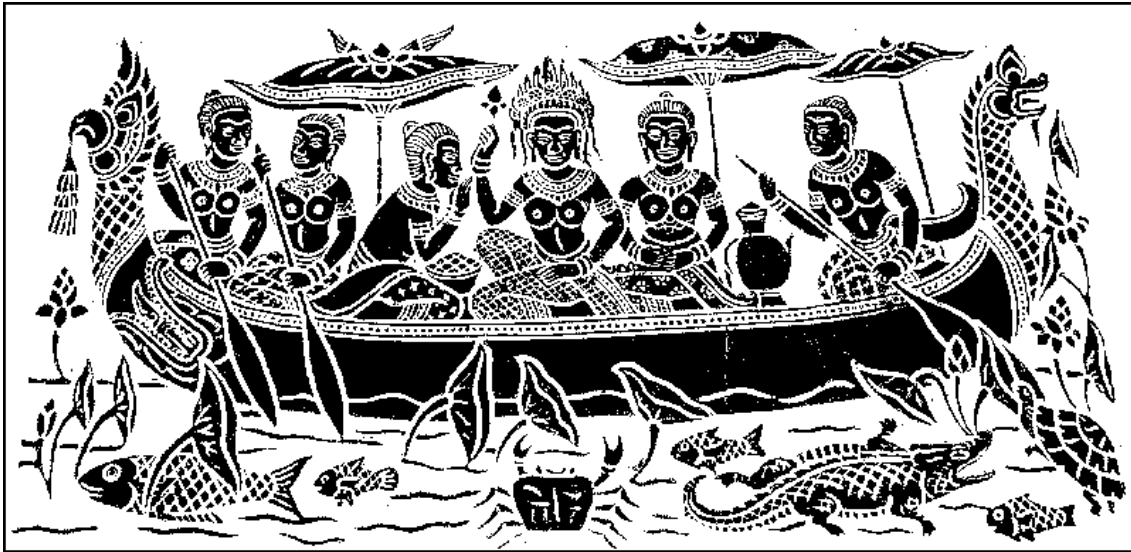


CROCODILE CONSERVATION AND MANAGEMENT IN CAMBODIA: A REVIEW WITH RECOMMENDATIONS



Summary Report of the IUCN-SSC Crocodile Specialist Group Review Mission to Cambodia

**Dietrich Jelden, Charlie Manolis, Choo Hoo Giam,
Julie Thomson and Alvin Lopez**

(13 April 2005)

Cover photo: Modified image from stone relief at Angkor Thom, Siem Reap.

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1. Summary of Recommendations

1.1. General

- a. The status of wild populations of *C. siamensis* in Cambodia is a major concern for the CSG, and current conservation efforts in Cambodia need to be maintained and where possible strengthened. Improving the management of farming and trade, and improving compliance with CITES, are considered essential prerequisites to improved conservation action.
- b. Communication and information exchange between all stakeholders with an interest in the conservation, management and sustainable use of crocodiles, remains a serious impediment to progress and constrains public education.
- c. The historical and/or present status of *C. porosus* and perhaps *Tomistoma schlegelii* within Cambodia should ideally be investigated. Both, if present historically, may now be extinct!

1.2. Specific Recommendations

Recommendations are listed in the order in which they appear and are numbered in the report. The main issues to which specific recommendations apply are indicated in square brackets (ie CITES= CITES Compliance and National Legislation; Captive = Management of Trade and Captive Population; Wild = Wild Population; Illegal Trade; Regional Issues). Most recommendations are directed at actions the review team considers Cambodia will need to take. If accepted, the responsible agency would need to be decided upon by Cambodia, and assistance from outside agencies may be needed to address some of them. Recommendations are:

1. A report on progress with finalising and approving of CITES-enabling legislation needs to be prepared and submitted (by end of May 2005) for consideration by the 53rd meeting of the CITES Standing Committee. [CITES]
2. Finalise and approve the CITES "Sub-decree on International Trade of Endangered Wild Animal and Plant Species" as soon as possible. [CITES]

3. Finalise and approve the new Fisheries Law. [CITES, Captive]
4. Clarify the role of the Cambodian CITES Management Authority and strengthen its capacity. [CITES]
5. Clarify the role of the two Cambodian CITES Scientific Authorities and strengthen their capacities. [CITES]
6. Establish a Cambodian Crocodile Monitoring Unit to monitor farm and wild populations. [Wild, Captive]
7. Review and improve reporting of farm data to the Department of Fisheries. [Captive]
8. Centralisation and ongoing computerisation and analysis of farm records. [Captive]
9. Establish and implement a licensing system that covers all farming operations (ie anyone with crocodiles), traders and exporters. [Captive]
10. Derive clear criteria for recognising hybrids, and assess and quantify the extent of hybridisation (*C. siamensis* x *C. rhombifer*; possibly *C. siamensis* x *C. porosus*) on farms. [Captive]
11. Implement actions to contain, reduce or eliminate hybridisation in order to minimise or eliminate completely the possibility of *C. rhombifer* genetic material entering the wild population of *C. siamensis*. [Wild, Captive]
12. As a matter of urgency the Cambodian CITES Management Authority prepare and submit the CITES annual report for 2003, which is overdue. [CITES]
13. Seek assistance from the CITES Secretariat in order to amend the CITES register to: (a) allow international trade in live *C. siamensis*, and (b) remove one inactive crocodile farm from the CITES register. [CITES]
14. Consider seeking CITES registration of all additional established crocodile farms that are producing *C. siamensis* through captive breeding and exporting. [CITES]
15. Review Government policy with regard to implementation of CITES Resolution Conf. 12.10 (Rev. COP13) on the registration of captive breeding operations for *C. siamensis*. [Captive]
16. Investigate national and international illegal trade in crocodiles involving Cambodia, and if possible quantify the amount of trade, the ways in which it is occurring and the identity of key players and/or organisations involved within or outside Cambodia. [Illegal Trade]
17. Develop pragmatic strategies to curtail illegal trade and test them through implementation. [Illegal Trade]

18. Strengthen enforcement capability of relevant agencies (eg customs, police, fisheries, communities, forestry) through training and capacity-building. [Illegal Trade]
19. Ensure the farm monitoring program with regular inspections is implemented and can assess the legality of stocks. [Illegal Trade]
20. Ensure appropriate actions are taken legally (eg confiscation, penalties) if the farm monitoring program identifies illegal stocks. [Illegal Trade]
21. Establish dialogue with neighbouring states, through a regional working group under an appropriate body (eg ASEAN wildlife trade initiative and/or Mekong River Sub-regional CITES Working Group), to address regional issues and problems with *C. siamensis*. [Illegal Trade, Regional Issues]
22. Develop as a matter of urgency a comprehensive crocodile management program for Cambodia. [Wild, Captive]
23. Establish a strategy for capacity building for all stakeholders, including communities, crocodile farmers, Government agencies, etc., in order to raise awareness of the current status of Cambodia's wild crocodile populations. [Wild, Captive]
24. Re-establish the Cambodian Crocodile Farming Development Association under its new statutes. [Captive]
25. Establish a multi-sectorial Cambodian Crocodile Consultative Committee composed of representatives from all stakeholders. [Wild, Captive]
26. Continue assessment of the status and distribution of wild *C. siamensis* and *C. porosus*, and perhaps *Tomistoma schlegelii*, in Cambodia. [Wild]
27. Identify training and capacity needs of Government departments involved with the management of wild crocodile populations. [Wild]
28. Improve enforcement and management activities to promote recovery of the wild population in existing protected areas where crocodiles are known to occur. [Wild]
29. Identify and establish such new protected areas and/or sanctuaries that may be needed to ensure a significant part of the remaining wild population and its habitats are retained. [Wild]
30. To ensure compliance with CITES make a strong high-level Government commitment to stop illegal trade in crocodiles (and other species of wildlife), and ensure compliance with CITES. [Regional Issues]
31. Identify training needs of the farming industry, and organise relevant courses, workshops, etc. [Captive]

2. Introduction

At the 17th working meeting of the IUCN-SSC Crocodile Specialist Group (CSG) held in Darwin, Australia (May 2004), representatives from a number of Government authorities and non-Government organisations within Cambodia strongly recommended an external review of crocodile conservation and management in Cambodia, with particular emphasis on the Siamese Crocodile, *Crocodylus siamensis* (SCWG 2004). The issue was again discussed informally amongst Government representatives from Cambodia and the CSG Chairman-elect (Grahame Webb) in Bangkok, Thailand, during the 13th Conference of the Parties to CITES (October 2004).

On 5 January 2005, Nao Thouk, Director General of the Department of Fisheries (DoF), within the Cambodian Ministry of Agriculture, Forestry and Fisheries (MAFF), invited the CSG Chairman, Professor Grahame Webb, to undertake a CSG mission to Cambodia to review the status and current management of wild and captive crocodiles: "so that we can have recommendations to improve the management and conservation of crocodiles in Cambodia".

A CSG review team was formed (see Appendix 1), and in consultation with Cambodian authorities and members of the team, the CSG Executive Officer (Tom Dacey), developed draft Terms of Reference (Appendix 1) and an itinerary (Appendix 2). Major aims were:

- Assess and evaluate monitoring and conservation of wild populations;
- Evaluate the production of crocodiles through captive breeding and its management;
- Assess the status of legal provisions aimed at regulating and controlling crocodile management; and,
- Make recommendations for improving the conservation, management and sustainable use of crocodiles within Cambodia.

Although *C. siamensis* was the focus of the mission, information on other species was also sought. The mission was carried out between 23 February and 3 March 2005.

3. Background

The history of key events in crocodile farming within Cambodia is summarised in Table 1.

Table 1. Chronology of major events affecting crocodile farming and management in Cambodia (information from: McClelland and Heng 2004; Jenkins 1998; TRAFFIC 2004; Cheang and Ratanakorn 1994; Ratanakorn 1992; Thouk 1998; Thouk and Tana 1994).

Pre-1900	Crocodile farming in Cambodia dates back over 1000 years, to the 10th Century.
1945	First commercial crocodile farm established, at Siem Reap.
1975	Khmer Rouge Government places all crocodiles from private farms into two Government-run facilities (in Siem Reap and Kampong Chhang Provinces).
Mid-1980s	Number of crocodile farms increases dramatically.
1986	Siem Reap Crocodile Farm, under Government management, receives four <i>C. porosus</i> hatchlings from Koh Kong Province.
Mar 1987	Decree 33 of the Fisheries Law provides main legal basis of fisheries management, including farming and transport of crocodiles. Enables people interested in commercial farming of crocodiles to obtain captive-bred crocodiles from one of two Government farms.
1990	Siem Reap Crocodile Farm purchases three Cuban Crocodiles (<i>Crocodylus rhombifer</i>) from Vietnam, for display purposes.
1995	Cambodian Crocodile Farming Development Association established.
1997	Cambodia accedes to CITES.
Jun 1998	MAFF Declaration No. 269 on the Export of Raised Crocodiles and Derivative Products enacted. Legislation covers farm registration and record keeping, permits (eg slaughter, export, unused), tagging procedures, fees, penalties and establishment of export quotas.
Jan 1999	Six crocodile farms registered as captive breeding operations by the CITES Secretariat.
Oct 2000	MAFF Declaration No. 632 establishes a CITES Management Authority (MAFF) and CITES Scientific Authorities (Forestry Administration and Department of Fisheries as dual Scientific Authorities).
2003	Drafting of a Sub-Decree on International Trade of Endangered Species of Wild Animal and Plant Species to assist the implementation of CITES begun. It strengthens the legal basis for establishment of a Cambodian CITES Secretariat (one CITES Management Authority and two CITES Scientific Authorities) and defines specific roles for each authority.
Nov 2003	National Workshop on the Management and Conservation of Siamese Crocodiles held.

Table 1. continued

Jan 2004	New, more comprehensive Fisheries Law to supersede the 1987 Fisheries Law approved by Council of Ministers and passed to National Assembly for approval. With change of Government, the draft law is sent back to Council of Ministers for re-submission.
Mar 2004	Logbooks and “ticket books” (for tagging crocodiles) dispatched to crocodile farmers, fulfilling some requirements of MAFF Declaration No. 269 and the new (not yet adopted) Fisheries Law.
May 2004	Possibility of an external review of crocodile conservation and management discussed at the 17th CSG working meeting (Darwin, Australia).
Jul 2004	National stakeholder workshop held to review draft of the CITES Sub-Decree on International Trade of Endangered Wild Animal and Plant Species.
Oct 2004	Final draft of Sub-Decree submitted to CITES Secretariat for review.
Jan 2005	CSG invited to undertake review of crocodile conservation and management in Cambodia.
Feb 2005	MAFF confirms the Department of Fisheries as the regulatory authority and the CITES Scientific Authority responsible for crocodiles in Cambodia.

4. Legal and Regulatory Procedures Governing the Production of and Trade in *Crocodylus siamensis* in Cambodia

4.1. Overview

There are five pieces of legislation pertaining to crocodile farming and trade in Cambodia. Two have been enacted:

- a. the Fisheries Law, Decree 33, which has been in effect since 9 March 1987; and,
- b. the Ministry of Agriculture, Forestry and Fisheries (MAFF) Declaration (Prakas) no. 269 on the Export of Raised Crocodiles and Derivative Products (enacted on 19 June 1998).

Other legislative actions that may soon come into force are:

- c. A new Fisheries Law has been submitted to the National Assembly for approval (the final stage in the enactment of a Law, following approval by the Council of Ministers), and will supersede the existing Fisheries Law.
- d. A Sub-Decree on International Trade of Endangered Wild Animal and Plant Species (the “CITES Sub-Decree”) has been drafted and is currently being reviewed by the CITES Secretariat. Harmonization and swift

enactment of the new Fisheries Law and the CITES Sub-Decree are required for effective legal regulation of crocodile production and trade within, to and from Cambodia.

- e. On 21 February 2005, a Declaration issued by the Minister of MAFF concluded that crocodiles, turtles and frogs are under the jurisdiction of the Department of Fisheries.

In addition to these, the Department of Fisheries has initiated some internal procedures for crocodile farm and transport registration and monitoring.

Harmonization and swift enactment of the new Fisheries Law and the CITES Sub-Decree are required for effective legal regulation of crocodile production and trade within, to and from Cambodia in accordance with national and international law.

4.2. Review of key existing legislation and legislation in progress

4.2.1. The CITES Sub-Decree

Recommendation 1

A report on progress with finalising and approving of CITES-enabling legislation needs to be prepared and submitted (by end of May 2005) for consideration by the 53rd meeting of the CITES Standing Committee.

Recommendation 2

Finalise and approve the CITES “Sub-decree on International Trade in Endangered Wild Animal and Plant Species” as soon as possible.

In the early 1990s, the CITES Secretariat initiated the National Legislation Project to review the legislative capacity of Parties to CITES to meet the four minimum requirements of CITES:

- to designate a Management and Scientific Authority;
- to prohibit trade in specimens in violation of the Convention;
- to penalize trade in violation of the Convention; and,
- to allow for confiscation of specimens illegally traded or possessed.

Cambodia’s existing legislation was analysed by the CITES Secretariat rated as Category 3: the lowest rating and deemed inadequate to implement CITES. Cambodia was directed by the CITES Secretariat to submit a CITES Legislation Plan, setting out the steps and a timetable for enacting adequate legislation with specific CITES enabling provisions by 30 June 2004.

A Legislation Plan was submitted to the Secretariat in 2003, and with work well underway Cambodia’s June 2004 deadline was extended.

Cambodia is obligated to report on progress in enacting the legislation before the 53rd meeting of the Standing Committee (June 2005).

In the event that Cambodia does not comply with the decision, the Standing Committee shall consider appropriate measures, which may include restrictions on the commercial trade in specimens of CITES-listed species.

Cambodia and other Parties in a similar situation are, according to the decision adopted in COP13 Doc. 22 (Rev. 2), directed to provide the CITES Secretariat with:

- i) an initial or revised CITES Legislation Plan indicating the procedures, actions and timeframes needed to enact the legislation;
- ii) draft legislation and a translation of this draft legislation into one of three working languages of the Convention; or,
- iii) enacted legislation and a translation of this legislation into one of three working languages of the Convention.

A draft of the CITES Sub-Decree to assist with the implementation of CITES was submitted to the CITES Secretariat for review in October 2004.

It provides the basis for the establishment of a Cambodian CITES Secretariat, an independent authority comprising:

- one Management Authority; and,
- two Scientific Authorities.

All would be within the Ministry of Agriculture, Forestry and Fisheries (MAFF), and they would be responsible for implementing and enforcing the management of import, transit, trans-shipment, export, re-export and introduction from the sea of wild animal and plant species listed in the CITES Appendices.

This legislation defines the specific roles of the CITES-implementing agencies. With respect to crocodiles these will be as listed below.

CITES Management Authority

- coordinating the preparation of guidelines for crocodile farm registration (a MAFF Declaration will be issued after the Sub-Decree's enactment regarding standards, guidelines and the registration process for all captive breeding operations);
- marking of specimens and transportation of live animals consistent with IATA;
- issuing and revoking CITES permits and certificates for international trade (in addition to the transport permits required by the Fisheries Administration under the new Fisheries Law);
- using the MAFF stamp to conduct operations, and collecting revenues;
- marking imported and exported specimens; inspecting and monitoring commercial captive breeding operations;

- undertaking the registration of captive breeding operations with the CITES Secretariat when the operations meet the requirements of the Convention; and,
- submitting export quotas for those operations.

CITES Scientific Authorities

- procedures for transport of live specimens;
- technical specifications requiring adherence by captive breeding operations; and,
- monitoring the issuance of permits and certificates for international trade in collaboration with the CITES Management Authority.

4.2.2. Ratification of CITES by Cambodia

On 10 June 1997, Ung Huot, the Minister of the Ministry of Foreign Affairs, signed and stamped an official Letter of Accession to CITES. The letter stated that “[a]fter seeing and examining this Convention as amended in Bonn, Germany in 1979, in accordance with provisions it contains and with the Constitutional requirement of the Kingdom of Cambodia, we formally declare the accession to CITES and promise that it will be inviolably respected.” The Letter of Accession was approved by the joint-Prime Ministers who have authority under Cambodia’s Constitution to lead negotiations of treaties and international conventions and as such, the CITES Secretariat recognizes Cambodia as a Party bound by the provisions of the Convention.

4.2.3. The Fisheries Laws

Recommendation 3

Finalise and approve the new Fisheries Law.
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The existing Fisheries Law (Decree 33) provides the main legal basis that guides policies and rulings regarding fisheries management (which includes crocodiles) within Cambodia.

Article 19 states “anyone operating a crocodile breeding facility, or transporting crocodiles, possess a permit”. The recent MAFF Declaration (21 February 2005) confirms that these permits are to be issued by the Department of Fisheries only.

A declaration enacted soon after the main Fisheries Law (Decree 33) was passed provides for registration of crocodile farms within Cambodia (“*Permit to Operate an Aquatic Farm*”), and the transport of crocodiles within Cambodia (“*Permit for Transporting Fisheries Products*”). Farms with <50 crocodiles are registered with the relevant Provincial Fisheries office, and farms with >50 crocodiles are registered with the central Fisheries Administration in Phnom Penh.

A new Fisheries Law was approved by the Council of Ministers and passed to the National Assembly for final approval in February 2004. Because of a change in Government, it was sent back to the Council of Ministers for re-submission. At the time of this report, the draft Fisheries Law had not yet been re-submitted to the National Assembly. [However, during preparation of the report the CSG review team was informed by the CITES Management Authority that the draft Fisheries Law had been re-submitted to the National Assembly.]

The version of the new Fisheries Law submitted to the National Assembly in February 2004 was considerably more comprehensive with respect to issues governing crocodile production and trade than the existing Fisheries Law (Decree 33). In addition to requiring that all crocodile farms have operating permits issued by the Department of Fisheries, it also stipulates record-keeping and monthly inspection requirements, procedures for internal transport which includes registration and permits, inspections and fees, import/export requirements, including compliance with CITES, and prohibited activities and penalties.

4.2.4. MAFF Declaration no. 269

This nine-Article Declaration comprises the only existing set of regulations pertaining specifically to international trade in *C. siamensis*. It is based upon guidelines prepared at the request of the Department of Fisheries by Mr. Hank Jenkins in his capacity as Chair of the CITES Animals Committee. The Declaration deals with the import/export of live-raised animals, including slaughtered animals and processed crocodile products. The IUCN-SSC Crocodile Specialist Group (CSG) discussed the guidelines and the proposed registration of six captive breeding farms at its 14th Working Meeting (Singapore, July 1998), and recommended to Cambodia that the registration proposal be accompanied by any information on the distribution of wild crocodiles (Ross 1998). Registration of the six farms with the CITES Secretariat occurred in 1999 (CITES Notification to the Parties No. 1999/09 of 29 January 1999) (see Jenkins 1998).

Declaration no. 269 also covers farm registration and record-keeping procedures, the requirement for a slaughtering permit from the Department of Fisheries, tagging procedures, export permit provision, destination and buyer details, fees, disposal of unused CITES tags, penalties, and provides the basis for setting domestic export quotas.

4.3. Additional regulatory procedures

Farm and Transport Registration and Monitoring

Cambodia's crocodile production and export trade do not currently operate as totally closed captive breeding systems, because there is regular movement of crocodiles between 900+ farms. To improve management of the industry, in late November 2003 the DoF developed a logbook for crocodile farmers, dispatched to the Provinces on 11 March 2004. There was also a "ticket book"

for tagging crocodiles, which allowed identification during transportation. The logbook provided for four sets of information (Articles):

Article 1 of the logbook requires detailed records be kept of:

- species, age, sex and number of crocodiles;
- names and addresses of all buyers from and sellers to the facility;
- numbers of crocodiles and their products sold or exported; and,
- the number of crocodiles missing/dead without permission to be slaughtered.

Articles 2 and 3 require that farmers adhere to standard conditions and procedures for logbook entries and feeding records, request permission and technical advice on use of chemicals to improve production, prohibit purchase or sale of wild-caught crocodiles for breeding, or the import of any crocodiles without the relevant permission from DoF.

Article 4 covers penalties for non-compliance with Articles 1-3. In addition, DoF has begun compiling a register of all ‘middlemen’, ie persons involved in the transport of crocodiles, but not farming *per se*.

Together these Articles fulfil some requirements set out in both the MAFF Declaration no. 269 on the Export of Raised Crocodiles and Derivative Products, and in Articles 34 and 53 of the new Fisheries Law.

5. Institutional Structure

Recommendation 4

Clarify the role of the Cambodian CITES Management Authority and strengthen its capacity.

Recommendation 5

Clarify the role of the two Cambodian CITES Scientific Authorities and strengthen their capacities.

Cambodia has notified the CITES Secretariat of one CITES Management Authority [ie the Under-Secretary of MAFF] and two CITES Scientific Authorities (DoF for aquatic CITES species and the Forestry Administration for terrestrial CITES species), both within MAFF (CITES Authorities established under MAFF Declaration no. 632).

The CSG review team visited the CITES Management Authority and the CITES Scientific Authorities, and discussed their abilities to provide the services expected of them. Strengthening the capacity and clarifying roles of each authority, and then strengthening their capacity to fulfil those roles were both considered priorities to their improved performance. Within the current operational environment, the two CITES Scientific Authorities are both involved to a large extent in CITES management and implementation issues, (eg reporting, licensing and record keeping involved with the crocodile trade).

Transferring purely management duties to the CITES Management Authority, and strengthening its enforcement capacity and implementation powers (eg to issue domestic transport permits, to impose sanctions, to investigate illegal trade) would significantly enhance the efficiency of CITES implementation in Cambodia.

6. Farm Management

6.1. Farms

Commercial crocodile farming in Cambodia began in 1945, mainly around the Tonle Sap Lake. In 1975, when the Khmer Rouge Government came to power, all crocodiles in private crocodile farms were placed into two Government-run operations, one in Siem Reap Province and one in Kampong Chhng Province. Following liberation from the Khmer Rouge Government in 1979, the two farms were again privatised, and additional farms were established in three other Provinces (Thuok and Tana 1994). Some Cambodian staff received training in crocodile farming in Cuba (Ratanakorn 1992).

The number of crocodile farms increased dramatically in the mid-1980s, and numbers have continued to increase to this day. Ratanakorn (1992) reported that there were 491 farms in 1992, holding 6100 non-hatchlings and producing 5200 hatchlings.

Thuok and Tana (1994) reported 172 farms, containing 1317 adults in 1993. Total stocks consisted of 3397 non-hatchlings, and hatchling production was 10,322. Only one farm was reported as having no breeding stock. The difference in farm numbers between 1992 (491) and 1993 (172) may reflect small household/village holdings.

In 1997, Jenkins (1998) presented data on 396 farms in three Provinces (Siem Reap, Battambang, Kompong Chhang), of which the majority (69.9%) possessed no breeding stock; 12.6% had 1-10 adults, 8.6% had 11-20 adults, 5.1% had 21-50 adults, and 0.6% had 100-300 adults. Total stocks in the three Provinces consisted of 9180 non-hatchlings and 11,670 hatchlings. Thouk (1998) reported a total of 429 farms in 1997.

Data provided by DoF in March 2004 to TRAFFIC (2004) indicate that there were 883 farms distributed through 10 Provinces at that time (Table 2). According to DoF, there are now around 900 crocodile farms in Cambodia, of which only 10-20 are thought to contain more than 100 crocodiles (SCWG 2004).

No data were presented to the review team on the current numbers of crocodiles held on Cambodian farms. Given that a high proportion of farms are not licenced (Table 2), precise estimates may simply not be able to be prepared. Some estimates suggest around 90,000 crocodiles (McClellan and Sovannara 2004), with more than 3500 breeding females (Thorbjarnarson and Daltry 2003).

Table 2. Numbers and location of crocodile farms in Cambodia, in 2003. Source: Department of Fisheries (March 2004). Data from TRAFFIC (2004).

Province	No. of Licenced Farms	No. of Unlicenced Farms	Total Farms
Siem Reap	218	288	506
Battambang	39	68	107
Kompong Thom	210	-	210
Kompong Chhnang	13	9	22
Phnom Penh	3	-	3
Banteay Meanchey	3	-	3
Pursat	2	9	11
Kandal	7	7	14
Sihanoukville	-	6	6
Koh Kong	-	1	1
Totals	495	388	883

Ratanakorn (1992) classified Cambodian crocodile farms into three different classes on the basis of size (number of crocodiles) and type of management. The following were visited during the CSG review mission:

Class 1

- Land-based farms (<20 crocodiles): One family had a single 2.4-2.5 m long *C. siamensis* in an earthen pond at the back of the house. The owner had previously raised a number of hatchlings and then sold them, and was now looking to acquire some more hatchlings to repeat the activity.
- Floating farms (<20 crocodiles): Small farms consisting of floating enclosures were seen at Chong Kneas, on Tonle Sap Lake, attached to floating houses.

Class 2

- Seasonal farms (20-70 crocodiles): Crocodiles are maintained in floating cages alongside the owners' floating houses during the wet season. Adult crocodiles are moved onto land-based breeding enclosures on the river bank near the home, prior to the dry season, when water levels have receded. All adults are housed within a single communal enclosure during the breeding season.

Class 3

- Floating farms (usually >100 crocodiles): One of 12 floating farms at Chong Kneas contained "over 100 crocodiles" maintained within a single

floating enclosure. It would be considered to be a Class 3 farm on the basis of the number of crocodiles involved, but with no breeding stock.

- Large, land-based farms (>500 crocodiles): Adults are maintained within large communal pens, as are juveniles and subadults.

Farms, particularly smaller ones with less than 100 crocodiles, can quickly change from one "class" to another; for example when hatchlings are produced during the nesting season, or where some hatchlings are retained for raising as future breeding stock, etc. The classification best reflects the numbers of crocodiles maintained on a permanent basis throughout the year.

The classification was developed to describe the types of management employed by the farming industry, and is not used for any other purpose. However, should licensing fees be introduced (currently licences are free), a modified classification that reflects the type of farm may have utility.

6.2. Markets

Live Crocodiles

The trade from Cambodia has always been live crocodiles, although key markets have changed over time. For example, In the late-1980s to mid-1990s, Thailand was the main importer of Cambodian crocodiles. During 2000-2002 this changed to China. Over the last 2-3 years (2002-2005) Vietnam has emerged as the main importer, but most crocodiles from Vietnam, including those of Cambodian origin, are ultimately exported to China (legally and illegally).

There has been a downturn in prices of live crocodiles sold to China and Vietnam, and so large breeding farms in Siem Reap are increasingly selling hatchlings to smaller farms that purchase them for subsequent raising. All Cambodian farmers interviewed indicated that the market was "bad" at the moment, and they were looking for new markets for live crocodiles and/or thinking of changing the focus of their farms towards skin production. However, even with these lower prices, the demand for live animals from Vietnamese traders still appears to be strong, despite some farms in Vietnam reportedly having difficulty selling crocodiles to China.

Current prices of hatchlings being offered, from any source, varied between \$US28 and \$US40 (mean= \$US34; N= 6). One village farm reported that the current prices are 10-15% lower than those offered 1-2 years ago. The highest prices obtained for hatchlings were around \$US300, when crocodile farming in Thailand was expanding rapidly in the early 1990s; also reported by Ratanakorn (1992). By the mid- to late 1990s, hatchlings were selling for \$US40-60.

The demand within Cambodia is also strong, with new operators still entering the industry. It is thus unclear whether the current outlook for the market is widely known. One floating farm purchased 100 hatchlings three years ago, but the owner felt that she would lose money if she was to sell now, as she thought she could only get around \$US100 per crocodile (1.4-1.6 m long).

Breeding stock do not appear to be traded extensively, with farms mainly buying hatchlings that are then grown to maturity. A village farmer at Prek Toal suggested that there was a market for breeding stock, with 1.5 m long animals (2-3 years until mature) for \$US250-300, and adults for \$US1500 and \$US3000 (males and females respectively). She did not sell breeding stock on the open market, but sometimes sold crocodiles to "friends". One informant who owns three crocodiles (2 *C. siamensis* and 1 hybrid), sold a 1.9 m long hybrid female crocodile, thought to be mature, to a local buyer for \$US500.

Skins

Skin production on Cambodian farms consists almost entirely of skins salvaged from dead animals. With only a few middlemen buying skins, the price is very low. At Prek Toal, it was estimated that less than 10 skins were produced each year from the 20-25 village farms there: a large salted skin (>1.8 m TL) sells for around \$US10. The Cambodian Crocodile Farming Development Association reported that large (>2 m TL) skins sold for \$US50-60 each, and smaller ones for considerably less. One farm in Phnom Penh used to slaughter crocodiles for their meat, and the skins were salted and sold.

According to DoF, recorded exports from Cambodia consist of 20 *C. siamensis* skins. The ultimate fate of skins from dead animals is unknown, but they may be exported illegally through the middlemen who buy them.

Meat

One Phnom Penh restaurant is known to have had crocodile meat on its menu, which was supplied by a local farm. The farmer reported that the local market for meat was small, but some crocodiles were previously slaughtered for this purpose. Now, when meat is occasionally sold to restaurants, it has been salvaged from dead animals.

The same Phnom Penh farm slaughtered some crocodiles for dried meat, which was exported to China. The number slaughtered varied according to the order placed for meat, but was still relatively low; skins were salted and also sold.

At remote village farms, meat from large dead animals may be eaten locally. Large farms in Siem Reap do not utilise the meat at all, and a farm in Sihanoukville discarded any dead carcasses - he would not feed the meat back to his crocodiles as he did not want them to develop a taste for it and start eating other each other.

Other Products

Some taxidermy of small crocodiles occurs, and "stuffed" hatchlings were seen at one farm in Phnom Penh. Stuffed juvenile crocodiles were on display at a Phnom Penh hotel. This trade simply makes use of crocodiles that die on farms.

There appears to be no use of skulls or teeth, and crocodile products (eg belts) in Cambodia have originated from Thailand. There does not appear to be even the most rudimentary tanning of skins in Cambodia, even for simple products.

6.3. Farms, Middlemen and Exporters

The CSG review team's observations on trade were:

- Families or individuals with less than 5 crocodiles sell hatchlings or larger crocodiles to larger existing facilities or people wishing to enter the industry.
- Floating farms with no breeding stock may sell crocodiles to other existing small farms, to middlemen, or directly to an exporter (which may be a farm or trading company). They may also sell to people wishing to start a farm.
- Small village farms (<50 adult crocodiles) typically sell hatchlings to middlemen (eg in Prek Toal, with 20-25 farms, three middlemen are involved). The middlemen contact farmers by telephone and find out the price the farmers are hoping for. They then check with their buyers, and later contact the farmers with confirmation of the sale price, or of a different (lower) offer. The middlemen visit the farms and collect the crocodiles.
- Most large farms sell the majority of their hatchling production to existing smaller farms, middlemen or directly to exporters (which may also be farmers). All farms visited by the review team keep around 5-10% of their hatchlings for raising, either as future breeding stock or for sale at larger sizes. Juvenile crocodiles are sold through the same avenues as hatchlings. Large farms at Siem Reap reported that when their hatchling production was relatively low a few years ago, it was not worth dealing directly with importers, due to cost of communication, etc., and it was more effective to deal with middlemen. Now that hatchling production has increased as a result of subadult animals reaching maturity in recent years, they are looking at dealing directly with overseas markets.
- Some large farms (CITES registered and non-registered) export live crocodiles. Typically, a buyer will place an order for crocodiles of certain sizes - if the farm is unable to fill the order with its own crocodiles, it will purchase them from other small, medium or large farms, either directly or through middlemen.
- Trading companies (brokers) with no linkage to a crocodile farm [eg Kamfimes Co.; see Thuok and Tana 1994] purchase and export crocodiles.

6.4. Licencing

Recommendation 6

Establish a Cambodian Crocodile Monitoring Unit to monitor farm and wild populations.

Recommendation 7

Review and improve reporting of farm data to the Department of Fisheries.

Recommendation 8

Centralisation and ongoing computerisation and analysis of farm records.

Recommendation 9

Establish and implement a licencing system that covers all farming operations (ie anyone with crocodiles), traders and exporters.

Under the existing legislation, farms with more than 5 crocodiles are required to be licenced with DoF. According to DoF, of the 900 crocodile farms in Cambodia, around 20% have less than 5 crocodiles, and therefore do not need to be licenced. Licences are renewed annually, and farms are required to submit information of stocks, transactions, etc., at the time of renewal.

Under the new Fisheries Law, licencing would be required for more than two (2) crocodiles (Nao Thuok, pers. comm.). Although this limit of two animals is an improvement on the previous limit (5), monitoring of farm stocks and transactions may still not be as effective as it could be. A pair of crocodiles may produce up to 30-40 hatchlings per year, which may be traded - without any obligation for reporting to DoF. Rather than establish a lower limit on number of crocodiles held, more effective monitoring would be achieved by licencing all operations with crocodiles, no matter how many crocodiles are held.

Monitoring of internal and external trade is proving difficult, and a logbook system to monitor farm stocks and transactions (see 4. above) has only recently (March 2004) been put into place. The levels of farms that are unlicenced suggests that the DoF may not have the capacity to monitor the farms. In this regard, the DoF is investigating the possibility of establishing a group (Cambodian Crocodile Monitoring Unit) that would be responsible for all "crocodile-related" issues, including monitoring of farm stocks and the wild population, reporting to the CITES Management Authority, liaison with enforcement agencies, etc. The establishment of such a group would require resources (WCS has agreed to fund it), as well as training. This approach was taken in Papua New Guinea, where the National Crocodile Monitoring Unit is responsible for all crocodile-related matters.

The CSG review team discussed ways in which monitoring of farm stocks and transactions (internal and external) could be improved. A system of licencing for farms, middlemen and exporters was considered one way in which this could perhaps be achieved. A similar system of licencing exists in Papua New Guinea, where live crocodiles and/or skins may pass through a number of licenced operators up to the point of export. Reporting obligations are associated with each type of licences (Kula and Solmu 1996).

6.5. Hybrids

Recommendation 10

Derive clear criteria for recognising hybrids, and assess and quantify the extent of hybridisation (*C. siamensis* x *C. rhombifer*; possibly *C. siamensis* x *C. porosus*) on farms.

Recommendation 11

Implement actions to contain, reduce or eliminate hybridisation in order to minimise or eliminate completely the possibility of *C. rhombifer* genetic material entering the wild population of *C. siamensis*.

Cuban crocodiles (*C. rhombifer*) were obtained by at least one farm in 1990 (Thuok and Tana 1992), and hybridisation with *C. siamensis* has occurred. Hybrids were recorded by the review team at large-scale farms visited at Sihanoukville (1), Phnom Penh (1) and Siam Reap (1). No hybrids were reported from a village farm at Prek Toal and three large farms at Siem Reap; all had acquired their initial stock from the original farm at Siem Reap in the early-mid 1980s. A floating farm at Chong Kneas with 100 3-year-old crocodiles also reported no hybrids.

SCWG (2004) also reported the possibility of *C. porosus* x *C. siamensis* hybrids within the farms. Given the extent of trade amongst farms within Cambodia, it is likely that hybrids are widespread through many farms. Some escapes (pure and hybrids?) have occurred from farms, and this raises the potential for hybrids to enter the wild population. Any restocking of the wild population would need crocodiles to be DNA-tested prior to release, as was carried out in Thailand (Y. Temsiripong, pers. comm.) and Vietnam (Polet 2004).

One informant suggested that farms preferred hybrids, as they grew faster than *C. siamensis*, and were therefore more sought after. This observation could not be confirmed during the review, and should be tested to determine whether there are any advantages and/or disadvantages of having *C. rhombifer*.

It is unclear how easily hybrids can be detected on visual appearance alone. As extensive cross breeding between hybrids may also have occurred, they may not be identifiable on the basis of external characteristics alone. In Vietnam, one individual assessed visually as *C. siamensis* was confirmed to be a hybrid after DNA testing (Thorbjarnarson, pers. comm.).

6.6. International obligations on reporting on CITES trade

Recommendation 12

As a matter of urgency the Cambodian CITES Management Authority prepare and submit the CITES annual report for 2003, which is overdue.

Article VII, paragraph 7 of the CITES Convention requires each Party to submit an annual report on its trade in CITES-listed species, which should also contain information on the number and type of permits issued and the States with which it traded, including the number and type of specimens including in the shipments. Such trade reporting can be highly useful in helping to shape, implement and assess a country's wildlife trade and management policies.

Cambodia has provided CITES annual reports for the years 1999-2002, but the report for 2003 was been overdue since 31 October 2004. Regardless of the volume and low diversity of Cambodia's wildlife trade, the CITES Management Authority is still in the process of finalizing its annual report.

6.7. Implementation and compliance with CITES legal frameworks

6.7.1. CITES-registered farms

Recommendation 13

Seek assistance from the CITES Secretariat in order to amend the CITES register to: (a) allow international trade in live *C. siamensis*, and (b) remove one inactive crocodile farm from the CITES register.

As *C. siamensis* is listed in CITES Appendix I, in 1998 Cambodia decided to comply with formal registration procedures for commercial captive breeding facilities, and to follow the recommendations as laid out in CITES Resolution Conf. 8.15 [now Resolution Conf. 12.10 (Rev. COP13)]. There are now six (6) crocodile farms in Cambodia registered as commercial captive breeding facilities for Appendix-I species.

Resolution Conf. 12.10 is stricter than the text of the CITES Convention itself. Accordingly, Parties are able to change their national CITES policy, and not be explicitly bound by such CITES Resolutions: they need to inform the CITES Secretariat of such decisions.

If Cambodia decided not to implement Resolution Conf. 12.10, as the EU has done, international trade in any specimen bred in captivity in accordance with Resolution Conf. 10.16 (Rev. COP11) (*'Specimens of animal species bred in captivity'*), can also be accepted, based simply on the provisions of Article VII, Paragraph 4 of the Convention. Adopting this option would not constitute a breach or infraction against the text of the Convention. International trade would still require the importing Party to issue an import permit (Article VII, Paragraph 4).

The current CITES registration of 6 farms is for the export of *C. siamensis* skins, parts and derivatives only - not live specimens. Under Resolution Conf. 12.10, Parties are requested to restrict commercial imports to captive-bred specimens derived from the registered farms only, and to the types of specimens for which the farms had been registered. Furthermore, importing Parties are also requested to reject any documents issued under Article VII, Paragraph 4, if the specimens do not originate from such a registered operation.

The UNEP - WCMC database (sea-bov.unep-wcmc.org/citestrade/report.cfm) indicates that since 1998 Cambodia has exported almost exclusively live *C. siamensis*, mostly in large consignments (eg >10,000 animals) to China, Vietnam and Thailand. This trade cannot be considered as being in accordance with the CITES provisions for either Cambodia or the three importing Parties, each of which also have CITES-registered captive-breeding operations, and should therefore also have complied with Resolution Conf. 12.10.

The nature of the crocodile farming industry in Cambodia is complex, and most of small and medium-sized village farms would not be eligible for CITES registration, and nor would it be warranted for many others. One way of making the crocodile farming and trade system in Cambodia more compliant with CITES under the current system of registration, would be to expand the scope of products that CITES-registered farms are able to export, to include live crocodiles. This could be achieved by notifying the CITES Secretariat that the scope of specimens to be exported by registered farms should be extended to allow trade in live specimens: the CITES Secretariat would amend the register accordingly.

The CSG review team was informed that one of the six registered farms (Long Saran Crocodile Farm, at Siem Reap) had ceased trading. If so, this farm should be removed immediately from the CITES register, through notification by the Cambodian CITES Management Authority to the CITES Secretariat.

6.7.2 Large farms not registered with CITES

Recommendation 14

Consider seeking CITES registration of all additional established crocodile farms that are producing *C. siamensis* through captive breeding and exporting.

At Siem Reap Province (Chea Sopeut Farm), in Sihanoukville and in Phnom Penh (Layimex Farm), the CSG review team visited three farms that were not registered with CITES, yet were similar in size, outlay, design and operation to the registered operations. At least one was a very significant exporter of crocodiles with Cambodian CITES permits. The Cambodian CITES Management Authority should seek registration of these and similar farms expediently, to increase compliance with

CITES until such times as more long-term options are considered (see 6.7.3).

6.7.3. Medium and small farms not registered with CITES

Recommendation 15

Review Government policy with regard to implementation of CITES Resolution Conf. 12.10 (Rev. COP13) on the registration of captive breeding operations for *C. siamensis*.

The majority (>90%) of farms in Cambodia are small-medium sized holding facilities with few (<100 crocodiles). According to the classification system of Ratanakorn (1992), these farms would be considered as either Class 1 (2-20 crocodiles) or Class 2 (<20-70 crocodiles) facilities. Stocks on these farms consist almost entirely of captive-bred F2-F3 generation animals that have originated from founder stock held at Siem Reap Crocodile Farm (in Siem Reap) and Wat Yeah Tep Crocodile Farm (in Kampong Chang Township). Moreover, over half of the village farms were operating when Cambodia acceded to CITES in 1997 (see Jenkins 1998).

Some village farms produce hatchlings from their own breeding stock, whereas others only raise captive-bred stock acquired from other small, medium or large farms. Hatchlings from all of these operations are also regularly sold to “middleman” traders or to larger CITES-registered or non-registered farms, which may finally export those animals together with their own farm-raised stock to CITES Parties.

The current export trade in crocodile specimens originating from non-CITES registered captive breeding operations is not compliant with Resolution Conf. 12.10 (Rev. COP13). One way to overcome this non-compliance within the provisions of the Convention would be for Cambodia to consider a new policy, to allow international trade in truly captive-bred CITES Appendix-I species. This would involve refraining from further adherence to Resolution Conf. 12.10, and would allow Cambodia to simply issue CITES export documents under Article VII, Paragraph 4 (see 6.7.1), only for those *C. siamensis* farms that had been specifically nationally licenced for this purpose. The source code on the respective CITES export permits for such specimens could be “D”, in accordance with the provisions of Resolution Conf. 12.3 (Rev. COP13).

However, before taking a decision for such a new policy, potential importing countries (eg Thailand, China, Vietnam, Singapore, Japan) should be consulted for their views.

6.8. Illegal Trade in Crocodiles

Recommendation 16

Investigate national and international illegal trade in crocodiles involving Cambodia, and if possible quantify the amount of trade, the ways in which it is occurring and the identity of key players and/or organisations involved within or outside Cambodia.

Recommendation 17

Develop pragmatic strategies to curtail illegal trade and test them through implementation.

Recommendation 18

Strengthen enforcement capability of relevant agencies (eg customs, police, fisheries, communities, forestry) through training and capacity-building.

Recommendation 19

Ensure the farm monitoring program with regular inspections is implemented and can assess the legality of stocks.

Recommendation 20

Ensure appropriate actions are taken legally (eg confiscation, penalties) if the farm monitoring program identifies illegal stocks.

Recommendation 21

Establish dialogue with neighbouring states, through a regional working group under an appropriate body (eg ASEAN wildlife trade initiative and/or Mekong River Sub-regional CITES Working Group), to address regional issues and problems with *C. siamensis*.

General

Although valuable insights were obtained on the nature of illegal trade in Cambodia (see below), a more detailed understanding of illegal trade is needed to assist future management and enforcement actions. A firm commitment to investigate this problem in depth from the highest levels of Government may be needed.

Preventing the taking of wild *C. siamensis* by local people through deliberate or incidental catch, and preventing them being offered for sale, is a serious conservation priority in Cambodia. It will require a concerted effort on the part of Government, and may well require assistance with resources.

Captive-bred Crocodiles

Illegal trade in live captive-bred crocodiles from Cambodia occurs mainly to Vietnam, but also to Thailand. Middlemen, particularly from Vietnam, approach farms to purchase crocodiles, and when successful, they smuggle them across the border. On the Cambodian side, incentives to participate in such trade include evasion of the export fee (tax?) imposed by Customs for each animal exported, and the higher prices offered by middlemen.

It was claimed that some Vietnamese middlemen have told Cambodian farmers that the Vietnamese Government does not require CITES permits to be issued. Regardless, it seems likely that some farmers in Cambodia may not even be aware of the illegality of such trade.

Fisheries permits issued for the transport of crocodiles from licensed farms to areas close to the borders with Thailand and Vietnam have assisted middlemen to undertake illegal smuggling across the borders. More stringent examination of applications for transport permits, coupled with improved monitoring of farm stocks and transactions would reduce the ease by which some of this illegal trade is occurring.

Wild Crocodiles

The CSG review team visited a limited number of facilities, and was not in a position to differentiate between what may have been wild or captive-bred crocodiles in those facilities. They cannot thus provide any additional information on the rate at which wild-caught crocodiles may be finding their way into the Cambodian crocodile farming industry. On 27 February at a holding pen at Sre Ambel village, the team were shown a 2.3-2.4 m long crocodile which a fisherman had accidentally caught in the Sre Ambel River, and which clearly had not been released back into the wild.

Discussions with local fishermen during a visit to crocodile habitat (including a nesting site) in the Sre Ambel River area confirmed that wild-taken crocodiles, eggs and hatchlings are being taken from the wild and sold to farms. Indeed, immediately after the CSG review, while this report was being drafted, detailed information (eg numbers and locations of nests, numbers of hatchling taken, prices, name of purchaser, location of animals) was received on crocodiles being illegally taken from the wild in the Tonle Sap area and sold to farms.

On a more positive note, during the CSG review team's visit to Siem Reap, a fisherman at Tonle Sap Lake (Fishing Lot 1, Pursat Province) reported the capture of a 2 m long *C. siamensis* to the Department of Fisheries. Different options for the release of the crocodile back into the wild were discussed between DoF, members of the review team and NGOs, including the possibility of fitting a radio-transmitter to the animal before release (Boyd Simpson, pers. comm.).

Daltry (2004) provided clear insights into the structure and quantity of illegal trade in wild-caught crocodiles that continues. There seems little doubt that these individuals would go to licenced and unlicenced farms, and

eventually find their way through middlemen across borders and into international trade.

Public education programs, capacity-building efforts, promotion of community participation at the local community level (Heng 2004), improved enforcement and monitoring are ways in which this problem may be tackled. Local people seem to be aware that the taking and sale of wild crocodiles is illegal, but there also appears to be a perception that "no-one will do anything about it".

In the opinion of the CSG review team, everything being done now to constrain the taking of wild crocodiles, under any circumstances, should continued while efforts are to upgrade management capacity and effectiveness in the ways suggested here are expediated. That is, it is considered unlikely that the wild crocodile issue can be dealt with effectively in isolation of the broader changes needed to improve management.

As a member of ASEAN (Association of Southeast Asian Nations), Cambodia should follow the recommendations as adopted at the 3rd IUCN World Conservation Congress (Thailand, 17-25 November 2004), of a resolution on '*Illegal and unsustainable international trade in the Association of the Asian Nations (ASEAN) and Mekong river riparian states*'. This resolution calls on all ASEAN and Mekong River riparian states to initiate an immediate, collective international effort to identify and implement the most appropriate solutions to control the illegal trade in wildlife and wildlife products throughout the region. Additionally all ASEAN states are urged to enforce legislation to control the illegal trade in wildlife, focusing especially on strict enforcement of CITES regulations through establishing appropriate legislation and its implementation by the relevant Management Authorities.

Serious dialogue with Vietnam, and also China and Thailand, is urgently required to address trade issues between Cambodia and these states. The CSG review team felt that the establishment of a working group under an appropriate body such as the ASEAN wildlife trade initiative and/or the Mekong River sub-regional CITES Working Group, may be an avenue through which dialogue could be initiated, in order to address regional issues and problems with *C. siamensis* and improve significantly the current situation where lack off co-operation prevails.

6.9. Management Program

Recommendation 22
Develop as a matter of urgency a comprehensive crocodile management program for Cambodia.

Recommendation 23
Establish a strategy for capacity building for all stakeholders, including communities, crocodile farmers, Government agencies, etc., in order to raise awareness of the current status of Cambodia's wild crocodile populations.

There is currently no national crocodile management program in Cambodia. A previous attempt to draft a “master plan” was not completed before funding ran out, and “new” funding would be needed to develop an appropriate management program. Attention also needs to be given to the legislative actions that may be needed to ensure that the conditions eventually agreed within an “approved” management program are enforceable under law.

The drafting of a management program should be undertaken expediently, preferably in cooperation with the IUCN-Mekong Wetlands Biodiversity Conservation and Sustainable Use Program. Consultation with all stakeholders (eg Government agencies, farms, NGOs, communities) in the development of a management program is highly recommended.

A formal management program would commit Cambodia to: discrete management goals; strategies for achieving those goals; mechanisms for assessing success; and, procedures for review and adaptation as new knowledge and experience are generated. Biological variables are often the least important in a management program, and social, cultural, economic and political variables that may ultimately determine the structure of the program, need to be considered.

A management program needs explicit aims and objectives (eg long-term conservation of wild population, habitat conservation, specific recovery goals, public education, industry development), and ideally strategies and actions through which each will be pursued.

All stakeholders, including crocodile farmers, would greatly benefit from having a management program in place, as it would clarify their roles and obligations within the program. CITES obligations and other national legislative requirements did not appear to be well understood by many stakeholders in industry or Government. More importantly, a strategy for capacity building for all stakeholders should be developed within a management program.

6.10. Crocodile Farmers Association

Recommendation 24
Re-establish the Cambodian Crocodile Farming Development Association under its new statutes.

There is recognition from Government and industry alike that the 900 crocodile farms in Cambodia require a body to represent them, nationally and internationally. With encouragement from Government, the Cambodian Crocodile Farming Development Association (CCFDA) was formed in 1995 for this purpose (Thuok 1998). Although early attempts were made to incorporate membership from farms in other provinces, membership of the CCFDA was always limited. Currently there are only 20 members, all from Siem Reap Province. Many farmers do not understand or see any benefits in membership of CCFDA.

Legal recognition of the CCFDA has lapsed (TRAFFIC 2004), and new statutes (Articles of Association) for the CCFDA are now under review by DoF, prior to their submission to the Ministry of Interior for approval. It is important that the CCFDA's new statutes reflect the role that the association can play with regard to conservation and management of both wild and captive crocodile populations.

The CCFDA meets every 3 months to exchange ideas, discuss concerns, etc., and there is one large meeting each year open to all farmers (members and non-members) in the industry. Membership fees are \$US50 per year.

Current CCFDA members are well aware that wild crocodiles should not enter the farms, and have discussed with Government potential avenues through which the CCFDA could assist conservation efforts with wild *C. siamensis* (eg funding, provision of crocodiles for restocking). However, a challenge for CCFDA is to increase membership, given the high number of farms (around 900), their wide distribution (10 Provinces) and the size of operations (containing from 1-2 to thousands of crocodiles). Promoting CCFDA's aims and objectives throughout the industry, perhaps through an industry newsletter, would assist in spreading their conservation message.

A general problem within the industry appears to be communication and information exchange, within and outside Cambodia. For example, the obligations for closed-cycle farming under CITES do not appear to be well understood. The recent decrease in prices for live crocodiles has prompted industry interest in production for skins. However, there is little understanding of the international market, how it operates, or the production requirements for producing high quality skins.

Improved capacity for the CCFDA could be obtained through:

- Increased membership, to reflect the majority and diversity of farms;
- Possible re-organisation into sub-groupings of members;
- Establishment of a clear Central Executive Committee or Executive Office to serve CCFDA members;
- Organisation of regular meetings, seminars and workshops to disseminate information and discuss issues of concern, etc.;
- Organise National workshops on crocodile production, husbandry and the international skin industry (including CITES);
- Development of general industry guidelines and standards (eg reporting, disease control, incubation, hatching, feeding/nutrition, raising); and,
- Participation in international meetings (eg CSG meetings held every two years) and other forums.

The CCFDA could play a major role with conservation and management of the wild crocodile population, by:

- Making crocodile farms, fishermen and the general public aware of the need to conserve the wild crocodile populations;
- Cooperating with Government departments, police, NGOs and others, by reporting infractions, and encouraging members not to accept wild crocodiles;
- Actively assisting Government with efforts to conserve wild crocodiles and their habitats (eg establishment of crocodile sanctuaries, protected areas);
- Providing pure *C. siamensis* for potential re-stocking programs;

- Considering the establishment of a Crocodile Conservation Fund, to raise funding for conservation projects.

The relationship between CCFDA and DoF (the regulatory authority) should be a close, collaborative one. On the one hand Government can keep the industry abreast of international issues, for example those associated with CITES and the CSG. On the other hand, the CCFDA can assist Government by promoting compliance in reporting (eg farm logbooks) and co-operating with licensing of farms or other industry participants (eg middlemen, exporters).

Additional real commercial benefits to CCFDA members could include identification of potential international markets, development of niche markets, value-adding (eg skin products), easier access to markets (eg without middlemen), discount on licencing fees should they be introduced, involvement in training courses, etc.

7. Wild Populations

Recommendation 25

Establish a multi-sectorial Cambodian Crocodile Consultative Committee composed of representatives from all stakeholders.

A number of Government agencies (eg Department of Fisheries, Wildlife Protection Office, Department of Nature Conservation and Protection, Cambodian CITES Secretariat), the farming industry and NGOs share the goal of ensuring the conservation and maintenance of viable wild crocodile populations and their habitats in Cambodia. In recognition of overlapping activities, and the contribution that each can make to a crocodile management program, it is recommended that a multi-sector Cambodian Crocodile Consultative Committee, be formed under the direction of DoF, to ensure communication and involvement of key stakeholders, including educational institutions and relevant community groups.

7.1. Status

Recommendation 26

Continue assessment of the status and distribution of wild *C. siamensis* and *C. porosus*, and perhaps *Tomistoma schlegelii*, in Cambodia.

Recommendation 27

Identify training and capacity needs of Government departments involved with the management of wild crocodile populations.

The need for a detailed assessment of the wild *C. siamensis* population in Cambodia has been identified since 1992, when the situation with farming in Cambodia was first reported to the CSG (Ratanakorn 1992). The issue was raised at subsequent CSG meetings (eg Chheang and Thouk 1993; Thouk and

Tana 1994; Thuok 1998), and although some broad estimates of population size were made (eg Thuok and Tana 1994), they were not based on systematic surveys. Little detailed information on the status of the wild population was available until fairly recently. Of significance in this regard, Flora and Fauna International (FFI) and the Wildlife Conservation Society (WCS), working closely with Government [Forestry Administration (FA) and Department of Fisheries (DoF) respectively], have provided invaluable information on the wild population.

The wild *C. siamensis* population was estimated to be in the order of 9000-12,000 individuals in 1994 (Thuok and Tana 1994; Thuok 1998). Surveys undertaken since 2001 by FFI/FA, in over 850 km of river, have identified 23 sites (in 6 Provinces; Fig. 1) where wild *C. siamensis* are known to occur (Simpson and Han 2004). Additional surveys have been done by WCS/DoF in the Sre Ambel River area, around Tonle Sap Lake and in Rotanakiry Province (bordering Laos) (Heng 2004). The wild population is now estimated to consist of no more than 200 adults (Simpson and Han 2004; SCWG 2004), and if adults represent 5-10% of the total population, which is reasonable in a depleted population, total population size may be 2000-4000 non-hatchlings.

Only two sites surveyed have recorded more than a few individuals, suggesting a highly fragmented population. Although many areas remain to be surveyed, and more sites containing crocodiles may well be identified, the overall status of the wild population is unlikely to change.

Nesting has been confirmed at three locations (Areng River, Veal Veng Swamp, Sre Ambel River), and reported from some others (eg Pursat and Koi Rivers, Srepok River, around Tonle Sap Lake) (Simpson and Han 2004; Simpson, pers. comm.). A recent survey by WCS/DoF in the Sre Ambel River area located a *C. siamensis* nest in an oxbow lake, which was protected until it hatched, and the resulting 8 hatchlings were released (Heng, pers. comm.). The total number of wild nests made in Cambodia is unknown.

Collection of crocodiles is considered to be the key threat for the wild *C. siamensis* population, although habitat destruction and unsustainable fishing practices are considered important (Simpson and Han 2004; Daltry *et al.* 2003).

The situation with wild *C. porosus* in Cambodia is unclear. Information from coastal township of Sihanoukville, suggest that *C. porosus* are rarely, if ever, sighted by fishermen. It is possible that remnant populations may still exist in unaltered mangrove habitat along the coast. Four *C. porosus* reported to be at one Siem Reap farm (Table 1) were not sighted by the CSG review team when that farm was visited.

7.2. Community involvement in crocodile conservation

A project initiated by FFI/FA with the O'Som Commune (Veal Veng District), integrates crocodile conservation with land use and resource management ("Veal Veng Community Conservation Project"). Over 200 ha of the Veal Veng Marsh have been designated as a crocodile sanctuary, and all crocodiles on O'Som lands are protected (Daltry *et al.* 2004). Veal Veng Marsh contains the largest known wild population of *C. siamensis* in Cambodia.

To the O'Som community, it is considered "bad luck" to kill a crocodile, and they are revered. These same types of beliefs are not necessarily shared by other local communities, and so this model may have limited application outside the area. Nonetheless it is an example of community involvement assisting crocodile conservation efforts.

Where a "relationship" does not exist between a community and crocodiles, the approach and incentives to conserve may need to be different. Incentives to conserve may need to be linked to some form of regulated use. Given the status of the crocodile population, this may become more important as the local crocodile populations recover.

7.3. Protected Areas

Recommendation 28

Improve enforcement and management activities to promote recovery of the wild population in existing protected areas where crocodiles are known to occur.

Protected areas make up approximately 23% of Cambodia's land area, with jurisdiction vested in two Government agencies:

- The Department of Nature Conservation and Protection (Ministry of Environment) is responsible for biodiversity protection in 23 areas protected prior to 1993 (Fig. 1). Most of these areas contain potential crocodile habitat. The capacity and knowledge of DNCP staff is not sufficient for adequate enforcement in these areas.
- The Forestry Administration (Ministry of Agriculture Forestry and Fisheries) is responsible for Protected Forests and Reserves established by Royal and Government Decree after 1993 – some 5 million hectares. As most wildlife is within forested areas, the responsibility for protection and maintenance of habitat, and enforcement, lies with the Wildlife Protection Office (WPO). Other than around Tonle Sap Lake, crocodile habitat is largely intact, and habitat restoration is not an issue. The first priority is to "secure" these areas – but resources to do so are limited. As a result, protected areas are still subject to illegal harvest. Under Declaration No. 509, the WPO has responsibility for maintaining wildlife in these protected areas, but not "fish", which includes crocodiles. Given the recent confirmation of responsibility for crocodiles to the DoF (see above), the WPO feels that it is crucial that the two agencies meet, to clarify how they will work together for common goals.

Other NGOs (eg WildAid, WWF), in collaboration with Government, have also established protected areas that have the capacity to protect crocodiles. A goal of FFI/FA is to try and fit crocodiles into existing programs of other NGOs (eg with WWF Cambodia and the Mundilkiri Protected Forest Project).

Unlike Vietnam, Thailand and China, where the amount of remaining suitable crocodile habitat is highly restricted, Cambodia has extensive areas of potential crocodile habitat. In addition, *C. siamensis* appears very adaptable

to different types of habitat (eg swamps, lakes, rivers). Thus, the option of stocking new areas with crocodiles is likely to be successful- as long as safeguards (eg enforcement) are in place to allow population growth and/or recovery. Crocodylians have an incredible capacity to recover from drastic population reductions, particularly if habitats remain intact and they are given the opportunity [eg *C. porosus* in Australia (Webb *et al.* 1984); *Alligator mississippiensis* in USA (Elsley and Kinler 2004)].

7.4. Crocodile Sanctuaries

Recommendation 29

Identify and establish such new protected areas and/or sanctuaries that may be needed to ensure a significant part of the remaining wild population and its habitats are retained.

Areas with wild crocodiles and nesting continue to be identified. Seven areas were recently identified in the Sre Ambel River area by WCS/DoF personnel. With intact habitat, areas like these could be proposed as crocodile sanctuaries. However, it is unlikely that collection of eggs or crocodiles will cease without personnel on-site.

A number of sanctuaries, distributed geographically around the country, could allow discrete populations of crocodiles to be boosted by reintroduction and recover. However, successful recovery in protected areas would still require nest protection and thus permanent (or seasonal) presence of staff.

Sustainable use programs (consumptive or non-consumptive) directly linked to communities could potentially create local incentives for crocodile conservation, even in sanctuaries set aside for crocodiles. Similar models are used elsewhere (eg Melacca Swamp in northern Australia).

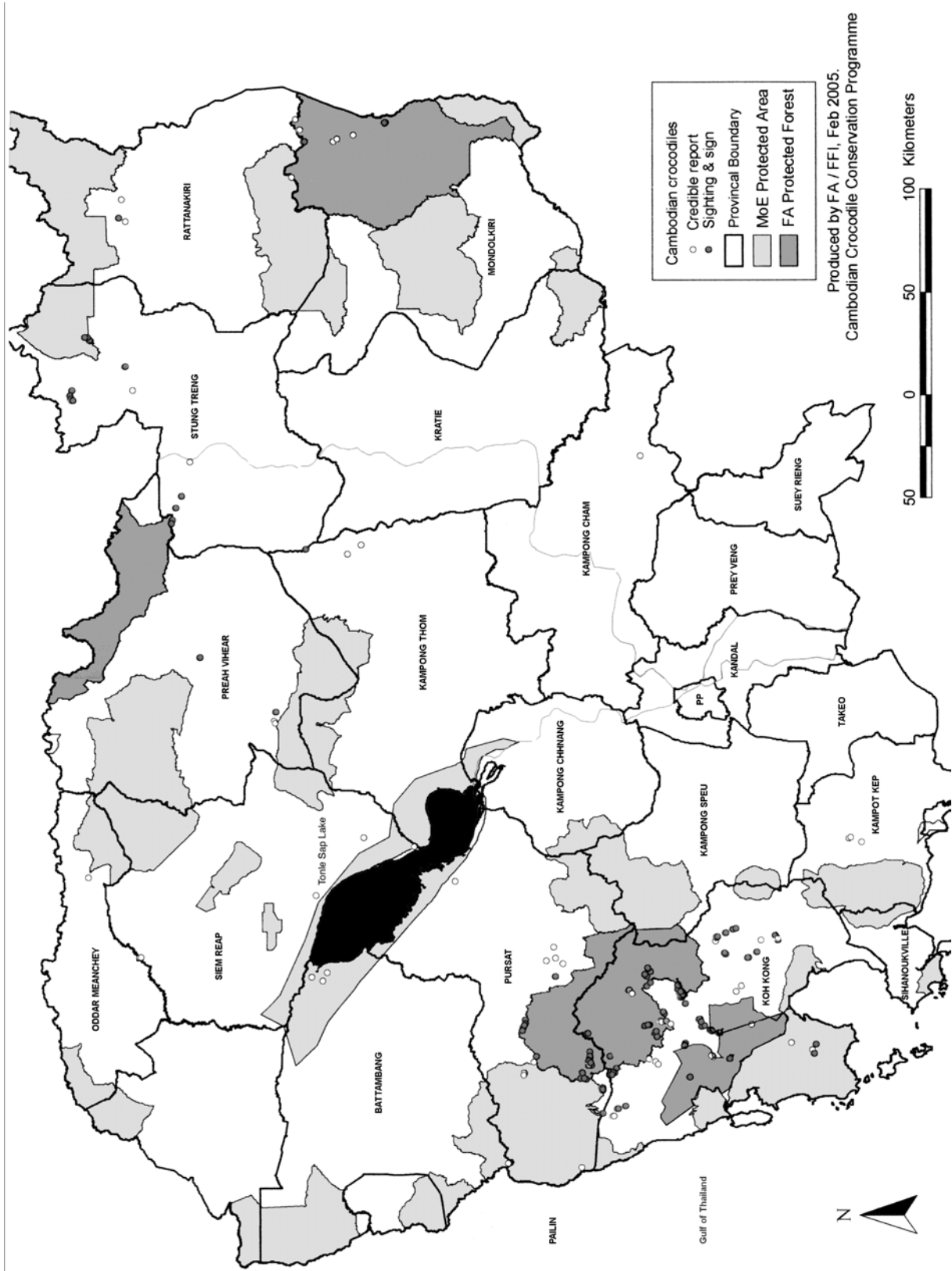
8. Law Enforcement and Implementation

Recommendation 30

To ensure compliance with CITES make a strong high-level Government commitment to stop illegal trade in crocodiles (and other species of wildlife), and ensure compliance with CITES.

A lack of enforcement capability was common to all Government departments visited by the CSG review team. Enforcement capability at all levels within different Government authorities needs to be increased and improved.

Improved monitoring of trade and farm stocks would assist enforcement, but a strong high-level Government commitment to stop illegal trade is critically important.



Produced by FA / FFI, Feb 2005.
Cambodian Crocodile Conservation Programme

Figure 1. Protected areas under the jurisdiction of the Ministry of Environment and Forestry Administration (Ministry of Agriculture, Forestry and Fisheries) (shaded areas; see key). Credible reports of crocodiles are shown as open circles, and sightings/signs are closed circles. Map produced by Forestry Administration-Flora and Fauna International.

9. Farming Issues

Recommendation 31

Identify training needs of the farming industry, and organise relevant courses, workshops, etc.

9.1. Captive Breeding

Regardless of size, farms can be divided into those that are land-based, and those where breeding stock are maintained in floating enclosures except in the breeding season, when they are moved onto land.

Land-based Farms

Land-based farms are very similar to each other in design, and mirror the systems used in Thailand and Sarawak (Malaysia) with *C. siamensis* (Webb and Jenkins 1991) and *C. porosus* respectively (personal observation). Breeding pens consist of concrete-lined ponds, and land areas are generally devoid of any vegetation except for some shade trees. Outer walls are constructed of concrete, with walkways across them to allow viewing and feeding of animals from above. Nesting boxes along the walls of the pens are available for females to enter and construct their nests. Doors can be dropped into place to allow workers into the boxes to safely collect eggs. Vegetation and/or soil for nesting is added to the nesting boxes prior to the nesting season.

Adults are housed together in large communal groups. At one farm, doors between adjacent breeding pens were left open, and crocodiles were able to move freely between the different pens. Three of the five farms visited maintained a sex ratio of 2.5-2.6 females per male, one farm had 3.8 females per male, and the remaining farm had 2.0 females per male. Thouk (1998) reported that a sex ratio of 3:1 was common.

At three farms that have operated for long periods of time, and where reasonable estimates were available on annual nest and hatchling production, approximately 18%, 26% and 45% of females nested each year. This equates to means of 6.7, 4.0 and 6.5 hatchlings produced per female. For another farm, nest numbers were not available, but it was claimed that a mean of 13.5 hatchlings is produced per adult female.

Eggs are not assessed prior to incubation to confirm whether they are fertile or not. The observation that some nests do not produce any hatchlings at all and that some nests produce only one or two hatchlings, is similar to observations with adult *C. porosus* housed in communal pens, where behavioural interactions result in high egg infertility and high proportions of females not nesting at all. Given that some farms have young crocodiles that may not have reached maturity yet, the degree to which such interactions are contributing to low hatchling production per female remains unclear.

Floating Farms

Breeding stock are maintained during the wet season in relatively high densities within floating cages. Prior to the nesting season, which is within the dry season, breeding stock are “walked” out into small wooden enclosures on the river bank. All such farms visited at Prek Toal were similar, with breeding adults maintained at relatively high densities within a single enclosure on the land. A concrete-lined pond provided water, and nesting boxes were arranged along the inside wall/s. Like the land-based farms, raised walkways allowed crocodiles to be observed and fed from above.

The floating farms at Prek Toal varied with regard to the number of breeding adults, having from 10 to 50 animals. Detailed information was only obtained from one of the largest and most efficient of the 20-25 floating farms there: it is considered to be one of the best in terms of production, nests are obtained from around 67% of the females, hatchling production is equivalent to a mean of 5.0 hatchlings per female, most adults are over 20 years old and are likely to be mature. Factors other than age and maturity may be responsible for low production.

9.2. Incubation

Incubation of eggs is undertaken in beds of humus and/or soil, which typically contains a high proportion of woody vegetative material. In Siem Reap, nesting material is collected from Tonle Sap Lake after wet season waters have receded. This style of incubation was practised by Thai crocodile farmers in the late 1980s and early 1990s (Webb and Jenkins 1991), but was subsequently replaced by more sophisticated incubation techniques by most if not all of the larger commercial farms.

“Incubators” have a roof of thatching material, corrugated iron or opaque/translucent fibreglass sheets. At one farm, one side of the roof comprised a sheet of clear plastic that could be rolled up or down for ventilation.

Temperature near or within the layers of eggs is measured with standard thermometers. Five farmers reported that incubation temperatures were; 36-40°C, 30-34°C, 31-33°C, 27-40°C and 28-32°C. Only one farmer appeared to have a clear idea of what constituted optimum incubation temperatures, and what was too low (“29°C”) or too high (“35°C”) – he also was aware that high temperatures for up to one day were not detrimental, but for longer periods they could be. Another farmer was aware that 40°C was too high, but that 36-37°C was “good”. Another considered that 28°C was the best temperature. In reality, temperatures of <28°C and >34°C throughout incubation are unlikely to hatch and/or result in high rates of abnormalities (Webb *et al.* 1987a; Webb and Cooper-Preston 1989; Manolis and Webb 1991).

Incubation periods (65-74 d) suggest that mean incubation temperatures for eggs that produce hatchlings are probably within the range of 32-34°C, despite more extreme daily fluctuations. Other than the physical structure of incubators (ie roof, soil depth), there appears to be little attempt to control temperature during incubation. One farmer indicated that he sprays the nesting material with water if temperatures are too high.

The moisture environment of incubation is also important. The general consistency of the nesting material appears to be such that it would drain easily, and allow water (for cooling) to be added without “drowning” the eggs, as would occur in a compact soil or earth nest mound. All farmers reported that a proportion of hatchlings (<10%) have abundant yolks and wide yolk scars. Although there is insufficient information available at this stage to ascertain the cause of this, high incubation temperatures, or lack of oxygen in the final stage of incubation, are known to cause “yolky” hatchlings (Manolis and Webb 1991). Nesting material which is too wet and/or compacted could restrict oxygen supply to the developing embryo, especially towards the end of incubation when their oxygen demands are highest (Whitehead 1987): it can also result in early internalisation of the yolk and premature hatching (Webb *et al.* 1987a).

Hatching rates were reported as varying between 45% and 70% (mode = 50%) of all eggs laid, for those farms that were visited. Eggs are not checked during incubation, and unhatched eggs are generally not opened to ascertain whether they were infertile, died during incubation, etc. Thus, incubation success based on live eggs cannot be determined.

All farmers were aware that the uppermost surface of the egg should be marked as eggs are removed from the nest (Webb *et al.* 1987b,c), so that egg orientation can be maintained in the incubator - although this may not always be done.

The sex ratio of hatchlings produced is unknown, but crocodiles have temperature-dependent sex determination and the incubation period suggests that it may be biased towards high-temperature females (Webb *et al.* 1987a): particularly if high temperatures are experienced during the period of embryonic development when sex is allocated.

9.3. Mortality

0-1 years

All farmers indicated that hatchling mortality was the main “problem” area associated with raising. Most mortality occurs within the first 3-4 months of life, and typically during the “cool” time of the year. Mortality rates appear to vary from farm to farm, and were reported as 10 to 40% for the farms visited. Informants indicated that mortalities can be higher at some other farms, and sometimes reach 100%.

The main causes of hatchling mortality were reported to be “viral infections”, eye disease (conjunctivitis?) and non-initiation of feeding. Animals that hatched with abundant yolk were also susceptible to mortality unless given special attention. Paralysis of the limbs and “star-gazing” was also described by some informants, and has been reported by Thuok (1998).

Juveniles (1-6 years)

After crocodiles have reached one year of age, mortality rates appear to be low (less than 1% per year), although definitive records were not available on

the farms visited. The main cause was reported to be fighting. One farm in Sihanoukville described symptoms suggestive of “steatitis” in 2-3 crocodiles that had died, which is usually linked to rancid fish oils in food.

Adults

Adult mortalities were reported to be very low, with only the occasional animal being killed by other crocodiles.

9.4. Growth Rates

Growth rates vary greatly between individual crocodiles within a farm, and between farms. There was insufficient information to conclude whether there were differences between different raising strategies (ie floating versus land-based farms). One floating farm at Chongkneas had around 100 juveniles of 1.4-1.6 m length, which were 3 years of age. A floating farm at Prek Toal reported that animals reached 1.5 m after 5 years. A Phnom Penh farm reported that crocodiles took around 6 years to reach 1.8-1.9 m.

Notwithstanding these differences, the mean size at one year of age appears to be around 70-80 cm, with the fastest-growing animals attaining 1 m in length, and the slowest-growing ones about 40 cm. The size of crocodile sold by farms in Cambodia is highly variable, but if production was for skins, crocodiles would need to be a minimum of 1.6-1.8 m length, which would probably take around 4 to 6 years of age.

9.5. Culling

The export market for Cambodian crocodile farms has been almost exclusively for live animals, and only one export of 20 skins has been reported by the Cambodian CITES Management Authority. Thus, farms have little experience or knowledge of appropriate skin removal and preparation for the international market.

9.6. Food

Freshwater fish is the main food used to feed crocodiles on all farms visited at Tonle Sap Lake and Phnom Penh. Marine fish is increasingly being sought by some large crocodile farms, in part due to the increasing belief that crocodiles grow better when fed marine fish. Hok (2003) found that the mean weight gain and food conversion rate for *C. siamensis* hatchlings fed marine fish were better than those for animals fed freshwater fish (15 g/d and 8 g/d; 42% and 71% of food eaten converted to body weight, respectively). The four farms near or in Sihanoukville all reportedly utilise trash marine fish, due to their proximity to the coast and the results of Hok (2003). In 2004, the cost of marine fish in Sihanoukville had increased to around \$US0.17/kg, compared with \$US0.10 the year before, due to the demand by farms at Siem Reap.

None of the four large farms visited at Siem Reap currently used water snakes as a food source, as the cost of snake is high relative to fish. However, the floating farms at Prek Toal (Tonle Sap Lake) do use water snakes (mainly 4-5 species), mainly during the wet (high water) season when fish are less

available. The cost of snake has increased from around \$US0.08-0.12/kg two years ago, to around \$0.50/kg now, apparently due to increasing demand from crocodile farms in Phnom Penh.

Fishermen are contracted to supply fish and snakes at Prek Toal, with fish currently costing \$US0.12-0.24/kg. The farm at Phnom Penh also reported using snakes (from Tonle Sap Lake) during the wet season, although fish was the main food source. A farmer at Prek Toal thought that crocodiles preferred snake to fish, as the former “stayed in the stomach longer”, perhaps reflecting differences in digestibility.

An expatriate living at Siam Reap for many years reported that the trade in water snakes (“5 tons/day”) at Tonle Sap Lake was mainly for the crocodile farming industry, and that perhaps 10% were for export or for the skin industry. A DoF informant reported that up to 10-20 tons/day of snake could be caught, and that snake is utilised by many village crocodile farms close to the source of the snakes, and by large-medium farms when fish is not available.

Floating and land-based crocodile farms at Prek Toal, Siem Reap, Chongkneas and Phnom Penh all reported that rats were also used to feed crocodiles, and that they are collected by farmers during the wet season. Other food sources (eg duck, dog, buffalo) are used opportunistically when and if they become available.

10. The Mekong Wetlands Biodiversity Conservation and Sustainable Use Program (2004–2009)

The Mekong Wetlands Biodiversity Program (MWBP) is a joint initiative of the four governments of the Lower Mekong – Cambodia, Lao PDR, Thailand and Vietnam - aimed at improving the conservation and sustainable use of wetlands and their natural resources. The program has a regional component and four national/demonstration site components. It is a GEF-sponsored program, executed by UNDP and implemented by IUCN–World Conservation Union and the Mekong River Commission.

Within the framework of the program, the MWBP has identified the Siamese Crocodile as one of four flagship species. The MWBP aims to address the conservation and management issues affecting these species through the development and implementation of Regional Species Conservation Action Plans (SCAP) for each one. The MWBP has recently appointed a Regional Coordinator for the Siamese Crocodile SCAP development.

The SCAP development process includes providing support to identified priority interventions parallel to the development of the SCAP. The MWBP is working with responsible agencies and other stakeholders in the four nations. In Cambodia, identified priorities for MWBP interventions for *C. siamensis* in 2005 include support for the following:

- Assessment of the status and distribution of the wild population
- Community-based conservation and management activities in identified critical areas

- Dialogue at all levels to address trade issues and CITES compliance
- Capacity building and awareness activities for relevant stakeholders, particularly crocodile farmers
- Production of survey and monitoring handbooks
- Development of a national and regional strategy and action plan.

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Appendix I. Terms of Reference developed for the CSG Review of Crocodile Conservation and Management in Cambodia.

Objective

Review the conservation status, management and farming of crocodiles in Cambodia.

Members of Review Mission

- Dr. Dietrich Jelden, CSG Deputy Chairman
- Mr. Charlie Manolis, CSG Regional Chairman for Australia and Oceania
- Dr. Choo Hoo Giam, CSG Steering Committee Member
- Ms. Julie Thomson, Deputy Director, TRAFFIC Southeast Asia and CSG Member
- Mr. Alvin Lopez, IUCN-Mekong Wetlands Biodiversity Conservation and Sustainable Use Program, Lao PDR, and CSG member.

Methods

Stage 1: Consultation with major stakeholders;

Stage 2: Visits to large CITES registered, non-registered and village level farms;

Stage 3: Visit to relatively accessible *C. siamensis* habitats;

Stage 4: Formulation of review and recommendations;

Stage 5: Presentation and discussion of findings and recommendations with all stakeholders (eg Government authorities, crocodile industry, representatives of local communities and NGOs); and,

Stage 6: Completion of final report.

Issues (exemplary only) to be addressed during review mission

- **Administration.** Legal framework, institutional structure (including staff and authorities involved) and/or policy to monitor and regulate the crocodile trade.
- **Management.** Evaluation of current crocodile management in Cambodia
 - Management plan
 - Implementation and compliance of CITES legal frameworks such as resolutions on captive breeding, farming and registration of captive breeding operations (mortality, monitoring, adding of additional animals, marking, marketing of product, etc.)
 - CITES permits and tags, including reporting on the national and international level
 - Internal and international trade in live animals
 - Illegal trade
 - Role and involvement of local people in crocodile management, including economic incentives

- **Reporting and Monitoring**
 - Wild populations
 - Stocks
 - Captive breeding
 - Raising
 - Culling
 - Export (live and products)

- **Law Enforcement and Implementation**

- **Wild Species Issues.** Conservation and management of wild populations
 - Species (*C. siamensis* and *C. porosus*) distribution (historical and now)
 - Biological status and protection
 - Monitoring

- **Captive Species Issues.**
 - Species (*C. siamensis*, *C. porosus* and *C. rhombifer*)
 - Historical assessment
 - Captive breeding
 - Incubation
 - Hatchling to Year 1
 - Year 1 to culling/sale
 - Mortalities
 - Growth rates
 - Food
 - Husbandry assessment
 - Skins versus live trade

- **Capacity assessment/training**
 - Wild populations
 - Captive populations

Host Agency

Ministry of Agriculture, Forestry and Fisheries - Department of Fisheries.

Timing

23 February to 3 March 2005

Appendix 2. Review Mission Itinerary.

- 21-22 Feb Arrival of CSG Review Team in Phnom Penh.
- 23 Feb Phnom Penh: Consultation with Government (Department of Fisheries; Wildlife Protection Office; Forestry Administration) and non-Government (WildAid) stakeholders.
- 24 Feb Phnom Penh: Consultation with Government (CITES Management Authority, Department of Nature Conservation and Protection) and non-Government (Wildlife Conservation Society, Flora and Fauna International, Save Cambodia's Wildlife, Village Focus International, WWF Cambodia, Conservation International) stakeholders.
- 25 Feb Siem Reap: Visit to floating (Chong Kneas) and village (Prek Toal) crocodile farms on Tonle Sap Lake.
- 26 Feb Siem Reap: Meeting with Cambodian Crocodile Farming Development Association; visit to large, land-based crocodile farms at Siem Reap.
- 27 Feb Visit to crocodile habitat on Sre Ambel River and crocodile farms at Sre Ambel township and Sihanoukville.
- 28 Feb Return to Phnom Penh; visit crocodile farm.
- 1 Mar Phnom Penh: preparation of report and presentation.
- 2 Mar Meeting with Cambodian CITES Secretariat; presentation of review results and recommendations to stakeholders.
- 3 Mar Departure from Phnom Penh.