500
Philippines	-	391	4212	-	407	1570
Singapore	757	3300	1285	3947	-	10725
Thailand	114	20379	19893	3361	1740	14180
Country of origin outside the range of *M. javanica* or origin unknown						
India	-	-	-	250	-	-
Japan	5582	1623	505	835	500	-
Korea	1	-	-	-	-	-
Taiwan	-	-	-	-	-	3500
Togo	-	-	-	-	-	500
USA	-	400	-	-	-	-
Unknown	2908	7200	1863	2140	3056	50

The great majority (84%) of net imports of *M. javanica* for 1980-85 were to the USA (Table 1b). 1982 was somewhat anomalous as in this year almost exactly half net imports were to Japan. As Japan otherwise featured very largely as a net re-exporting nation for *Manis* skins, it is possible that a large number of exports from Japan were not recorded in 1982 or that skins or records of exports were held over until subsequent years - in 1983 Japan recorded export of 3819 skins, but import of only 660.

A far higher percentage of the reported trade in this species, compared with that in the other two Asian pangolins, was recorded with country of origin within its range (Table 2b). Singapore, however, although strictly within the range of *M. javanica*, acts as a re-exporting nation and could not possibly sustain apparent exports from its wild population (see *M. javanica* population above). The 1985 data include a very large number of skins from Singapore, which probably originated elsewhere. Most declared trade in this species is channelled either through Singapore or Japan, though analysis of trade through Singapore is hampered by that country having been a non-signatory to CITES before 1987. As pangolin exports are banned from Thailand, Indonesia and West Malaysia, a large proportion of this trade (assuming declared country of origin is accurate) must be illegal.

C. *M. pentadactyla*

Table 1c. Apparent minimum net imports of skins of *Manis pentadactyla* reported to CITES, 1980-1985.

	1980	1981	1982	1983	1984	1985
Canada	-	3	-	-	-	-
France	-	-	1	1	14	-
Italy	-	185	-	-	-	-
Japan	-	-	-	466	-	-
Korea	-	-	-	-	320	-
Mexico	-	-	-	-	400	-
USA	9951	19290	3862	3365	3072	1498
Total	9951	19478	3863	3832	3806	1498

Table 2c. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions in *Manis pentadactyla* skins reported to CITES, 1980-1985.

	1980	1981	1982	1983	1984	1985
Country of origin within the range of *M. pentadactyla*						
China	-	2040	900	-	-	-
India	-	300	-	-	-	-
Taiwan	598	2815	1250	1500	-	1000
Thailand	-	1375	150	800	2861	1002
Country of origin outside known range of *M. pentadactyla* or origin unknown						
Indonesia	7421	3350	926	-	720	-
Japan	1382	7718	-	-	-	-
Malaysia	-	1436	-	-	-	-
Singapore	-	1	150	1531	520	496
Unknown	550	450	837	346	5	-

There was a small declared trade in live *M. pentadactyla* (30 in total for 1980-1985), all except three given as originating in China (two of these three, to Hong Kong in 1983, were illegal imports); these are not included in

Manis spp.

the tables above.

Virtually all (98%) of declared trade in skins of *M. pentadactyla* was to the USA (Table 1c). A large proportion of the trade was through Japan and a considerable number of skins were exported to Mexico from the USA being then apparently re-imported, largely as shoes. The total number of skins in Table 2c for 1985 exceeds the total of all net imports for that year as indicated in Table 1c. This discrepancy is caused by the fact that Japan was a net exporter in 1985, but the imported skins reportedly originated in Taiwan, while those exported were recorded as originating in Thailand and Singapore.

Only just over 30% of the total number of skins (from Table 1c) had a declared country of origin within the range of the species (Table 2c); c. 40% of these apparently originated in Thailand, which appears to be marginal to the species's range, while 50% are reported as originating in Taiwan, which featured as an importing nation in Taiwanese customs statistics in 1981-82 and as a re-exporting nation for 2380 *M. pentadactyla* skins in 1984. In the early 1970s a number of pangolins, presumably of this species, were apparently imported to Hong Kong from China. Records from the Department of Agriculture and Fisheries totalled: (1972) 2271; (1973) 7004; (1974) 3426; (1975) 10. The virtual cessation of imports in 1975 is attributed to a Chinese ban on exports due to the alleged discovery that a cancer cure may be derived from part of its body (Webster, 1977). If countries of origin reported to CITES are accurate, then this ban has evidently either been rescinded or is not effective as nearly 3000 skins were reported as exported in 1982-83; none of these were reported by China and most were reported as re-exports originating in China.

D. Trade in all Asian Manis species

It is impractical to consider trade in each of the three Asian *Manis* species in isolation. That misidentification of skins occurs is demonstrated by, for example, a shipment of 298 skins from Japan to the USA in 1982, described in the customs documentation as *M. javanica* by the importers and *M. pentadactyla* by the exporters.

Combined trade in Asian *Manis* regardless of species as recorded by CITES for the period 1980-1985 can be summarised in Tables 1d and 2d below. These tables represent as simple summation of the tables in sections A to C above, with the addition of 1236 skins reported as '*Manis* spp'. If many shipments have been reported to CITES as different species by the importer and exporter, totals in these tables will be inflated.

Table 1d. Apparent minimum net imports of skins of Asian *Manis* spp. reported to CITES, 1980-1985.

	1980	1981	1982	1983	1984	1985
Canada	-	3	-	-	3	-
France	-	-	6	7	28	-
Italy	-	185	1200	1500	-	-
Japan	-	-	13377	1160	-	9310
Mexico	-	-	-	-	400	431
Thailand	-	-	-	-	-	171
USA	32940	61993	17530	12314	9010	22285
Total	32940	62178	32113	14981	9761	32197

Table 2d. Reported countries of origin (or exporting country if no original source reported) and quantities of transactions in Asian *Manis* skins reported to CITES, 1980-1985.

	1980	1981	1982	1983	1984	1985
Countries with wild populations of *Manis* spp.						
China (P,?J,?C)	-	2040	900	-	-	-
India (C,P)	-	300	-	250	-	-
Indonesia (J)	15610	12363	2032	448	1799	3570
Malaysia (J)	4631	7399	5019	422	500	500
Philippines (J)	-	391	5430	4	407	1570
Taiwan (P)	598	2815	1250	1500	-	4500
Thailand (J,P)	114	21754	20018	4861	4601	15182
Singapore (J)	1142	3377	1435	5478	520	11221
C = *M. crassicaudata*; J = *M. javanica*; P = *M. pentadactyla*;						
Countries without wild populations of *Manis* spp, and origin unknown.						
Japan	7836	1058	505	841	-	-
Korea	1	-	-	-	-	-
USA	-	400	-	-	-	-
Unknown	3458	7650	2700	2486	3064	50

Minimum trade in Asian *Manis* species in 1980-1985 reported to CITES (taken from Table 1.) amounted to some 185 000 skins, the great majority of these (almost 90%) being imported by the USA. After a peak of over 60 000 skins in 1981, there was a marked decline in recorded trade, to fewer than 10 000 in 1984. However, trade in 1985 apparently increased substantially in 1985 to over 32 000 skins, a similar number to that recorded in 1982. Some of this trade was made up of re-exports of skins obtained from their countries of origin in earlier years but at least half of the total trade reported in 1985 was direct trade from the original source.

Almost 80% of the total minimum trade was declared as originating in countries which support wild pangolin populations (Table 2a), excluding Singapore (for reasons explained above). As there is evidence that Taiwan is an importer of pangolin products on a relatively large scale, it is likely that a proportion (perhaps all) of those given as origin Taiwan in fact originated elsewhere. If declared countries of origin are accurate (rather than identification of species), and Taiwan and Singapore are excluded, and it is assumed that pangolins originating in Thailand are *M. javanica* rather than *M. pentadactyla*, then at least 95% of the total are likely to be *M. javanica*, rather than the other two species.

Thailand and Indonesia were the most important originating countries, accounting for 45% and 30% respectively of the total in Table 2a (excluding Singapore and Taiwan).

Inspection of trade records for 1982 imports (mainly of *Manis javanica*) to the USA from Japan indicate a mean wholesale value of US$79 per skin, based on just over 5000 skins in 15 different transactions concerning a total of 7 importing companies in the USA and 7 exporting companies in Japan. Trade to the USA in 1982 is thus estimated at a total value of c. US$1 400 000 at point of import. On the assumption that this value per skin has remained constant

over the five years (1980-84), total value of pangolin imports to the USA for that period exceeds US$10.5 million, again at point of import.

2. Scales Considerable quantities of pangolin scales (of *M. javanica*) have been exported from Sarawak (Malaysia) in the past. Harrison and Loh (1965) reported that during the period 1958-64, 126 061 katis, or over 60 tons, of scales were exported under license through Kuching, through the agency of nine different traders; on the basis of an average of 2.5 katis (= c. 1.5 kg) of scales per pangolin this was calculated to involve over 50 000 pangolins. The great majority (99%) of these were stated to have come from Kalimantan (Indonesian Borneo), being smuggled over the border to towns mainly in the First Division. The political events of 'Confrontation' between Indonesia and Malaysia, starting in September 1963, had a marked effect on the trade, which fell from a peak of 26 675 katis in 1962 (representing over 10 000 animals) to 15 570 katis in 1963 and 5650 katis in 1964. A small proportion of the trade came as a by-product of hunting for food by Dayak peoples in Sarawak, who sold the scales to local Chinese shopkeepers. Most of the scales were exported to Singapore and were believed likely to be re-exported from there to mainland China.

Proud (*in litt.* to N. Duplaix, 9 May 1981) reported that during the late 1970s around 4 export applications were made a year in Sarawak, with each shipment varying between 1 and 7 tons; all were to Singapore for medicines and Proud believed a large proportion originated in Kalimantan. Assuming 1.5 kg per pangolin, this would represent at least 6500 individuals. The Indonesian Directorate of Forest Protection and Nature Conservation (1986) further note that at least 2170 kg of 'skin specimens' were smuggled from West Kalimantan to East Malaysia during 1983-1984.

In Sabah, one trader accumulated 468 kg of scales (representing at least 300 pangolins) in a 3-year period (1981-1984) from the western half of Sabah, buying from village people. No other stock of scales approaching this size had been detected in recent years, and exploitation in eastern Sabah was very much less than that along the west coast. It was thought that the number killed might therefore be about 100-200 per year, though decreasing as it became more widely known that export was not permitted (Malaysia, Sabah CITES MA, 1986). This harvest rate, if it is accurate, represents less that one percent of the average annual trade in pangolin skins reported to CITES (see below).

Both Taiwan and South Korea include Pangolin scales in their Customs reports of imports. These figures are given in Table 3. Taiwan imported 1-10t a year between 1980 and 1985, mostly from Singapore, while South Korea imported between 2 and 6t, mostly from Indonesia. It is likely that many of the scales from Singapore actually originated in Indonesia. Assuming an average weight of 1.5kg per animal, these imoprts combined represented the scales of between 3000 and 8000 pangolins a year.

Summary of international trade As *Manis javanica* is protected in Thailand and has been protected in Indonesia since 1931, most of the overall trade in pangolins would appear to be illegal, again assuming declared countries of origin are accurate. Skins from Indonesia may follow the same trade route as scales, described above, with a large number originating in Kalimantan (Indonesia) and being smuggled into Sarawak (East Malaysia), from where they may be legally exported. In 1983-84, at least 2100 kg of 'skin specimens' were reportedly smuggled along this route (Indonesia CITES MA, 1986), though it is not clear if these were scales or skins. It is also not clear whether scales and skins are obtained from the same individuals - no trade in scales is reported in CITES annual reports and if these represent different animals, then obviously considerably more individuals are in trade than are revealed in

Table 3. Exporters of pangolin scales (kg) as recorded in the customs import statistics of Taiwan and South Korea.

	1980	1981	1982	1983	1984	1985	1986
Imports reported by Taiwan ("Manis scales" 05090210)							
Hong Kong	-	-	659	-	650	-	
Indonesia	-	-	-	-	200	-	
Malaysia	-	-	-	-	500	3000	
Singapore	1070	2090	4800	6630	8437	1246	
Total	1070	2090	5459	6630	9787	4246	
Imports to South Korea ("Pangolin shells and scales" 0509.0502)							
Burma	-	-	-	-	-	-	100
China	-	-	300	-	-	-	-
India	400	-	-	-	-	-	-
Indonesia	2700	2060	3480	3740	948	2145	2019
Malaysia	300	-	-	-	-	400	110
Taiwan	-	-	-	-	-	-	100
Thailand	-	300	-	702	795	2202	-
USA	-	-	300	758	460	420	577
Others	-	-	300	758	460	420	577
Total	3400	2360	4080	5501	2203	5167	2906

CITES statistics. It is conceivable that pangolin skins for the leather trade are essentially a by-product of those collected for medicinal purposes, though in view of the high wholesale price of these skins, in the USA at least (see above), this is unlikely.

In the absence of adequate population data for any of the three species and the lack of certainty regarding the origin and identification of skins in trade, it is not possible to draw conclusions regarding the effect of trade on the Asian pangolins.

Clearly more information is required on:

i. Pangolin population densities.
ii. The geographical origin and identification of pangolin skins in trade.
iii. The relation between trade in pangolin products for traditional medicines, in skins for the leather trade and in collecting for food.
iv. More recent trends in the number of skins in trade and the causes behind them.

CONSERVATION MEASURES

Bangladesh All pangolins are legally protected (Bangladesh CITES MA, 1986).

China Reportedly banned from export in the mid-1970s, but it is not known how long this measure continued (Webster, 1977).

Hong Kong Hunting and export of *Manis pentadactyla* is totally banned under the Wild Animals Protection Ordinance and the Animals and Plants (Protection of Endangered Species) Ordinance (UK, Hong Kong CITES MA, 1985).

Manis spp.

India *Manis crassicaudata* and *M. pentadactyla* are totally protected, being included in Schedule I of the Wildlife Protection Act 1972.

Indonesia *Manis javanica* has been a protected species since 1931 under the Wildlife Protection Ordinance (Indonesia CITES MA, 1985).

Malaysia *Manis javanica* is a totally protected animal in West Malaysia under the Protection of Wild Life Act, 1972; it is not protected in East Malaysia.

Philippines *Manis javanica* is protected under a blanket ban on the collection of any form of wildlife in the Province of Palawan, the entire province having been declared a game refuge and bird sanctuary in 1969 (Proclamations 219 and 530-B) (Philippines CITES MA, 1986).

Taiwan Hunting has been prohibited since 1972, but adherence to this measure has been poor (Taiwan Council of Agriculture Executive Yuan, *in litt.*, 14 February 1986).

Thailand All *Manis* spp. are classified as Protected Wild Animals of the first category in Thailand. Capturing live animals is allowed, but killing of them is not except with authorisation of a collecting permit issued only for educational or scientific purposes (Jintanugool *et al.*, 1982). The export or re-export of live *Manis* spp. or parts and derivatives of these species from Thailand for commercial purposes is prohibited (Thailand CITES MA, 1985).

Legal status elsewhere unknown.

CAPTIVE BREEDING Pangolins are difficult to maintain in captivity, it appears principally on account of their specialized diet (Roberts, 1977). However, captive births of both *M. crassicuadata* and *M. pentadactyla* have occurred (Masui, 1967; Ogilvie and Bridgewater, 1967). It is not known how many of any of the species are held in captivity at present.

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