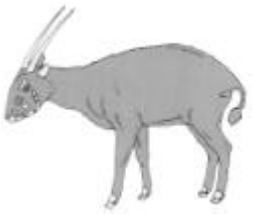
CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA



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CONTROL OF CAPTIVE BREEDING, RANCHING AND WILD HARVEST PRODUCTION SYSTEMS FOR APPENDIX-II SPECIES

1. The Annex to this document has been prepared by Creative Conservation Solutions under contract to the CITES Secretariat.

2. As stated at the 16th meeting of the Animals Committee, the Secretariat commissioned this discussion document in response to a decision of the Animals Committee at its 15th meeting, but also to meet the more general need for clarification concerning the use of specimen source codes on CITES export documents. This issue also has direct relevance to the making of non-detriment findings for Appendix-II species, and it will therefore be included in programmes to build capacity in Scientific Authorities.

3. The Secretariat has not endorsed the annex to this document or provided comments and welcomes further discussion and comment on the annex by the Animals Committee.

WILD FAUNA MANAGEMENT AND PRODUCTION SYSTEMS – THEIR DESCRIPTION, CONSERVATION IMPLICATIONS AND TREATMENT BY CITES

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1. Purpose

This discussion paper has been commissioned by the CITES Secretariat to describe and differentiate the different management regimes for the production of wild fauna and the application of an appropriate CITES source code for each regime according to the following terms of reference:

i) Provide an overview of the range of wild animal production systems involving CITES Appendix-II species in exporting countries in the context of the provisions and terminology of CITES concerning captive breeding, ranching and off-takes from wild populations;

ii) Develop standard descriptions and criteria to distinguish ranching operations, captive breeding operations and wild harvesting of Appendix-II species, taking into account the range of life histories and known production methods for Appendix-II mammals, birds, reptiles, amphibians, fish, butterflies, hard corals and other marine invertebrates;

iii) Specify criteria for the use of source codes W, R and F for exporting specimens from production systems specified in paragraph ii) above; and

iv) Develop simple guidelines for Management Authorities in countries where ranching operations, captive-breeding operations and wild harvesting occur concerning basic and practical supervision required to ensure that such operations remain within the descriptions of operations outlined in paragraph iii) above.

A separate report has been prepared for consideration by the Secretariat outlining simple and practical guidelines for application by Parties that administer operations practising management regimes, detailed in this report, using the three source codes identified in paragraph iii) above (TOR-iv). The proposed regulatory guidelines would apply until such time as Resolution Conf. 10.2 (Rev.) is amended.

2. Structure of Report

This report contains sections that first define the problem before proceeding to review and define different management regimes for using and/or producing specimens of wild fauna for international trade. New terms are introduced to describe certain management regimes and production systems to distinguish them from existing regimes. In the context of the management regimes identified, various implementation problems with each of the regimes are discussed in relation to the application of the source codes currently in use by the Convention. The report concludes with a series of recommendations to clarify each management regime or production system and the application of an appropriate source code.

3. Defining the Problem

The Convention is primarily structured as an instrument to regulate international trade in species included in the three Appendices. However, the provisions of Article IV of the Convention impose requirements on Parties to address issues related to resource management. In this regard, there is a need to interpret and correlate, in a practical manner, the information contained in CITES documents (i.e. permits and certificates), with the type of management system from which the specimens in trade were derived.

One issue is immediately apparent. As currently interpreted by the Parties, the Convention does not adequately accommodate the variety of management regimes that are currently practised to manage the use of wild fauna. The Articles of the Convention recognize only two principal management regimes for exporting species of wild fauna included in the Appendices:

i) The import of Appendix-I species for commercial purposes is restricted to specimens that have been bred in captivity. The Conference of the Parties, through a series of resolutions has established various definitions that interpret and clarify the language of the Convention "specimens of species bred in captivity".

ii) In contrast to Appendix I, the Convention provides greater latitude for the commercial export of specimens of species included in Appendix II and Appendix III. Wild harvesting of Appendix-II listed species for commercial export is permitted provided the non-detriment requirements of Article IV of the Convention are satisfied.

In practice, management systems for harvesting and producing wild fauna are almost as varied as the diversity of species that are subject to commercial use. Many exporting Parties often tailor management and production systems to suit the life history characteristics of species, local conditions and the available technology. In many instances these systems do not accord fully with the relatively narrow parameters, as described above, established by the provisions of the Convention and as currently interpreted by the Conference of the Parties. Some innovative strategies are applied to Appendix-I species, but most have been developed for Appendix-II-listed species.

The other, closely related, matter concerns the manner in which the administration of trade controls under the Convention can be correlated, in a meaningful way, to management. The source codes recognized in Resolution Conf. 10.2 (Rev.), on permits and certificates, represent the only means of determining the origin (source) of specimens of Appendix-II listed species that enter international trade. The manner in which each specimen entering trade is obtained will determine the types and levels of information necessary for an exporting Party to undertake and effectively satisfy the non-detriment requirements of Article IV of the Convention. The problem of accurately identifying the management system from which a specimen has been derived, and hence measuring the nature and extent of adverse impact on the wild population (Article IV), is further complicated in cases where specimens entering trade have been derived from multiple production systems or management regimes. It is therefore important that the source codes accommodate the variety of management regimes being used and that Parties apply the correct code that most accurately reflects the management system from which specimens of Appendix-listed species have been derived.

The following three source codes relating to specimens of animal species included in Appendix II (and Appendix I) of the Convention are contained in Resolution Conf. 10.2 (Rev.)

W Specimens taken from the wild.

R Specimens originating from a ranching operation.

F Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of "bred in captivity" in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof).

Two other codes are used to describe the source of animal specimens traded in accordance with the provisions of the Convention. Although one code is not directly pertinent to specimens of Appendix-II or Appendix-III species, in order to place the above three source codes into context, it is necessary to reference and examine each in this discussion paper. The two codes are:

D Appendix I animals bred in captivity for commercial purposes and Appendix I plants artificially propagated for commercial purposes as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 4, of the Convention.

C Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5, of the Convention (specimens of species included in Appendix I for non-commercial purposes and specimens of species included in Appendices II and III).

Some of the problems associated with the correct use of source codes have been created by the approach adopted by the Parties in 1979 to administering trade in specimens of Appendix-I species that have been bred in captivity. Concern to ensure that captive breeding operations were "closed-cycle" and operated in isolation from the wild population was expressed in Resolution Conf. 2.12 by the requirement for these operations to demonstrate a capability to reliably produce second generation offspring. Resolution Conf. 2.12 has since been repealed, however second generation offspring production (or demonstration that the operation is being managed in a manner similar to that which has been shown elsewhere to produce second generation offspring of the species in question) remains a principal requirement for closed-cycle captive breeding. In hindsight, this approach, although maybe warranted at the time, can be considered extremely conservative. Numerous exports of "captive bred" first generation specimens of Appendix-I species are approved each year by some Parties. Export of these specimens is subject to a non-detriment finding and authorized in accordance with Article III. The absence of any flexibility and the inability to accommodate genuine cases of Appendix-I animals being bred in captivity and successfully producing first generation offspring has led to the adoption of the source code "F". The source code "F" is currently being used by some Parties to describe the source of captive-bred specimens authorized for export in accordance with Article III of the Convention. This code has also been used to describe a variety of captive-bred specimens in trade that do not comply unambiguously with any other source code.

Considerable confusion exists among some exporting States on the correct use of codes for specimens of Appendix-II species derived from particular management systems. Incorrect use of these source codes by exporting countries has led to misunderstandings by the Secretariat and/or the authorities of importing countries. These misunderstandings can, in extreme cases, result in unilateral action by a country, or group of countries (e.g. the European Union), to suspend acceptance of imports of specimens of particular species in the belief that the level of use is unsustainable and in violation of Article IV of the Convention.

In its implementation of Resolution Conf. 8.9 (Rev.), the Animals Committee has encountered several instances where an exporting country has applied a particular source code for exports

of Appendix-II listed species that does not reflect the actual management regime or production system being practised. There have been instances where an exporting State has applied a management system not adequately described in Resolution Conf. 10.2 (Rev.) or it has used a source code that does not accurately reflect a management regime that has been adapted to suit local conditions. This has led to misinterpretations that can result in unnecessary, or inappropriate, recommendations under Resolution Conf. 8.9 (Rev.) being directed to the Management Authority of the exporting Party in question. Not only can this action create animosity towards the Secretariat and the Animals Committee, it also represents a diversion of valuable resources to focus on perceived rather than real conservation problems. It is therefore important that Parties establish, and apply, an agreed understanding of and nomenclature for the different management and production systems that are currently in use for different Appendix-II listed species. This will avoid exporting Parties giving their own, possibly incorrect, interpretation of source codes and applying them to export documents.

In reviewing currently practised management and production systems, and the use of CITES source codes, it is necessary to introduce new nomenclature to describe each broad type of system. This is necessary because of the differential application of particular management and production systems to species that are included either in Appendix I or Appendix II. These terms are presented in UPPER CASE where they first appear in the document. In order to define these systems and their corresponding source codes more clearly, the adoption of the nomenclature used in this document is strongly recommended.

4. Management Regimes for the Use and Export of Wild Animals

Use and export of wild fauna may be derived from either INTENSIVE or EXTENSIVE MANAGEMENT SYSTEMS, or in some cases, a combination of both. These two broad management regimes differ in their characteristics and dependence on wild populations. Both comprise different systems – each of which exhibits a varying degree of dependence and impact on the wild population.

4.1 Intensive Management Systems

Intensive management regimes, in the context of the present paper, are those that practise husbandry for the production of animals held and managed in captivity prior to export. Intensive management, as the term suggests, refers to those regimes that exercise a high degree of human intervention to ensure that reproduction, survivorship and growth are maximized. In this regard, the term is generally restricted to describe the management of animals kept under captive conditions in a controlled environment. CLOSED-CYCLE CAPTIVE BREEDING operations represent the most conservative form of intensive management. Except for the establishment of the founder stock and the occasional incorporation of additional specimens to avoid inbreeding, closed-cycle captive breeding is conducted independently of the wild population(s), and as such has minimal direct impact on the wild population(s) of the species.

Two forms of intensive management, i.e. closed-cycle captive breeding and CONTAINED PRODUCTION, although differing with respect to the relative emphasis of certain management elements (see below), are characterized by the single feature of maintaining breeding adults for the exchange of gametes and the production of offspring under captive conditions. This section describes the two different regimes that are currently practised, as well as examples of species involved.

4.1.1 Closed-Cycle Captive Breeding Operations

The conditions required to be satisfied for an operation to be considered as breeding a species in captivity are well enunciated in Resolution Conf. 10.16 (Rev.), and apart from the following clarifications, will not be dealt with further in this discussion paper. In order for a specimen to be recognized as being "bred in captivity" the following biological conditions, which apply to species included in all three Appendices, must be satisfied:

- The parents mated or exchanged gametes in a controlled environment (sexual reproduction); or, if reproduction is asexual, the parent(s) were held in a controlled environment when development of the offspring commenced;

- The captive population is maintained as a sustainable reproductive unit without ongoing augmentation from the wild (except for the occasional authorized addition of new specimens to avoid inbreeding);

- The operation must either, i) have produced second or subsequent generation offspring or, ii) be managed in a manner that has been demonstrated elsewhere to be capable of reliably producing second generation offspring.

Scientifically, the first condition should be all that is required to define the term "bred in captivity". The second and third conditions have been adopted by Resolution to ensure that captive-breeding operations involving Appendix-I species are truly closed-cycle operations and are not dependent on the wild resource. The third condition represents a redundancy that, in practice, is simply a means by which Parties can be assured that a closed-cycle captive breeding operation satisfies, or will be able to satisfy, the second condition.

Some Parties have received erroneous advice and mistakenly believe that a captive-breeding operation, in order to satisfy Resolution Conf. 10.16 (Rev.), is required to restrict exports of specimens derived from the operation, to second generation offspring or products thereof. Resolution Conf. 10.16 (Rev.) only requires an operation to **either** have produced second generation production **or** be managing the breeding stock in a manner that has been shown elsewhere to be capable of second generation production. Once either of these conditions has been satisfied (a registration pre-requisite for operations breeding certain identified Appendix-I species for commercial purposes), an operation is able to export any, including first, generation offspring.

4.1.2 Contained Production Systems (Born in Captivity)

Recent years have seen the emergence of an increasing number of production systems that practise variations of closed-cycle captive-breeding. Although there are subtle differences between these systems, all exhibit one feature in common. They are focused on the permanent removal of reproductive adults from the wild population for the express purpose of producing (obtaining) first generation offspring in captivity for export. Contained production systems differ from closed-cycle captive breeding operations in not intending to produce second generation specimens for export, although it may occur in cases where a particular facility has been operating for an extended period of time. Furthermore, contained production systems are able to obtain new breeding stock from the wild continuously, although this does not necessarily always happen. Because of this ability, they do not produce specimens that comply with Resolution Conf. 10.16 (Rev.). **Contained production systems are therefore necessarily restricted in their application to Appendix-II or Appendix-III species.**

The adult breeding stock is maintained in enclosures that are commonly, although not always, separated from those housing the progeny. However, as noted above, the breeding stock

may be renewed or replenished at any time by the inclusion of individuals that are captured from the wild. Approvals for contained production systems to acquire new breeding stock regularly should be given by the Management Authority in the same manner as a wild harvest (i.e. with emphasis on Article IV non-detriment considerations). Alternatively, some contained production operations may choose to retain a small percentage of first generation offspring for growing through to adulthood in order to augment the breeding population. These contained production operations, initially established for the production of first generation offspring will, over a period of time (depending on the species concerned), develop the capacity to produce second, or subsequent generation individuals.

The parental stock for some contained production systems (e.g. for *Iguana iguana, Boa constrictor, Geochelone pardalis* and *Malacochersus tornieri*) is sometimes obtained initially from the wild population(s) with no further reliance on additional stock from the wild. In this respect, these types of operations apply much the same management approach as operations based on closed-cycle captive breeding. Alternatively, an operation may depend on the regular supply of reproductive adults from the wild for the production of offspring (e.g. *Python regius* production systems in Benin). The technology required for successful contained production systems is clearly dependent on the biological and ecological characteristics of the species involved.

Mariculture and aquaculture are two forms of intensive management specializing in the commercial production of marine and freshwater species respectively. Culturing methods are continuing to evolve for the commercial production of certain hard corals and meat from giant clams (e.g. *Tridacna gigas, T. derasa* and *T. maxima*) and an increasing variety of techniques are becoming available. With respect to giant clams, the longest-established method involves the animals spending their first 7-12 months in land-based facilities before being transferred to the ocean. The parental stock is held temporarily in tanks where spawned eggs are collected and fertilized in isolated chambers by mixing with sperm. After hatching, the larval clams pass through a motile stage lasting about seven days. The young are then placed in settlement tanks where they remain until visible. At this stage they are collected by hand and placed in other land-based tanks until large enough to be transferred into protected nursery cages in the inter-tidal zone for a further 12-18 months before being transferred to sheltered ocean waters for "growing-out". When the young clams have reached this approximately 20cm no further protection is necessary. *Tridacna crocea* is farmed for the aquarium industry using totally land-based operations. In addition, there are mariculture operations that minimize the land-based phase by placing young (3-4 month-old) clams in floating cages in the ocean.

Present management of the commercial sturgeon fishery in the Caspian Sea entails each of the participating States operating an aquaculture and restocking programme that is an integral element of the management regime. The systematic destruction and alteration of spawning habitat in the rivers that drain into the Caspian Sea has reduced natural recruitment to levels below that necessary for the wild populations to sustain the number and level of commercial fisheries that operate in the Caspian Sea. In the absence of significant natural recruitment, the sole purpose of aquaculture therefore, is the regular production of fingerling sturgeon for release into the Caspian Sea in order to compensate the wild populations subject to commercial harvesting operations.

4.2 Extensive Management Systems

Extensive management systems are those regimes involving the regular removal of individuals from the wild population(s). Unlike intensive regimes, extensive management systems, because of their dependence on regularly removing (harvesting) individuals from the wild, are more dependent on maintaining viable populations of the species in the wild. Such

programmes, because of their inherent potential to impact negatively on the harvested population, require a more cautious approach with management elements not necessarily applicable to intensive regimes. Extensive management systems are therefore necessarily required to direct greater attention to ensuring that the wild resource is managed in a sustainable manner with no detriment to its long-term conservation. There are two types of management regimes that may broadly be defined as extensive management systems (i.e. ranching and wild harvests). However, there are several different types of wild harvests that can be recognized. Furthermore, from a resource conservation and management viewpoint, certain production systems currently being practised, on the surface, appear to conform to intensive management systems. These systems (discussed in section 4.2.2), can more appropriately be considered as variations of a wild harvest and should, therefore, be subject to the regulatory controls applicable to an extensive management system.

4.2.1 Ranching

At its second meeting (San José, 1979), the Conference of the Parties recognized that the Convention did not adequately cater for certain commercial use management regimes that actually facilitated and enhanced the recovery and conservation of depleted populations of Appendix-I species. As a consequence, a special working group was established to examine the subject of ranching. On the basis of the working group's report, at its third meeting (New Delhi, 1981) the Conference of the Parties resolved to broaden, beyond the Bern Criteria, the conditions under which species may be transferred to Appendix II of the Convention. The adoption of Resolution Conf. 3.15, on ranching (subsequently repealed and replaced by Resolution Conf. 11.16), introduced the concept of "ranching" as an acceptable basis for considering a population as suitable for transfer to Appendix II. In the context of CITES, "ranching" is defined as *the rearing in a controlled environment of specimens taken from the wild*.

Ranching, unlike closed-cycle captive breeding, relies on maintaining a healthy wild population from which individuals are removed on a regular basis. In this regard, ranching may be viewed as similar to captive production systems (as described in section 4.1.2). Because ranching represents an alternative transfer mechanism to the Resolution Conf. 9.24 criteria, as a precautionary measure to achieve the necessary support for an Appendix-II listing, *inter alia* a ranching operation *"must be primarily beneficial to the conservation of the local population*". In cases where an Appendix-II species is subject to ranching, there is no requirement to demonstrate benefit to the wild population. Rather, such programmes must satisfy the non-detriment requirements of Article IV of the Convention (see section 5). Where monitoring indicates the need to augment the wild population, ranching, like closed-cycle captive breeding and contained production systems, enables a percentage of the captive progeny to be made available for release into the wild at an age when survivorship is enhanced.

It is instructive to examine how the concept has been applied in practice since its adoption. Ranching has most successfully been applied to transfer certain species of Appendix-I crocodilians for the purpose of applying the commercial value of skins as an economic incentive for the range States to manage the species for their recovery and on-going conservation. Ranching of crocodilians is based on the annual harvest of eggs and/or neonates. As currently practised with crocodilians, ranching does **not** involve the removal of gravid females form the wild population. Eggs are artificially incubated and the resulting neonates are raised in a controlled environment for varying periods until they reach a size to be slaughtered for their skins and meat. Therefore, as a management regime, ranching exploits a particular life-history characteristic, exhibited by many other species of reptiles, amphibians, fish and invertebrates, i.e. the annual production of large numbers of eggs and neonates that are subject to a high natural mortality. The high levels of natural mortality that

are experienced by these life-stages may thus be regarded as a natural surfeit available for use without impairing the ability of the wild population to recover or maintain itself.

The harvest of birds' eggs and/or fledglings represents another form of ranching paralleling the crocodilian model. Furthermore, many avian species display the ability to produce compensatory eggs or clutches when eggs are removed at an early stage of incubation.

Although ranching is applied to some species of psittacines such as *Amazona aestiva* (Argentina) and reptiles such as *Crocodylus porosus* (Australia), *Crocodylus niloticus* (Zimbabwe) and *Crocodylus novaeguineae* (Papua New Guinea and Indonesia), it otherwise appears to be poorly understood by many Parties and is not widely practised as a management regime. The production of *Python regius* in Ghana and Togo offers an interesting and innovative approach to ranching. Gravid females, occurring primarily on agricultural land are collected from the wild by communities and placed in enclosures, supplied by the exporters, where they are kept until they have laid eggs. The female is removed from its egg clutch and released back into the wild in the area from which it was obtained. Individual egg masses are then placed into a pit and covered with vegetation where they remain until hatching. The temperature is manipulated crudely by adding or removing decomposing vegetation. The resulting neonates are sold to the exporters. Surplus juveniles that are not exported are released into the wild each year. By focusing on the management of eggs for the production of neonates, this management system differs very little from the crocodilian model. Further research is required to quantify survivorship of the liberated animals and monitor subsequent reproductive capacity of the females in order to endorse the utility of this form of management as an effective conservation strategy for the species. Until such time as these aspects of management are better understood, the collection of gravid females for harvesting eggs in captivity should be subject to a non-detriment finding by the Scientific Authority.

4.2.2 Captive-Rearing Systems

Although the term "CAPTIVE REARING" suggests a degree of contained management and hence be defined as an intensive management regime, in practice this production system simply represents a by-product of wild harvesting. Captive-rearing systems differ from intensive production systems in that operations are **not** managed for captive breeding. Captive rearing is often practised when exporters receive wild-caught adult females that are either pregnant or gravid, and parturition occurs in captivity **before** the adult specimens are exported or otherwise used. Exporters' holding facilities are not designed to accommodate or necessarily facilitate adults breeding in captivity. Exporters who practise this form of management do so in order to maximize the number and export value of the animals collected from the wild. In most cases, the females have been obtained under an allocated national quota and are exported **after** they have given birth or laid eggs. These offspring, derived from wild-caught females, are technically "born in captivity", simply represent a bonus for the exporter. Captive-rearing is becoming practiced more widely, particularly for certain reptiles, such as some chamaeleonid lizards (e.g. *Bradypodion* spp. in the United Republic of Tanzania, *Furcifer* spp. and *Calumma* spp. in Madagascar) that produce eggs and/or neonates throughout the year. In such cases, it is not possible to impose a closed season that coincides with breeding activities and alternative management measures (e.g. conservative capture quotas) need to be applied to minimize the risk of harvests becoming concentrated on pregnant or gravid females.

4.2.3 Direct Wild-Harvest Management Programmes

DIRECT WILD-HARVEST PROGRAMMES are management regimes based on the regular removal of individuals from the wild population without any intensive or captive management

other than placing live animals in holding facilities. There is thus a requirement to apply adaptive management that features more rigorous controls on harvest activities. In addition to non-detriment findings by the Scientific Authority, management **must** involve effective population monitoring in order to evaluate the impact of collecting activities on the harvested population(s). Direct-harvest management strategies should be subject to regular review with feedback mechanisms in place to adjust management prescriptions such as quotas, harvest seasons and/or areas on the basis of appropriate monitoring programmes. A direct wild harvest can be defined as:

> A management regime involving the regular and programmed removal of pre-determined numbers of individuals (e.g. through quotas) from the wild population for either:
>
> i) Direct use (live specimens); or
>
> ii) Direct processing to supply a particular commodity (skins, meat or other derivatives, etc.) without any form of intensive management.

Direct Wild Harvests of Abundant Species

Many species are included in Appendix II because they form part of a higher taxonomic listing. In many cases these species are widespread and abundant and not necessarily subject to any form of management in which the sustainability, or non-detriment, of the harvest is a critical issue. Indeed, in some cases the species may be regarded as an agricultural pest in their natural area of distribution (e.g. common baboon, *Papio cyanocephalus*) and management is directed to reducing abundance to levels that are economically or socially acceptable. The extent to which management actions for these species and other non-pest, but abundant species, should address the issue of non-detriment and should be commensurate with the conservation status of the species concerned and the objectives of management. Under such circumstances, the requirement to satisfy the Article IV non-detriment findings of the Convention, when specimens of these species are exported, is therefore relatively straightforward and should not present a problem for importing countries that exercise stricter domestic measures and undertake non-detriment findings for Appendix-II imports [1].

Wildlife Farming

WILDLIFE FARMING represents another management strategy that may be classified as a modified wild harvest. From a resource conservation standpoint with the one following qualification, this management regime may be considered as a more benign form of wild harvest involving the management of natural habitat and populations to maximize production and/or minimize deleterious impacts on the naturally occurring population(s). When evaluating operations practising this type of management regime, the Scientific Authority **must** be satisfied that the requirements of Article IV.3 of the Convention are met and that management will **not** modify habitat to favour the harvested species in a way that is deleterious to other resident species. In considering proposals to farm wildlife, the Scientific Authority should conduct an Environmental Impact Assessment to ensure that the management plan does **not** involve any form of habitat manipulation or management that may prove deleterious to other species.

[1] Although not an issue relevant to exporting countries, cases involving the export of abundant and/or pest species, the importing Party would be well advised to assess the risk of the species becoming established in the wild **before** approving importation.

The development and growing importance of game ranching in some parts of the world (e.g. southern Africa), warrants comment. In these cases, certain wild species with high economic values have assumed the role of substitute livestock and are being actively farmed by private landowners (e.g. white rhinoceros, *Ceratotherium simum* in South Africa). These examples of "wildlife farming" parallel closely "open range" livestock ranching and other similar forms of pastoral, or agricultural, land-use management practised in numerous countries. For Appendix-II species, non-detriment determinations, particularly those in relation to Article IV, paragraph 3, should be considered in the context of the overall land use management systems that are being practised on surrounding lands. In other forms of wildlife farming, management is directed to creating high production or the commodity is being obtained from "artificial" populations established within areas of natural distribution as a direct result of management interventions. The extraction of a commodity (e.g. vicuña wool) represents a manipulation of a wild population that can be compared to open-range sheep farming for the production of wool.

Although the foregoing examples may be regarded as a form of managed "captive breeding", they do **not** represent captive breeding as this production system is currently understood within the terminology of the Convention.

In some instances it is possible to integrate contemporary agricultural land-use practices with wildlife use. Such integrated systems effectively bestow a commercial value on natural habitats, thereby providing an economic incentive for their conservation. In other cases, it is possible to "manage" habitat, or create new "artificial" habitats to enhance the recruitment potential of a population of a species by providing additional artificial habitat[2]. Artificial nesting for the small parrot *Forpus passerinus* in the Venezuelan llaños is provided in the form of plastic tubes attached to wooden fence posts. The provision of additional nesting habitat has the potential to enable an increased proportion of the adult population to produce eggs. The eggs, which are laid in wire baskets placed within the plastic tubes, are subsequently removed and incubated. Offspring produced as a result of this enhanced recruitment thus becomes available to be harvested, either for subsequent ranching or direct export.

The provision of additional habitat by planting preferred food species in gardens and vegetable orchards has enhanced the capacity to harvest the pupae of certain lepidopterans (e.g. *Ornithoptera priamus* in Papua New Guinea). Although these management regimes clearly represent wild-harvest systems, their application can be regarded as having less impact on the conservation of the naturally occurring populations. This management strategy

[2] Although the following examples involve species not currently included in the Appendices to the Convention, they offer interesting examples of two different types of wildlife farming.

In Venezuela, the capybara *Hydrochaeris hydrochaeris* is subject to a regular annual harvest according to a quota set each year on the basis of population censuses. In Colombia, the species has been classified as eligible for extensive "captive breeding". This classification enables landholders to manage, for the production of capybara, areas of suitable wetland habitat occurring on privately owned cattle ranches. This management regime, which closely parallels cattle ranching, promotes integrated management of wetlands in the llaños of both countries.

House farming of edible-nest swiftlets of the genus *Collocalia* in parts of the northern coast of Java and East Java, Indonesia, for the intensive production of nests represents an innovative form of wildlife farming. Harvesting nests from cave-nesting colonies of the species in Java is gradually being replaced by nests derived from "artificial" populations established in empty houses converted and made suitable for the species to colonize. These birds behave naturally and are free to depart and forage for insects in rice fields. Apart from security measures to protect these colonies against theft, the level of management applied to these house-nesting colonies, once they become established as self-reproducing, is minimal. The ability of *Collocalia* spp. to produce multiple clutches is exploited by Indonesians who practise "house-farming" as a production system. The eggs of *Collocalia fuciphaga* are harvested from nests in established house colonies for use in establishing new colonies in vacant houses. These eggs are placed in naturally constructed nests of another species, *Collocalia linchi,* which behaves as a foster parent for the *C. fuciphaga* offspring.

is also being applied as a community-based conservation measure for *Ornithoptera alexandrae*. In the case of *O. alexandrae*, which is currently included in Appendix I of the Convention, no criteria exist, other than in Resolution Conf. 9.24, as the basis for deciding on the possible transfer of the species to Appendix II to enable the program to obtain foreign revenue from exports.

Wild Harvests of Introduced Exotic Species

There are examples of Appendix-II species that have become established outside their areas of natural distribution. The Convention does not distinguish between exotic and naturally occurring populations of listed species. *Chamaeleo jacksoni* and *Dendrobates auratus* have been introduced onto one of the Hawaiian islands. *Macaca fascicularis* has become established in Mauritius and Jamaica. Harvesting and trade in wild-caught specimens of these species in the areas of introduction may be practised as a form of population control or eradication. Determining non-detriment in such cases, although a requirement of Article IV of the Convention, is a relatively straightforward procedure.

A different management system currently operating in Indonesia offers a further example of wildlife farming. It is focused on breeding of *Macaca fascicularis* on two small offshore islands where the species does not occur naturally. Wild-caught specimens of *Macaca fascicularis*, obtained from the neighbouring island of Sumatera, have been introduced onto each island as nuclei for establishing self-reproducing populations that are free-ranging within naturally confined habitats. Offspring are periodically collected for export, and management input is minimal. Although the animals are confined to or "captive on" the two islands, the management regime does not comply with any form of intensive captive husbandry.

5. Management Regimes and Application of Source Codes

The consumptive or extractive use of wild fauna has an impact on the harvested population. The extent and nature of this impact, regarded by some as a conservation threat, is determined by a variety of factors which, to a greater or lesser extent, should be addressed in the management strategy. Management should seek to achieve sustainability and minimize any deleterious effect on the population(s) subject to harvesting. The biological and ecological characteristics of a species (e.g. distribution and abundance, life-history strategies and conservation status) determine the selection of a particular management regime as well as the sustainability of harvests. The absence of any management, or the application of inappropriate management, may result in a negative impact on the conservation of the harvested species. Conversely, pragmatic management regimes, adapted to exploit a particular biological characteristic (or set of characteristics) of a species, may, in fact, be beneficial and enhance the conservation of the species in the wild by creating the social (and political) support necessary to sustain conservation and management activities over time. In this regard, the need for governments to achieve this perception is particularly important in the case of species that are perceived as "dangerous", regardless of their conservation status.

As stated previously, the text of the Convention only recognizes two forms of management for commercial use and export, i.e. captive breeding (Appendix-I, -II and -III species) and wild harvesting (Appendix-II and Appendix-III species). The absence of any inherent flexibility in the text of the Convention with regard to managing the export use of species included in the Appendices – particularly Appendix I, may be viewed as a failure to acknowledge the diversity of captive production and other management systems used by many countries. Very often, production systems, such as closed-cycle captive breeding, are applied to Appendix-II species simply to satisfy stricter domestic legislative requirements of importing countries. Many species currently included in Appendix II, particularly those species listed as

components of a higher taxon, can be widespread and abundant. In such instances, there is no meaningful conservation advantage for the Management Authority of a range State to adopt a policy of closed-cycle captive breeding. Indeed, this approach may impose a negative conservation impact, in that it has the potential to remove any value on maintaining abundant numbers of the species in the wild. Under such circumstances, it is not surprising that some Parties have adopted modified captive breeding programs that do not satisfy the "restrictive" requirements of Resolution Conf. 10.16 (Rev.). A diverse array of modified captive-breeding programmes focus on the production of first generation offspring while exhibiting a close (and on-going) dependence on the wild population (in much the same way as ranching programmes). These production systems are referred to, in this paper, as "Contained Production Systems", in order to differentiate them from closed-cycle captive breeding operations that satisfy the requirements of Resolution Conf. 10.16 (Rev.). Specimens from contained production systems, therefore, require the use of the source code "F".

It is apparent there are several management regimes for using, producing or enhancing the production of wild fauna for commercial purposes, including export, that are not clearly defined under the Convention. The Parties have adopted Resolution Conf. 10.2 (Rev.), which specifies certain source codes to signify the origin of specimens in trade. The principal purpose of requiring a specific source code on CITES export permits and certificates is to assist in identifying a particular management regime and thus confirm which trade provisions apply. In the case of Appendix-II species, this information provides the Secretariat and Animals Committee with insights into the manner and extent to which the provisions of Article IV are satisfied. However, the utility of the source codes provided by Resolution Conf. 10.2 (Rev.) is seriously compromised. The present source codes are too inclusive and not sufficiently well defined. Furthermore, the present source codes fail to accommodate, in a manner that is readily understood and able to be applied by Parties, the variety of management regimes currently in use for different species. As a consequence, there are increasing numbers of cases which, because of the lack of uniform interpretation of some source codes, create uncertainty in the Secretariat and Animals Committee over the manner in which the commercial use of a particular natural resource is managed. This confusion has been manifested by incorrect source codes being used to describe the origin of specimens of some CITES-listed species. The problem is compounded in the case of specimens derived from operations practising more than one production system. From a monitoring standpoint, the ability to apply multiple management regimes for some species further complicates the use of a simplified coding system to describe the source of animals that are used for international trade.

As stated previously, one of the purposes of the source codes contained in Resolution Conf. 10.2 (Rev.) is to identify specific management regimes from which a specimen was derived. Correctly used and linked to the application of standardized guidelines for implementing Article IV "non-detriment" requirements, source codes can provide a reliable indication for importing countries, or combinations thereof, that exercise stricter domestic measures of the manner in which an exporting country has implemented the provisions of Article IV.

The application of two different source codes to signify captive-bred specimens is confusing. All source codes, except "D" and "C", are applied to describe certain applicable provisions. In addition to signifying specimens derived from closed-cycle captive breeding operations, the two source codes "C" and "D", describe the purpose of a transaction (i.e. commercial or non-commercial). This represents a confusing departure from the general purpose of source codes. These two codes are used to differentiate between exports authorized pursuant to Article VII paragraphs 4 and 5. In this regard, use of source code "C" to refer to non-commercial transactions involving captive-bred Appendix-I specimens **as well as** commercial transactions involving captive-bred specimens of Appendix-II and Appendix-III species further complicates interpretation and impairs uniform implementation. The utility of differentiating

between closed-cycle captive breeding operations on the basis of whether or not their purpose is commercial is questionable. In practice many captive breeding operations, notably zoological gardens, undertake both commercial and non-commercial transactions involving captive-bred specimens of species included in Appendix I and Appendix II.

Article III, paragraph 3(c), of the Convention does not permit specimens of Appendix-I species to be imported for purposes that are "primarily commercial" in nature. Article VII, paragraph 4, provides and exception to this restriction by enabling specimens of Appendix-I species that have been bred in captivity to be regarded as specimens of an Appendix-II species which can thus be imported for commercial purposes. Resolution Conf. 10.16 (Rev.) defines the term "bred in captivity", as well as an agreed interpretation of the term "controlled environment" (see section 4.1.2). Article VII, paragraph 5, of the Convention establishes that a Management Authority may issue a certificate of captive breeding for specimens that satisfy the requirements of Resolution Conf. 10.16 (Rev.) in lieu of permits pursuant to Articles III, IV or V. This provision effectively, therefore, applies a uniform approach to the treatment of captive-bred specimens of animal species included in all three Appendices.

Although Resolution Conf. 10.16 (Rev.) provides an interpretation of Article VII, paragraphs 4 and 5, the rationale and logic by which the Parties have established this difference between the paragraphs, (i.e. on the basis of whether or not the transaction is commercial or non-commercial), is not apparent. The language of Articles VII paragraphs 4 and 5, does not lead the reader to reach this conclusion. The confusion is compounded further by the explanatory notes contained in Resolution Conf. 10.2 (Rev.) for the source code "D", (i.e. captive-bred specimens exported in accordance with Article VII, paragraph 4). The absence of any reference to Resolution Conf. 10.16 (Rev.) for this source code may be interpreted, therefore, as the source code "D" not requiring Resolution Conf. 10.16 (Rev.) to be satisfied.

An alternative, less confusing, interpretation of Article VII, paragraphs 4 and 5, of the Convention is to link the two in the following manner. Article VII, paragraph 4, unambiguously states the principle that a specimen of an Appendix-I species bred in captivity for commercial purposes shall be deemed to be an Appendix-II species. Article VII, paragraph 5, simply provides the means by which the Convention is able to implement the principle established by Article VII, paragraph 4. By extending the captive-bred provisions to apply equally to specimens of Appendix-II and Appendix-III species, the drafters of the Convention sought to achieve a uniform approach to administering trade in captive-bred specimens of Appendix-listed animals. Interpreted in this manner, implementation of Article VII would be simplified significantly, allowing one source code to be used for all closed-cycle captive breeding operations, regardless of the Appendix in which the species in question was listed. Non-commercial imports in captive-bred specimens of Appendix-I animals should be administered according to the provisions of Article III. Operations involved in captive breeding for commercial purposes that seek to undertake a transaction of a non-commercial nature would receive an export permit issued in accordance with Article III of the Convention. Commercial transactions would be authorized in accordance with the provisions of Article VII, paragraph 5, of the Convention.

Including the term second generation production (or demonstration that management is being applied that has been shown to produce second generation offspring elsewhere) into the definition of the term "bred in captivity" has direct bearing on the biological definition of "bred in captivity". This requirement was incorporated into the definition at the second meeting of the Conference of the Parties (San José, 1979), simply to provide a means by which Parties can be assured that a captive breeding operation is fully closed-cycle without any dependence of the wild population(s). There are alternative mechanisms (e.g. regular inspections and scrutinized record keeping) to ensure that captive breeding operations are sustainable without being dependent on the wild resource.

First generation offspring of captive-bred Appendix-I animals are currently exported in accordance with Article III of the Convention. The Scientific Authority of the exporting Party undertakes a relatively straightforward non-detriment evaluation of the export. The source code "F" has been adopted to describe these specimens amongst others (see Notification No. 1998/14). There are additional unconventional, but nevertheless successful, methods by which Appendix-I animals may be born in captivity (e.g. captive, "domesticated" Asian elephants that have been fertilized by wild males). Although the progeny can be exported in accordance with Article III, because of the species and the method by which the offspring are produced, such transactions have proven to be particularly problematic. In addition to the special case of Asian elephants, there are potentially numerous parallel examples involving other species, where there is no demonstrable negative impact on the conservation of the species. However, because of the present definition of "bred in captivity" import of the progeny for commercial purposes is not permitted. The present definition of the term "bred in captivity" has created the need to use the code "F" to accommodate exports of first generation captive-bred offspring from non-registered operations. In cases such as the Asian elephant, it imposes a negative incentive for local communities to value and hence conserve wild elephants.

Adopting a more rational approach to interpreting Article VII, paragraphs 4 and 5, should be accompanied by a further examination of Resolution Conf. 10.16 (Rev.). Defining the term "bred in captivity" in a more practical manner that addresses the present differentiation between captive-bred first and second generation offspring of Appendix-I species would overcome many of the problems associated with administering trade in captive-bred specimens of Appendix-I species. There are more practical strategies to differentiate captive breeding operations involving Appendix-I species from those involving Appendix-II and Appendix-III species to ensure that the former operate independently of the wild population(s). By doing so, captive-bred specimens of **all** Appendix-listed animals could be assigned a single source code.

Although the Resolution on ranching was initially adopted to facilitate the transfer of Appendix-I species to Appendix II, ranching is also applied for the commercial use of Appendix-II and Appendix-III species. In such cases, Parties are not bound by the recommendations of Resolution Conf. 11.16 (which specifies the conditions necessary to be satisfied for the transfer of species from Appendix I to Appendix II for ranching). There is no requirement under the Convention to demonstrate a conservation benefit for permitting export of specimens of an Appendix-II species. Article IV only requires the exporting country to ensure that such exports are not detrimental to the survival of the species in the wild.

Much of the confusion surrounding ranching and use of the code "R" may be attributed to the loose nature in which the term "ranching" was originally defined in Resolution Conf. 3.15 (since repealed). The definition; *"the rearing in a controlled environment of specimens taken from the* wild", retained in Resolution Conf. 11.16, is vague and open to varying interpretations. The present confusion would be overcome by defining the term "ranching" more precisely to make this form of management more specific. Simply removing specimens from the wild and rearing or maintaining them in controlled conditions for an unspecified period of time does **not** necessarily imply that the species is being ranched. The present definition of ranching does not preclude the collection of sub-adult specimens for rearing in captivity for a short period of time (a matter of days) before export. Such operations are only required to demonstrate a conservation benefit to the local population and meet all other requirements of the Resolution.

As a further example, there is interest by some countries to ranch *Ornithoptera* butterflies on the basis of collecting pupae or third instar larvae from the wild and rearing these in a

controlled environment through to the imago stage for export. Although it can reasonably be argued that this form of management conforms to the present CITES definition of ranching, from a conservation standpoint, if one accepts the tenet of the crocodilian model (discussed below), the harvest of late instar larvae and/or pupae does not constitute ranching in the sense of ranching being a form of low-risk wild harvesting of surplus juveniles subject to high natural mortality. This form of management is focused on life-history stages that represent the portion of a population that has survived high levels of natural mortality during the egg and early larval stages. In the case of *Ornithoptera* butterflies, other lepidopterans and some insects, these life stages constitute the next generation of reproductive individuals that are relatively short-lived and necessary to ensure that recruitment into the population and dispersal takes place. Harvesting these life stages should therefore be considered more correctly as a typical wild harvest and be subject to an appropriate non-detriment finding.

Although the removal of fledgling birds from nests for subsequent rearing in captivity constitutes ranching as the term is currently defined, many such "ranching" systems, unless practiced to minimize any negative impact on the long-term recruitment potential of the harvested population, may be regarded as typical wild harvest programmes. For instance, as the term is defined, there is no safeguard against felling trees and destroying available nesting habitat in order to harvest and "ranch" fledglings. Under these circumstances, use of "R" as a source code may lead to a misinterpretation of the sustainability of harvests, and the nature and extent of detrimental impact on the conservation of the wild population(s).

Ranching as a management regime applied to crocodilians acknowledges that an annual surfeit of eggs and neonates is available for use with no negative impact on the ability of previously depleted populations to recover and increase in abundance. However, it does not follow that ranching will necessarily be applicable to other species – particularly the higher vertebrates, most of which exhibit quite different life-history strategies. It would be appropriate to re-define ranching as a management strategy that is more exclusive and restricted to species with life stages exhibiting high levels of natural mortality (e.g. eggs and/or neonates) that can be harvested from the wild for rearing in a controlled environment for export. In cases where an Appendix-I taxon (or population) is transferred to Appendix II for ranching, the need to compensate the wild population, if required, with ranched juveniles is an important element of this form of management.

Use of the source code "W" to describe management systems based on the removal of specimens directly from the wild population is seemingly straightforward. However, the present vague definition of "ranching" has led to confusion over the application of the source code for wild harvest regimes. Correcting this confusion is best achieved by redefining, in a more exclusive manner, these two management regimes (see section 7).

Within the direct wild-harvest management regime, as it is currently applied, there are some modified, subordinate systems, i.e. captive rearing and the different forms of wildlife farming, that require further scrutiny in order to determine whether or not a separate and distinct source code is warranted for each. Captive rearing represents an opportunistic artifact of direct wild harvest regimes. Indeed, there are potential negative effects if harvest activities become focused on acquiring pregnant or gravid females without the application of any controls. It could be concluded to be appropriate to apply the source code "W" for specimens of Appendix-II animals obtained in this manner. However there are some practical aspects of this approach that warrant further consideration. The most obvious of these relates to annual export quotas. A single annual export quota that represents a combination of wild-harvested specimens and a component of captive-reared specimens can be misinterpreted as representing an excessive, possibly unsustainable, off-take from harvested population(s). Furthermore, an exporter would be able to export pregnant or gravid females to an offshore partner company as part of an agreed annual export quota, allow the animals

to lay eggs or give birth and re-export the "spent" females, incubate the eggs and re-export the resulting progeny. Under these circumstances the exporting country is not able to extract an export levy on the progeny, thereby losing a potentially important source of revenue. A single composite export quota is particularly problematic in cases where a conservative annual export quota has been established as a result of the Resolution Conf. 8.9 (Rev.) process. Under these circumstances the exporting Party is not able to authorize exports of captive-reared specimens without establishing a separate quota and notifying the Secretariat accordingly. The most pragmatic approach to accurately identify this form of supplementary production is to administer a separate quota with a maximum size limit that restricts the export of captive-reared specimens to neonates or small juveniles. Specimens derived from this source should be clearly identified by a distinct source code that is a subset of the code "W" – thereby signifying that Article IV non-detriment requirements **must** be satisfied.

"Wildlife farming", as referenced in this document, applies various strategies to enhance natural production, including harvesting specimens from modified or artificial habitat. These management systems may, therefore, be regarded as subordinate or modified forms of wild harvest. When practised within a species' natural area of distribution, wildlife farming, from a resource conservation perspective, is potentially less detrimental than a direct wild harvest. This form of management (i.e. wildlife farming), does not satisfy any existing CITES source code except "W" (signifying a direct wild harvest) and permits issued for the export of specimens derived from these management regimes are currently required to use the source code "W". In general, use of animals derived from these sources has little, if any, adverse impact on the overall conservation of the species (i.e. a non-detriment finding is not an issue).

Recognizing and defining a single management regime is further complicated when the same operation practises more than one production system. Many operations established to practice one management system (e.g. ranching), for commercial reasons often practice a combination of management systems that may incorporate closed-cycle captive breeding and/or contained production. The use of multiple production systems by a single operation creates obvious practical problems for the Management Authority in selecting an appropriate source code when authorizing export permits for specimens derived from these operations. In such cases, the Management Authority has at least three choices. It may elect to apply a source code that most accurately reflects the national management regime (if one exists). The Management Authority, in the case of an export from a registered operation, may use the source code(s) that identifies the management system upon which the operation in question was established. Alternatively, the Management Authority may require the exporter to specify the proportion of a consignment derived from each source and cite the relevant codes on the permit, or certificate. From a monitoring standpoint, the last approach provides a more accurate indication of management, thereby facilitating subsequent analyses. However, there are obvious associated practical problems, and separating specimens on the basis of their source may not be possible for some species subject to multiple management systems when issuing export permits.

Annex 1 summarizes known examples of different management and production systems currently in use for a range of species. A source code, as currently recognized and defined by Resolution Conf. 10.2 (Rev.), has been ascribed to each system. Where the management system is known, the taxon has been ascribed an appropriate new source code that describes more accurately the actual management system being applied.

6. Conclusions

Although there is nothing inherently incorrect with the present source code definitions contained in Resolution Conf. 10.2 (Rev.), they are too vague, and do not describe the whole gamut of production systems. There is thus, considerable potential for varying interpretations

by the Parties. The present definitions are too inclusive and do not reflect the differences between the variety of management systems currently in use for the commercial production of wild fauna. As a consequence, the present codes do not, in many cases, provide an accurate indication of the actual management and/or production system being employed by exporting countries.

The confusion surrounding the correct application of the CITES source codes stems from the "loose" nature of definitions. There is misunderstanding of closed-cycle captive breeding (C), as defined in Resolution Conf. 10.16 (Rev.); ranching (R), as defined in Resolution Conf. 11.16 and captive born (F), as referred to in Resolution Conf. 10.2 (Rev.). The utility of using two codes (C and D) to differentiate between transactions involving specimens of species derived from closed-cycle captive breeding operations on the basis of whether or not their purpose is commercial is questionable.

The present confusion surrounding the use of correct codes for closed-cycle captive breeding and ranching has resulted in widespread misunderstanding and incorrect use of the source code "F" despite the explanation provided in Notification No. 1998/14. The source code "F" is used to describe a variety of quite different management systems, ranging from surrogates for captive-bred specimens, to specimens that have been born and reared in captivity. Many, if not all the problems associated with trade in captive-bred specimens of Appendix-listed animals would be overcome by redefining the term "bred in captivity" to remove reference to production of second generation offspring. One source code would apply to all captive-bred specimens of all Appendix-listed animal species.

The following series of seven source codes would have the effect of treating both forms of intensive management regimes (i.e. closed-cycle captive breeding and contained production systems) uniformly by applying a single source code. It would no longer be necessary to differentiate between commercial and non-commercial transactions involving captive-bred specimens of Appendix-I species and apply separate source codes. Understanding, and hence application, of ranching techniques would be improved substantially by defining this form of management more explicitly. Recognizing the four types of wild harvest identified will facilitate the collection of statistics that more accurately reflect actual management practices.

C Specimens bred in captivity in accordance with a new definition of the term "bred in captivity" that removes reference to the production of second generation offspring.

D To be abolished.

F To be abolished (as currently applied)

R Specimens derived from ranching programmes that meet the requirements of Resolution Conf. 11.16, or, in the case of Appendix-II species not transferred from Appendix I for ranching, satisfy the definition of ranching; and

W Specimens taken from the wild for export.

Wc Juvenile specimens born in captivity from wild-caught females that were pregnant or gravid when removed from the wild population(s), with maximum size limits imposed (where appropriate).

Wr Specimens taken from the wild population, the natural recruitment of which has been enhanced by the provision of additional artificial habitat, modified habitat or intensive, directed management.

Wx Specimens taken directly from the wild as a result of a programme to control pest species or species that have become established outside the area of their natural geographic range.

The above-proposed codes would clarify significantly the broad types of management regimes that are currently practised to obtain specimens of wild fauna for international trade, while maintaining sufficient flexibility for exporting Parties to modify a particular regime to suit local conditions. Any attempt to achieve a more precise definition for each particular type of management and production system will become an ongoing exercise – leading to a proliferation of source codes. Such an approach would severely restrict the flexibility that is necessary for successful management. Furthermore, codes used to describe management regimes that have been modified to suit the biological characteristics of the species involved, have the potential to result in conflicting interpretations which the Secretariat and/or Animals Committee will be constantly requested to consider.

The definitions proposed in the following section provide the appropriate specificity while, at the same time, allowing Parties to exercise some flexibility in the manner in which each regime (or combination of regimes) is applied.

7. Recommendations

From the point of view of achieving more uniform implementation of CITES and from a resource management and conservation perspective, greater meaning and clarity would be derived from:

i) Recognizing and defining, in a more specific and exclusive manner, the following management systems for the commercial production of wild animals. Management regimes recognized, defined and coded by CITES should be restricted to direct wild harvests (W) with associated subordinate codes for captive rearing (Wc); pest and/or exotic species control management (Wx), enhanced natural recruitment management systems (Wr); ranching (R); contained production systems (F) and captive breeding (C).

ii) Revising Resolution Conf. 10.16 (Rev.) to re-define the term "bred in captivity" to remove reference to production of second generation offspring and replace with a requirement for captive breeding operations to **demonstrate** sustainability independent of the wild population(s).

iii) Clarifying and standardizing the use of a single code for all captive-breeding operations that satisfy Resolution Conf. 10.16 (Rev.), revised as recommended in ii) above **regardless** of the purpose of breeding or Appendix listing (source code – C). In addition to ii) above, this process would entail the following actions:

- The Secretariat reviewing the present interpretation of Article VII, paragraphs 4 and 5, of the Convention that provides for a differential administration of commercial and non-commercial trade in captive-bred specimens of Appendix-I species;

- Amending Resolution Conf. 11.14 to provide guidance for the implementation of Article VII, paragraph 4, as establishing the principle that Appendix-I species of animals bred in captivity for commercial purposes shall be deemed to be specimens of Appendix-II listed species; and

- Amending paragraph b) under DETERMINES of Resolution Conf. 11.14 to restrict the application of Article VII, paragraph 5, to transactions for commercial purposes (as defined in the preceding paragraph a) of the Resolution);

Explanatory Note – The foregoing proposed amendments would have the effect of removing all reference in the operative paragraphs of Resolution Conf. 11.14 to non-commercial transactions involving captive-bred specimens of Appendix-I species of wild fauna. Export permits for transactions (involving Appendix-I specimens not produced in compliance with Resolution 11.16) of a non-commercial nature would be issued in accordance with the provisions of Article III of the Convention (as noted in the second preambular paragraph of the resolution). Any ambiguity, uncertainty or confusion would be removed if all such export permits cited Article III as the basis by which they were issued.

iv) Defining the term "contained production systems" in the following manner;

- Contained production systems are operations that are managed for the production of first generation offspring from the exchange of gametes under controlled conditions but do not fulfil the definition of "bred in captivity" in Resolution Conf. 10.16 (Rev.), (source code – F).

Explanatory Note – A definition of "contained production systems" and an accompanying source code for first generation captive-bred specimens of Appendix-II and Appendix-III animal species will be necessary if the definition of "bred in captivity", as contained in Resolution Conf. 10.16 (Rev.), is not amended as recommended in ii) above.

v) Amending Resolution Conf. 11.16 by redefining in a more explicit way, the term "ranching", that restricts its application to:

- Species with life stages that exhibit high levels of natural mortality (e.g. eggs and/or neonates) representing an annual population surfeit capable of being harvested, without any adverse affect, for subsequent raising in a controlled environment for export (source code – R);

vi) Defining a direct wild harvest (source code – W) as "a management regime involving the regular and programmed removal of individuals (e.g. through quotas) from the wild population for either;

- export of live specimens , or

- processing to supply a particular commodity (skins, meat or other derivatives etc.) without any form of intensive (captive) management";

vii) Juvenile specimens derived from females that are removed from the wild as pregnant or gravid specimens and subject to subsequent captive management (i.e. captive rearing) for the purpose of producing offspring for export (source code – Wc);

viii) Specimens obtained from a direct wild harvest that represents control of a species that is defined under relevant national legislation to be a pest or is exotic and does not represent a component of the natural biota of a country (source code – Wx);

ix) Specimens obtained from a direct wild harvest where the population of the species have been managed to enhance natural recruitment (source code – Wr);

x) Preparing draft amendments to operative paragraph e) of Resolution Conf. 10.2 (Rev.) that reflect the foregoing management regimes and production systems, and the revised definitions for each;

xi) Providing a plain language description and guidelines (in the form of a practical manual) for the application of each management system.

EXAMPLES OF SPECIES SUBJECT TO DIFFERENT MANAGEMENT AND/OR PRODUCTION SYSTEMS

Explanatory Notes

* Examples of species that are subject to closed-cycle captive breeding management are not provided here but may be obtained by referring to the series of Notifications to Parties on captive breeding operations registered with the Secretariat.

** No attempt has been made to include all examples of direct wild harvest regimes and *ex situ* captive production systems. Examples given represent species that are subject to multiple management regimes.

? Management system as stated by the Party concerned but considered as requiring confirmation

Party and Taxon	Present Source Codes (as used by the Parties)				*Proposed New Source Codes (where management system is known)*					
	D*	F	R	W**	*C*	*R*	*W*	*Wc*	*Wx*	*Wr*
ARGENTINA										
Amazona aestiva			✔			✔				
Rhea pennata pennata			✔			✔				
Caiman latirostris			✔			✔				
AUSTRALIA										
Crocodylus porosus	✔		✔	✔	✔	✔	✔			
Tridacnidae spp		✔			✔					
BENIN										
Calabaria reinhardti			✔					✔		
Chamaeleo gracilis			✔				✔	✔		
Chamaeleo senegalensis			✔				✔	✔		
Geochelone sulcata		✔			✔					
Kinixys belliana			✔				✔	✔		
Kinixys homeana			✔				✔	✔		
Pelusios niger			✔					✔		
Trionyx triunguis			✔					✔		
Pelomedusa subrufa			✔					✔		
Python regius			✔	✔	✔		✔	✔		
Python sebae			✔	✔			✔	✔		
Varanus exanthematicus			✔	✔			✔	✔		
Varanus niloticus			✔					✔		
Pandinus imperator			✔				✔	✔		
CANADA										
Acipenser fulvescens		✔			✔					
Acipenser oxyrhynchus		✔			✔					
COLOMBIA										
Boa constrictor		✔			✔					
Caiman fuscus		✔			✔					
Iguana iguana		✔			✔					
Tupinambis teguixin		✔			✔					

Party and Taxon	Present Source Codes (as used by the Parties)				*Proposed New Source Codes (where management system is known)*					
	D*	F	R	W**	*C*	*R*	*W*	*Wc*	*Wx*	*Wr*
EL SALVADOR										
Iguana iguana		✔			✔					
GHANA										
Chamaeleo gracilis				✔			✔	✔		
Chamaeleo senegalensis				✔			✔	✔		
Kinixys belliana				✔			✔			
Kinixys erosa				✔			✔			
Kinixys homeana				✔			✔			
Python regius			✔	✔		✔(?)	✔	✔		
Python sebae			✔	✔		✔(?)	✔	✔		
INDONESIA										
Macaca fascicularis		✔			✔					✔
Morelia viridis		✔		✔	✔		✔			
Crocodylus novaeguineae		✔	✔	✔	✔	✔	✔			
Crocodylus porosus	✔		✔	✔	✔	✔	✔			
Scleropages formosus	✔				✔					
MADAGASCAR										
Crocodylus niloticus	✔		✔	✔	✔	✔	✔			
Pyxis arachnoides		✔		✔	✔		✔			
Pyxis planicauda		✔		✔	✔		✔			
MAURITIUS										
Macaca fascicularis		✔		✔	✔				✔	
MOZAMBIQUE										
Agapornis lillianae			✔			✔(?)			✔(?)	
Poicephalus cryptoxanthus			✔			✔(?)			✔(?)	
Poicephalus meyeri			✔			✔(?)			✔(?)	
Serinus mozambicus			✔	✔		✔(?)			✔(?)	
Kinixys belliana			✔	✔		✔(?)	✔			
NAMIBIA										
Ceratotherium simum				✔						✔
Equus zebra hartmannae				✔			✔			✔
NICARAGUA										
Amazona albifrons			✔			✔(?)				
Amazona auropalliata			✔			✔(?)				
Amazona autumnalis			✔			✔(?)				
Aratinga finschi			✔			✔(?)				
Aratinga canicularis			✔			✔(?)				
Aratinga holochlora			✔			✔(?)				
Aratinga nana astec			✔			✔(?)				
Brotogeris jugularis			✔			✔(?)				
Pionus senilis			✔			✔(?)				
Ramphastos sulfuratus			✔			✔(?)				
PAPUA NEW GUINEA										
Crocodylus novaeguineae			✔	✔		✔	✔			
Crocodylus porosus	✔		✔	✔	✔	✔	✔			
Ornithoptera spp			✔							✔

Party and Taxon	Present Source Codes (as used by the Parties)				*Proposed New Source Codes (where management system is known)*					
	D*	F	R	W**	*C*	*R*	*W*	*Wc*	*Wx*	*Wr*
SOUTH AFRICA										
Ceratotherium simum				✔						✔
Papio cynocephalus				✔					✔	
TOGO										
Cercocebus torquatus		✔			✔					
Calabaria reinhardti										
Chamaeleo gracilis										
Chamaeleo senegalensis										
Geochelone sulcata		✔			✔					
Kinixys belliana			✔	✔			✔	✔		
Kinixys erosa			✔	✔			✔	✔		
Kinixys homeana			✔	✔			✔	✔		
Pelomedusa subrufa			✔	✔			✔	✔		
Pelusios niger			✔	✔			✔	✔		
Python regius			✔	✔		✔(?)	✔	✔		
Python sebae			✔	✔		✔(?)	✔	✔		
Varanus examthematicus			✔	✔			✔	✔		
Varanus niloticus			✔	✔			✔	✔		
UNITED REP OF TANZANIA										
Bradypodion fischeri		✔		✔			✔	✔		
Bradypodion oxyrhinum		✔						✔		
Bradypodion spinosum		✔						✔		
Bradypodion tavetanum		✔		✔			✔	✔		
Chamaeleo bitaeniatus		✔		✔			✔	✔		
Chamaeleo demerensis		✔		✔			✔	✔		
Chamaeleo dilepis		✔		✔			✔	✔		
Chamaeleo fuellenborni		✔		✔			✔	✔		
Chamaeleo goetzei		✔		✔			✔	✔		
Chamaeleo gracilis		✔		✔			✔	✔		
Chamaeleo inornatus		✔		✔			✔	✔		
Chamaeleo j. merumontanus		✔		✔			✔	✔		
Chamaeleo mellori		✔		✔			✔	✔		
Chamaeleo rudis		✔		✔			✔	✔		
Chamaeleo werneri		✔		✔			✔	✔		
Cordylus tropidosternum		✔		✔			✔	✔		
Cordylus ukingensis		✔						✔		
Eryx colubrinus		✔			✔(?)					
Geochelone gigantea		✔			✔					
Geochelone pardalis		✔			✔					
Kinixys belliana		✔			✔					
Malacochersus tornieri		✔			✔					
Pelomedusa subrufa		✔						✔		
Python sebae		✔		✔			✔	✔		
UNITED STATES OF AMERICA										
Chamaeleo jacksoni				✔					✔	
Alligator mississippiensis		✔	✔	✔	✔	✔	✔			
UZBEKISTAN										
Testudo horsfieldii		✔		✔			✔	✔(?)		
VENEZUELA										
Forpus passerinus				✔						✔