

IUCN-SSC CROCODILE SPECIALIST GROUP

FINAL REPORT MISSION TO COLOMBIA

DR. ALEJANDRO LARRIERA

VICE CHAIRMAN LATIN AMERICAN AND THE CARIBBEAN REGION

PROF. GRAHAME WEBB

VICE CHAIRMAN EASTERN ASIA, AUSTRALIA AND OCEANIA

LIC. ALVARO VELASCO B.

DEPUTY VICE CHAIRMAN LATIN AMERICAN AND THE CARIBBEAN REGION

DR. MIGUEL RODRÌGUEZ

LATIN AMERICAN MEMBER STEERING COMMITTEE

LIC. BERNARDO ORTIZ

EX-OFFICIO MEMBER STEERING COMMITTEE

TRAFFIC SOUTH AMERICA

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Recommendations

A central aim of the CSG Mission to Colombia (1-6 March 2004) was to provide advice on the conservation, management and sustainable use of crocodilians within Colombia. The following observations and recommendations are made:

1. The current crocodile industry and management program in Colombia generates few conservation benefits, and the CSG believes that this can and should be changed over time.
2. The CSG strongly endorses the recent actions taken in Colombia, which may allow “ranching” to proceed hand in hand with captive breeding.
3. At present it appears that wildlife management in Colombia is pursued in accordance with the same set of very rigid prescriptive procedures, for all species, built into the legislation itself. In many countries the main legislation provides for management of each species to be undertaken in accordance with an *approved managed program*. Then the fine details of each species-specific management program are contained in a register of *approved management programs*. This provides a legal framework for tailoring management programs to particular species and their context, and allows them to be adjusted more easily as new information is gained. This type of approach may help Colombia to be more flexible and adaptive with its management..
4. Cooperation between industry, Government and research sectors may be improved if the industry were represented by a single association that had specialist subcommittees (eg *Conservation, Research*) to coordinate industry participation in national programs.
5. Public education about Colombian crocodilians, their conservation needs and the linkages between conservation and sustainable use, may be important for maintaining public support for crocodilian populations to rebuild.
6. Not all, but perhaps most wild populations of *Caiman c. fuscus* are probably depleted, but may have good potential to recover if given the opportunity - these issues ideally need to be determined through research, and on the basis of the results, different management options for *C. c. fuscus* could be investigated. We suggest the following actions be considered:
 - Research into recovery rates is an important management priority.
 - Research into ranching is important, because it has the potential to put value on wild adults in the field (because they produce the eggs and/or hatchlings that can be sold).
 - Continuation and expansion of the experimental community development program at Canal del Dique is highly recommended, because it has the potential to enhance conservation and result in a more equitable distribution of benefits.
 - Preventing illegal harvesting of wild adult *Caiman. c. fuscus* should remain a priority.
 - Some funds for research should be obtained from the commercial farms in replacement of part of their legal obligation to return *Caiman c. fuscus* for restocking.

7. Implementation of a national program for rebuilding depleted populations of *Crocodylus acutus* is seen by the CSG as a major priority. The community development program visited at Cispatá Bay is a striking example of what can be achieved. This program should be consolidated and ideally expanded to other areas where remnant wild populations exist.
8. Industry can and should be able to play a significant role in rebuilding the wild populations of *C. acutus* and of other “non-commercial” crocodilian species, but they need to be given the legal opportunity to do so, and then be encouraged to work with Colombia's wildlife authorities as partners. *C. acutus* farms that clearly meet the requirements of CITES for registration, and are maintaining large stocks (2000+) where maintenance is a burden likely to compromise the operation, should be examined with a view to expedient registration so that these farmers are in a sound position to assist conservation. A review of all farms holding *C. acutus* with reference to their stage of development and degree of compliance with CITES should be considered.
9. The CSG believes “ranching” at the local community level could be undertaken in a way that benefits commercial farms, wild crocodilian populations and local communities. It would add greatly to Colombia's international reputation for crocodilian conservation. The community development programs using crocodilians, that are currently underway, should be continued and expanded.
10. Colombia's efforts to minimize illegal trade through stringent reporting procedures on farm production, and other mechanisms, are exemplary and should be maintained and strengthened. Colombia's national conservation goals and its ability to trade internationally will be compromised if skins enter trade that have not been acquired in accordance with Colombian laws. The industry clearly has a strong vested interest in minimizing illegal trade and can and should be important partners in such actions.
11. The system for the determination of the production and annual export quotas is currently carried out using a qualitative method that does not reflect the potential of annual production of the *C. c. fuscus* farms in Colombia. A simple system should be looked for in its implementation that is based on the productive capacity of farms and that allows evaluation to be done easily. We believe that the necessary information for designing a new system along these lines is held by each farm and is provided to the authorities on a regular basis. It is sufficient to identify key production variables that must be consistent with each other. For assessing *Caiman c. fuscus* production on farms:
 - A two-stage model is suggested. The first stage, applied to all farms, should be cost-effective and rapid. The second, more detailed stage, should be implemented randomly or if problems emerge.
 - The very detailed draft annual farm assessment criteria discussed during the mission can and should form the basis of research into production dynamics, but may not assist in detecting illegal trade.
 - Research aimed at distinguishing wild skins from captive skins is urgently needed and may form the best way of detecting any illegal trade.

- An inventory of farm and skin stocks may be needed to correct any accumulated clerical errors before any new system is instigated.
 - An accuracy level of 5-10% may be all that is needed to determine if farm production is basically consistent.
 - Increasing the accuracy will exponentially increase the costs of inventory.
 - The skins of dead breeders should be able to be tagged and exported if obtained legally, and not accumulated within Colombia.
 - Perverse incentives with reporting need to be avoided or the system will fail.
12. Colombia expressed concerns that skins exported to some countries are being re-exported without the tagging procedures agreed to by the Parties in Resolution Conf. 11.12. The issue of compliance with CITES is currently being investigated by the CITES Standing Committee, and will be discussed at the next CSG Working Meeting. It is recommended that Colombia document its concerns so that they can be discussed at the next CSG Steering Committee meeting (May 2004).
13. For future international markets to expand, buyers will ultimately need to be assured that the wildlife products they purchase from Colombia are not only acquired legally, but in a way that is contributing to conservation. There are sound commercial reasons for the Colombian industry to invest more in conservation. With regard to *Crocodylus acutus*, markets will continue to be constrained unless the species can be reclassified under the US Endangered Species Act, and this is unlikely unless the conservation of wild populations is greatly advanced over the situation that exists now. There are sound reasons for Colombian producers of *C. acutus* to work together to ensure a high standard of product and a real commitment to conservation.

1. BACKGROUND ISSUES

In carrying out its mission to Colombia, the CSG addressed specific areas of concern identified by the Colombian authorities, and examined areas over and beyond this which were important to the CSG and its global network of members. There is often some confusion about who the CSG are, their aims and goals, their relationship with organizations such as CITES, and their general views on conservation and management. These issues are discussed briefly here, because they are implicit in the observations, advice and recommendations we make.

The CSG approach to management of crocodilians subject to sustainable use is guided by the IUCN World Conservation Union Policy on Sustainable Use (Annex 1)"

1.1. The CSG and CITES

The CSG is concerned with the conservation of all crocodilian species within a country, regardless of whether they are used commercially or not, and is thus focused on improving domestic management and ensuring such uses that may be occurring are sustainable. CITES is concerned mainly with species exported for commercial purposes, and it relies on the national Management Authority to ensure uses of wild populations, for international trade, are not detrimental to the survival of species.

The Crocodile Specialist Group (CSG) of the IUCN-SSC is a voluntary group concerned primarily with the conservation of wild crocodilian populations within the countries of origin, regardless of whether they are in international trade or not. It supports the IUCN policy statement on sustainable use, and tries to encourage such commercial enterprises based on crocodilians as may exist to assist in their conservation in the wild. It supports and assists CITES whenever asked, but its main function is to work with the Government, commercial sectors and research sectors, within countries, to enhance conservation.

CITES is largely concerned with controlling international trade in wildlife considered threatened or endangered by international trade. Regardless of whether it is an Appendix I species being produced through captive breeding, or an Appendix II species being produced through captive breeding or wild harvest (ranching or direct harvest), the responsibility for domestic controls lies with the Scientific and Management authorities of the exporting country. CITES has no jurisdiction at the national level and its actions are restricted to species in international trade.

1.2. CSG and COLOMBIA

The CSG is interested in providing what assistance it can to Colombia, which has the greatest diversity of crocodilians in the world. Colombia is also the largest producer of crocodilian skins, but the benefits derived from exploiting commercially valuable species appear to be providing little assistance to the conservation of those same species in the wild. Colombia is in the process of reviewing certain aspects of its conservation and management of crocodilians, and invited the CSG to send a mission to visit Colombia (1-5 March 2004), and give what assistance and advice it could.

The CSG has a particular interest in the conservation of crocodilians within Colombia because:

- a. Colombia has the greatest diversity of crocodilians in the world.
- b. Colombia is the largest producer of crocodilians skins in the world.
- c. Colombia has developed a high level of expertise with some aspects of crocodilian conservation, management and sustainable use which can assist the CSG in its broader mission.
- d. Membership to the CSG by Colombian representatives is outdated and no longer reflects the diversity of expertise within Colombia.
- e. The CSG believes that the focus on captive breeding may be constraining the commercial sector from playing an active role in conserving the wild crocodile populations.

The Colombian Ministry of Environment is itself reviewing certain aspects of the Colombian national program for crocodilian conservation, management and sustainable use, and together with the producer associations, invited the CSG to provide advice and recommendations that may assist them in their deliberations. Specific areas of interest were:

- f. The Colombian Constitution provides for the conservation and sustainable use of biological diversity, to provide social, cultural and economic benefits to people.
- g. The Ministry of Environment is interested in increasing this Constitutional commitment with crocodilians.
- h. The management of *Caiman crocodilus fuscus* produced through captive breeding on farms obligates the Ministry to set export quotas on the basis of production criteria which are under review.
- i. Restocking and rebuilding wild populations of species being used commercially is a goal of the management programs for commercially used species and strategies for implementation are being reviewed.
- j. Captive breeding of *Crocodylus acutus* is increasing on farms and management protocols and issues associated with the registration of commercial captive breeding are being reviewed.
- k. Efforts to rebuild and restock wild *C. acutus* populations need to be implemented.
- l. Experiments are now underway in Colombia to link community development with the commercial use of crocodilians.

m. Conservation programs with *Crocodylus intermedius* and *Melanosuchus niger* are being pursued in Colombia and opinions and advice on progress may be helpful.

The joint CSG-COLOMBIAN mission took place 1-5 March 2004 in accordance with the itinerary attached (Annex 2).

1.3. CONSERVATION AND SUSTAINABLE USE

For the purposes of this mission conservation was viewed as: *actions taken to protect and maintain items (wild populations) that are valued positively*. Increasing the value of wild species in the eyes of the community is a prerequisite to conservation action, and with some species, economic values derived from sustainable use can be effective. With other species this is not the case

It is difficult to discuss what actions may assist or be detrimental to conservation, if the main players do not have a united view about what constitutes conservation, and how it can or cannot be linked to sustainable use. For the purposes of this mission the CSG suggested that history demonstrates that people have only ever spent resources conserving items that they have valued positively for one reason or another (commercial or non-commercial). Therefore conservation could be broadly defined as: *Actions taken to protect and maintain items to which we attribute a positive value*. This definition suggests that getting people to *value* crocodilians is the first step towards effective conservation. Those values can be diverse, but for many people, *economic values* are the most likely to be successful in the short-term. For economic values to be effective at stimulating conservation action for wild crocodilian populations, uses need to be sustainable (biologically, socially and economically) and real benefits need to accrue to the people best in a position to influence the conservation of wild crocodilians – often local communities.

The Convention of Biological Diversity (CDB) provides a good definition of sustainable use in principle, but for implementation, *sustainable use of wildlife* can be defined as *uses of wildlife that can be maintained indefinitely with the impacts of use (ecological, social, economic) maintained within defined levels*.

1.4. ADAPTIVE MANAGEMENT AND INTERNATIONAL “BEST PRACTICE”

Management should not generally aim to be highly prescriptive, unless all the management variables are very well understood. Management usually needs to be *flexible* and *adaptive*, and based on the results of experiments at the management level of resolution. This is *Adaptive Management*.

A CSG review of international “best practice” with the management of crocodilians is nearing completion, but the primary finding is that there is no single approach to management that

applies to all situations. Management is highly context specific and needs to be tailored to the exact local conditions (social, biological, economic) where a program is expected to operate.

Even when tailored to local conditions, any one management program should never be assumed to be perfect, and its weaknesses will only be identified by trial and error. *Experimental management* (eg the community development programs reviewed on the Mission, Canal del Dique with *C. c. fuscus* and Cispatá Bay with *C. acutus*) may need to play a major role in establishing management options. All management should be *experimental* in the sense that there needs to be a goal or predicted outcome, and an objective protocol for determining whether that outcome was realized. *Adaptive management* is the process through which management is continually altered and changed so that the desired outcomes are realized over time.

The key problem with management is risk and uncertainty – new influences and threats. Programs ideally need to be designed to respond to them when they arise, rather than attempt to be so highly prescriptive that every imaginable problem is dealt with before it is encountered ... even with the best of intentions, this can never be achieved.

Wildlife management is a science in its own right, that is highly multivariate, and operates at the management level of resolution where biological, social and economic variables all interact.

2. GENERAL MISSION FINDINGS

2.1. COLOMBIA'S GENERAL APPROACH TO COMMERCIAL USE

The CSG strongly endorses the recent actions in Colombia which may allow “ranching” to proceed hand in hand with captive breeding. Ranching can open avenues, involving local communities, through which the established industry can assist the conservation of wild crocodilian populations and there can be a more equitable distribution of benefits in line with Colombia's Constitutional commitments.

Through restricting commercial uses to captive breeding, Colombia has established programs in which the production and economic value of some species (*Caiman crocodilus fuscus* and *Crocodylus acutus*) are being pursued in a sustainable way but are providing little in the way of benefits to wild populations, their habitats or to local communities.

Recent legislative changes which will allow “ranching” for *Caiman crocodiles fuscus* are a major and important change in this approach, as are the experiments with ranching and community development linked with crocodilians. The CSG strongly endorses this change in direction.

Although the national legislation allows the commercial production through captive breeding of all crocodilian species within Colombia, at present such activities are restricted to two species, and thus the industry plays no formal role in the conservation of the other species. It seems likely that an effective partnership between Government and the industry could be formed to advance the conservation of both *Crocodylus intermedius* and *Melanosuchus niger*, which could extend benefits to local people, help rebuild wild populations of endangered species, and allow the potential for the eventual commercial production through farming to be assessed.

2.2. LEGAL FRAMEWORK FOR MANAGEMENT

If legislation can allocate the detailed management of a species to an *approved management program*, then a legal framework for managing any species in a context-specific way can be created. Management can be adjusted more regularly and easily than if highly prescriptive management protocols are built into the legislation itself.

Adaptive Management needs management to be flexible and able to be adjusted easily as the results of management are acquired. It is common that problems that were thought to be critically important may ultimately prove to be trivial, and new problems, not considered

originally, will increase in importance. Management needs to be highly context specific and vary greatly from species to species within and between countries.

Building this adaptability into a legislative framework is often complicated, because legislation tends to be prescriptive – assuming there is a *right* and *wrong* approach with no *shades of grey* in between. Perhaps the ideal situation is that the legislation allocates the legal framework for the management of different species to *approved management programs*, which can be reviewed and altered with more ease than the basic legislation.

2.3. INDUSTRY ASSOCIATIONS

Cooperation between industry, Government and research sectors may be greatly advanced if the industry is represented by a single association that has specialist subcommittees (eg *Conservation, Research*) to coordinate industry participation in national programs.

The successful conservation, management and sustainable use of crocodilians within Colombia, will be enhanced if industry, research and management organizations can truly work together in a positive spirit. Having a single, united industry association is one important step in this process, if it can be achieved. Any such Association clearly needs to operate at a level above the commercial interests of any one group of industry players, which has proved problematic in some countries but not others. Having an industry *Conservation Subcommittee* could be an important step for industry to get more involved in conservation and sustainable use, relying on members skilled in this area. It is not unusual for such industry associations (eg Safari Club International), to have such subcommittees to coordinate conservation activities and set priorities. There may also need to be a *research subcommittee* to help facilitate research activities of common good (eg criteria for evaluating ensuring skins in international trade or held on farms or in tanneries are truly derived from farm production). It is clearly in the interests of industry to assist the Management Authority in its ongoing efforts to encourage legal trade and constrain illegal trade.

2.4. PUBLIC EDUCATION

Public education about Colombian crocodilians, their conservation needs and the linkages between conservation and sustainable use, may be important for maintaining public support for crocodilian populations to rebuild.

The effectiveness of conservation in any country will ultimately be linked to public support and understanding. With the issue of sustainable use well established in the Constitution, Colombia may need to educate people from school age upward about how and why conservation and sustainable use are linked, and how both people and wildlife can benefit. With crocodilians, public education is very important, because they are predators and as their populations rebuild, so too can the dangers. Cost-effective public display and education about Colombia's remarkable

diversity of crocodilian species, their conservation needs and the role of sustainable use, should be a priority.

3. SPECIFIC MISSION FINDINGS

3.1. RESTOCKING AND REBUILDING WILD POPULATIONS

a) *Caiman crocodilus fuscus*

Wild populations are probably depleted, but also probably have good potential to recover if given the opportunity. Research into recovery rates, and programs such as ranching that put value on wild adults in the field (because they produce the eggs and/or hatchlings that can be sold), may be sufficient to rebuild the wild populations. Preventing illegal harvesting of wild adults should remain a priority during the recovery phase. Funds for this critical research should be obtained from the commercial farms in part replacement of their legal obligation to return *Caiman c. fuscus* for restocking.

There is a lack of new or recent information on the status of the wild populations of *Caiman c. fuscus* in Colombia, and on the rate at which wild populations can recover if given the opportunity. It is considered unlikely that the collection of wild adults of this Appendix II species, for captive breeding, has been detrimental to the “survival” of the species in the wild, although it would be surprising if it had not reduced populations, perhaps greatly. There is clearly a need for research in this area.

Caiman c. fuscus matures at a small size and young age, and their populations can thus be expected to recover rapidly if given the opportunity. But quantification of these recovery rates would have considerable management significance.

The obligation of farms to provide stock back to the Ministry for restocking is a financially significant one which each farm accepted. It may not be biologically necessary, at least in all areas, if populations retain the ability to recover rapidly. However, this clearly needs to be verified by scientific examination. There is a need to research recovery rates of wild populations, and the CSG mission believes that some of the restocking obligation should be transferred to financial support directed specifically to researching the recovery potential.

Economic conditions conducive to the recovery of wild populations may be required. This may be achievable through encouraging ranching, which allows eggs and/or hatchlings to be harvested in a sustainable way and sold legally, which can create incentives to keep adults in the wild.

Maintaining prohibitions on the use of wild adults may be necessary. If populations of adults recover until they are clearly abundant, and are able to sustain harvests in their own right (eg Louisiana’s alligator program; Venezuela’s Caiman program), it may be possible to implement a wild harvest program at some later date.

Experimental programs with *Caiman c. fuscus* like that implemented in the Canal del Dique, involving local communities, are essential for learning how to design ranching programs, and spread benefits to local communities without compromising the benefits that farms receive.

b) *Crocodylus acutus*

Implementation of a national program for rebuilding depleted populations is seen by the CSG as the major priority. The community development program visited at Cispata Bay is a striking example of what can be achieved. This program ideally needs to be expanded to other areas. The ability to market Colombian *C. acutus* skins internationally will ultimately depend on the status of the wild populations being greatly improved. Registration of captive breeding farms for *C. acutus* in Colombia appears constrained by stricter domestic measures than are required by CITES. Although this precautionary measure may have advantages during the early experimental phases of operation, it is unclear whether it should proceed indefinitely. A review would seem timely.

The situation in Colombia with *C. acutus* is fundamentally different to that with *C. c. fuscus*.

- The wild populations appear much more depleted.
- The recovery potential of the species appears biologically constrained relative to *Caiman c. fuscus* by the longer ages for *C. acutus* to reach maturity.
- They are a much larger and more dangerous crocodilian for people to coexist with.
- The longer people exist in areas where *C. acutus* are absent, the more difficult it will be to reintroduce them.
- Incentives for rebuilding wild populations may be critically important with this species.
- They exist in coastal habitats which are more limited and under constant fishing pressure.
- Captive breeding has often been based on parents from zoo stocks and/or limited “temporary” collection of wild stocks with a legal requirement to replace and contribute to restocking.
- As an Appendix I species, founder stock for farms cannot be derived by depleting wild populations further.
- Markets will be constrained unless the USA is satisfied that the species in Colombia is no longer endangered.
- Captive breeding has been very successful with this species, with captive stocks probably now many times greater than wild stocks.

A national program for rebuilding wild populations and implementing management programs that provide incentives for those wild populations to be maintained by local communities, is seen by the CSG as a major priority that needs to be acted upon urgently.

The community development program visited during the Mission, that concentrated on *C. acutus* (Cispata Bay), is a remarkably good example of how a “ranching” and restocking

program could be implemented, hand in hand, and greatly improve conservation in the wild in discrete areas. The potential clearly exists to rebuild this population quickly, and ongoing industry involvement in the program is clearly beneficial.

Some of the farms that are producing *C. acutus* through captive breeding in Colombia now have achieved considerable success and appear to meet the CITES requirements for registration as commercial captive breeding facilities for Appendix I species. Some confusion exists about whether all farms need to produce F2 generation before they can be registered. In Resolution Conf. 12.10 Annex 1 paragraph 10, the CITES requirement is: *If the operation has only bred the species to the first generation, documentation showing that the husbandry methods used are the same as, or similar to, those that have resulted in second-generation offspring elsewhere.* It appears that Colombian domestic legislation has adopted stricter domestic measures than CITES, and requires the actual production of F2 generation stock prior to registration. This is clearly a more precautionary approach, and it is consistent with Colombia's unique two stage approach to farming - an experimental phase followed by a commercial phase. However, some farms with large stocks of F1 generation *C. acutus* may be significantly constrained by their inability to export, which means that they cannot contribute to rebuilding wild populations or anything else. A review of the conditions surrounding *C. acutus* registration would seem long overdue.

c) *Crocodylus intermedius, Melanosuchus niger and other Species*

Industry can and should be able to play a significant role in rebuilding the wild populations of other “non-commercial” species, but they need to be given the opportunity and be encouraged to do so.

Restocking and rebuilding the wild populations of *C. intermedius* may be able to be achieved far more rapidly and more cost-effectively if commercial farms were used as a tool in conservation. Some are clearly prepared to get involved for purely conservation purposes alone. These farms have clearly developed effective technologies for captive breeding, hatching care and raising, which is not being used for conservation at present. The same situation may also apply to *Melanosuchus niger*. Both species are clearly conservation priorities for the CSG. The status of species such as *Paleosuchus* may needed to be updated from the 1994-97 assessment, if there are reasons to believe status has changed. The same situation applies to the current status of the caiman subspecies *Caiman crocodilus apaporiensis*, *C. c. chiapasius* and *C. c. crocodilus*, whose taxonomic status is still also in need of clarification. If restocking is required the industry is clearly an important potential partner with the right technology at hand.

3.2. CAPTIVE BREEDING versus RANCHING

The CSG believes strongly that “ranching” at the local community level could be undertaken to benefit commercial farms, the wild crocodilian populations and local communities. It would add greatly to Colombia’s international reputation for

crocodilian conservation. The community development programs using crocodilians that are currently underway should be consolidated, continued and expanded.

The industry in Colombia has invested heavily in captive breeding and captive raising, and with a ceiling on exports (600,000 per year), has no commercial incentive to encourage “ranching”, even though this is one avenue through which commercial benefits could be extended to local people and provide incentives for conserving adult crocodilians in the wild. For ranching to be introduced, the export quota, set by Colombia itself, would need to be increased.

In the opinion of the CSG, ranching could provide additional stock for the farms to purchase, thereby reducing the average cost of hatchlings being raised on farms. It cannot “replace” captive breeding, because ranching is inherently risk-prone due to resource access problems and perhaps high annual variation in the extent of nesting and egg mortality in the wild. .

A national program could be designed to encourage ranching in a positive and cost-effective way. The two community development programs examined during the Mission were both important management experiments with ranching, and both deserve to be encouraged. This is clearly a means through which the conservation benefits being derived from Colombia’s crocodilian program can be improved and Colombians’ Constitutional obligations to sustainable use and the equitable distribution of benefits achieved more directly.

3.3. LEGAL AND ILLEGAL TRADE

Colombia’s efforts to minimize illegal trade through stringent reporting procedures on farm production, and other mechanisms, are exemplary and the CSG advises that these measures be maintained and strengthened. Colombia’s national conservation goals and its ability to trade internationally will be compromised if skins enter trade that have not been acquired in accordance with Colombian laws. The industry clearly has a strong vested interest in minimizing illegal trade and can and should be important partners in such actions. Concerns about nations re-exporting Colombian skins without complying with the tagging requirements of Resolution Conf. 11.12 should be addressed formerly by Colombia through CITES..

Colombia’s efforts to minimize avenues for illegal trade by stringent reporting, the development of new technologies (eg. a new tag that does not break in tanning), and certification procedures, are clearly exemplary. The CSG strongly encourages such actions in order to ensure the conservation of wild crocodilians is not adversely affected, and to ensure Colombia meets the basic CITES requirement that all skins exported have been derived in accordance with national laws.

Ongoing action areas that may be considered are:

- Continued development of tags that can withstand the tanning procedure intact.

- Increased research into criteria for identifying farm-raised skins from wild skins at different ages.
- Continued and possible improved certification procedures prior to export.
- Assistance from Parties to CITES as necessary, to ensure re-exported skins continue to be identified as being of legal Colombian origin.
- The creation of appropriate disincentives to trade illegally, by finding legal means of undertaking ranching and for trading in larger skins of dead breeding animals from farms.
- Appropriate penalties for illegal trade through both national laws and industry association actions.

The industry itself has a strong vested interest in curtailing illegal trade and can and should be actively involved in achieving 100% legal use. Concerns were expressed to the CSG mission that some countries which purchase Colombian skins re-export them without tagging in compliance with Resolution 11.12, and that this could contribute to illegal international trade. This issue is one that needs to be formerly addressed through CITES once the evidence is assembled.

3.4. CAIMAN CROCODYLUS FUSCUS QUOTA SYSTEM

If the quota system is adjusted annually to production, and a few basic indicators of production are independently confirmed, then a Stage 1 assessment of farm quotas should be possible with modest resources. More detailed Stage 2 assessment may be randomly implemented, or implemented if production characteristics appear in error. The very detailed draft annual farm assessment criteria, presented to the CSG, can and should form the basis of some detailed production research aimed at increasing the knowledge of production dynamics. But it would be very costly to implement as an annual management task. Furthermore, it would still be open to manipulation by anyone determined to introduce wild hatchlings into their stock. Prevention of illegal trade through farms is best handled directly though criteria for distinguishing wild from captive animals. An inventory of farm and skin stocks may be needed to correct any accumulated errors in the old system. An accuracy level of 5-10% may be all that is needed to determine if farm production elements are basically consistent with each other. Increasing the accuracy will exponentially increase the costs of inventory. The skins of dead breeders should be able to be tagged and exported if obtained legally, and not accumulated within Colombia. Perverse incentives with reporting need to be avoided or the system will fail.

When *C. c. fuscus* farming was initiated in Colombia, strict record keeping was mandated in order to ensure legal production and minimize the possibility of the farms being used as a vehicle for illegal trade. The Colombian farms visited all have sophisticated information gathering and reporting systems, and the regional authorities and the Environment Ministry are extremely well informed about the production dynamics on each farm. More so than perhaps in most countries.

The concept of setting a national quota or ceiling on exports, that matched production capability reasonably closely, was a strategy implemented in some other countries (eg Indonesia) as a first step towards gaining more control over farming. However, as farm production approaches and

may soon exceed this annual quota, it is important that the quota be adjusted annually to include all legally produced skins. If not, and production exceeds the quota, it may encourage illegal trade. The maximum export quota of 600,000 is a domestic issue, and Colombia can increase or decrease it annually so that it matches production.

It is clearly within the interests of the Colombian authorities and industry to take such steps as are possible to ensure only legal skins get exported. So within the quota system, having *criteria* for assessing or validating the production on farms is important. With this in mind, a draft set of detailed criteria were presented to the CSG for comment.

In the opinion of the CSG, these detailed criteria would form the basis of some excellent research studies on the dynamics of farming in Colombia, which can and should be undertaken in samples of small, medium and large farms by scientists skilled in quantifying animal production dynamics. But they are considered far too detailed and costly to implement for the sole purpose of determining whether the annual production stated by a farm is consistent with their production capabilities.

In essence, the culture of detailed record-keeping and reporting is assisting production efficiency and does provide records through which detailed assessment of production can be made if required. But only some aspects of this may be needed to estimate annual exports from any one farm.

In choosing the criteria for this purpose, the CSG believe Colombia should concentrate on *the reality* rather than performance goals. Key annual indicators for Stage 1 assessment should be:

- number of breeding females held
- hatchlings produced per year
- raising stock held (1, 2 and 3-year olds)
- anticipated cull in the following year
- losses or gains due to other (perhaps unknown) reasons

An initial inventory may be needed to verify or adjust stocks, and checks may need to be made on incubators, hatching stocks etc. If there are reasons to suspect that a farm is exporting skins in excess of those produced, which are not readily accounted for by Stage 1 reporting, then a more detailed Stage 2 assessment could be undertaken based on the records that each farm keeps and the increased ability to distinguish wild from farm-raised stock derived through targeted research - if this recommendation is pursued.

In any form of farm production efficiency will vary greatly between farms, depending on skills, investment, investment in research and development etc. It is not realistic to expect all farms to produce at the highest level.

However, the ability to assess production efficiency generally, in terms of the maximum biological potential being realized, provides an index which can assist farmers to improve their performance and direct research and development priorities in production.

An example of a system that estimates maximum biological potential is given below with bogus estimates:

Number of breeding females on farm = a (say 500)
Mean of maximum 10% of clutch size = b (say 30 eggs)
Biologically attainable number of eggs = c (a*b) (say 500 x 30 = 15,000)
Mean of maximum 10% of hatchlings derived from eggs laid = d (say 80%)
Maximum hatchling production = e (c*d) (15,000 x 0.80 = 12,000)
Maximum 10% survival to 1 year = f (say 90%)
Maximum production of one-year-olds = g (f*e) (12,000 x 0.90 = 10,800)
Maximum 10% body weight at 1 year = h (say 2 kg)
Maximum total weight of one-year-olds = g*h (10,800 x 2) = 21,600 kg

What these calculations tell us is that a farm with 500 breeding females has the biological potential to produce 21.6 tonnes of one-year-olds.

If the weight of one-year-olds produced from a real farm with 500 females was 4,300 kg due to a variety of factors, production would be well below the maximum biologically attainable (it may always be), but could be expressed as a proportion of that maximum - in this case 19.9% (4300/21600 x 100).

Such a simple analysis can be used to provide a production index which in turn can be used to monitor production from year to year, compare production between farms, to prioritize areas of inefficiency, etc. It can also be extended to 2- or 3-year olds. Experience with this type of index indicates that most farms would range between 15% and 26% of the maximum biological potential. If a farm suddenly claimed 46%, then some serious investigation may be merited.

Given that management in the past in Colombia may have led to increasing production errors with farm stocks, an overall inventory of stocks and skins held in farms and tanneries may be needed before any new system was implemented.

How farms account for the skins of dead breeders, above the maximum size for export, needs to be accounted for more clearly. If these larger skins are legally produced, then they should be able to be legally exported.

The introduction of ranching would remove completely any concerns about wild harvested eggs or juveniles coming onto farms, because such transactions would become legal and simply be reported. The annual quota would need to be expanded to account for ranned stock, or otherwise any switch to ranching would compromise the current investment in captive breeding.

As a general rule, perverse incentives associated with reporting need to be avoided. That is, if farm production is down in a particular year due to some legitimate cause, the farm should not be penalized for reporting it. Otherwise, the reporting system will encourage errors and perhaps stimulate illegal trade.

3.5. FUTURE MARKETS

For future international markets to expand, buyers will ultimately need to be assured that the wildlife products they purchase are not only acquired legally, but are actively assisting conservation. There are sound commercial reasons for the Colombian industry to invest more in conservation. With regard to *Crocodylus acutus*, markets will continue to be constrained unless the species can be reclassified under the US Endangered Species Act, and this is highly unlikely unless the conservation of wild populations is greatly advanced over the situation that exists now. With Colombia about to start exporting captive bred *C. acutus* from a number of farms, it would seem important that those farms work together to ensure high standards are met in the products exported and that their contribution to conservation is unequivocal and tangible.

The CSG is not really in a position to evaluate future markets, but some things would seem rather obvious. With wildlife products in particular, there is increasing concern in developed countries that all consumptive uses of wildlife are *bad*, because they lead to population declines and the extinction of wild species.

Notwithstanding that this is true in many cases, there are many other cases around the world where the sustainable use of crocodilians is generating increased “values” of crocodilians in the eyes of the community, which are in turn assisting the conservation of crocodilians.

In the longer term, markets may increase if people feel that they are genuinely assisting conservation by buying wildlife products. It remains one of the great paradoxes that habitats are continually being destroyed for agriculture not wildlife production. The more people buy agriculture products in preference to wildlife products, the more incentives they create for destroying wild habitats in order to pursue agriculture.

In Colombia’s case, with their restriction of commercial use of crocodilians to captive breeding, there is little in the way of tangible conservation benefits being produced. Hence the CSG recommendation that ranching and community development be integrated into the programs, and that the industry become more actively involved in the conservation of “non-commercial” crocodilian species.

Poverty is clearly the worst environmental threat in most countries, and if sustainable use of wildlife can assist in the alleviation of poverty, so the final purchaser of wildlife products can be much more satisfied.

With crocodilians being produced world-wide, it is in the interests of all to promote the use of valid, legal wildlife products produced through sustainable use programs.

In the specific case of *Crocodylus acutus*, very clear and transparent conservation action will be required before the USA will consider lifting its classification of the species as “Endangered”. This will continue to constrain demand, because despite the production of high fashion items in

Europe and Japan, a large percentage of the final retail marketing is in the USA. If products cannot be imported into the USA, clearly the producers of high quality products from classic skins will opt not to use them. With Colombia about the start exporting captive bred *C. acutus* from a number of farms, it would seem very important that those farms work together to ensure high standards are met in the products exported and that their contribution to conservation is unequivocal and tangible.

Annex 1

The IUCN Policy Statement on Sustainable Use of Wild Living Resources (Resolution 2.29) adopted at the IUCN World Conservation Congress, Amman, October 2000:

RECALLING Resolution 1.39 'Sustainable Use Initiative' adopted by the 1st Session of the World Conservation Congress, requested the Species Survival Commission's (SSC) Sustainable Use Specialist Group (SUSG) to develop urgently a short policy paper on sustainable use for written comment from IUCN members, and for SSC to take these comments into account in preparing a final draft for presentation at the next World Conservation Congress;

ACKNOWLEDGING that, in accordance with Resolution 1.39, the Steering Committee of the SUSG prepared the draft 'Policy Statement on Sustainable Use of Wild Living Resources' that is attached herewith;

ALSO ACKNOWLEDGING that successive drafts of this statement were reviewed by members of 14 regional SUSGs, Chairs and members of the SSC Specialist Groups, the SSC Steering Committee, Chairs of other Commissions, heads of IUCN's Thematic and Regional Component Programmes, and IUCN's members;

RECOGNIZING that sustainable use is one of the three components of the objective of the Convention on Biological Diversity and that the Convention provides a definition of 'sustainable use';

NOTING that Article 3 of the 'Ramsar' Convention on Wetlands obliges its Contracting Parties to implement wise use approaches and that, in particular, the Convention has recently produced a series of Wise Use Handbooks;

ALSO NOTING that the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) have endorsed the principle of sustainable use in Resolution Conf. 8.3;

RECOGNIZING that sustainability and sustainable use are concepts that are now being applied to sectors beyond the scope of this policy statement per se, e.g., water, agriculture, soils;

and NOTING that most Component Programmes of IUCN work on sustainable use and that there is a need for the principles of sustainable use to be mainstreamed in all pertinent IUCN technical, regional, national, project, and Commission activities;

The World Conservation Congress at its 2nd Session in Amman, Jordan, 4-11 October 2000:

1. ADOPTS the Policy Statement attached herewith and commends the policy to IUCN's members, Commissions, and Secretariat for implementation in the context of its Overall Programme, and in accordance with the objectives of IUCN; and,
2. CALLS ON the Secretariat to report on the progress achieved in implementing the terms of the Policy Statement at the 3 rd World Conservation Congress.

This Resolution was adopted by a show of hands. The delegation of the State member United States indicated that it had abstained.

Policy Statement on Sustainable Use of Wild Living Resources

1. Conservation of biological diversity is central to the mission of IUCN, and accordingly IUCN recommends that decisions of whether to use, or not to use, wild living resources should be consistent with this aim.
2. Both consumptive and non-consumptive use of biological diversity are fundamental to the economies, cultures, and well-being of all nations and peoples.
3. Use, if sustainable, can serve human needs on an ongoing basis while contributing to the conservation of biological diversity.
4. At the 18th Session of the General Assembly (Perth, 1990) in Recommendation 18.24, IUCN - The World Conservation Union recognised that "the ethical, wise and sustainable use of some wildlife can provide an alternative or supplementary means of productive land-use, and can be consistent with and encourage conservation, where such use is in accordance with appropriate safeguards".
5. This position was re-affirmed in Recommendation 19.54 at the following session of the Union's General Assembly in 1994 and subsequently in Resolution 1.39 at the 1 st Session of the World Conservation Congress in 1996.
6. Analyses of uses of wild living resources in a number of different contexts demonstrate that there are many biological, social, cultural, and economic factors, which combine in a variety of configurations to affect the likelihood that a particular use may be sustainable.
7. On the basis of these analyses, IUCN concludes that:
 - a) Use of wild living resources, if sustainable, is an important conservation tool because the social and economic benefits derived from such use provide incentives for people to conserve them;
 - b) When using wild living resources, people should seek to minimize losses of biological diversity;
 - c) Enhancing the sustainability of uses of wild living resources involves an ongoing process of improved management of those resources; and,
 - d) Such management should be adaptive, incorporating monitoring and the ability to modify management to take account of risk and uncertainty.
8. To increase the likelihood that any use of a wild living resource will be sustainable requires consideration of the following:
 - a) The supply of biological products and ecological services available for use is limited by intrinsic biological characteristics of both species and ecosystems, including productivity, resilience, and stability, which themselves are subject to extrinsic environmental change;

- b) Institutional structures of management and control require both positive incentives and negative sanctions, good governance, and implementation at an appropriate scale. Such structures should include participation of relevant stake-holders and take account of land tenure, access rights, regulatory systems, traditional knowledge, and customary law;
 - c) Wild living resources have many cultural, ethical, ecological, and economic values, which can provide incentives for conservation. Where an economic value can be attached to a wild living resource, perverse incentives removed, and costs and benefits internalised, favourable conditions can be created for investment in the conservation and the sustainable use of the resource, thus reducing the risk of resource degradation, depletion, and habitat conversion;
 - d) Levels and fluctuations of demand for wild living resources are affected by a complex array of social, demographic, and economic factors, and are likely to increase in coming years. Thus attention to both demand and supply is necessary to promote sustainability of uses.
9. IUCN is committed to ensuring any uses of wild living resources are equitable and ecologically sustainable, and to this end it has established the Sustainable Use Initiative which incorporates regionally-structured Specialist Groups of the Species Survival Commission to:
- a) Identify, evaluate, and promote the principles of management that contribute to sustainability and enhanced efficiency in the use of wild living resources; and,
 - b) Regularly communicate their findings to members and the broader community.

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Annex 2 [Itinerary]

Monday, 1 March

Meeting in the Ministerio del Ambiente, Vivienda y Desarrollo Territorial, Bogotá city.
Meeting with Vice-Minister Dr. Juan Pablo Bonilla, Ecosystem Director Dr. Gonzalo Andrade and its staff (Adriana Rivera, Francisco Gutierrez, Antonio Gomez, Milena Gomez, Claudia Rodriguez).

Ministry presentations (Annex 3)

Leaving for Cartagena city.

Tuesday, 2 March

Meeting with Autonomous Regional Corporations (Corporaciones Regionales Autónomas), Producers' associations, independent producers, technicians and biologists, tag producer company (Annex 4).

Wednesday, 3 March and Thursday, 4 March

Field trip (Annex 5)

Friday, 5 March

Back to Bogotá

Final meeting at the National Science Institute, with Ministry staff, producers associations and independent producers, technicians and biologists (Annex 6).

Annex 3 [Ministry presentations]

- Structure of the National Environmental System -SINA- [CITES Administrative Authority]
Francisco de P. Gutiérrez B. (Ecosystem Directorate)
- CITES Administrative y Scientific Authorities [CITES Administrative Authority]
Adriana Rivera B. (Ecosystem Directorate)
- Wildlife law in Colombia [Ministerio de Ambiente, Vivienda y Desarrollo Territorial]
Dr. Rodrigo Negrete (Legal office)
- CITES general procedures [Harvest quotas. Export quotas. Customs officers procedures etc.]
Adriana Rivera B. (Ecosystem Directorate)
- Strategy for the prevention and illegal traffic control
Milena Gómez Cely. (Ecosystem Directorate)
- Criteria and Indicators system for Captive Breeding
Dr. Fernando Gast H., Director of the Institute of Biological Investigations Alexander von Humboldt. CITES Scientific Authority.

Annex 4 [Meeting in Cartagena]

- Captive breeding evaluation and monitoring system in Colombia
Canal del Dique Autonomous Regional Corporations (CARDIQUE) [representing all Corporations]
- Criteria and Indicators system for Captive Breeding
Dr. Fernando Gast H., Director of the Institute of Biological Investigations Alexander von Humboldt. CITES Scientific Authority.
- The sustainable use programs as a conservation tool
Alejandro Larriera (Crocodile Specialist Group)
- Crocodile conservation and sustainable use.
Alvaro Velasco B (Crocodile Specialist Group)
- Harvesting and trade in CITES-listed wildlife species: The role of wildlife management principles and practices
Grahame Webb (Crocodile Specialist Group)
- New tag system proposal
ALPHEX Enterprise
- Crocodiles sustainable Workshop
Reporter Sergio Medrano

Annex 5 [Field trip]

Field trip

Day one

- Fly around Canal del Dique area and Cispata Bay
- Visit to Cispata Bay, *Crocodilus acutus* conservation program
- Visit Caicsa farm (*Crocodilus acutus* and *Caiman crocodilus fuscus*)
- Visit Los Caimanes farm (*Caiman crocodilus fuscus*)

Day two

- Visit Zoobem farm (*Crocodilus acutus* and *Caiman crocodilus fuscus*)
- Visit Caribbean farm (*Caiman crocodilus fuscus*)
- Visit Canal del Dique project, *Caiman crocodilus fuscus* conservation program
- Visit Zoofarm farm (*Crocodilus acutus* and *Caiman crocodilus fuscus*)

Annex 6 [Final meeting]

Final meeting

- General status of crocodilians in Colombia
Dra. Olga Castaño, Universidad Nacional de Colombia. CITES Scientific Authority
- *Crocodylus intermedius* conservation program
Dra. María Cristina Ardila, Universidad Nacional de Colombia. Instituto de Ciencias Naturales.
CITES Scientific Authority
- *Melanosuchus niger* conservation program
Claudia Sánchez, Instituto Amazónico de Investigaciones-SINCHI- CITES Scientific Authority
- *Crocodilus acutus* conservation program
Adriana Rivera (Ecosystem Directorate)
- Preliminary conclusions and recommendations
Crocodile Specialist Group