AMENDMENTS TO APPENDICES I AND II OF THE CONVENTION

Proposals Submitted Pursuant to Resolution on Ranching

A. PROPOSAL

Maintenance of the Indonesian population of <u>Crocodylus porosus</u> in Appendix II.

B. PROPONENT

The Republic of Indonesia.

C. SUPPORTING STATEMENT

1. Taxonomy

15.

11.	Class:	Rentilia
	01433.	Keptiita

- 12. Order: Crocodylia
- 13. Family: Crocodylidae

14. Species: Crocodylus porosus Schneider, 1801

Common	Names:	English:	saltwater	crocodile,
			estuarine	crocodile
		French:	crocodile	marin
		Spanish:	Cocodrilo	poroso

16. Code Numbers: A-306.002.001.009

2. Introduction

The Republic of Indonesia comprises an archipelago of more than 17,000 islands that span the equator from Irian Jaya in the east to Sumatera in the west.

The people of Indonesia have a history of utilizing crocodiles for a variety of non-commercial purposes. As in Papua New Guinea, the people of Irian Jaya coexist with <u>Crocodylus novaeguineae</u> and <u>Crocodylus porosus</u> and hunt them traditionally for protein. The commercial use of crocodiles by these people is a relatively recent phenomenon and one which has been recognized by the Government of Indonesia as making a significant contribution to local village economies and the overall economic development of the Province of Irian Jaya.

The development of a national management plan for crocodiles in the Republic of Indonesia must take account of the diversity of cultures and the varying extent of intact suitable wetland habitats for crocodilians.

The successful conservation of crocodilians in the Republic of Indonesia will depend on the selection of a suite of management strategies that are sufficiently flexible to be adapted to meet the different regional cultures and economies of Indonesia. The present proposal seeks to obtain the endorsement of the Conference of Parties to an integrated programme for the conservation of crocodilians throughout the Indonesian archipelago which is based on the sustainable use of the wild resource and tailored specifically to meet local socio-economic conditions. In Irian Jaya where <u>Crocodylus</u> <u>porosus</u> occurs sympatrically with <u>Crocodylus</u> <u>novaeguineae</u> and it is not practical to apply differential management regimes, this will involve the harvest of skins and live juveniles for ranching. Elsewhere in Indonesia commercial use of crocodilians will be restricted to captive breeding operations. Ranching will similarly be confined to areas where it can be demonstrated to benefit the long-term conservation of the local population of crocodiles that is subject to harvesting.

In order to implement the proposed management programme for crocodilians in Indonesia within the legal framework of CITES requirements for international trade, it will be necessary to list the Indonesian population of <u>Crocodylus porosus</u> in Appendix II of CITES both for the purpose of ranching and the wild harvest of skins in Irian Jaya.

The following detailed statement in support of the proposal has been submitted for consideration at the eighth meeting of the Conference of the Parties to CITES.

3. Biological Data

31. <u>General</u>: Four species of crocodilians are currently recognized as occurring in Indonesia. <u>Crocodylus novaeguineae</u> is confined to the Province of Irian Jaya and appears to comprise northern and southern forms. <u>Tomistoma schlegelii</u> occurs on the islands of Sumatera and Kalimantan. <u>Crocodylus porosus</u> is by far the most cosmopolitan species occurring throughout the archipelago albeit in varying densities. <u>Crocodylus siamensis</u> appears to be confined to eastern Kalimantan. From the lack of isolating topographical features, proximity of alleged origins of east Kalimantan stocks and local resident information, it appears likely that <u>C. siamensis</u> occurs in central Kalimantan and probably south Kalimantan as well. However further surveys in these areas are required to confirm this suspected distribution.

Although some species are well known, and have been researched in depth, others remain poorly understood. There appears to be only one species (Tomistoma schlegelii) about which there is no taxonomic confusion. Crocodylus porosus has been assumed to be a single species with a cosmopolitan distribution, although significant variation throughout its Indo-Pacific range may exist. Crocodylus siamensis has been recently detected on farms in Kalimantan and has some features similar to <u>C</u>. porosus. <u>Crocodylus raninus</u> has been recently described (Ross, 1989) on the basis of a small number of old museum specimens from "Borneo", but there is no evidence that <u>C</u>. raninus presently exists in Kalimantan. The abundant <u>Crocodylus novaeguineae</u> comprises at least two distinct morphological races, one from the northern parts of PNG-Irian Jaya, and the other from the south.

Historically, it can be assumed that crocodiles occurred extensively throughout the Indonesian archipelago in areas of suitable wetland habitat. The development of Indonesia that has

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accompanied the increase in population has altered many wetland areas that formerly were suitable for crocodiles. Nevertheless, there are many areas, particularly in Irian Jaya, Sulawesi and Kalimantan where extensive areas of suitable wetlands persist. Figure 3.1 and the accompanying Table 3.1 (extracted from the IWRB Asian Wetlands Directory) summarise the distribution and size of wetland areas that have been identified by the International Wetlands and Waterfowl Research Bureau (IWRB) as providing important habitat for crocodiles.

- 311. Crocodylus porosus: This species is found throughout Indonesia. It is typically associated with brackish waters, but also extends to freshwater rivers and grass-swamp. Males are sexually mature at around 3.2 m and 16 years of age, and females at around 2.2 m and 10 years. Nesting takes place in the wet season (December - April), and clutch size is 25 -90 eggs with a mean of 50 -60 (Honegger, 1968; Cox, 1985; Groombridge, 1987).
- 312. Crocodylus novaeguineae: This species occurs in Irian Jaya wherever alluvial riverine plains and swamps are found. Females become sexually active at a length of 2 m and 6-8 years, and produce 10 - 48 eggs per clutch (average 27). Males are mature at about 2.5 m and 10 years. C. novaeguineae nests on the ground and on floating mats, commencing during first rains, but before maximum rainfall (i.e. August - November) (Honegger, 1968; Cox, 1985; Groombridge, 1987).
- 313. Crocodylus siamensis: In Indonesia, this freshwater species appears to be confined to Kalimantan (Frazier, 1991). Groombridge (1987) suggests that C. siamensis may possibly also occur in Sumatera. In captivity, maturity is reached at 10-12 years of age and 20 - 48 eggs are laid in a mound nest from March - May (Groombridge, 1987).
- 314. Tomistoma schlegelii: T. schlegelii is a large, slender-snouted species which inhabits freshwater rivers, swamps and lakes. Although no precise status data are available, moderate, breeding populations of this species occur in parts of Sumatera and Kalimantan. Further data are required on the ecology and status of the species (Groombridge, 1987; Honegger, 1975).
- 32. <u>Wild Population</u>: Little information is available on the size of current crocodile populations in Indonesia. Areas surveyed as part of the UN/FAO Crocodile Project are shown in Figure 3.2 and results are summarised in Table 3.2. Analyses of repeated surveys indicate that the populations in accessible open water areas are depleted although nest counts in the swamplands of Irian Jaya (for <u>C. novaeguineae</u>) indicate a positive rate of increase is accompanying the current harvest programme (see Appendix 1).
- 33. <u>Captive Population</u>: At present there are 33 PHPA-licensed crocodile farms located throughout Indonesia. Juveniles have been collected from the wild and are currently being raised on farms in Irian Jaya (<u>C. porosus and C. novaeguineae</u>), Kalimantan (<u>C. porosus and C. siamensis</u>), Sulawesi (<u>C. porosus</u>) and Sumatera (<u>C. porosus and T. schlegelii</u>). The total number of crocodiles



TABLE 3.1

	Name	C.p	T.s	C.n	Cs
					**
*1	Way Kambas	+	+	-	-
3	Padang-Sugihan Wildlife Reserve	+	-	-	-
4	Pulau Betet	+	-	-	-
5	Banyuasin Musi River Delta	+	-	-	-
6	Sungai Lalan	+	+	-	-
*8	Berbak Game Reserve	+	+	-	-
11	Tanjung Bakung	?	-	-	-
12	Tanjung Datuk	+	-	-	-
14	Bakau Muara Kapuas	+	-	-	-
16	Danau Bawah and Pulau Besar	-	+	-	-
17	Danau Belat, Besar Sekak and				
	Sarang Burung	-	+	-	-
18	Siak Kecil	-	+	-	-
19	Bakau Selat Dumai	+	-	-	-
*24	Taitai Batti and Pulau Siberut	+	-	-	-
25	Muara Siberut	+	-	-	-
39	Pulau Bawean	+	-	-	-
53	Pulau Satonda	+	-	-	-
*54	Wetlands in Komodo National Park	+	-	-	-
58	Kupang Bay	+	-	-	-
60	Maubesi Mangrove Swamp	+	-	-	-
*63	Wetlands in Kutai ational Park	+	+	-	-
*70	Pleihari Tanah Laut	+	-	-	-
75	Sungai Kumai and Kumai Bay	+	-	-	-
77	Muara Kendawangan	+	-	-	-
*78	Gunung Palung and surrounding Swamps	-	+	-	-
*81	Danau Sentarum	+	+	-	-
83	Togian Archipelago	+	-	-	-
*86	Morowali	+	-	-	-
9 9	Watumohae	+	-	-	-

MAJOR WETLAND HABITATS CONTAINING CROCODILIANS (IWRB 1989)

currently held in farms exceeds 54,500 individuals of the foregoing four species. Table 3.3 summarises stocks held on each establishment and Figure 3.3 shows the geographic distribution of licensed crocodile farms in Indonesia.

4. Protection Status

- 41. Regulation
 - 411. National: The Republic of Indonesia acceded to CITES by Presidential Decree on 15 December 1978. Legislative protection was extended to C. novaeguineae immediately and C. porosus became protected under Indonesian law in 1980. T. schlegelii had been decreed a protected species on 29 May 1978. The recently detected C. siamensis will be treated legally as C. porosus until its taxonomic status is clarified.

Primary responsibility for wildlife in Indonesia lies with the Directorate General of Forest Protection and Nature Conservation (Direktorat Jenderal Perlindungan Hutan dan Pelestarian Alam, "PHPA") within the Ministry of Forestry. The Directorate General of PHPA is located in Bogor and has been designated as the CITES Management Authority for Indonesia. In each of the provinces of Indonesia the Ministry maintains a regional office.

Capture and transport of crocodiles is controlled under a complex permitting system. Three different types of permit are issued - capture permits, permits for transport within Indonesia, and export permits.

An application for a permit to **capture** crocodiles must be submitted to the head of the relevant regional forestry office. Technical advice on whether the permit should be granted is provided by the local PHPA representative.

Applications for permits to **transport** crocodiles within Indonesia must be submitted to the relevant sub-regional PHPA office, which maintains a stock inventory of commercial traders to ensure that the number of skins transported do not exceed the number legally acquired.

412. International: Permits to export wildlife from Indonesia are issued by the Director General of PHPA.

In 1985, a Presidential instruction was issued to the effect that Customs officers were no longer empowered to inspect export consignments. This function was conferred on an independent company, Sucofindo. Customs officers are responsible for inspecting and verifying the accompanying paperwork. PHPA officers also inspect export consignments to confirm that their contents correspond with the details entered on the export permit. When the inspection is complete, the packages are sealed and delivered to the port of departure from Indonesia. This process has recently been strengthened further by the requirement for UN/FAO Project staff to be present during inspections to provide independent verification of accurate marriage of documents with the contents of each consignment.

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	TABLE 3.1 continued				
*100	Tanjung Peropa	+	-	-	-
104	Wasile Bay	+	-	-	-
107	Wetlands in Manusela Proposed National				
	Park (Wae Mual and Wae Nua Reserves)	?	- 1	-	-
112	Yamdena and the Tanimbar Archipelago	+	-	-	-
113	Kai Archipelago	+	-	-	-
114	Pulau Kobroor	+	-	+	-
*115	Aru Tenggara Proposed Marine Reserve	+	-	+	-
120	Bintuni Bay	+	-	-	-
122	Teluk Cenderawasih	+	-	-	-
*127	Sungai Rouffaer	+	-	+	-
128	Wetlands in Mamberamo-Foja				
	National Park	+	-	+	-
130	Wetlands in Lorenz Proposed				
	National Park	+	-	+	-
132	Sungai Digul	+	-	-	-
*133	Wetland in Danau Bian Game Reserve	+	-	+	-
*134	Palau Kimaam	+	-	+	-
*136	Wasur and Rawa Biru	?	-	-	-

Key

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NB: (i) Numbers in left hand column refer to those cited in "A Directory of Asian Wetlands"
(ii) The presence of *Crocodylus siamensis* in the Indonesian Archipelago was not detected until the 1991 visit by Webb and Jenkins.

* Reserves



FIGURE 3.2 AREAS SURVEYED BY FAO FOR CROCODILE INHABITATION

TABLE 3.2

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AREA	LOCATION	YEAR	DISTANCE (KM)	SIGHTING	DENSITY
IRIAN JAYA					
Waropen Atas	S Rapamarei	1988	-	0	-
1	S Maniyandi	1988	-	0	-
	S Evambori	1988	-	1	-
	Survey ke-1	1989	7.6	0	0
	Survey ke-2	1989	10.3	1	0.097
	Survey ke-3	1989	68.8	2	0.029
	Survey ke-4	1989	15.1	0	0
	Survey ke-5	1989	9.4	0	0
	Survey ke-6	1989	36.5	4	0.11
	Survey ke-7	1989	17.8	1	0.05
	Survey ke-8	1989	18.8	0	0
	Survey ke-9	1989	11.1	0	0
Kec. Kaimana	S Fewan	1988	-	0	-
		1989	-	2	-
	S Besiri	1988	-	1	-
	S Kabasesi	1988	-		-
	S Barusa	1988	-	14	-
		1989		25	-
		1990	4	0	1.5
	S Gesawi	1988	-	12 50	-
		1989	12.5	17	1.26
	S Pada	1990	15.5	1/	1.20
	S Daua	1900	_		
	S Buruwai	1088		15	_
	5 Dui uwai	1980	_	8	_
		1990	8	3	0.38
	S Garawa	1990	1	5	2.0
	SHia	1989	-	4	-
	S Kamabu	1990	0.5	1	2.0
Kec Arguni	S Karora	1988	-	0	-
		1990	2	0	0
	S Turgani	1990	4	0	0
	S Suwiki	1988	-	18	-
		1989	-	28	-
		1990	-	12	-
	S Jabuenggara	1989	-	17	-
Kec Etna	S Yamor Kecil	1989	-	28	-
	S Muara Omba	1990	10	6	0.6
	S Cabang Omba	1990	2	.1	0.5
Kec Bintuni	S Ruarif	1988	10	0	0
		1990	10	0	0
	S Bupita	1989	12.5	1	0.08
		1990	12.5	2	0.16
	S Kasira	1988	15	1	0.06

SURVEY DATA FOR CROCODLYUS POROSUS

IRIA	ŇĬ	AY	ΖA
ALLAL AL			

TABLE 3.2 CONTINUED				
	1990	15	0	0
S Yaru	1988	13.75	16	1.16
	1989	13.75	3	0.22
	1990	13.75	3	0.22
S Beris	1988	5	0	0
	1990	5	0	0
S Wemoi	1988	18	4	0.22
	1989	18	5	0.27
	1990	18	5	0.27
S Naramasa	1988	45	5	0.11
	1990	45	0	0
S Kutuai	1988	7.5	18	2.4
	1989	7.5	0	
	1990	7.5		0.13
S Soeberawara	1988	5	31	0.2
	1989	5		
0.37.1	1990	21.25	4	0.0
S Yakati	1988	31.25	12	0.10
	1969	31.25	5	0.4
S Batu Putih	1990	10	8	0.10
5 Datu I utili	1990	10	2	0.2
S Barokabuni	1988	3	1	0.33
	1990	3	0	0
S Reriesi	1988	20	0	0
	1990	20	0	0
S Kambuewewari	1988	20	0	0
	1990	20	0	0
S Sikimbi	1988	20	0	0
	1990	20	0	0
S Taburei	1988	20	0	0
	1990	20	0	
S Paserai	1988	20	0	0
S Monronu	1990	20	0.	0
5 Mairanu	1900	20	0	0
S Vawerni	1988	20	0	0
5 Tuworui	1990		1	0.5
S Simeri	1988	5	0	0
	1990	5	2	0.4
S Preseri	1988	1.5	0	0
	1990	1.5	1	0.6
S Tewerei	1988	1.5	0	0
	1990	1.5	0	0
S Kuruari	1988	1	0	0
_	1990	1	0	0
S Rario	1988	1.5	0	0
	1990	1.5		
S Anekası	1988	6		
C Subari	1990	1 5		
5 Suberi	1988	1.5		
S Tirarai	1089	1.5		
	1900			0.05
S Bui	1988	60		
0 Dui	1 1700	1 00	1	1

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Sambungan Kec Bintuni

	TABLE 3.2 CONTINUED				
IRIAN JAYA					
		1990	60	0	0
	S Menimeri	1988	60	0	0
		1990	60	0	0
	S Muturi	1988	60	0	0
		1989	60	3	0.05
		1990	60	0	0
	S Iritiyoi	1988	60	0	0
		1990	60	0	0
	S Sebyar	1989	20	1	0.05
		1990	20	4	0.2
Pulau Kimam	S Muli (Kwantuar)	1988	11	20	1.8
	, , , ,	1989	11	6	0.55
		1990	11	9	0.82
	S Muli Kecil	1988	15.6	60	3.8
		1990	15.6	27	1.7
	S Muli Selatan	1988	18.5	22	1.2
		1989	18.5	14	0.76
		1990	18.5	4	0.22
7	S Burahap	1988	14.3	9	0.63
		1989	14.3	21	1.5
		1990	14.3	8	0.56
	S Bugeram	1988	27.3	71	2.6
	0 - 080-000-	1990	27.3	31	1.1
	S Manggen	1988	20.9	42	2
	o manggon	1990	20.9	19	0.91
	S Korimuen Atas	1988	9.3	47	5.1
		1990	9.3	3	0.32
	S Korimuen Bawah	1988	16	26	1.6
	5 Kormiden Dawan	1990	16	10	0.62
	S Kwacawu /Kahe	1988	9.6	19	2
	5 Kwacawa/Kane	1990	9.6	5	0.52
	SImuens	1988	25.2	13	0.52
	5 millions	1990	25.2	13	0.52
	S Balem	1989	8	6	0.75
	5 Datem	1990	8	5	0.62
KAT IMANTAN	Sungai Semaia & S Sekitong	1990	25.2	0	0
TAXATALALA TATA	Sungar Sennaja de S Sexitolig	1000	35.8	0 0	
	S Seboung & S Injuanan	1000	40.3		
	S Sebuku	1000	64.8		0.031
	S Dion	1000	36		0.051
	S Riall	1990	26	2	0.077
	S Delajau	1990	20	1	0.035
	S Lanuang Kayan	1990	16.2		0.055
	S Bulun Besar	1990	10.2		
	S Bulun Kech	1990	596		0.017
	S Kumai	1990	30.0		0.017
	S Seruyan I	1990	49.7		0.020
	S Seruyan II	1000	32.7		
	S Sebangau	1000	41.3		
SUMATERA	Sungai Air Hitam	1990	30		
	S Batang Xubu	1990	27.1		
	Muara Batang Xubu	1990	31.5		
	Sungai Rokan Xanau	1990	18		
	Middle Sungai Rokan	1990	69.5	0	0
	S Rokan (Riaba Melintang	1005			
	Ujung Tanjung)	1990	48.5	2	0.4

TABLE 3.2 CONTINUED				
S Rokan (above				
Pulau Perdamaran)	1990	1.5	0	0
S Rokan (below				
Pulau Perdamaran)	1990	5.8	0	0
Pulau Perdamaran	1990	30.9	8	0.26
S Reti-S Ujan	1990	24.5	2	0.08
Pulau Xijang Selatan	1990	16.8	0	0
S Selat Jaran	1990	10.7	3	0.28
S Air Lalang	1990	18	0	0
S Lalang	1990	38	1	0.03
S Herang	1990	22.8	1	0.04
S Lalang	1990	27.5	0	0
S Medak	1990	8	0	0
S Air Lalang	1990	16.8	0	0
(Muara Medin - Mendis)				
S Air Lalang (Bayat				
- Merdis)	1990	43.8	2	0.05
S Air Lalang (Kedak				
- Talang Kamut)	1990	36	2	0.08
S Air Lalang	1990	36.3	2	0.06
(Karang Agung - Desa Duo)				
S Air Calik	1990	65.8	5	0.08
S Air Bantung	1990	34.5	0	0
Sinpang Harian	1990	13.8	0	0
Sinpang Gajah	1990	4.1	2	0.48
Sungai Sembilang Tanah				-
Abang to S Haji M Hur)	1990	17.1	2	0.12
Sungai Sembilang (S Haji M				
Hur to S Simpang Prepat)	1990	33.2	1	0.03
Sungai Bugis	1990	10.7	0	0
S Simpang Halangan	1990	27.8	1	0.04
S Capuk	1990	18.3	0	0
Kali Bakorendo	1990	24.4	1	0.04
Kali Herawan	1990	16.5	0	0
S Terusan Dalam	1990	20.3	0	0
S Tungkal	1990	3.5	0	0
S Titik	1990	14.3	0	0
S Air Hitam Laut	1990	20.5	6	0.029
S Tengorak	1990	18.8	13	0.069

SUMATERA



FIGURE 3.3 CROCODILE REARING ENTERPRISES IN INDONESIA

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TABLE 3.3

LICENSED CROCODILE FARMS IN INDONESIA

	Name of Farm	Location	No of C.porosus	No of C.novaeguine	Other ae Crocodiles	Total No of Crocodiles
4		Simpour Combus N Sumotors	-	1	i I	I
1	UD Alain Ruswan	Moden North Sumators	066	3853		4810
2	Alam Murni Banana	Dinici North Sumatoro	300	3055	4 T c	38
3	PT Pasandra	Batam Dian	1780	/313	4 T c	6106
4	PT Perkasa Jagool Karunia	Balam, Klau	620	4315	41.5.	630
Ş	CV Bintang Sakti	Deleveloure South Sumators	1000		250 T c	1250
6	PT Budiman	Palembang, South Sumatera	1000		250 T.S.	545
7	CV Stock Borsuma	Palemoang, South Sumatera	500		45 1.5.	545
8	PT Pembanguana Jaya	Pontianak, W. Kalimantan	147		0.77.6	150
9	PT Alas Watu	Banjarmasin, S. Kalimantan	147		91.8.	130
10	CV Surya Raya	Balikpapan, E. Kalimantan	2004		4 C.S.	2026
11	PT Makmur Abadi Permai	Samarinda, E. Kalimantan	2924		12 C.S.	2950
12	CV Harapan Kaltim Utama	Tarakan, E. Kalimantan	2200		1 77	2200
13	CV Leo Jaya	Jakarta, West Java	153		1 I.S.	154
14	Perum Perhutani	Blanakan, West Java	94			94
15	PT Margomulyo	Yogyakarta, Central Java	1000	0.50		2202
16	CV Sumber Karya	Ujung Pandang, S. Sulawesi	1333	950		2283
17	FAO-PHPA Farm	Sorong, Irian Jaya	2/7	1957		2234
18	FA Fajar Baru	Sorong, Irian Jaya	359	1407		1766
19	PT Alam Mrmi Bahana	Sorong, Irian Jaya	966	3853		4819
20	CV Modan Baru	Sorong, Irian Jaya	733	685		1418
21	PT Reptilindo Ekapratama	Biak,Irian Jaya	859	7572		8431
22	CV Dwi Tunddal	Serui, Irian Jaya	350	350		700
23	CV Siloway Jaya	Doyo Baru, Irian Jaya				
24	PT Sentani Valley	Sentani, Irian Jaya	181	603		784
25	PT Inhutani II	Sentani, Irian Jaya	223	1791		2014
26	CV Bintang Mas	Jayapura, Irian Jaya	3500	17045		20545
27	PT Perkasa Desain Utama	Arso, Irian Jaya		400		400
28	CV Nikmat	Merauke, Irian Jaya	470	245		715
29	PT Timor Sakti Abadi	Merauke, Irian Jaya	404	706		1110
30	CV Sumber Karya	Merauke, Irian Jaya	1333	950		2283
31	CV Ramlie	Biak, Irian Jaya	26	26		52
	TOTAL		22106	46706	329	69143

Three (3) new enterprises planned for Sulawesi; one for Sulawesi; one for Ambon, Maluku.

T.s = Tomistoma schlegeli C.s = Crocodylus siamensis

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FIGURE 4.2 INDONESIAN PARKS AND RESERVES

<u>2</u>

TABLE 4.2

TABLE OF CONTENTS

2.22

2.23

2.24

2.25

2.26

2.27

2.28

2.29

2.30

2.31

2.32

?

T W Bukit Tang Kiling

T W Air Terjun Wera

T W Bantimurung

T W Danau Towuti

Mahalano

C A Sibolangit

T W Lau Debuk

T W Rimbo Panti

T W Lembah Harau

T W Danan Matano/

T W Tirta Rimba/Air Jatuh

NATIONAL PARKS

RECREATION PARKS

LOCATION

.

HECTARES LOCATION

HECTARES

533

250

18

65,000

30,000

500

7

570

27,5

90,15

1.1	C A Way Maul dan Perluasan	35,800	2.1	T W Tuti Adegae	5,000
1.2	S M P Komodo	31,000	2.2	T W L Gugus Tlk Maumere	62,450
	S M P Padar	1,533	2.3	?	?
	S M P Rinca	8,196	2.4	T W Surana DI	52
1.3	S M Bali Barat	19,365,8	2.5	T W Panelokan	540
1.4	Ijan Merapi Ungup	2,560	2.6	T W Tretes	10
1.5	C A Ujung Kulon	39,120	2.7	T W Gn Baung	195,5
1.6	T L Pulau Seribu	108,000	2.8	T W Ranu Pani Regulo	96
1.7	C A Arcadomas	2	2.9	T W Ranu Darungan	380
	C A Cimungkat	56	2.10	C A Pulan Noko dan Nusa	15
1.8	S M Kotawaringa/Sampit				
	(T G Puting)	335,000	2.11	C A Plawangan Turgo	198,5
1.9	S M Kutai	200,000	2.12	T W Tuk Songo	6,5
1.10	C A Bulawa	75,200	2.13	T W Gn Selok	126,2
1.11	S M Lore Kalamanta	131,000	2.14	T W Pangandaran	37,7
1.12	S M Sumatera Selatan			C	,
	1(Sebagian)	286,800	2.15	T W Linggta Jati	11,5
1.13	S M Kappi	142,800	2.16	T W Gn Tampomas	12,5
	S M Langkat Barat	51,900	2.17	C A Yunghun	2,5
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WILDLIFE RESERVES

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HECTARES

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3.13	Banyuwangi Selatan	62,000	3.45	C A Gur
3.14	S M Meru Betiri	58,000	3.46	S M Tait
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Protected wildlife may only be collected for the purposes of Presidential gifts to the head of another State, exchanges between zoological gardens, scientific research or for population control.

The export of animal skins is further regulated by a Ministry of Trade Decree which prohibits the export of raw skins from Indonesia. Although this decree was principally intended to control the export of the skins of domestic animals, it also applies to the skins of reptiles.

42. Protected Areas: There are approximately 176 million people in Indonesia and this figure is increasing at 2.2% p.a. The density of the human population has necessitated the conversion of much of the natural habitat, including the wetland habitat of crocodiles, for the intensive production of food. Consequently there is little land that can be set aside for the non-consumptive protection of wildlife. Nevertheless, some islands retain large tracts of pristine swamp and forest, and there are networks of protected areas scattered throughout the archipelago.

Within Indonesia the Government has established a network of conservation areas that afford varying degrees of protection according to the type of reserve that a particular area of land has been designated. National parks afford the highest level of protection followed in decending order by: nature reserves, game reserves, recreation forests and grand forest parks. Figure 4.2 shows the geographic distribution throughout the archipelago of four types of conservation area and Table 4.2 summarises the area of land within each province that has been designated under each classification.

5. Trade data

51. <u>National Utilization</u>: The people of Indonesia have a history of utilising crocodiles for a variety of non-commercial purposes. Throughout the Indonesian archipelago, but particularly on the islands of Kalimantan, Sumatera, Timor and Irian Jaya crocodile motifs feature prominently in native craftworks. Within Irian Jaya both species of crocodiles are harvested traditionally for protein. The commercial use of crocodiles skins by village people is relatively recent, but the sustainable commercial use of wild crocodiles by the Irianese village people represents an important contribution to local village economies. As in Papua New Guinea, revenue generated from the use of crocodiles is the only form of cash income for many village people.

Commercial utilization in Irian Jaya evolved in an unregulated fashion. However, within the last 4 years a significant effort has been directed at the development of a management programme that ensures the harvest from the wild population is sustainable and that the industry is structured and administered in such a way as to ensure that local people and the economy benefit directly.

Management of crocodiles in Irian Jaya is modelled on the programme currently operating in neighbouring Papua New Guinea, where <u>C. porosus</u> and <u>C. novaeguineae</u> are managed as a single resource. Utilization of crocodiles in Irian Jaya involves the

hunting of both <u>C. porosus</u> and <u>C. novaeguineae</u> for skins, and the live capture of juveniles of both species for raising on crocodile farms under a ranching programme. Wild egg harvesting has been confined to <u>C. novaeguineae</u> and has been limited to minor experimental harvests carried out by the UN/FAO Crocodile Project based in Jayapura and Sorong.

As in Papua New Guinea, the industry in Irian Jaya is structured around a small number of licensed commercial farms (termed "nuclei") which derive both skins and livestock for ranching and captive breeding from remote villages (termed "plasms"). These villages are situated in areas of crocodile habitat and have direct access to wild crocodiles. Hunting for both skins and live animals is mainly carried out in remote villages. These villages are accessible only by boat and/or aircraft. Networks of people involving a considerable investment in logistics have been established, mainly by the farms, for moving skins and live animals from remote areas to the farms, in return for supplies, payments or trade goods to the hunters.

The value to the local economy and future development of Irian Jaya of utilizing crocodiles for commercial purposes has been recognized and is further safeguarded by the prohibition of moving live crocodiles from Irian Jaya to elsewhere in the Indonesian archipelago.

52. Legal International Trade: The system for issuing permits for the export of wildlife in Indonesia is outlined in Section 412. In the case of reptiles a Ministry of Trade Decree prohibits the export of raw skins from Indonesia. All tanned skins exported from Indonesia bear the plastic, self-locking, non-reusable tag approved by CITES.

Following the adoption of Resolution Conf. 5.21 by the Conference of the Parties to CITES in 1985, the Republic of Indonesia was permitted to trade internationally in C. porosus skins according to an annual export quota agreed to by the Conference of the Parties. In 1989 the Republic of Indonesia sought CITES approval for an increased annual export quota incorporating both wild-harvested and ranched specimens. The Conference of the Parties initially rejected this proposal and, following intervention by the IUCN/SSC Crocodile Specialist Group, approved annual export quotas for Indonesia for the period 1990-1992 of 5, 6 & 7,000 skins (comprising varying proportions of wild skins and ranched specimens). The 1989 meeting of CITES adopted Resolution Conf. 7.14 which restricts the application of Resolution Conf. 5.21 export quotas to a maximum period of two intervals between regular meetings of the Parties or one interval should the period between meetings become three years.

Indonesia has regulated the export of <u>C</u>. porosus according to the provisions of Resolution Conf. 5.21 and has instituted an annual harvest quota for <u>C</u>. novaeguineae to ensure that commercial use of the wild population of this species in Irian Jaya is sustainable. Tables 5.2 (a) and (b) provide information on the export quotas for both species together with actual export levels for the period 1985 to 1990.

TABLE 52. (a)

CROCODILE SKIN EXPORT QUOTA

Year	C. novaeguineae	C. porosu	IS	Total
	Wild	Ranched	Wild	
1985	_	_	2,000	2,000
1986	_	-	2,000	2,000
1987	_	-	2,000	2,000
1988	20,000	-	4,000	4,000
1989	20,000	-	4,000	4,000
1990	20,000	2,000	3,000	5,000
1991	25,000	3,000	3,000	6,000
1992	25,000	5,000	2,500	7,500

NB: Quotas for <u>C</u>. <u>novaeguineae</u> are self-imposed by the Republic of Indonesia.

TABLE 52. (b)

ANNUAL EXPORT OF CROCODILE SKINS FROM INDONESIA

<u>C. porosus</u>	<u>1987</u>	<u>1988</u>	1989	1990
Wild Ranched	_ 824	_ 2,069	2,297 470	1,773
TOTAL	824	2,069	2,767	1,773
<u>C</u> . <u>novaeguine</u>	eae			
Wild Ranched	_ 1,125	_ 7,579	12,608 2,255	16,472 -
TOTAL	1,125	7,579	14,863	16,472

53. <u>Illegal Trade</u>: The geography of Indonesia, comprising an archipelago of more than 17,000 islands linking Asia and Oceania, makes it extremely difficult to effectively control illegal trade in crocodile skins and other products. It is unrealistic not to acknowledge this. In particular the proximity of northern Sumatera to Singapore and the common border between Kalimantan and neighbouring Sarawak and Sabah, means that some illegal trade is almost certain to occur.

The introduction of documentary monitoring (see Section 67.) is a strategy that provides a practical means of implementing controls in illegal trade.

Complementary international co-operation is essential, especially with countries with whom Indonesia shares a common border, i.e. Papua New Guinea and Malaysia (Sarawak and Sabah). Papua New Guinea operates a similar crocodile management programme applying a maximum size limit of 51 cm (20 inches) BW to all skins exported. Indonesia introduced a conservative 46 cm BW limit because of concern that the 51 cm BW (belly width) limit applying in neighbouring PNG had the potential to incorporate a significant proportion of mature C. novaeguineae. This inconsistency between the two programmes, operating on a single resource in adjoining countries, has the potential to create an incentive for illegal trade in some oversized skins (i.e. 46 - 51 cm BW).

The Indonesian Management Authority for CITES has initiated dialogue with its counterpart agency in Papua New Guinea, the Department of Environment and Conservation, to determine whether significant illegal trade occurs across the border, and whether the different maximum size limits present management problems in either country. Also, it is intended to seek assistance from the CITES Secretariat to co-ordinate meetings with the relevant authorities from Singapore, Malaysia and other countries in the Region that may be recipients of crocodile skins and/or live animals that are illegally exported from Indonesia.

6. Proposed Management

- 61. <u>Preface</u>: Since the last meeting of the Conference of the Parties to CITES in 1989, the management of crocodiles in Indonesia, particularly <u>Crocodylus porosus</u> has been researched extensively by the Indonesian Management Authority with the assistance of the Australian National Parks and Wildlife Service and G Webb Pty Ltd. The following management strategy is based on existing control systems and modifications to current management that are designed to improve substantially the management of crocodiles as a renewable resource.
- 62. <u>Background</u>: Following discussions by representatives of PHPA with the Chairman of the IUCN/SSC Crocodile Specialist Group and the Australian National Parks and Wildlife Service a detailed review of crocodile management in the Republic of Indonesia was undertaken by independent experts (Webb and Jenkins, 1991) in February 1991 for the purpose of formulating a national conservation plan for crocodiles based on the wise use of the wild resource.

The wise management of crocodiles for commercial purposes in Indonesia requires a flexible approach. Where possible the Indonesian Government has adopted recommendations contained in the Webb/Jenkins report on which to base the future management of crocodilians in Indonesia. The application of a single management regime throughout the Indonesian archipelago is neither feasible nor therefore appropriate. A system which may be applicable in parts of Java may be totally impractical in the remote and under-developed parts of Irian Jaya. Similarly the varying conservation requirements of crocodiles in different parts of the Indonesian archipelago require different management prescriptions tailored to suit those requirements.

IT IS PROPOSED THAT CROCODYLUS POROSUS AND CROCODYLUS NOVAEGUINEAE BE MANAGED AS A SINGLE RESOURCE IN IRIAN JAYA, AS CURRENTLY OCCURS IN NEIGHBOURING PAPUA NEW GUINEA.

IN THE SHORT TERM THE MANAGEMENT OF ALL WILD CROCODILES ELSEWHERE THROUGHOUT THE INDONESIAN ARCHIPELAGO WILL BE CONSISTENT WITH THE MANAGEMENT OF CITES APPENDIX I SPECIES AND CONFINED TO CAPTIVE BREEDING. Although the commercial use of the crocodilian resource in areas outside Irian Jaya will be approached conservatively in the first instance, management strategies must be sufficiently flexible to permit the application of ranching operations where such management can be demonstrated on the basis of objective information to be beneficial to the conservation of the local crocodile population. The principal purpose of introducing these programmes in other parts of Indonesia is to confer an economic value on a resource which is otherwise regarded by local people as dangerous and killed without any regard.

Harvest of Crocodiles: Wild populations of the two species 63. occurring within Irian Jaya (viz. C. porosus and C. novaeguineae) will be managed as a single resource in a manner similar to and consistent with the approach adopted in neighbouring Papua New Guinea. The adoption of an integrated management of crocodiles in Irian Jaya recognizes the level of investment made to date by the five commercial crocodile farms currently operating in Irian Jaya and the contribution these operations make to the economies of remote villages. The strategy of integrating wild skin harvests with live capture of juveniles for ranching and captive breeding has the advantage of generating an immediate cash flow from the skin trade which can carry the investment in ranching and captive breeding during the lead time needed for commercial viability for ranching. To meet these management objectives the Management Authority, with the agreement of the five commercial farms in Irian Jaya, has introduced a policy that two (2) live juveniles should be purchased by a farm for each skin purchased.

Elsewhere in Indonesia commercial use of crocodilians will be restricted to specimens derived from captive breeding. Ranching operations will be approved for particular regions where it can be demonstrated that the wild population is capable of sustaining an annual off-take of eggs and/or juveniles for the purpose of ranching and that such use of the wild resource will be beneficial. The acquisition of adult crocodiles for use in establishing captive breeding operations will be confined to existing livestock on farms that is surplus to the breeding requirements of a particular farm. The removal of breeding-sized animals from the wild will be prohibited.

64. <u>Ranching</u>: The objectives of the commercial management of captive crocodilians involve either ranching, captive breeding or a combination of both strategies.

Any collection of wild crocodiles for ranching or captive breeding will be restricted to eggs and/or juveniles up to 80 cm TL (total length) from clearly defined areas by village hunters. These are typically held in village pens, from which they are acquired either directly or indirectly by licensed farms. When live juvenile crocodiles reach the farms, they are housed under a variety of conditions and maintained in a variety of ways. Animals may be shipped between farms owned by the same company or traded between farms, and may be either culled at a future date or maintained for captive breeding.

The principal problem associated with ranching, as in Papua New Guinea, is the mortality rate among wild caught juveniles. Because of such losses the prices that can be paid to hunters for livestock are reduced. The total stocks available to farms for raising are reduced. Small juveniles (hatchlings) have a proportionally higher mortality rate than larger ones, and thus although numerically abundant, in practice they are underutilised. A significant segment of the available resource is thus wasted.

Based on research data for <u>C</u>. <u>porosus</u> in Northern Australia significant natural mortality can be expected between egg-laying and hatching (70%) and between hatching and 80 cm TL (20-30%) such that ranching directs the harvest at a vulnerable stage of the life cycle. In depleted populations juveniles longer than 80 cm TL have a high probability of surviving and eventually entering the adult population. Accordingly, the conservation value of ranching is likely to be highest with the harvest of smaller animals. Eggs and juveniles up to 80 cm TL can be safely caught by hand and transported economically from remote areas to raising establishments.

The causes of mortality among wild caught juveniles are numerous and varied, but some factors appear obvious:

- Stock purchased by the farms has often been held in captivity for long periods of time without "adequate" care.
- Transit from the field to farms may require a number of days under varying, possibly adverse, conditions, or it may involve staging through other establishments.
- Some crocodiles are physically injured during capture.
- The final raising environment on some farms may not be optimal.
- The food offered to stock in captivity may not be optimal for freshly caught juveniles, newly introduced into farms.

Based on advice provided on management methods to the Indonesian Crocodile Farmers Association by Webb and Jenkins during their visit to Indonesia in February 1991, maximizing the survivorship of hatchling crocodiles in captivity will substantially improve captive husbandry of small crocodiles and hence both reduce wastage of the wild resource and enhance the overall commercial viability of crocodile farming in Indonesia.

- 65. <u>Captive Breeding</u>: Captive breeding is a stated management goal of the Government of Indonesia and farms are expected to pursue captive breeding as part of their overall management strategy. Approaches to captive breeding range from single pairs of adults (1 male and 1 female), to large aggregations of breeding adults, comprising various sex ratios. The optimal pen conditions for efficient captive breeding is the subject of current research.
- 66. <u>Restocking Potential</u>: Current PHPA regulations stipulate that 10% of all crocodiles reared and/or bred in captivity for which a slaughter permit has been granted must be made available for restocking into the wild. This requirement was effected several times during 1984 -1988 in the Province of South Sumatera although no follow-up surveys have been conducted from which to

evaluate the success or otherwise of the strategy. In Irian Jaya, a number of problems were encountered with batches of 100 animals released by one farm (CV Bintang Mas of Jayapura) - the animals were returned to the farm for sale either as live animals or skins. A basic problem with restocking concerns the potential for compromising genetic diversity particularly with <u>C. novaeguineae</u>. To avoid any deleterious mixing of possibly discrete genetic races no restocking of <u>C. novaeguineae</u> will be undertaken, although the provision to review this issue will be maintained.

The requirement for farms to provide reared and captive bred crocodiles for restocking designated areas, which on the basis of survey results are shown to have been depleted, will be retained for <u>C. porosus</u> at a rate of 5% of culled stock. The minimum size of <u>C. porosus</u> to be made available for restocking will be 1.0 m TL. Effective prior extension work in areas to be restocked will minimize the threat of restocked crocodiles being recaptured or killed for sale to the industry.

67. <u>Monitoring and Quota Determination</u>: The heavily vegetated nature of wetlands in Irian Jaya creates practical problems for monitoring. In most cases neither nests nor live animals can be seen by day or night, whether from the water or from the air. There are few sighting indices available, and these give conflicting results. Nests counts of <u>C. novaeguineae</u> over the last four years indicate that the number of adult females nesting is either stable or increasing (see Appendix 1).

Spotlight counts in accessible rivers show a sharp decline since intensive harvesting began. As in Papua New Guinea, the accessible areas of a hunted population are the easiest to hunt, and a decline in such areas is to be expected. No open areas suitable for nest surveys of <u>C</u>. porosus have been discovered, and the only index available is spotlight counts in accessible rivers, which are difficult to interpret in terms of the total population (i.e. these counts refer to that component of the population in accessible areas where hunting is easiest).

With respect to the spotlight counts of <u>C. porosus</u> in parts of Irian Jaya by the UN/FAO Project, as in Papua New Guinea, it is difficult to determine how spotlight counts in accessible hunted areas relate to the bulk of the population which appears to exist in heavily vegetated swamps. For example, commercial farms harvest substantially greater numbers of juvenile <u>C. porosus</u> than are recorded from the same areas during spotlight surveys. Similar discrepancies occur between the results of spotlight counts of <u>C. porosus</u> and the number of juveniles harvested from coastal rivers in East Kalimantan.

The current programme of spotlight surveys in accessible rivers may not provide a usable index of the hunted population in Irian Jaya and will be reviewed with the objective of maximizing the management benefits of such field activities. It is important to maintain an active presence of qualified management personnel in the field particularly at the village level to monitor hunting activities.

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In addition to the central monitoring programme (see Section 68.), every effort will be made to locate areas suitable for annual nest surveying in order to overcome the difficulties associated with spotlight surveys as a useful method for population monitoring. In the Province of Irian Jaya an attempt will be made to locate suitable areas for nest surveys in each of the MANAGEMENT ZONES (see Section 67.).

Annual harvest quotas for the wild skin harvest of <u>Crocodylus</u> porosus and <u>Crocodylus</u> novaeguineae in Irian Jaya will represent the summation of individual quotas for each species in each of the MANAGEMENT ZONES and will be determined on the basis of all available information.

The base-line annual harvest quota for the two species of crocodiles in Irian Jaya will comprise skins and live juveniles. Annual harvest quotas will be set at the following levels and adjusted as necessary in light of the results of monitoring surveys:

Crocodylus novaeguineae 20,000 Crocodylus porosus 4,500

The annual harvest of 4,500 <u>C</u>. <u>porosus</u> will comprise a continued maximum harvest of 1,500 skins and provision for a maximum harvest of 3,000 juveniles (or their equivalent in terms of viable eggs) in keeping with the government policy of a 1 : 2 ratio of skins to live animals for the purpose of promoting commercial ranching.

The on-going CENTRAL MONITORING PROGRAMME will provide data upon which decisions by PHPA to increase or decrease harvest levels will be based. Conclusions drawn from the CENTRAL MONITORING PROGRAMME can be independently checked against the results of nest surveys.

68. Regulations and Control of the Industry: The conservation management of <u>C. porosus</u> and <u>C. novaeguineae</u> in Irian Jaya involves the application of commercial ranching and wild skin harvests for both species. Regulation of activities conducted in accordance with the revised management programme will involve a rigorous system of record keeping by the commercial crocodile farms throughout Indonesia and other strategies designed to ensure compliance with the management programme.

Control of the management programme currently involves a series of licences and permits, issued by the central office of PHPA in Jakarta, or, where appropriate, by regional offices and other Departments. These include:

- Licences to farm crocodiles (ranching and/or captive breeding). Issued by the central PHPA office (Jakarta), and signed by the Director General of PHPA usually valid for 5 years.
- Licences to operate a tannery. Issued by the Ministry of Industry.

- 3. Licences to purchase skins. Issued by the central PHPA office, and signed by the Director General of PHPA.
- 4. Licences to purchase livestock; A Capture Licence' issued by the central PHPA office, and signed by the Director-General for periods of 6 to 12 months. Capture licences are issued for a specified number of juveniles none of which can exceed 80 cm TL.
- 5. Permits to move crocodiles and/or skins within Indonesia. Issued by the Director General of PHPA in Jakarta.
- 6. Permits to export skins. Issued by the central PHPA office and signed by the Director General (see section 312.).
- 7. On 8 February 1991 PHPA introduced the use of internal CITES-like tags for attachment to all raw skins (farm culls and wild-harvested). Each exporting company is responsible for purchasing internal tags.

To further strengthen controls over exports, staff of the UN/FAO Crocodile Project are now required to witness culls on farms and the application of CITES tags. UN/FAO personnel also witness the packing of skins for export. Enforcement is carried out by PHPA officers with special police or investigator status, and in their absence, by the police.

The PHPA crocodile effort will be concentrated into a CROCODILE CONSERVATION TASK FORCE such that a single group with a single goal has the prime responsibility for integrating operational aspects of the programme. This unit may utilize staff from other Departments, but will be under the direction of PHPA, the CITES Management Authority.

The CROCODILE CONSERVATION TASK FORCE will:

- a) concentrate its activities on Irian Jaya initially, and perhaps be centred in Irian Jaya;
- b) be well-equipped with data handling and communication facilities;
- c) merge with the current UN/FAO Project with a view to incorporating experienced staff of the project into the TASK FORCE when funding for the UN/FAO Project ceases;
- d) establish secure long-term record-keeping systems capable of incorporating all current data, with back-up copies located in Jakarta;
- e) manage all monitoring systems associated with the programme (wild, captive and tanneries);
- f) be the central point of contact for the issue of licences, permits and tags for the industry, although these may be issued from higher authorities;
- g) liaise closely with the crocodile industry and co-operate with it on the development of programmes aimed at improving all aspects of crocodile management in Irian Jaya;

- h) co-ordinate the development of crocodile conservation and management programmes in other parts of Indonesia;
- i) be the central reference point for PHPA on all matters related to the conservation and management of crocodiles within Indonesia.

Farms and tanneries will be considered separate legal entities, requiring separate permits to hold crocodiles and process crocodile products. Each entity will be responsible for independent record keeping and monthly reporting to the TASK FORCE.

Within the Province of Irian Jaya, commercial use of <u>C</u>. <u>porosus</u> and <u>C</u>. <u>novaeguineae</u> will be monitored and regulated by a system of tags and documentary records as follows:

- Irian Jaya will be subdivided on the basis of natural areas of harvest concentration into discrete MANAGEMENT ZONES.
- A national tagging system, that replaces the current system, will be introduced to distinguish between wild caught skins (WILD TAGS) and those derived from farms (FARM TAGS).
- Serially-numbered WILD TAGS and FARM TAGS will be purchased from PHPA. A price differential will exist to discourage the killing of smaller wild animals for skins, in preference to encouraging their collection for ranching and raising to a larger size. The tags will be issued with data sheets (FARM TAG RECORD SHEET and WILD TAG RECORD SHEET) containing the printed tag numbers.
- PHPA will maintain the recently introduced system of identification cards (colour-coded for each of the 5 licensed companies) for village-level buyers of skins and live crocodiles.
- Skins derived from mortality on a farm or from on-farm culling will have a FARM TAG affixed to them at the first available time in the skinning operation before they enter a tannery or major skin store. Details, including the FARM TAG number, will be included on a FARM TAG RECORD SHEET.
- SPECIAL SKINNING INSTRUCTIONS will apply to animals skinned on farms. These can be varied from year to year to ensure wild caught skins cannot be laundered through farms.
- Wild skins that have been skinned in accordance with the SPECIAL SKINNING INSTRUCTIONS will be considered illegal and subject to confiscation.
- Skins derived from wild harvesting will have a WILD TAG affixed to them at the first available time in the operation when precise and responsible record keeping can be achieved. In some cases this may be at the tannery door. Information on the WILD TAG number, size, species and MANAGEMENT ZONE, will be included on the WILD TAG RECORD SHEET.

- Tanneries and/or major skin buying centres will be issued with a SKIN REGISTER in which the details of all skins entering the facility, and all skins that are either destroyed or exported, are recorded. Details of all skins exported will be included on a SKIN EXPORT FORM.
- ALL live crocodiles purchased by farms, or traded between farms, will be recorded on a LIVE CROCODILE TRANSACTION FORM which makes provision for species, size, MANAGEMENT ZONE and/or farm of origin.

With the implementation of such a system, ALL crocodilian skins within ALL tanneries or central buying facilities, will be tagged. Permit conditions to operate a tannery or skin purchasing centre will contain clear provision for the immediate closure of those facilities, pending investigation, should any untagged skins be located on the premises. All untagged skins will be confiscated pending the results of investigation.

The CENTRAL MONITORING PROGRAMME will operate at the level of the MANAGEMENT ZONE, and be based on data provided by the wild harvest of both skins and livestock, as recorded on the LIVE CROCODILE TRANSACTION FORMS and WILD TAG RECORDS SHEETS. Copies of forms will be submitted monthly to the TASK FORCE, and the results summarised and computerised.

Although the CENTRAL MONITORING PROGRAM will operate continuously, the results will be summarised in an annual report at the end of each year, which interprets the data in terms of MANAGEMENT ZONES.

Farm stocks will be reported monthly on a FARM MONTHLY REPORT FORM, designed with a view to ease of operation. This will allow the TASK FORCE at all times to summarise the state of the industry. Equally important, it identifies individual on-farm management problems such as increased mortality.

Stock on farms will be referred to in three categories for each species: HATCHLINGS, RAISING STOCK and BREEDING STOCK.

- 69. <u>Size Limits</u>: Management of crocodiles in Irian Jaya has the following theoretical base:
 - 1. By imposing a maximum size limit on skins that can be legally traded, which coincides with the size of female maturity, hunting should be directed away from the reproductively active segment of the population. In Irian Jaya that size limit is 46 cm (18 inches) belly width (BW).
 - 2. By imposing a minimum size limit on skins that can be legally traded, it prevents loss of revenue to the Province as the smaller animals can be either left in the wild to grow or caught live and grown within crocodile farms. The minimum legal size limit for wild-harvested skins of both species in Irian Jaya is 25 cm (10 inches) BW. The minimum legal export size for "wet blue" processed skins for both species is 22 cm (8.5 inches) BW.

- 3. A maximum size limit has been placed on juveniles caught live for ranching, which is intended to direct the hunting pressure at the young juvenile stage where mortality is greatest. The present maximum size limit throughout Indonesia, including Irian Jaya, for all species in live trade is 80 cm total length (TL).
- 4. The use of fishing hooks for capturing crocodiles is banned principally because the size of hooks used (i.e. that suitable for catching sharks) tends to select for breeding sized animals in excess of 45 cm BW. Relatively few crocodiles smaller than 33 cm (13 inches) BW appear to be hooked by this method. The use of harpoons for the capture of larger animals is encouraged. Most live juveniles are caught by hand.

The maximum and minimum size limits will only apply to wild harvested skins and live specimens of <u>C</u>. porosus and <u>C</u>. <u>novaeguineae</u>. The special skinning instructions that apply to farm-raised crocodiles are designed to allow ready differentiation between wild harvested skins and those derived from farmed animals. It is not necessary therefore to apply any size limit to the skins of farm-raised crocodiles that enter trade.

The current hunting strategy of Irianese villagers sometimes results in crocodiles being killed that exceed 46 cm BW. Except for the illegal use of fish hooks it is unlikely that traditional hunting methods will alter. Some large animals will continue to be killed. The entry of such skins into trade will be readily detectable by the different arrangements of cuts in the skin relative to other large skins which enter trade legally as farm-raised stock.

- 610. <u>Marking System</u>: Current CITES requirements for marking crocodile skins that enter international trade will be met under the national plan for the management of crocodilians in Indonesia in the following manner:
 - ALL crocodile skins exported from Indonesia, independent of species, will bear a CITES approved non-reusable export tag.
 - CITES export tags will be colour-coded for species.
 - CITES export tags will be attached by an authorised Government official and will replace WILD and FARM tags prior to export.
 - Applicants for EXPORT of skins will be required to provide information on the number of skins, the size of each skin, the name of the exporter, the destination and the name and address of the receiver.
 - Packaging and a final Customs clearance will be witnessed by a TASK FORCE officer.
 - Packages of crocodile skins will be sealed following verification. Should the seal be broken or interfered with the complete contents of any such package will be confiscated.

- A CITES export permit will accompany each consignment of crocodile skins exported from Indonesia.
- The number of CITES export tags that will be required in any given year will be determined in September/October of the previous year to ensure that the tags are available for use by the industry in January of the year of issue.
- The number of CITES export tags for each species that is subject to export that are required for any given year will be based on the annual quota for the wild skin harvest of <u>C. porosus and C. novaeguineae</u> in Irian Jaya and the projected annual production of skins derived from captive breeding and ranching as advised by individual farms.
- CITES export tags that are not used in a given year will be destroyed by PHPA and recorded, together with the total number of tags which are used by Indonesia, in the annual report to CITES.
- 611. Enforcement and Penalties: The provisions of the management programme will be enforced by PHPA officials, the police, military and Customs officers. Non-compliance with the programme, especially falsification of documents will be regarded as a very serious offence, particularly if practised by a licensed farm or tannery through which large numbers of Irianese crocodiles are processed. Penalties will be sufficient to act as a deterrent.

The government has established a close working relationship with the Indonesian Crocodile Farmers Association which is the principal body representing industry interests. This Association stands to benefit from the reduction of illegal trade in crocodiles and has indicated a willingness to adopt a self-regulatory policy for its members as well as being actively involved in creating incentives for illegal trade to be uncovered and the offending parties to be dealt with by the court.

7. References

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ANALYSES OF SURVEY DATA

Within Irian Jaya, nest counts and spotlight counts have been used to provide an index of the *C. novaeguineae* population, whereas with *C. porosus*, only spotlight counts are available. Spotlight counts have proved to be of limited use as a survey method in riverine habitat that is characterised by heavily vegetated swamps. This is especially so if the crocodile population is hunted and the animals become wary of boats and spotlights. In Irian Jaya the only areas that are readily accessible for surveying are the same ones readily accessible for hunting. The data for *C. novaeguineae* collected in Irian Jaya are analysed below, such that conclusions drawn from nest and spotlight counts can be compared.

C. novaeguineae Results

The nest counts occur within 12 zones within the Mamberamo River area, and each zone is subdivided into 2 to 11 distinct nesting areas. Some of these nesting areas were identified on the first survey (1987), and have been surveyed each year since (1988, 1989, 1990) to give 4 years of data. Other areas have been identified and brought into the monitoring program on subsequent visits giving data for 1, 2 or 3 years depending on when a particular area was first surveyed. Of the 12 zones, only one (No 12) has no subareas which have been surveyed for 4 years.

Table 1. The mean, SE, SD, Maximum and Minimum counts of C. novaeguineae nests in the 11 survey areas, surveyed each year between 1987 and 1990 (N = 4). Linear regression analysis was used to describe the mean trend of the data over time. Slope (in units of nests/year) indicates the direction (+ = increasing; - = decreasing) and magnitude of the mean trend in nest counts; R^2 = the proportion of variation in the number of nests explained by the variable time (years 1 to 4); and P = the probability that the relationship is due to chance.

Zone	Mean	SE	SD	Max	Min	Slope	\mathbb{R}^2	Р
1	8.25	0.25	0.50	9	8	0.25	0.54	0.267
2	21.00	2.48	4.97	27	15	1.16	0.12	0.659
3	3.75	0.83	1.71	6	2	-1.17	0.99	0.005
4	8.00	1.47	2.94	11	5	0.51	0.06	0.747
5	7.75	1.03	2.06	10	6	1.13	0.64	0.199
6	1.00	0.58	1.15	2	0	-0.38	0.23	0.521
7	4.00	1.78	3.56	8	1	2.23	0.84	0.085
8	2.75	0.63	1.26	4	1	0.82	0.90	0.050
9	17.50	2.40	4.80	22	11	2.93	0.80	1.108
10	19.25	1.93	3.86	23	14	0.12	0.00	0.954
11	1.25	0.47	0.96	2	0	-0.13	0.04	0.806
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Extracted from: Management of Crocodilians in Indonesia, (1991) a Report for the Indonesian Management Authority by G Webb & R Jenkins

For the purposes of this review, only areas which had been surveyed for each of the 4 years were included and the results from each separate area were lumped to give a total nest count for each zone. The results are summarised in Table 1.

With high annual variation and only four years data, few of the trends are statistically significant (P < 0.05). Zone 3 is the only one which indicates a significant decline.

When the data from all zones are examined against year (Table 2), it can be seen that the mean trend is towards an increase in the number of nests. Regression analysis indicates that the increase in total nests is statistically significant ($R^2=0.90$; P=0.05).

Table 2.	The mean and total numbers of nests located each year.						
Year in	No of	Total	Mean	SE	SD	Max	М
	Zones						
1987	11	83	7.55	2.14	7.12	21	
1988	11	86	7.82	2.18	7.24	22	
1989	11	103	9.36	2.37	7.85	23	
1990 0	11	106	9.63	2.62	8.68	27	

Table 3The exponential rate of increase (r) for each survey zone using 4
years survey data.

Zone	r	Р
1	0.02650	0.270
2 3	-0.02449	0.740
4	0.06685	0.710
5	0.13233	0.180
7	0.49622	0.097
8	0.25284	0.072
9 10	0.00797	0.102
11	-0.07892	0.778

To calculate the exponential rate of increase (r), the nest counts in each zone were transformed to natural logarithms (ln). As zero (0) cannot be transformed, and three zeros were recorded in the data (2 in zone 6 and 1 in zone 11), one nest was added to each survey. Regression analysis was carried in each zone [ln nest count plus one vs year (1-4)]. The individual slopes estimate r, and they are summarised in Table 3. The mean value of r over all areas was $+0.081 \pm 0.056$,

indicating that the mean trend in the population over the last 4 years equates to an 8% increase in nesting per year.

The spotlight count data for *C. novaeguineae*, in the same areas, are more difficult to interpret. Altogether, 28 areas have been counted by spotlight between 1 and 4 times, from 1987 to 1990. The spotlight count areas are unequally divided between the nesting zones (Table 1). Using only areas that had been counted 3 or more times, densities were converted to natural logarithms and the exponential rates of increase were calculated as above, to enable direct comparison with results from the nest count.

Table 4.	The exponential rate of increase (r) for 2 survey zones using nest
	count data (bold) and spotlight count data. The mean r for the 5
	areas spotlight counted in nest zone $1 = -0.09859$.

Nest	Spotlight	r	P
Zone	Area	0.02650	0.270
1	A.1	-0.04868	0.805
	A.2	0.05044	0.841
	A.4	-0.35563	0.260
	A.6	-0.59988	0.096
	A.10	0.46081	0.068
10	-	0.00797	0.943
	B.1	-0.41635	0.140

None of these data are significant, partly due to the high variability and low numbers of counts. However the trends are quite different. Based on nest counts in nest zone 1, the population has been increasing at about 2.7% per year, whereas the mean of the 5 spotlight counts (r = -0.09859) indicates it has been decreasing by nearly 10% per year. In nest zone 10, nest counts indicate no significant trend (0.8% increase), whereas the spotlight counts indicate a 42% drop.

Taking all spotlight count data from sections of river in which at least 2 surveys had been conducted (N = 14), densities at the first survey [mean = 4.2 ± 1.24 (SE), max = 14.12; min = 0.21] were compared with densities at the last survey [mean = 1.49 ± 0.52 (SE) max = 7.06; min = 0.00]. A paired t-test indicated that the decrease was significant (DF = 13; t = 2.38; p = 0.017).

Taken together, these data indicate that in a hunted population of *C. novaeguineae* in Irian Jaya, the numbers of animals being sighted in accessible areas of open water (which are the only ones suitable for spotlight counting), are showing a significant decrease. Against this, the nest counts, based largely in areas away from open water are showing a significant increase. As in Papua New Guinea and Louisiana, nest counts would appear to be a better index of the total population in a hunted population, because hunting tends to be concentrated in accessible areas.

C. porosus Results

The spotlight survey results for *C. porosus* from Irian Jaya have been obtained over three years (1988, 1989, 1990). The results are from seven major areas, with between 3 and 18 survey sections within an area (a total of 72 survey sections in the 7 areas). Surveys were carried out under varying conditions, and in some cases information on the distances surveyed are not available.

To clarify broad trends, the areas which had been surveyed 3 times, were isolated from the remainder of the results (Table 5). These surveys indicate a decline in the total count by the third year, although it does not reach statistical significance ($R^2 = 0.82$; P = 0.29) with only 3 years data.

Table 5.Summary of C. porosus spotlight count results. "Sections" refers
to the number of survey sections within a survey area, that had
been surveyed three times. "Counts" refers to total counts for all
sections within an area.

Area	Sections	1988	Counts 1989	1990
$\frac{1}{2}$	03	- 41	83	- 26
3	1	18	28	12
4 5	0 5	74	20	- 18
6 7	3 1	51 0	41 3	21 0
Total	13	184	175	77

Densities are available for 8 of the 13 survey sections included in Table 6, and these were used to calculate exponential rates of increase. No single section showed a statistically significant change, due to wide variation and small sample sizes. The mean trend was r = -0.255, indicating an annual decline of around 25% over the three years.

Table 6.	Densities (crocodiles	/kilometre)) and calculated exponential
	rates of incre	ase for the	9 sections	of known length surveyed.

Area	Sections	1000	Counts	1000		
Р		1988	1989	1990	Γ	
5	4	1.16	0.22	0.22	-0.28563	0.33
5	7	0.22	0.27	0.27	0.02008	0.33
5	8	2.40	0.00	0.13	-0.55078	0.39
5	9	6.20	0.00	0.80	-0.69315	0.52
5	10	0.16	0.40	0.16	0.00000	1.00
6	1	1.80	0.55	0.82	-0.21539	0.50
6	3	1.20	0.76	0.22	-0.29480	0.90
6	4	0.63	1.50	0.56	-0.02195	0.95

Some survey sections had been surveyed twice, and thus the first and last densities recorded for each section with multiple surveys (2 or 3 years data; N = 27) were compared (as above for *C. novaeguineae*). For this comparison, only sections with at least 1 crocodile sighted in one survey were included. The mean density for the first surveys was 1.25 ± 0.31 (SE), (min = 0.00; max = 6.2), whereas the mean for the second survey was 0.43 ± 0.077 (SE), (min = 0.00; max = 1.70), A paired t-test indicated that the decrease was significant (DF = 26; t = 2.94; p = 0.003).

No areas outside Irian Jaya have been subjected to repeated counts, although a spotlight counting program was conducted in Sumatera and Kalimantan during 1990. In Sumatera, 37 survey sections (972 km) were surveyed for a total sighting

of 54 *C porosus* (31 hatchlings); maximum density in a section was 0.69 per km and minimum density 0.00 per km. In Kalimantan, 13 survey sections (462 km) were surveyed for a total count of 7 non-hatchling *C. porosus*; mean density = 0.015 per km.

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