

Crocodile Conservation at Work in Vietnam, Re-Establishing *Crocodylus siamensis* in Cat Tien National Park

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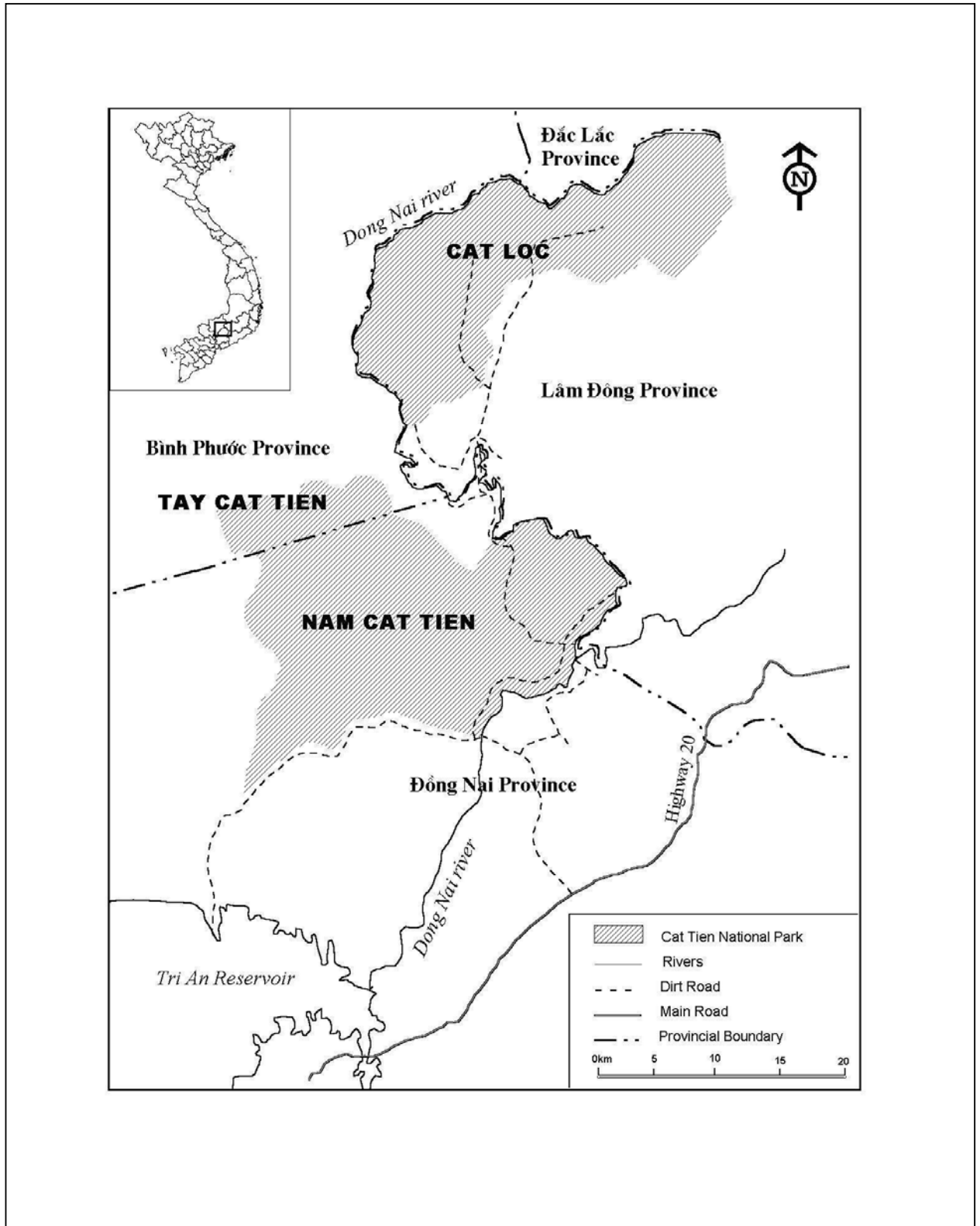
ABSTRACT: The Siamese Crocodile *Crocodylus siamensis* is classified by IUCN as globally critically endangered. Up to two decades ago, the species was abundant in a wetland ecosystem currently located in Cat Tien National Park – southern Vietnam. Hunting for meat and to stock crocodile breeding farms decimated the population and the species was regarded to be extinct from the Park. This paper presents the activities undertaken to re-establish the species in Cat Tien National Park over the last two years. Crocodiles, donated by a private farmer in Ho Chi Minh City, have been DNA tested to avoid the release of mixed breed individuals (*C. siamensis* x *C. porosus* and *C. rhombifer*). From December 2001 onward, nineteen crocodiles have been released in the Park. Initial monitoring data suggests a stable population has been established. The programme is scheduled to continue over the next two years.

INTRODUCTION

Cat Tien National Park is located about 150 km North of Ho Chi Minh City, on the plains of the Dong Nai River, South of Vietnam's Central Highlands. It is situated in Dong Nai, Lam Dong and Binh Phuoc Provinces but management is in the hands of the central Government's Ministry of Agriculture and Rural Development). The Park measures about 75,000 ha but is divided in two separated sectors; Cat Loc in the North and Nam Cat Tien in the South (see Map 1). Since 1998, the Park receives

substantial financial and technical support from The Netherlands Government through the WWF - Cat Tien National Park Conservation Project.

Map 1: Cat Tien National Park



Cat Tien National Park is located in the monsoon tropical region with a distinct wet and dry season. The topography is characterised by areas with steep hills and flat areas. Although altitudes range only from 200 to 600 metres above sea level, slopes are relatively steep. The Dong Nai River borders the Nam Cat Tien sector in the East and the Cat Loc sector in the West and North. The northern central section of Nam Cat Tien is poorly drained and contains an area of small streams, lakes and seasonally inundated grasslands (Cox et al., 1995).

The Park harbours the last remaining sizeable lowland rainforest in southern Vietnam which consists of a wide variety of habitats. These include:

- primary and re-growth evergreen tropical lowland rainforests dominated by Dipterocarpaceae,
- primary and re-growth semi-evergreen tropical lowland rainforests dominated by *Lagerstroemia spp.*,
- freshwater wetlands with open lakes and seasonal floodplains containing *Saccharum spontaneum*, *S. arundinaceum* and *Neyraudia arundinacea*,
- flooded forests dominated by *Hydnocarpus anthelmintica* mixed with *Ficus benjaminica*, and
- areas severely denuded by warfare dominated by bamboo and open grasslands.

The Park hosts a rich variety of wildlife. A total of 99 mammal, 311 bird, 69 reptile and 30 amphibian species have been confirmed to occur in the Park. These include rare and endangered species such as Javan Rhinoceros *Rhinoceros sondaicus annamiticus*, Asian Elephant *Elephas maximus* and Gaur *Bos gaurus* and nine primate species, albeit all in rather low numbers (Polet et al., 1999; CTNP, 2000). Orange-necked Partridge *Aborophila davidi* is endemic to the Park area (Atkins and Tentij, 1998).

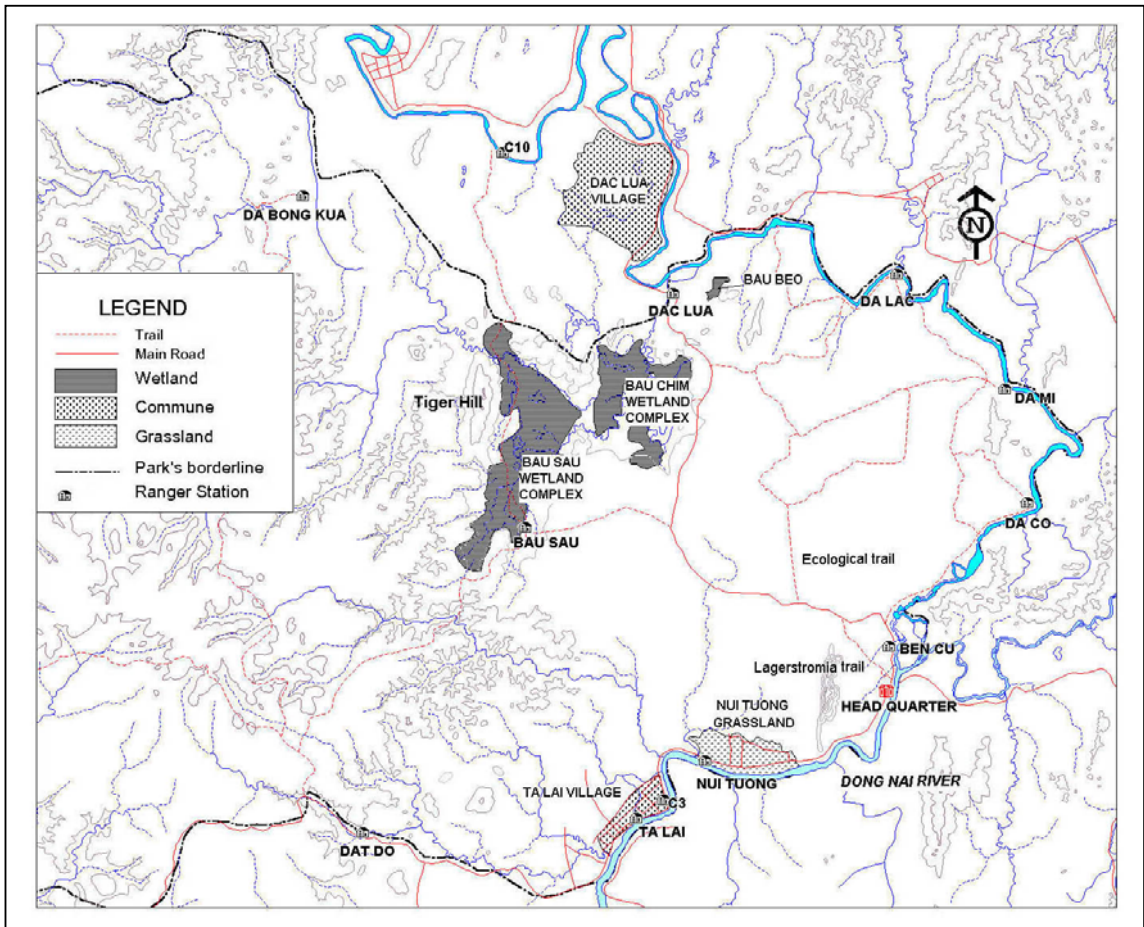
SIAMESE CROCODILES IN CAT TIEN NATIONAL PARK

Cat Tien National Park hosted large numbers of Siamese Crocodile *Crocodylus siamensis* in earlier times. They occurred on the Dong Nai River but high concentrations could be found in the wetland complex in the northern section of Nam Cat Tien (see Map 2). One of the lakes in this complex is called Bau Sau (Crocodile Lake). The Bau Sau wetland complex has a wet-season maximum circumference of about 2,670 ha and a minimum dry-season circumference of about 150 ha (Wuytack, 2000). Large areas of the Bau Sau wetland habitat are intact and currently well protected.

Ho Thu Cuc (1994) reported that wild populations of Siamese crocodile in Vietnam were restricted to Suoi Trai Nature Reserve in Khanh Hoa Province, Lac Lake in Dak Lak Province and Nam Cat Tien National Park and that no more than 100 individuals survived in the wild in Vietnam. A crocodile was caught in the Dong Nai River in 1989 when fishermen were using explosives. In the same year a small crocodile was observed by Cat Tien National Park staff in the Dong Nai River near the Park's headquarters. Villagers from Dak Lua village reported to have last seen an 80 kg crocodile in 1996 and in the same year they caught a 50 kg crocodile in the Bau Sau wetland complex (Bembrick and Cannon, 1999). In 1994 a Russian scientist claims to have seen a crocodile in a small pond inside the forest (Andrei Kouzenetsov, pers.

comm.). Cat Tien National Park staff have not observed crocodiles since 1996 and it has been concluded that there are no Siamese crocodiles remaining in Cat Tien National Park although there is a possibility of a few animals surviving in areas which are difficult to access (Bembrick and Cannon, 1999). Platt and Ngo Van Tri (2000) came to the same conclusion after a brief survey in Cat Tien National Park. The Siamese crocodile is now regarded to be one of the most critically endangered crocodiles in the wild in the world although captive populations in breeding farms number many thousands (Ross, 1998).

Map 2: Crocodile Lake Wetland Complex



The decline of the Siamese crocodile in Cat Tien National Park was due to vigorous hunting of adults for their skin and sub-adults sold live to crocodile breeding farms; eggs were never harvested (Bembrick and Cannon, 1999). Since the mid-1970's, the crocodile population in Cat Tien National Park has dwindled, most dramatically between 1975 and 1985. Hunters came from the Mekong Delta and Dak Lua village; the latter reported to have caught one crocodile per day on average. Hunting took place year-round, but most intensively during the wet season, using baited hooks and lines, nets in the water and rope traps on land (Bembrick and Cannon, 1999). Habitat

destruction does not appear to have contributed significantly to the decline of Siamese crocodiles in Cat Tien National Park.

In the 1980's Cuban crocodiles (*Crocodylus rhombifer*) have been imported into Vietnam. They were distributed between zoos and also ended-up in crocodile farms. Hybridisation between *C. siamensis* and *C. rhombifer* produces larger egg clutches and offspring which seem to grow faster than pure breeds. These features are advantages for the leather industry and most captive crocodiles in southern Vietnam are now hybrids. Hybrid animals remain fertile. Second and third generation off-spring can not be distinguished by eye from pure *C. siamensis*. Therefore, most of the captive crocodile stock available in southern Vietnam is not suitable for a re-establishment programme which requires pure *C. siamensis* to be released within its historic range.

BACKGROUND TO THE RE-INTRODUCTION PROGRAMME

The Cat Tien National Park authorities have been seeking to re-establish a Siamese crocodile population since early 1999. Such a move was inspired from a desire to secure an ecosystem which is as complete as possible as an example for future generations.

Under the auspices of the WWF-Cat Tien National Park Conservation Project, a short survey was conducted by Bembrick and Cannon in January 1999 whose main findings have been presented above. Their survey included several visits to crocodile farms in and around Ho Chi Minh City. The owner of one of the farms visited contacted the authorities of Cat Tien National Park later in 1999 and offered to donate a number of crocodiles for release into the Bau Sau wetlands. Based on his breeding records, he was quite certain that the crocodiles he offered were related to crocodiles which were captured live in the same Bau Sau wetlands a few decades earlier and should therefore be pure *C. siamensis*.

In Vietnam, confiscated wildlife is often released in protected areas. Because there are very few wildlife rehabilitation centres in the country, most wildlife is simply released in a protected area nearest to the confiscation site. It thus happens regularly that species are released outside their natural range. Also, quarantine rules are not observed and thus these releases pose a real threat to indigenous populations of wildlife. Apart from the lack of facilities, most wildlife officials in Vietnam seem to be simply un-aware of issues such as wildlife diseases and introducing non-indigenous species. As a result, many officials tend to believe that re-introducing wildlife is simply a matter of opening a cage or bag.

When the WWF-Cat Tien National Park Conservation Project was invited to support the re-establishment programme, issues such as pure breeds, indigenous species and re-introduction guidelines were discussed at some length. It was agreed that the re-establishment of the Siamese crocodiles would be conducted on the basis of sound science. WWF put forward three requirements for its involvement:

- As hybrids can not be distinguished from pure animals using external features, all crocodiles should be DNA tested and confirmed to be of pure *Crocodylus siamensis* before being transferred to the Bau Sau area.
- The Bau Sau wetland complex has to be strictly patrolled in order to reduce the current high incidence of illegal fishing in the area, where opportunistic fisherman in the area thought to pose a threat to released crocodiles.
- A feasibility study should be conducted to assess the suitability of the Bau Sau wetlands as a re-establishment site before release.

The re-establishment programme was conceived and formulated in 1999 by different organisations working together informally. These were:

- Cat Tien National Park as the host and release site of crocodiles.
- A private company crocodile farmer from Ho Chi Minh City who would donate about 20 crocodiles.
- The Saigon Zoo which would provide technical advice and who would be the intermediary with Queensland and Canberra Universities – Australia.
- Queensland and Canberra Universities which would conduct DNA testing under an agreement with the Saigon Zoo.
- The WWF-Cat Tien National Park Conservation Project which would provide financial support and technical advice based on contacts with the IUCN-SSC Crocodile Specialist Group.
- At a later stage, the MARD of the Vietnam Government joined as a stakeholder when they made an additional budget available.

GOAL, OBJECTIVES AND PLANNED ACTIVITIES

By late 1999, the following set of objectives were formulated and agreed by the stakeholders to guide the re-establishment programme.

The goal to re-establish a population of Siamese crocodile in Cat Tien National Park is to ensure that an ecosystem that is as complete as possible and which represents a natural southern Vietnamese lowland ecosystem will remain as an example for future generations. The objectives to reach this goal are as follows:

1. To re-establish Siamese crocodile in Cat Tien National Park in a careful and scientifically sound manner.
2. To maintain a viable wild population of Siamese crocodile in Cat Tien National Park.

In order to reach the above objectives, aiming at achieving the above goal, a number of activities have to be deployed.

To re-establish Siamese crocodile in Cat Tien National Park in a careful and scientifically sound manner.

- A **feasibility study** has to be executed, assessing the suitability of - and food-availability in the prospective area to host Siamese crocodile, i.e. Bau Sau wetland complex in Cat Tien National Park. The study should include an assessment of impacts of crocodile on the remainder of the ecosystem as well as an assessment on whether crocodiles in the area will be safe from poaching. Of concern is the heavy under-water vegetation which can hamper the movement of young crocodiles. Also the risk of having crocodiles leaving the National Park through the Dak Lua creek, during high water levels and over land has to be assessed.
- The founder population has to be checked on being pure Siamese crocodile breed. Apart from Siamese crocodiles, breeding farms in Vietnam hold large numbers of Cuban crocodiles (*Crocodylus rhombifer*) as well. *C. siamensis* and *C. rhombifer* are known to produce fertile offspring. Release of crocodiles into the wild is only acceptable if pure *C. siamensis* are used. Although there are a number of exterior signs distinguishing *C. siamensis* and *C. rhombifer* (CITES, 1995), second and third generations are hard to distinguish from pure or mixed breeds. Therefore, a **DNA analysis** is essential to ensure that pure *C. siamensis* stock is being used in the re-establishment programme. If this is not done, Cat Tien National Parks runs the risk of ending-up with a crocodile population of unknown composition, which may have far-reaching (negative) ecological effects.
- At least two **staff** of Cat Tien National Park have to receive a minimum 2-month **training** in crocodile handling at the private crocodile farm and the Saigon Zoo.
- Crocodiles transferred to Cat Tien National Park will be held in a temporary facility at the head quarters. Here they will gradually be weaned from saltwater fish and will get used to live freshwater fish.
- Only after completion of the feasibility study, DNA analysis and when the crocodiles are used to fresh water fish, the animals will be **released** in the Bau Sau wetland complex.

To maintain a viable wild population of Siamese crocodile in Cat Tien National Park.

- **Strict and effective protection** must be ensured prior to a complete release in the wild. With a guard station at Bau Sau, basic facilities are available. However, continued entrance of fishermen into the Bau Sau wetlands complex (who use various kinds of gear including hook lines and nets) is a point of great concern. Released crocodiles may get entangled in the fishing gear and drown if not purposely hunted by poachers. Therefore, a strict control of the area by the Cat Tien National Park Forest Protection Department staff is a prerequisite for the implementation of this programme.
- **Monitoring** of released crocodiles (numbers, dispersment) has to be continued over an extensive period of time.
- An **information campaign** has to be held amongst the people living in the vicinity of the Bau Sau wetland complex (i.e. Dak Lua Commune) and amongst visitors to the National Park. This campaign should aim at disseminating general information about the crocodiles, their value as a member of the National Park's ecosystem and at avoiding possible crocodile-human conflicts.
- **Small-scale tourism** facilities should be established in the Bau Sau area. These could be a canoe and boardwalks along parts of the perimeter of the wetland. These should facilitate *safe* crocodile viewing opportunities. In order not to disturb

the animals too much and not to put too much pressure on the fragile Bau Sau wetland ecosystem, only small groups of a maximum of 10 people per day should be allowed to visit the Bau Sau area. Special fees should be levied to permit visitors entering the Bau Sau area. The fees should be utilised to maintain strict protection and tourism facilities.

PROGRESS AND EXPERIENCES SO FAR

In early 2000, two staff of Cat Tien National Park were trained in crocodile handling at the crocodile farm. A holding cage for the crocodiles was built at the headquarters of Cat Tien National Park. On October 25, 2000 a handing-over ceremony took place in Ho Chi Minh City whereby the Park received 25 crocodiles from Hoa Ca Crocodile Farm. All of them were born in 1998. Saigon Zoo took the responsibility of taking samples for DNA testing to be sent to Queensland University and tagging the individual crocodiles with a micro-chip so that individuals can be recognised when matching test results with individual crocodiles. Unfortunately the samples were not sent to Australia before the animals arrived in the Park. Also, the crocodiles arrived while a habitat feasibility study had not been executed yet. DNA samples of 20 crocodiles were sent to Australia in November 2000 as part of a larger number of samples taken in southern Vietnam. Meanwhile the Vietnam Government provided support for this activity and the Park bought 15 additional crocodiles of unknown breed from crocodile farms. After arrival in the Park, the diet of the crocodiles shifted from eating dead sea-fish to dead freshwater fish, then to live freshwater fish over a period of 2 months.

Members of the IUCN-SSC Crocodile Specialist Group visited the Park in May 2001 and assessed the intended release site (Crocodile Lake) and the different ideas held by different stakeholders on how to proceed with the re-introduction programme. Their expert opinion was discussed with Park and Project authorities and it was concluded that the following line of action was to be followed.

- All crocodiles will have to be DNA tested. Non-pure *Crocodylus siamensis* have to be taken out of the release programme.
- There is no need to buy more crocodiles as the stock available should be adequate to re-populate the wetlands in Cat Tien National Park. Also, buying additional stock is likely to bring non-pure *C. siamensis* to the Park as there are few pure-bred animals available in Vietnam.
- While awaiting DNA test results, the crocodiles should be kept at the Park's headquarters. Young individuals and DNA tested animals have to be separated from older and un-tested animals. Therefore two additional cages have to be build at headquarters.
- Animals should be released directly into Crocodile Lake and do not need to be kept there in a temporary cage as the habitat at Crocodile Lake is ideal for crocodiles (adequate quantities of fish and no natural predators).
- The best time for release is when flood-waters recede (December – February) and the Crocodile Lake is confined by dry land. As when released, the animals can

establish home ranges within a confined area and are more likely to stay there when the next flood increases their potential range.

- In the coming dry season (2001-2002), a group of 10 – 15 animals should be released. The other animals should be kept at headquarters awaiting DNA test results for subsequent releases in 2003.
- The released animals should be monitored using a simple spotlight method. Trials with radio collars (undertaken in May 2001) show that the effort required to locate a signal will render the method in-efficient. Additionally, the amount of manpower required to execute a radio-tracking programme is probably not available. Spotting should not commence before 10 days after release so that the animals can get used to their new environment undisturbed. Over the subsequent two months, weekly spotlight surveys should be undertaken. After this intensive survey period, the spotlight surveys should be cut back to monthly surveys in order to limit disturbance and to establish a realistic routine within the limited manpower available at the Park.
- The aim for monitoring should be to assess whether the crocodiles remain in Crocodile Lake or whether they will immediately range deeper inside and / or outside the Park. Additionally monitoring information will establish a baseline of the population and will in due time hopefully find a population increase due to natural growth.

The assessment of the habitat and the feasibility for release conducted by the IUCN-SSC Crocodile Specialist Group members confirmed earlier findings (Polet and Tran Van Mui, 1999; Platt and Ngo Van Tri, 2000) that the Crocodile Lake of the Bau Sau wetland complex is an excellent release site. There are no large predators which will cause mortality amongst released crocodiles, fish are available in abundance and the vegetation cover is good. Protection of the area has been greatly improved by stricter control of the Park's forest protection staff. One concern remaining is the risk that crocodiles can get entangled in abandoned fishing nets floating underwater in the lake.

In June 2001, DNA test results came back from Queensland University. A detailed description of findings is being presented elsewhere (Fitzsimmons, *et al.* in press). One of the animals held in Cat Tien National Park was proven to be a cross between *C. siamensis* and *C. rhombifer*, despite care taken by the crocodile farmer to keep proper stud-books. This animal has been removed from the release programme.

On December 18, 2001 the first batch of 10 crocodiles were released in the Bau Sau wetland complex. On March 12, 2002 five more animals were released and on March 13, 2002 the last four of the DNA tested animals were released (Table 1). At the time of release the animals were about 3.5 years old and measured 1.55 to 1.92 metres.

Table 1: Number and Sex of Released *C. siamensis* in Cat Tien National Park

Release Date	Males	Females	Total
December 18, 2001	5	5	10
March 12, 2002	2	3	5
March 13, 2002	1	3	4
Total	8	11	19

POST RELEASE MONITORING

Methods

Monthly spotlight surveys are used as a baseline index of the crocodile population in Bau Sau (Crocodile Lake). Every month a two-man team, consisting of an observer and boatman, circumnavigate the lake searching for the eye-shine of crocodiles following the methods described by Messel *et al.* (1981), Ratanakorn *et al.* (1994), and Perran Ross (pers. comm.). Each survey is carried out as close to the new moon as possible as crocodiles are more wary on the full moon (Perran Ross pers. comm.). Before the start of each survey data on the lake level, cloud cover, wind, air and water temperature are recorded, as these variables can affect crocodile observability (Woodward and Moore, 1993; Pacheco, 1994).

In 2002 the monthly spotlight surveys can be separated in to two phases where alterations to the method were made in May. In the first phase (January-April) the two-man team would circumnavigate the whole lake using a Q-beam spotlight. In May three members of the CSG (Paul Moler, C. L. Abercrombie, and Phil Wilkinson) visited Bau Sau and suggested circumnavigating each of the two lobes of the lake separately and using a weaker spotlight that would not wash out the eye-shine of any nearby crocodiles. In the second phase (June-current) these suggestions have been incorporated.

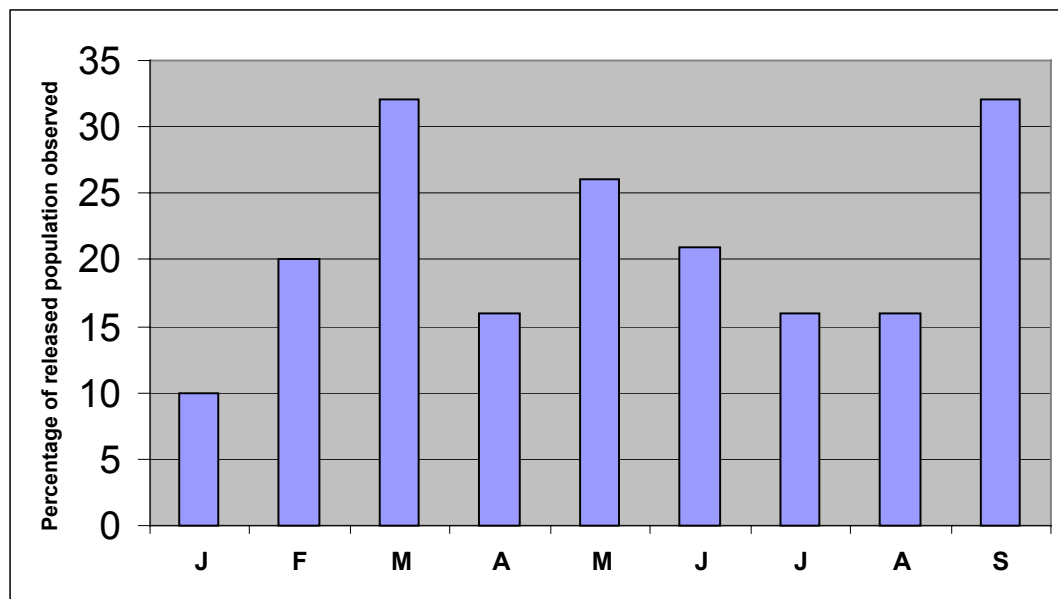
Results

For the first two monthly surveys there was a low number of crocodiles observed with one or two seen per survey (Table 2). In March, when another 9 animals were released in Bau Sau, the number observed increased sharply. From April to September the number of crocodiles seen each survey has been between 3 to 6 (Table 2), which represents 16 to 32% of a total released population of 19 (Figure 1). Crocodiles have mainly been observed in the smaller lobe, closest to the forest guard station, which is deeper. In February one crocodile has been seen in the large lobe of the lake, and two at the same location in September, which is characterised by large shallow areas of tall reeds around its perimeter. The greater distance travelled by canoe in September was because of the higher lake level after flooding at the end of August.

Table 2: The number of Siamese crocodiles observed, Km travelled, number of crocodiles observed/km travelled, and % of the total released population observed during monthly spotlight surveys at Crocodile Lake, Cat Tien National Park, in 2002

	Number of crocodiles observed	Km travelled	Number of crocodiles observed/Km travelled	% of the total released population observed
January	1	5.5	0.18	10
February	2	5.5	0.34	20
March	6	5.5	1.10	32
April	3	5.5	0.55	16
May	5	5.5	0.92	26
June	4	5.5	0.73	21
July	3	5.5	0.55	16
August	3	5.5	0.55	16
September	6	7.2	0.83	32

Figure 1: The percentage of the total released population of Siamese crocodiles observed during monthly spotlight surveys at Crocodile Lake, Cat Tien National Park, in 2002



Discussion

The 10 to 32% of the crocodile population observed in Bau Sau is comparable to other spotlight studies with a known population size where 9 to 19% of the population was observed (Woodward *et al.*, 1996). This suggests that the spotlight surveys are a suitable index of the local crocodile population. The small variance in the observed number of crocodiles between months indicates a relatively stable population. The high count of crocodiles in March was soon after the second release and was probably

influenced by newly released crocodiles still habituating to their new environment. The high count in September was when the lake level had risen above some of the shoreline vegetation potentially improving the chances of seeing crocodiles. The September count also suggests a stable population in Bau Sau and no crocodiles have emigrated to other adjoining wetlands and the Dong Nai River that connect with Bau Sau during flooding at the height of the monsoon season (August-September). The more crocodiles observed in the smaller lobe of the lake is possibly a preference for the deeper water for easier feeding, or because crocodiles were missed in the larger lobe of the lake where the tall reeds reduced visibility.

Spotlight surveys have been an easy method to implement because their simplicity and low time-commitment have allowed them to be incorporated into busy existing schedules. However, as observers have changed, with monitoring activities being transferred to park staff and with changes in park staffing, results cannot be reliably used for any analysis of trends in the observed population (Woodward and Moore, 1993) until standardised observers are maintained at the park. Maintaining standardised observers (from changes in staffing), and a monthly routine, are the focal areas for the future of crocodile monitoring by Cat Tien National Park staff.

FUTURE PLANS

On August 1, 2002, the Park and a new crocodile farmer signed an agreement in which the Park is to receive 100 crocodiles over a period of three years. Samples for DNA testing of these animals were taken on last August 29. A CITES export permit has been applied for and the samples will be sent to Canberra University – Australia for DNA testing. A new batch of 30 to 40 animals is scheduled to be released during the coming dry season (December 2002 – March 2003).

As responsibility for monitoring is being transferred to park staff, monthly spotlight surveys should continue, executed by Park staff, with the aim to detect population trends and habitat use. It is hoped that young crocodiles will be encountered which would proof natural growth of the population. It will also be interesting to see whether there are indications of crocodiles having moved-out of the area after the flood season or whether some crocodiles maintained their home range at the lake despite their larger potential range during the floods.

LESSONS LEARNED

Some lessons can be learned from the experience gained in the crocodile re-establishment programme in Cat Tien National Park – Vietnam.

The programme has a wide range of different partners; from the private sector to governmental organisations to international conservation organisations and specialists. This set-up has its strengths and weaknesses. Most of the expertise and logistical support for the programme is available amongst its partners. However, working with so many different organisations, each with different priorities and with different powers, is

a complicated matter. Working towards the success of the re-introduction programme depends on each partner's willingness to contribute and accommodate other partner's points of view. This can only be achieved, and geared towards getting results, if the objective of the re-introduction programme is spelt-out right from the start of the activity. This has been the case in the Cat Tien National Park re-introduction programme and well defined goals and activities were formulated at the beginning of the programme.

But even with such clearly defined activities and timetables, different implementation sequences were followed in Cat Tien National Park. The crocodiles arrived in the Park before DNA test results were obtained. An informal feasibility study of the release site was conducted after the animals arrived in the Park. This experience illustrates on-the-ground complexities to implement a programme according to agreed timetables and in a scientifically sound manner. It is due to the partners willingness to consider and re-consider different ideas and priorities that this specific programme has not resulted in the pre-mature release (i.e. crocodiles which have not been confirmed to be pure *C. siamensis* through DNA analysis) of crocodiles in Cat Tien National Park.

The need to conduct DNA analysis is also evident from the experience in Cat Tien National Park. Although the crocodile farmer kept a stud-book and was convinced that his crocodiles were pure *C. siamensis*, DNA testing concluded that 1 of the 20 tested animals was in fact a hybrid of *C. siamensis* x *C. rhombifer*. If DNA testing would not have been conducted, this animal would have been released and thus an alien species would have been introduced in the Park's ecosystem.

Spotlight surveys are a suitable index of the crocodile population at Bau Sau as the results in 2002 are comparable to other studies of a known population. Spotlight surveys indicate a stable population of released Siamese crocodiles in Bau Sau before and after the height of annual flooding of the Bau Sau wetland complex (though more surveys are required to assess the post-monsoon population).

Spotlight surveys have been an easy method to implement because their simplicity and low time-commitment have allowed them to be incorporated into busy existing schedules. The only possible problems for the future of monitoring in Cat Tien National Park is maintaining a monthly routine, and non-standardized observers from rapid changes in park staffing.

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