

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



Sixteenth meeting of the Animals Committee
Shepherdstown (United States of America), 11-15 December 2000

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

1. The Annex has been prepared by Creative Conservation Solutions under contract to the CITES Secretariat.
2. 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. In addition, a number of Parties in one specific region also requested that guidelines be developed for the control of trade in specimens from different forms of animal production systems. This issue also has direct relevance to the making of non-detriment findings for Appendix-II specimens, and it will therefore be included in programmes to build capacity in Scientific Authorities.
3. An additional document has also been commissioned that outlines the supervision that Management Authorities should exercise over the range of animal production systems addressed in the Annex. This initiative was intended to assist Management Authorities that have little experience in the control and management of trade in specimens produced from the range of production systems.
4. The Committee is invited to comment on the Annex. It will then be edited and distributed to the Parties.

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 use of wild fauna and the application of an appropriate CITES source code to 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 distinguishing criteria for 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 and butterflies;
- iii) Specify criteria for the use of source codes W, R and F for exporting specimens from production systems identified in paragraph 2 above; and
- iv) Develop simple guidelines for Management Authorities in countries where ranching operations, captive breeding operations and wild harvesting occurs 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 will be prepared for consideration by the Secretariat outlining simple regulatory 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).

2. Structure of Report

The 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, for consideration by the Animals Committee, clarifying each management regime or production system and the use 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 Contracting Parties to address resource management related issues. In this regard, there is thus a need to interpret and correlate, in a practical manner, the information contained in CITES regulatory documents, *viz* permits and certificates, with the type of management system from which the specimens in trade were derived.

One issue is immediately apparent. As presently structured, 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, for example, the phrase "specimens of species bred in captivity"; and
- 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 that 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 suite the life history characteristics of species, local conditions or 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. Some innovative strategies are applied to Appendix-I species, but most have been developed for Appendix-II listed species. The problem is further complicated in the case of the entry into trade of those animals, including their parts and products that have been derived from multiple production systems or management regimes.

Another matter concerns the manner in which the administration of trade controls under the Convention can be correlated, in a meaningful way, to management. The 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. It is therefore important that these codes accommodate the variety of management regimes being practised 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 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, 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 useful to reference and briefly examine them 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 Appendix I for non-commercial purposes and specimens of species included in Appendices II and III).

Considerable confusion exists among some exporting States on the correct use of codes relating to Appendix-II species. 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 to suspend accepting 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.

The Animals Committee, in conducting the Significant Trade Review to implement Resolution Conf 8.9 (Rev.), has encountered several instances involving the export of an Appendix-II species in significant quantities where an exporting country is practising a management regime or production system other than a regulated wild harvest. 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 may lead to a misinterpretation that can result in unnecessary recommendations under Resolution Conf 8.9 (Rev.) being directed to the Management Authority of the exporting Party in question. Furthermore, not only can this action create animosity towards the Secretariat and the Committee, it represents a diversion of valuable resources to focus on a perceived rather than real conservation problems. It is therefore important that Parties establish an agreed understanding of and an appropriate nomenclature for the different management and production systems that are presently in use for different Appendix-II listed species.

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 regimes, 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 in turn 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 practice “close-order” husbandry for the production of animals held and managed in captivity. Close-order 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.

Only two production systems are recognized; *viz* closed-cycle captive breeding and captive production, which although different are both 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 criteria required to be satisfied for a captive breeding operation 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 when reproduction is asexual that the parents 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 addition of new stock to avoid inbreeding);
- the operation must demonstrate an ability to produce 2nd generation, or subsequent generation offspring; or that the operation is being managed in a manner that has been demonstrated elsewhere of 2nd generation production.

Some Parties mistakenly believe that a captive breeding operations, in order to satisfy Resolution Conf 10.16 (Rev), is required to restrict exports of specimens derived from the operation to 2nd generation offspring or products thereof. Resolution Conf 10.16 (Rev) only requires an operation to demonstrate second generation production or management that has been shown elsewhere of being capable of 2nd generation production. Once this requirement has been satisfied (a registration prerequisite 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 Captive Production Systems

Recent years have seen the emergence of an increasing number of captive production systems that represent variations on 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 first generation offspring in captivity for export. Captive production systems differ from closed-cycle captive breeding operations by being able to continuously obtain new breeding stock from the wild and are not bound by the requirements of Resolution Conf 10.16 (Rev). Captive production systems are therefore necessarily restricted in their application to Appendix-II or Appendix-III species.

The adult breeding stock is maintained indefinitely in enclosures that are separated from those containing the progeny. However, the breeding stock may be replenished at any time by the inclusion of individuals that are captured from the wild. The ability of an operation to acquire additional breeding stock depends on the nature of controls applied by the Management Authority. Alternatively, some operations may elect to retain a small percentage of 1st generation offspring for growing through to adulthood in order to supplement the breeding population. Accordingly, some operations that have been established and producing 1st generation offspring for an extended period of time will, over time, develop the capacity to produce 2nd, or more, generation individuals.

The parental stock for some captive production systems (e.g. systems involving species such as *Iguana iguana*, *Boa constrictor*, *Geochelone pardalis* and *Malacochersus tornieri*) may be 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 approach as operations based on closed-cycle captive breeding of an Appendix-I species. Alternatively, an operation may depend on the regular supply of reproductive adults for the production of offspring (e.g. systems producing *Python regius*). Very often the technology for captive production systems, although clearly dependent on the species concerned, is less sophisticated than closed-cycle breeding regimes.

Mariculture and aquaculture represent 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 meat from giant clams (*Tridacna gigas*, *T. derasa* and *T. maxima*) and an increasing variety of techniques are becoming available. 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 by mixing with sperm. After hatching the larval clams pass through a motile stage of 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 ocean for a further 12-18 months (approximately 20cm) before being transferred to the ocean for "growing-out". When the young clams have reached this size 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 clams (3-4 months) in floating cages in the ocean.

The present management of the commercial sturgeon fishery in the Caspian Sea entails each of the participating States operating integral aquaculture programs. Systematic alteration of spawning habitat in the rivers that drain into the Caspian Sea has reduced natural recruitment to levels below that necessary 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 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 programs, because of their inherent potential to impact adversely on the harvested population, require a more cautious approach with management elements not necessarily applicable to other regimes. Extensive management systems are therefore necessarily required to direct greater attention to ensuring that the wild resource is managed in a sustainable manner. 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, certain captive production systems, currently being practised, more appropriately conform, from a resource conservation and management viewpoint, to a wild harvest. These systems (discussed in section 4.2.2) should be subject to the regulatory controls applicable to the relevant extensive management system.

4.2.1 Ranching

Ranching, like most captive production systems, relies on maintaining a healthy wild population from which individuals are removed on a regular basis. Ranching was first introduced into the CITES forum as a means of facilitating the transfer to Appendix II of certain Appendix-I species. As a consequence, in order to achieve the necessary support for an Appendix II listing, the ranching operation "*must be primarily beneficial to the conservation of the local population*". 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 crocodylians 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. Ranching of crocodylians is based on the annual harvest of eggs and/or neonates. 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. to produce large numbers of eggs and neonates that are subject to a high rates of natural mortality. These life-

stages experience high levels of natural mortality and 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 are able to "double clutch" when eggs are removed at early stage of incubation (i.e. to produce a compensatory clutch of eggs after a clutch has been removed).

Apart from some species of psittacines (e.g. *Amazona aestiva* in Argentina) and reptiles (e.g. *Python regius* in Togo and Ghana, *Crocodylus porosus* in Australia and *Crocodylus novaeguineae* in Papua New Guinea and Indonesia), ranching, as presently defined, appears to be poorly understood by many Parties and is not widely practised as a management regime. The management of commercial use 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. Individual egg masses are then placed into a pit and covered with vegetation where they remain until hatching. The temperature is monitored crudely by adding or removing decomposing vegetation. The resulting neonates are sold to the exporters. By focusing on the management of eggs for the production of neonates, this management system differs very little from the crocodilian model.

4.2.2 Captive Rearing Systems

Although the term "captive rearing" may suggest a degree of close order 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 captive 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 breeding adults in captivity. Exporters who practice this form of management do so in order to maximize the 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", therefore simply represent a bonus for the exporter. Captive rearing production systems are becoming practised more widely, particularly for certain reptiles, such as some chamaeleonid lizards, (e.g. *Bradypodion* spp. in Tanzania) that produce eggs or offspring throughout the year and species harvested during the breeding season.

4.2.3 Direct Wild Harvest Programs

Direct wild harvest programs represent management regimes that remove individuals from the harvested population(s) on a regular basis without any intensive or captive management. There is thus a requirement to apply adaptive management that features more rigorous controls on harvest activities and 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 programs. A direct wild harvest can be defined as:

a management regime involving the regular and programmed removal of pre-determined numbers of individuals (eg 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 (captive) management.

Wildlife Farming

Wildlife farming represents another management strategy that may be regarded as a modified wild harvest. From a resource conservation standpoint, these management regimes may be considered as more benign forms of wild harvest involving the manipulation of habitat to maximize production and/or minimize deleterious impacts on the naturally occurring population(s).

Some of the following examples of “wildlife farming” parallel closely “open range” livestock ranching and other similar forms of pastoral land-use management practiced in numerous countries. These regimes do not comfortably conform to any of the management regimes recognized by the Parties. Although wild populations are being managed for the production and extraction of a commodity, management is directed to creating artificially high production or the commodity is being obtained from relocated “artificial” populations. In some instances, the extraction of a commodity (e.g. vicuña wool) represents a benign manipulation of a wild population that can be compared to open range sheep farming for the production of wool.

In some instances it is possible to “manage” habitat to enhance the recruitment potential of a population of a species by providing additional artificial habitat. Artificial nesting for the small parrot *Pionus menstruus* in the Venezuelan Ilaños 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. This enhanced recruitment thus becomes available to be harvested, either for ranching or direct export.

House farming in parts of the northern coast of Java, especially in East Java, Indonesia, for the production of nests of edible-nest swiftlets of the genus *Collocalia* represents an innovative form of wildlife farming. Harvesting nests from cave-nesting colonies of the species 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 exhibit multiple clutches is exploited by Indonesians who practice 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* that behaves as a foster parent for the *C. fuciphaga* offspring.

The provision of additional habitat by planting preferred food species in gardens and vegetable orchards has enhanced to capacity to harvest the pupae of certain lepidoterans (eg *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 harvested population(s). This management strategy is also being applied as a community-based conservation measure for *Ornithoptera alexandrae*. In the case of *O. alexandrae*, which is presently included in Appendix I of the Convention, no mechanism exists, other than the Resolution Conf 9.24 criteria, to transfer the species to Appendix II to enable the program to obtain foreign revenue from exports.

Two management systems currently operating in Indonesia offer further examples of wildlife farming. Both are focused on breeding of *Macaca fascicularis* on small offshore islands where the species does not occur naturally. Wild-caught specimens of *Macaca fascicularis*, obtained from the neighbouring island of Sumatra, 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 (“captive on”) the two islands, the management regime does not comply with any form of intensive captive husbandry.

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 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 (but importing countries have nevertheless experienced problems with such exports).

In Venezuela, the capybara *Hydrochoerus 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 authority 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 Ilaños of both countries. However, it does not represent captive breeding as this production system is presently understood within the terminology of the Convention.

5. Management Regimes and Application of Source Codes

The consumptive or extractive use of wild fauna impacts on the harvested population. The extent and nature of this impact, regarded by some as "conservation threat", is determined by a variety of factors. Management should seek to achieve sustainability and minimize any deleterious affect on the population(s) subject to harvest activities. 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 application of inappropriate management, may result in an adverse impact on the conservation of the harvested species. Conversely, pragmatic management regimes, that are adapted to exploit a particular biological characteristic (or set of characters) of a species, may, in fact, be beneficial and enhance the conservation potential of the species 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 present text of the Convention only recognizes two forms of management for commercial use and export, *viz* captive breeding (Appendix-I species) and wild harvesting (Appendix-II and Appendix-III species). The absence of any inherent flexibility in the text of the Convention in this regard fails to acknowledge the diversity of captive production systems used by many countries. These systems often to satisfy the requirements of importing countries. Furthermore, 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 a Management Authority 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 modified captive breeding programs to focus on the production of 1st generation offspring and exhibit a close (and on-going) relationship and dependence on the wild population.

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 recognizes certain 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 determining the relative potential impact of each regime on the conservation of the species. 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 codes provided by Resolution Conf. 10.2 (Rev) are too inclusive and not sufficiently well defined. Furthermore, the present codes fail to accommodate the variety of management regimes currently in use for different species. As

a consequence, there are an increasing number of cases which, because of no 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 the source codes being used incorrectly to describe the origin of specimens of some CITES-listed species in trade. The problem is further compounded for specimens derived from operations practicing 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.

The principal purpose of the source codes contained in Resolution Conf. 10.2 (Rev) is to identify specific management regimes in order to provide an accurate indicator system of "non detriment". The application of two different codes to signify captive-bred specimens is confusing. All other codes reflect certain management regimes, except the codes "D" and "C". In addition to signifying specimens derived from closed-cycle captive breeding operations, these two codes, by describing the purpose of a transaction (i.e. commercial or non-commercial), represent a departure from this approach. Rather, these two codes are used to differentiate between and accommodate exports authorized pursuant to Article VII paragraphs 4 and 5 respectively. In this regard, use of code "D" to refer 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. 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, enables specimens of Appendix-I species that have been bred in captivity to be regarded as specimens of an Appendix-II species for the purposes of commercial exports. 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 certificate of captive breeding for a specimens that satisfy 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. 11.16 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 transaction type), is not immediately apparent. Furthermore, 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), make no reference to, and hence apparently do not require, Resolution Conf. 10.16 (Rev.) to be satisfied.

Article VII, paragraph 5 of the Convention extends exemptions of Articles IV and V requirements to captive-bred specimens of Appendix-II and Appendix-III species. Captive production systems of these species are able to continually acquire additional parental stock from the wild and are generally focused on producing 1st generation offspring. Under the circumstances, Management Authorities should use a source code that represents the least conservative production ranking. Regardless of the provisions of Article VII, paragraph 5, captive-bred specimens derived from these operations should be identified by the source code "F".

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 captive-bred specimen of an Appendix-I species shall be deemed to be an Appendix-II species for the purposes of commercial use. Article VII, paragraph 5, simply provides the means by which the Convention is able to implement the principle established by paragraph 4. Clearly, in making provision for commercial trade in Appendix-I species, there is a need for an alternative mechanism to Article III. Trade in captive-bred specimens of Appendix-I animals should be administered according to the provisions of Article III. 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, Article VII would be simplified significantly, allowing one source code to be used for all closed-cycle captive breeding operations, regardless in which Appendix the species in question was listed.

The 2nd meeting of the Conference of the Parties (San José, 1979) recognized that the Convention did not adequately cater for certain management regimes, based on commercial use, designed to facilitate and enhance the recovery and conservation of depleted populations of Appendix-I species. As a consequence, the 3rd meeting of the Conference of the Parties (New Delhi, 1981) resolved to broaden, beyond the Bern Criteria, the conditions by which species may be transferred to Appendix II of the Convention, thereby enabling commercial exports to be authorized. 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 means of managing certain Appendix-I listed species as Appendix-II listed species for commercial export. In the context of CITES, “ranching” is defined as “the rearing in a controlled environment of specimens taken from the wild”.

Although ranching was initially conceived as an alternative mechanism to facilitate the transfer of Appendix-I species to Appendix II, an increasing number of Parties apply ranching as a management regime for the commercial use of Appendix-II or Appendix-III species. In such cases, Parties are not bound by the constraints of Resolution Conf. 11.16 as it relates to regimes necessary for the transfer of species from Appendix I to Appendix II. For example, 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 exports of specimens of an Appendix-II species are not detrimental to the survival of the species in the wild.

Much of the confusion surrounding ranching and use of the code “R” as well as may be attributed to the loose nature in which the term “ranching” was originally defined in Resolution Conf. 3.15. This definition; “*the rearing in a controlled environment of specimens taken from the wild*”, which has been retained in Resolution Conf. 11.16 is particularly vague and open to interpretation. This present confusion would, to a large extent, be overcome by defining the term “ranching” more precisely making 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 in itself necessarily imply that the species is being ranched. The present definition of ranching does not preclude the collection of sub-adult specimens of any Appendix-I species for rearing in captivity for an unspecified period of time before export – provided it demonstrates a conservation benefit to the local population and meets all other requirements of the Resolution.

As a further example, there is interest by some countries to ranch *Ornithoptera* spp. 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 crocodylian model, the harvest of late instar larvae and/or pupae does not constitute ranching. 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* spp. butterflies, other lepidopterans and indeed all other 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 wild harvest.

Although the removal of fledgling birds from nests for subsequent rearing in captivity constitutes ranching as the term is presently defined, many such “ranching” systems may be regarded as wild harvest programs. For instance, as the term is presently 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 leads to gross misinterpretation of actual management practices, the sustainability of harvests, the nature and extent of detrimental impact on the conservation of the wild population(s).

Therefore, ranching as a management regime applied to crocodylians, acknowledges that an annual surfeit of eggs and neonates is available for use with no adverse impact on the recovery potential or maintenance of the wild population. 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.

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, the two management regimes (see section 4).

Within the direct wild harvest management regime, there are some subordinate systems, *viz* captive rearing and wildlife farming, that require further scrutiny in order to designate a source code that provides an accurate indication of potential non-detriment. Although captive rearing is a production system that conforms to the present definition of the CITES source code “F”, it does not reflect a management regime with reduced risks to the conservation of the wild population(s) of the species concerned that the source code “F” is intended to imply. This form of management is opportunistic and does not necessarily confer any conservation benefit on the wild population(s). Indeed, there are potential negative affects if harvest activities become focused on acquiring pregnant or gravid females without the application of any controls. Under the circumstances, it would be more appropriate to apply the source code “W” for specimens of Appendix-II animals obtained in this manner.

Wildlife farming involving various strategies to enhance natural production as well as the harvest of specimens from artificial habitat represents a subordinate or modified form of wild harvest that, from a resource conservation perspective, is potentially less detrimental. In some cases, management may actually benefit conservation of the species concerned. This form of management, i.e. wildlife farming, does not satisfy any existing CITES source code except “W”, signifying a direct wild harvest. Permits authorized for the export of specimens derived from these management regimes are presently required to use the source code “W”. However, use of animals derived from these sources has little, if any, adverse impact on the overall conservation of the species. As a consequence, the continued use of the source code “W”, as an accurate indicator of non-detriment potential, for specimens derived from this source, is questionable. Although some of these management regimes may be considered to satisfy the present definition of the source code “F”, they should, more appropriately, be regarded as a more “conservation friendly” form of wild harvest and be identified by a specific code.

Recognizing and defining a single management regime is further complicated when the same operation practices more than one production system. Many operations, established to practice one management system (e.g. ranching), may, for commercial reasons, practice a combination of management systems that may incorporate closed-cycle captive breeding and/or captive 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. 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. Alternatively, 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 the operation in question was established.

6. Conclusions and Recommendations

Greater understanding of the different management systems for the commercial production of wild fauna will result in the wider correct use of the different CITES source codes. The confusion surrounding the correct application of the CITES source codes stems from a misunderstanding of closed-cycle captive breeding (C), as defined in Resolution Conf 10.16 (Rev) and ranching (R), as defined in Resolution Conf

11.16. Furthermore, the present range and definitions of source codes contained in Resolution Conf 10.2 (Rev) is too inclusive and does not accurately reflect the variety of different management systems currently in use for the commercial production of wild fauna.

Clearly, there is a need to achieve a uniform approach to interpreting and applying the source codes currently recognized in Resolution Conf. 10.2 (Rev.). As an interim arrangement, the provisions of the Convention, as they relate to the different forms of management that are presently practiced for the use of wild fauna within the constraints of the flawed system of source codes presently recognized by Resolution Conf 10.2 (Rev), should be administered as follows. Examples of known systems appear in Annex 1.

- D** Closed-cycle captive breeding operations (Appendix-I spp. trade for commercial purposes)
- C** Closed-cycle captive breeding (Appendix-I spp. traded for non-commercial purposes and Appendix-II, Appendix-III spp. traded for commercial purposes)
- F** Captive production systems
- F** Captive rearing programs
- R** Ranching
- W** Direct wild harvests (including "wildlife farming")

Although there is nothing inherently incorrect with the present source code definitions, they are not accurate management indicators for potential non-detriment. From a resource conservation perspective, greater meaning would be achieved by:

- i) recognizing and defining, in a more exclusive manner, each management system for the commercial production of wild animals;
- ii) clarifying and standardizing the use of a single code for all closed-cycle captive-breeding operations satisfying Resolution Conf 10.16 (Rev) regardless of the purpose of transaction or appendix listing by;
 - 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;
- iii) redefining in a more exclusive manner, the term "ranching", restricting 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 and subsequently raised in a controlled environment for export;
- iv) Differentiating between captive production systems and captive rearing regimes;
 - Captive production systems would represent all operations that do not fulfil the definition of "bred in captivity" in Resolution Conf. 10.16 (Rev.), and are characterized by the production of offspring from breeding adults maintained permanently in captivity with, however, the ability for continual input of new breeding adults from the wild (source code F);
 - Captive rearing should be classed as a subordinate phenomenon of wild harvests (source code W) that enables an exporter to maximize the economic benefits derived from wild-caught animals.

- v) Providing more explicit guidelines for wild harvests according to the definition provided in this report that, when used in conjunction with revised definitions for other management regimes, avoids any misinterpretation;
- vi) Providing for a differential approach, as a subordinate element of wild harvests (source code W), to management regimes that crop animals from artificial populations or areas of enhanced habitats; and
- vii) Providing a plain language description and guidelines (in the form of a practical manual) for the application of each management system.

Annex

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

Taxon	Captive Production ** (source code F)	Captive Rearing (source code F)	Ranching (source code R)	Direct Wild Harvest ** (source code W)	Wildlife Farming (Enhanced Habitat) (source code – W)
<i>Collocalia fuciphaga</i>				Malaysia, Vietnam, Indonesia	Indonesia
<i>Amazona aestiva</i>			Argentina		
<i>Amazona albifrons</i>			Nicaragua		
<i>Amazona auropalliata</i>			Nicaragua		
<i>Amazona autumnalis</i>			Nicaragua		
<i>Amazona farinosa</i>			Nicaragua		
<i>Aratinga canicularis</i>			Nicaragua		
<i>Aratinga finschi</i>			Nicaragua		
<i>Aratinga holochlora</i>			Nicaragua		
<i>Aratinga nana astec</i>			Nicaragua		
<i>Brotogeris jugularis</i>			Nicaragua		
<i>Pionus senilis</i>			Nicaragua		
<i>Pionus menstruus</i>					Venezuela
<i>Ramphastes sulfuratus</i>			Nicaragua		
<i>Rhea pennata pennata</i>			Argentina		
<i>Boa constrictor</i>	Colombia				
<i>Morelia viridis</i>	Indonesia				
<i>Python regius</i>	Benin, Togo, Ghana	Benin, Togo, Ghana	Togo	Benin, Togo, Ghana	
<i>Python sebae</i>	Benin, Togo, Ghana (?)				
<i>Gongylophis colubrinus</i>	Tanzania (?)				
<i>Calabaria reinhardtii</i>	Togo, Benin, Ghana (?)				
<i>Chamaeleo gracilis</i>		Benin, Togo, Ghana		Benin, Togo, Ghana	
<i>Chamaeleo senegalensis</i>		Benin, Togo, Ghana		Benin, Togo, Ghana	
<i>Tupinambis nigropunctatus</i>	Colombia				

Taxon	Captive Production ** (source code F)	Captive Rearing (source code F)	Ranching (source code R)	Direct Wild Harvest ** (source code W)	Wildlife Farming (Enhanced Habitat) (source code – W)
<i>Iguana iguana</i>	Colombia, El Salvador				
<i>Malacochersus tornieri</i>	Tanzania				
<i>Geochelone pardalis</i>	Tanzania				
<i>Geochelone sulcata</i>	Benin, Togo, Ghana				
<i>Pyxis planicauda</i>	Madagascar				
<i>Pyxis arachnoides</i>	Madagascar				
<i>Aldabrachelys elephantina</i>	Madagascar, Tanzania				
<i>Kinixys belliana</i>	Togo, Benin, Ghana (?)				
<i>Kinixys homeana</i>	Togo, Benin, Ghana (?)				
<i>Crocodylus porosus</i>	Australia		Australia, PNG	Australia, PNG	
<i>Crocodylus novaeguineae</i>	Indonesia		PNG, Indonesia	PNG, Indonesia	
<i>Crocodylus niloticus</i>	Madagascar, Zimbabwe,		Zimbabwe, South Africa, Madagascar	Madagascar, Tanzania	
<i>Caiman latirostris</i>			Argentina		
<i>Alligator mississippiensis</i>	USA		USA	USA	
<i>Ornithoptera alexandrae</i>					Papua New Guinea
<i>Ornithoptera priamus</i>					Papua New Guinea
<i>Pandinus imperator</i>	Togo, Benin, Ghana (?)				
Tridacnidae spp	Australia				

Explanatory Notes

- Examples of species that are subject to closed-cycle captive breeding management are not here provided 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 is claimed to be practised but has not been verified.