

The World Conservation Strategy and CITES; Principles for the Management of Crocodilians

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WITHIN the last century crocodilians have been over-exploited for their skins. The extent to which each species has been affected has been determined largely by the economics of commercial hunting — species with valuable skins have been hunted more intensively than those with commercially inferior skins. Interestingly, no species to the best of our knowledge has become extinct in the wild as a result, although a number of species, for example the Siamese crocodile, *Crocodylus siamensis*, may be approaching that state.

The 1960's heralded a growing world awareness of environmental issues and concern in particular for the rate at which the world's living resources were becoming extinct or were being reduced to critically low levels. Many governments legislated to protect crocodiles and implemented conservation programmes to support that protection. Scientific interest in crocodilians was aroused and intensive research was directed at the group. In some countries exploitation continued, but often with efforts to get it onto a sustainable basis.

The establishment of crocodile farms and rearing stations in different regions of the world coincided with, and was stimulated by, the world-wide decline in stocks of wild crocodilians. Industry had largely failed to safeguard its investment. Captive-breeding programmes established or promoted by governments (notably in the Republic of South Africa, the United States of America, Zimbabwe and Papua New Guinea) have been able to enhance the conservation of wild crocodiles while providing skins for commercial use. Interest in farming crocodiles commercially has been stimulated by these ventures and today, commercial farms are operating with varying degrees of success in a great number of countries including Australia, Greece, Israel, Kenya, Malaysia, Mexico, the Philippines, the Republic of South Africa, Singapore, Taiwan, Thailand, the United States of America and Zimbabwe.

The present management of crocodilians encompasses a wide spectrum of approaches. It is influenced by the extent to which a species was hunted, the duration and effectiveness of protective legislation, the extent to which crocodile populations have recovered, and by people's perception of crocodiles in any particular region. At one end of the spectrum management can be actively preserving a species and re-establishing viable populations in the wild, such as is being done by the Indian Government with *Gavialis gangeticus*. At the other end of the spectrum, where species such as *Alligator mississippiensis* and *Crocodylus porosus* have recovered substantially, public safety may require the removal of animals from areas of intensive human use. A primary objective for the management of these species, in some areas, is the application of conservation principles to their sustained utilization as a renewable natural resource.

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

The concept of a convention on trade in endangered species was adopted by the United Nations (UN) Conference on the Human Environment held in Stockholm in 1972. It recommended that a plenipotentiary conference be convened to prepare and adopt a convention on export, import and transit of certain species of wild animals and plants. In February 1973 the U.S. Government hosted a conference in Washington DC which concluded the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). All members of the Order Crocodylia were included initially on either Appendix I (18 species and subspecies) or Appendix II (9 species and subspecies).

Fundamental to CITES is the recognition that peoples and countries are and should be the best protectors of their own wild fauna and flora; and

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inherent within this perception is the desire to see judicious management and use of living resources. Commercial enterprises based on increasingly scarce resources have become established to supply luxury items to expanding markets which exist mainly in industrialised countries; a trend which threatens both the resource and the economy of the country which possesses it.

CITES established differential regulatory controls for international trade in certain species of fauna and flora. The degree of regulation was based on an assessment of the conservation status of each species concerned, and this was reflected in the allocation of species or populations to one of three Appendices.

Appendix I includes taxa threatened with extinction which are or may be affected by trade. Appendix II contains wildlife which although not necessarily now threatened with extinction, may become so if trade in them is not strictly regulated. Appendix II may also contain wildlife that are morphologically similar to taxa in Appendix I, which further strengthens the regulation of trade in Appendix I species. Appendix III comprises species which individual Party nations have identified as ones that they consider require co-operation of other Parties to control trade in them.

Commercial trade in Appendix I wildlife is prohibited, with the exception of animals bred in captivity. In theory, recovery of Appendix I crocodilian species in the wild is facilitated by prohibiting commercial trade in those species, from the wild. In reality this objective may only be achievable for species that are endemic to one country. For example *Crocodylus niloticus* occurs in many countries throughout the sub-Saharan parts of Africa and is subject to varying regimes of protection. In the absence of uniform protection, Appendix I status for the species may be meaningless.

The provision within CITES for signatory nations to reserve trading rights in respect of particular species at the time of ratification, or when an amendment to an Appendix is made, can further weaken the effectiveness of Appendix I. Skins of Appendix I *Crocodylus niloticus* persist as a legally tradable commodity entering the international market through France from sources in Sudan, Zambia and Botswana.

Article IV.3 of CITES requires export permits to be issued for Appendix II crocodilians according to quotas which are consistent with the capacity of the wild populations to sustain particular rates of harvest. This requirement by CITES endorses the concept of wildlife as a renewable resource. It also reminds us that CITES was enacted principally to *control* trade in wildlife, not to *stop* it.

Following entry into force of CITES in 1973 and the inclusion of most commercially valuable species

on Appendix I, it became necessary to breed these taxa in captivity if there was to be a legal trade in their products. Article VII.4 provides for Appendix I animals that are bred in captivity for commercial purposes to be considered as Appendix II animals for the purposes of regulating trade.

In 1979 the Second Conference of Parties to CITES met in Costa Rica and defined and clarified the term "bred in captivity" to mean offspring which had been derived from parents successfully breeding in a controlled environment. The relevant sections of the resolution are:

"(a) ... Specimens of animal species in Appendix I bred in captivity ... shall be treated as if they were in Appendix II, and shall not be exempted from the provisions of Article IV by the granting of certificates to the effect that they were bred in captivity ...

(b) that the term "bred in captivity" be interpreted to refer only to offspring, including eggs, born or otherwise produced in a controlled environment, either of parents that mated or otherwise transferred gametes in a controlled environment ... The parental breeding stock must be to the satisfaction of the competent government authorities of the relevant country:

(i) established in a manner not detrimental to the survival of the species in the wild;

(ii) maintained without augmentation from the wild, except for the occasional addition of animals, eggs or gametes from wild populations to prevent deleterious inbreeding, with the magnitude of such addition determined by the need for new genetic material and not by other factors, and

(iii) managed in a manner designed to maintain the breeding stock indefinitely. A controlled environment for animals is an environment that is intensively manipulated by man for the purpose of producing the species in question, and that has boundaries designed to prevent animals, eggs or gametes of the selected species from entering or leaving the controlled environment. General characteristics of a controlled environment may include but are not limited to artificial housing, waste removal, health care, protection from predators, and artificially supplied food. A parental breeding stock shall be considered to be "managed in a manner designed to maintain the breeding stock indefinitely" only if it is managed in a manner which has been demonstrated to be capable of reliably producing second-generation offspring in a controlled environment;

(d) *that the competent government authorities of countries exporting live animals, parts and derivatives of specimens bred in captivity of species listed in Appendix I endeavour, where possible, to ensure that these be made identifiable by means other than documentation alone.*"

The concept of *ranching* wildlife commercially relies on the ability to regularly harvest a component of the population without impairing the reproductive capacity and viability of the population. In the case of crocodylians, high reproductive effort and low recruitment provide the means whereby populations may be *ranching* commercially. Eggs can be harvested from the wild, incubated in a controlled environment and the resulting hatchlings can be reared in enclosures to slaughter size. If necessary the wild populations can be augmented with some of these captive-raised animals, although this has not yet proved to be necessary.

Provided a population can sustain the harvest, this form of management has one major advantage over closed-system, captive-breeding type farming. *Ranching depends* on the maintenance of viable wild populations whereas closed-system farming develops in isolation from the wild populations and creates little or no incentive to protect wild populations or their habitats.

Management of Appendix I wildlife through *ranching* was formally endorsed by CITES at the 1981 Conference of Parties in New Delhi. Parties wishing to *ranch* Appendix I species for commercial export are required to satisfy a number of criteria established by CITES. The relevant sections of the resolution are:

"(a) *that populations of species included in Appendix I, which occur within the jurisdiction of Parties, but which are deemed by the Parties to be no longer endangered and to benefit by ranching... with the intention of trade be included in Appendix II;*

(b) *... to be considered by the Parties, any proposal to transfer a population to Appendix II in order to conduct a ranching operation satisfy the following general criteria:*

(i) *the operation must be primarily beneficial to the conservation of the local population (i.e. where applicable, contribute to its increase in the wild); and*

(ii) *the products of the operation must be adequately identified and documented to ensure that they can be readily distinguished from products of Appendix I populations;*

(c) *... the Management Authority submit a proposal to the Secretariat... containing the following:*

(i) *evidence that the taking from the wild shall have no significant detrimental impact on wild populations;*

(ii) *an assessment of the likelihood of the biological and economic success of the ranching operation;*

(iii) *assurance that the operation shall be carried out at all stages in a humane (non-cruel) manner;*

(iv) *assurance that the operation will be beneficial to the wild population through reintroduction or in other ways;*

(v) *a description of the methods to be used to identify the products through marking and/or documentation; and*

(vi) *assurance that the criteria continue to be met, with records open to scrutiny by the Secretariat, and that the Management Authority shall include in its reports to the Secretariat sufficient detail concerning the status of its population and concerning the performance of any ranching operation to satisfy the parties that these criteria continue to be met; and*

(d) *... any proposal... pursuant to this resolution be received by the Secretariat at least 330 days before that meeting; the Secretariat will consult with the Standing Committee in seeking such appropriate scientific and technical advice to verify that the criteria specified under b) and c) have been met; if in the opinion of the Secretariat further information concerning the criteria is required, the Secretariat shall request information from the proposing Party within 150 days after receipt; thereafter, the Secretariat shall communicate with the Parties in accordance with Article XV of the Convention."*

Zimbabwe was one of the first countries to develop commercial *ranching* of crocodiles, with a programme based on harvesting wild-laid eggs, incubating them in a controlled environment and rearing the resultant offspring. To facilitate this programme Zimbabwe lodged a reservation with respect to the Appendix I listing of *Crocodylus niloticus* when it acceded to CITES in May 1981. The 1983 meeting of the Conference of Parties to CITES supported a Zimbabwean proposal to both list its population of *Crocodylus niloticus* on Appendix II and to continue *ranching* the species commercially. With financial assistance through United Nations Development Programme/Food and Agriculture Organisation (UNDP/FAO), the Papua New Guinea Government developed a commercial industry structured on the harvesting and *ranching* of juvenile crocodiles. Implementation of this conservation-management programme enabled Papua

New Guinea to retain its population of *Crocodylus porosus* on Appendix II of CITES when the species was transferred to Appendix I in 1979. At this time the United States of America successfully proposed the transfer of *Alligator mississippiensis* from Appendix I to Appendix II. That proposal was based on extensive research and data on the continued recovery of the harvested wild population in Louisiana.

WCS — WORLD CONSERVATION STRATEGY

The World Conservation Strategy was launched in 1980. The document was prepared by the International Union for Conservation of Nature and Natural Resources (IUCN), with assistance from the United Nations Environment Programme (UNEP) and the World Wildlife Fund (WWF), and in collaboration with the Food and Agricultural Organization of the United Nations (FAO) and the United Nations Education, Scientific and Cultural Organization (UNESCO). In essence, the World Conservation Strategy provides a blueprint for the conservation of living resources under the conditions of sustained and continuing development. The WCS aims to achieve three main objectives:

1. to maintain essential ecological processes and life-support systems;
2. to preserve genetic diversity;
3. to ensure the utilization of species and ecosystems is sustainable.

The destruction of habitat is the most serious threat to the long-term survival of wild fauna, although over-exploitation and the introduction of exotic species are additional factors which often operate in concert to further threaten crocodilians. The net result of these pressures, when applied to taxa with reduced fecundity, is a greatly accelerated rate of population decline and ultimately the threat of extinction. The WCS identified CITES as one of four global conservation conventions which are important instruments for implementing it. The application of CITES to the regulation of international trade in crocodilians will facilitate the eventual sustainable use of them as a resource.

Commercial utilization of crocodilians represents an important and sometimes the only source of income for rural communities, and thus the rational management of wild stocks can significantly improve the quality of life in such nations. It is unrealistic to adopt a policy of prohibiting international trade in *all* crocodilians, as a matter of principle, as many conservation organisations would advocate. However, neither should international trade be permitted to flourish without regulation. In the interests of resource conservation and rational economic development, prohibition of international trade in critically endangered species may be the only practical alternative.

One of the key priorities identified in the WCS is the need for development and implementation of national conservation strategies (NCS's). An NCS is a plan for conservation action within a country that will secure realistic and lasting development. Without this national involvement the WCS becomes just another meaningless document advocating conservation principles to an uncaring world. The objectives of an NCS are the same as those of the WCS, but action to meet them must be tailored to local conditions.

Formulating an NCS is a complex process of reviews, analyses and judgement. Analyses of conservation-development interactions identify deficiencies in knowledge, which in turn determine research priorities. Implicit within the WCS is the message that governments should place research of living resources high in their national scientific and research programmes. National councils should be established to encourage universities and other institutions to co-ordinate their activities and relate research to on-ground conservation action. Three main areas of research are identified:

1. *inventory*: distribution of ecosystems and species in each country;
2. *functional*: ecosystem dynamics and relationships; effects of human activities on ecological processes, and vice versa; baseline monitoring and population studies;
3. *management-oriented*: research into standards, techniques and technologies to improve planning and management of living resource use.

DISCUSSION

What then are the future prospects for the global conservation and management of 'crocodilians?' CITES should provide the means for ensuring the sustained use of crocodilians as a renewable commercial resource. As more countries accede to CITES, international commerce in crocodilians should become more effectively regulated. In this respect there is some difficulty in evaluating the extent to which CITES has been successful to date. Although certain species of crocodilians and populations of others appear to have benefited from it, many populations continue to be exploited without restriction. Market demand by consumer countries continues to stimulate the supply of crocodile skins, and the economies of most crocodilian producer countries are such that a minimal demand is sufficient to stimulate intense harvesting.

In reality, the revenue derived from marketing finished products made from crocodilian skins benefits a small number of individuals and is a relatively minor contribution to the national income of consumer nations. In contrast the export of raw

crocodile skins can represent a significant income to developing producer countries. Yet often the real value of crocodilian skins is not realised in the country of origin. Skins are purchased by foreign buyers according to a price structure based on a particular local economy, and the value of the finished product is vastly disproportionate to the costs of procuring the skin and manufacturing it.

Ideally, consumer nations should adopt a more responsible use of crocodilian skins and contribute to conservation-management programmes for crocodilians in the producer nations. This can be achieved by funding applied research and more appropriately, by adhering to the provisions of CITES and ceasing to trade commercially in Appendix I taxa. A greater understanding of, and support for, the sustainable exploitation of commercial living resources should be built up among both producers and consumers.

The effective conservation and management of any wild living resource requires adequate protection of habitats. Where wildlife remains the property of the State, regardless of land tenure, automatically there are competing land-use interests. Pastoralists gain little benefit from retaining wetlands, which may be valuable refugia for crocodiles, if they are non-productive in terms of pastoral interests. A landowner is more likely to retain and protect crocodilian habitats if he derives some financial benefit by doing so, and is involved in the decision-making processes through which managed wildlife becomes an economic asset. Against this, a system of resource ownership requires safeguards to prohibit individuals applying

management contrary to the underlying conservation intent.

CONCLUSIONS

There is increasing worldwide interest in the development of informed management programmes for crocodilians, and both CITES and WCS are reflections of that interest. The approach of "management by experiment" is becoming more common in developed nations, and should perhaps be extended to developing nations which lack their own research organisations.

Industries deriving an income from the commercial use of crocodilians should perhaps be expected to play a more significant role in the preservation of species that appear endangered. Complementary to this, a more judicious use of crocodilian resources can possibly be achieved through increased liaison between skin manufacturers, crocodile farmers and resource managers. Perhaps it is possible to determine annually the quantities of skins required to satisfy market demands, and evaluate the capacity of various stocks to supply those quantities. Could the CITES Secretariat fulfil a useful role in formulating multilateral trade agreements between Party and non-Party countries? Could a form of resource-sharing based on the allocation of annual quotas of skins for international trade, work in practice?

In an era where stocks of wild crocodilians are diminishing, people can no longer afford the extravagances of wastefulness or selfishness in their use of the resource. We do not own the wildlife of today, but merely have it in trust for the generations that follow.