AMENDMENTS TO APPENDICES I AND II OF THE CONVENTION

Proposals submitted pursuant to Resolution on Ranching

A. PROPOSAL

Maintenance of the Indonesian population of Saltwater Crocodiles (*Crocodylus porosus*) on Appendix II of CITES pursuant to Resolution Conf. 3.15 throughout Indonesia, with additional "Special Conditions" applying to Irian Jaya, namely notification of the Parties as required by Resolution Conf. 8.22 that within the ranching programme the established wild harvest of sub-adult *C. porosus* will continue, subject to quotas issued by Indonesia.

Rationale

Indonesia is requesting the maintenance of Indonesian *C. porosus* population in Appendix II (under quotas) to Appendix II pursuant to Resolution Conf. 3.15 (ranching). A transfer back to Appendix I is considered totally inappropriate as *C. porosus* is not an endangered species in Indonesia.

The situation within Irian Jaya is unique within Indonesia. "Special conditions" apply there now, with the maintenance of a wild harvest of subadult *C. porosus* controlled by a size limit and other mechanisms. Indonesia seeks to have the "special conditions" endorsed by the Parties within their overall ranching programme, as provided for within Resolution Conf. 8.22. This will mean that management in Irian Jaya and adjoining Papua New Guinea are the same, removing incentives for smuggling. It will also ensure that management throughout Indonesia is not compromised by the unique situation that exists in Irian Jaya. All aspects of the wild harvest are subject to quotas imposed within Indonesia.

Irian Jaya is one of the most remote areas of the world and its indigenous people have much to benefit from the sustainable use of wild resources. Irian Jaya provides 85% of Indonesia's crocodile exports. *C. porosus* and *C. novaeguineae* coexist and are hunted as a single resource for food, with skins and live juveniles providing important trade items. It is impossible to separate the species for the purposes of management. The combination of hunting and ranching in Irian Jaya, as in Papua New Guinea, has been sustained for many years.

Outside of Irian Jaya wild harvesting for skins is prohibited, but captive breeding and ranching of juveniles are established. Within and outside of Irian Jaya, most hunting is carried out by people living in very remote areas.

Crocodile management in Indonesia has been the subject of a series of detailed, independent, on-site reviews [Webb and Jenkins (1991), Messel *et al.* (1992) and Messel (1993)]. Each has resulted in recommendations which have been implemented where possible, and each contains detailed information on current management.

Resolution Conf. 8.22 could be interpreted as requiring a transfer of the complete population to Appendix II under the Berne Criteria (Resolution Conf. 1.2). However, the harvest does not involve adults. In addition, the original transfer of the Indonesian population of *C. porosus* to Appendix I was decided without Resolution Conf. 1.1 being applied and without information on the status of the species in Indonesia being provided by the proponent (see Annex 1). The population of *C. porosus* in Irian Jaya is not endangered and does not meet the requirements of the Berne Criteria. This proposal, based on Resolution Conf. 3.15 and supported by Resolution Conf. 8.22 is considered a more conservative and responsible one, which will promote conservation and the sustainable use of *C. porosus* in Indonesia.

Compliance with each of the relevant CITES Resolutions is summarised in ANNEX 1.

B. PROPONENT

The Republic of Indonesia.

C. SUPPORTING STATEMENT

1. Taxonomy

11. Class: Reptilia

12. Order: Crocodilia

13. Family: Crocodylidae

14. Species: *Crocodylus porosus* Schneider, 1801

15. Common Names: English: Saltwater crocodile, estuarine crocodile
French: Crocodile marin
Spanish:

16. Code Numbers:

2. Biological Data

Indonesia contains three other species of crocodiles. All may live sympatrically with *C. porosus* to some extent, but the situation with *C. porosus* and *C. novaeguineae* in Irian Jaya is extreme. The two species occur sympatrically throughout the majority of the freshwater swamp habitat in Irian Jaya.

The New Guinea Freshwater Crocodile *Crocodylus novaeguineae* (Appendix II): Widespread in Irian Jaya and some adjacent islands. Occurs sympatrically with *C. porosus* in most areas. It is subject to ranching, skin harvesting and captive breeding as part of a single crocodile resource. Management involves size limits and export quotas imposed by Indonesia. As in Papua New Guinea, there appear to be morphological differences between northern and southern forms.

The Siamese Freshwater Crocodile *Crocodylus siamensis* (Appendix I): Recently confirmed from Kalimantan (Cox *et al.* 1993) and may occur in Sumatera (Groombridge 1982, 1987). Definitive taxonomic clarification is needed. It was discovered on farms after being collected amongst wild-caught juvenile *C. porosus* from the Mahakam River system (East Kalimantan). The collection of additional *C. siamensis* from the wild is no longer permitted (since 1993). An inventory of all current stocks is being undertaken with ACSUG assistance.

The Malayan False Gharial *Tomistoma schlegelii* (Appendix I): Occurs in Kalimantan and Sumatera where it is unclear whether it lives sympatrically with *C. porosus* in some habitats. It was subject to limited ranching involving the collection of juveniles in the Palembang area (Sumatera) but their collection from the wild is no longer permitted (since 1993). An inventory of all current stocks is being undertaken with ACSUG assistance.

21. Distribution: *C. porosus* occupy mangroves and coastal wetlands throughout the Indonesian archipelago, which comprises some 17,000 islands spanning an area 5000 km wide by 2000 km deep (Fig. 1). They occupy saline and freshwater coastal wetlands and extend up rivers into totally freshwater reaches.

22. Population: *C. porosus* occupy the coast, mangroves, estuaries and tidal rivers, freshwater rivers and a variety of permanent wetlands and vegetated swamps. Major wetlands are in Fig. 1, with the distribution of crocodiles in Table 1. Some 44% of Indonesia's original mangroves remain intact, with 11.2% in protected areas; 47% of original freshwater swamps are intact with 5.2% in protected areas (MSPE 1992). The major *C. porosus* habitats remaining in Indonesia are distributed disproportionately through the main biogeographic regions (MSPE 1992):

	Mangroves		Marais	
	km^2	%	km^2	%
Total Indonesia	35,830	100	56,278	100
Irian Jaya	12,929	36	33,062	59
Sumatra	8,324	23	12,012	21
Kalimantan	9,856	28	7,582	13
Sulawesi	2,295	6	918	2
Petites Sunda	292	1	195	<1
Maluku	2,134	6	2,510	5

Irian Jaya contains vast areas of wetlands, largely in a pristine condition. The mangroves and freshwater swamps are largely pristine and are not currently under any serious threat. In contrast, within the Java-Bali biogeoraphic region, with some two thirds of Indonesia's human population, wetlands have been allocated almost totally to agriculture and aquaculture.

23. Abundance: *C. porosus* populations have been reduced significantly from their historical abundance throughout Indonesia. An extensive survey programme was conducted by FAO (Fig. 2) and subsequently by PHPA. However, there is no reliable estimate of the total population size (Frazier 1989). The total wild harvest in Irian Jaya for all purposes is thought to be around 5000 animals per year (ranching, skins, consumption), and outside Irian Jaya, up to 2000 per year (ranching, consumption). The total wild population could be under 20,000 but given the inaccessible nature of much *C. porosus* habitat (see below), it may be many times greater than this.

As in Papua New Guinea (Hollands 1987), surveying is complicated by spotlight surveys being conducted in the accessible mainstreams where hunting is concentrated; the bulk of the population exists in areas that are extremely inaccessible, namely heavily vegetated swamps, oxbow lakes and bodies of permanent water away from the mainstreams. [Current independent census methods (even nest counts; see below), are not suited to such areas.] Significant annual harvests come from areas with low reported densities from spotlight counts (Webb and Jenkins 1991).

Spotlight counts in Irian Jaya, where most *C. porosus* occur, gave densities of 0.04 to 3.06 *C. porosus* sighted per kilometre (Table 2), over a period of 2-5 years. Densities were reduced during the period of high prices and intensive hunting (1989-90; see also Webb and Jenkins 1991), and are increasing now that demand has slowed. Surveys are also being

conducted in areas where *C. porosus* and *C. novaeguineae* co-exist (Table 3). In 1990, one-off surveys in 462 km in Kalimantan gave a mean density of 0.02 sightings per kilometre; 972 km in Sumatera gave a mean density of 0.06 sightings per kilometre (unpublished FAO results).

Some 20,000 *C. porosus* are currently housed on crocodile farms (Fig. 3; Table 4). The intake of wild *C. porosus* into Indonesia's largest farm (in Irian Jaya), reached a peak in 1990 (1516 juveniles; 719 skins) when prices were the highest ever and has stabilised since: 1991 (976 juveniles; 387 skins) and 1992 (1141 juveniles; 302 skins) despite collection being reduced from 33 areas in 1990 to 21 in 1992 for logistic reasons (see ANNEX 2).

24. Reproduction: *C. porosus* nest during the wet season (December- April) with clutch sizes of 25-90 eggs, with a mean of 50-60 (Cox 1985; Groombridge 1982). Nests surveys located 29 nests in the Idenburg tributary (Mamberamo drainage; Irian Jaya) but in most areas nests appear to be beneath closed canopies (rather than in open grass swamps) and are not amenable to aerial counting.

25. Survival Rates: Estimates have not been derived specifically for *C. porosus* in Indonesia. In Australia, less than 25% of wild eggs produce hatchlings, and 3% of hatchlings survive to 5 years of age (Webb and Manolis 1989). The survival rate of 2- and 3-year-olds appears density-dependent; high when populations are depleted and low when they start to expand (Messel *et al.* 1981; Webb 1992).

26. Size, Growth and Maturity: Growth rates vary with sex, season (rainfall and temperature) and food availability. On average, female *C. porosus* mature at 2.3-2.4 m TL and 12 years of age; males at about 3.35 m and 16 years of age. Normal maximum sizes are 4.6-5.2 m TL for males and 3.1-3.4 m TL for females. Some males may reach 6-7 m (Webb and Manolis 1989). The maximum size limit for skin hunting is 51 cm, which corresponds to about 2.25 m TL in wild *C. porosus*.

27. Interactions with People: *C. porosus* is a large and dangerous predator on people and their domestic stock. In many parts of Indonesia, particularly poorly developed areas like Irian Jaya, the daily use of rivers and wetlands by people, for a great variety of essential purposes, makes it impossible for large populations of adult *C. porosus* to be established throughout their former range.

3. History of Management

31. International: The Republic of Indonesia acceded to CITES by Presidential Decree on 15 December 1978 and *C. porosus* became protected under Indonesian law in 1980. However illegal hunting was widespread. Following the adoption of Resolution Conf. 5.21 by the Conference of Parties to CITES in 1985, the Republic of Indonesia was permitted to trade internationally in *C. porosus* skins with an annual export quota agreed to by the Conference of Parties.

In 1989 the Conference of Parties approved annual export quotas for Indonesia for the period 1990-1992 of 5000, 6000 and 7000 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 or three years, after which the species or population must be listed in Appendix II pursuant to Resolution Conf. 3.15 (ranching) of Resolution Conf. 1.2 (Berne Criteria).

At the 1992 meeting of CITES Indonesia proposed (PHPA 1991) that its population of *C. porosus* be retained in Appendix II under Resolution Conf. 3.15, as required by Resolution Conf. 7.14. The Parties were concerned that Indonesia's implementation of CITES generally needed improving, and some Parties felt that a technical difficulty existed because the wild skin harvest in Irian Jaya could not be accommodated under Resolution Conf. 3.15 [despite precedents with Australia's transfer of *C. porosus* to Appendix II primarily for ranching but which also included trial harvests (Webb *et al.* 1984)]. A further export quota was issued for the period 1992 (revised quota) to 1994 for accumulated skins, ranching and wild harvest: 9700, 8500, 8500 (wild harvested skins: 1500, 1500, 1500).

Resolution Conf. 8.22, passed at Kyoto, indicates that the Berne Criteria (Resolution Conf. 1.2) should be applied to programmes involving wild harvesting of adults, but gives no direction for the harvest of sub-adults, as occurs in Irian Jaya (the maximum size limit is below the size of maturity of *C. porosus*). It also implies that an unqualified Appendix-II listing should be sought, if wild harvesting of adults were to be undertaken in any part of the range.

The current proposal, prepared on advice from the IUCN Crocodile Specialist Group and the CITES Secretariat (Messel *et al.* 1992), addresses the technical difficulties in retaining the conservative Appendix-II listing pursuant to Resolution Conf. 3.15 and requesting "special conditions" to retain the harvest of sub-adult skins in Irian Jaya.

32. National

321. Hunting by Indigenous People: The people of Indonesia have a long history of eradicating *C. porosus* where human safety is involved, and utilizing them for a variety of non-commercial purposes. As in Papua New Guinea, the people of Irian Jaya and Kalimantan hunt crocodiles traditionally for protein and since the 1960s have traded in skins. Appendix-I listing will not help the conservation of the *C. porosus* because they will continue to be killed for food, in the defense of life and property and because they compete for wetlands.

    The current programme involves hunting/harvesting at a village level, typically in remote areas accessible only by boat and/or aircraft. It provides an important form of income to many people and the only form of cash income for some: for example, an estimated 12,000 people in the Mamberamo River region of Irian Jaya, one of the most remote and least developed regions in the world.

322. Ranching and Captive Breeding: Ranching was initiated over 25 years ago in Indonesia, mainly with *C. porosus*. In the 1980's, increasing prices of crocodile skins prompted many new farms and ranches, with government promoting both captive breeding and ranching (Fig. 3; Table 4). Farms in Irian Jaya were typically engaged in wild-skin trading and ranching with limited captive breeding, whereas those in Kalimantan were largely based on ranching and captive breeding, and those in Sumatera and Java on captive breeding. The current downturn in prices has slowed commercial activity in most farms and ranches (Tables 5 and 6).

323. Tanneries: Manufacturing of finished products now occurs in Jakarta. The Government of Indonesia introduced mandatory value-adding through partial tanning (at least to the "wet-blue" stage) before export and introduced a policy requiring each new ranching enterprise to construct a tannery. Five were established in Irian Jaya (1987-1989); others are in Jakarta, Palembang, Samarinda and Surabaya.

324. FAO Project: A previous FAO Project, which ceased in January 1991, was instrumental in advancing monitoring (Fig. 2), technical assistance, education, research and the development of new management initiatives (Cox 1992). A proposal for a further project has been prepared.

4. Current Management

41. Management Programme: A single management programme has been developed as the legal and operational basis for crocodile management within Indonesia. This is in draft form at present and will be finalised after review by the IUCN Crocodile Specialist Group and others. It is expected to be effective by April-May 1994.

42. National and International Co-operation:

421. Indonesian Crocodile Conservation Task Force: The Indonesian Crocodile Conservation Task Force (ICCTF) was formed by PHPA decree on 22 December 1991. A high proportion of operational funding comes from the industry. ICCTF has members from LIPI and industry and is a management unit for crocodiles. Responsibilities include co-ordination of monitoring (farms/wild), extension, recording, reporting and enforcement assistance. ICCTF was restructured by PHPA Decree of 27 September 1993, and is functioning with increasing efficiency.

422. LIPI: The CITES Scientific Authority in Indonesia plays an increasingly important role in crocodile management in Indonesia. Over and above their participation in the ICCTF, they have established a permanent Wildlife Export Quota Team, to review all quotas, including those for crocodiles. With assistance from ACSUG, a new wildlife survey initiative has been launched, and three LIPI staff have now attended an intensive overseas training course in crocodile management.

423. Indonesian Crocodile Farmers Association: In 1989 the Indonesian Crocodile Farmers Association (ICFA) was formed as a compartment of the Indonesian Fauna Flora Trade Association (IFFTA). The aim of the Association is self-regulation within the industry, and it provides assistance and financial support for PHPA's management efforts. ICFA promotes sustainable commercial use of crocodiles and assists in the detection and prevention of illegal activities. ICFA has recently (1993) been restructured.

424. CITES and the IUCN-SSC Crocodile Specialist Group (CSG): The CITES Secretariat and the CSG have continually provided assistance, encouragement and technical expertise.

43. Regulations

431. Legal Framework: The conservation and management of crocodiles in Indonesia is primarily governed by two Acts: Act of the Republic of Indonesia No. 4 of 1982 concerning Basic Provisions for Management, and the more powerful Act of the Republic of Indonesia No. 5 of 1990 which deals with the Conservation of Living Resources and their Ecosystems. The maximum penalty for breaches of this act is Rupiah 200 million (around USD 100,000) and 10 years imprisonment. An amendment to this Act, which allows management of a particular species to be subject to an approved Management Programme is expected to be introduced early in 1994.

Non-compliance with management procedures, especially falsification of documents, is regarded as a very serious offence, particularly if practised by a licensed farm or tannery.

Decrees issued by the Director General of PHPA on behalf of the Minister of Forestry are used to introduce new management initiatives and rescind old ones.

432. Licences and Permits: Commercial utilization of crocodilians within Indonesia is subject to a series of licences and permits, issued by the central office of PHPA in Jakarta, or where appropriate, by regional offices of either PHPA or the Ministry of Forestry. Separate licences and permits include:

4321. Farm Licences: Licences to farm crocodiles (ranching and/or captive breeding, are issued by the central PHPA office (Jakarta) and signed by the Director General of PHPA; usually valid for 5 years. (Licensed farms are in Table 1)

4322. Tannery Licences: Licences to operate a tannery are issued by the Ministry of Industry.

4323. Licences to Purchase Skins: Issued by the central Jakarta PHPA office and signed by the Director General of PHPA.

4324. Licences to Purchase Stock: Capture licences are issued by the central Jakarta PHPA office and signed by the Director General of PHPA for periods of 6 to 12 months; where appropriate they specify the number of juveniles to be purchased/caught.

4325. Permits to Move Stock/Skins: Required for movement between the Provinces of Indonesia. Issued by the central PHPA office and signed by the Director General of PHPA.

4326. Permits to Export Skins: Issued by the central PHPA office and signed by the Director General of PHPA.

433. Harvest Regulations

4331. Maximum Size Limit: The maximum size skin that may be traded is 51 cm belly width, which coincides with the size of *C. porosus* mature females. For wild harvested skins (Irian Jaya only) it is consistent with size limits in adjoining Papua New Guinea. [Prior to 1993 the maximum size limit in Indonesia was 46 cm, creating a disparity between adjoining nations that encouraged smuggling].

4332. Minimum Size Limit: The minimum legal size limit for wild-harvested skins in Irian Jaya is 25 cm BW.

4333. Ranching Size Limit: Commercial management of crocodiles in Indonesia involves ranching, captive breeding or a combination of both strategies. The collection of crocodiles for ranching and captive breeding is restricted to eggs or juveniles up to 80 cm Total Length.

4334. Fishing Hooks: The use of fishing hooks for capturing crocodiles is banned. Harpooning and hand-capture (juveniles) is encouraged.

4335. Restocking: For *C. porosus*, 10% of stock for which culling permits are requested (ranched and captive-bred specimens) may be acquired by PHPA for restocking. Farms must hold these for up to two years. If the government does not require them, they may be culled. The restocking option is retained as a

safeguard. Restocking was carried out several times during 1984-1988 in South Sumatera (no subsequent monitoring) and Irian Jaya, where animals released by one farm (C.V. Bintang Mas) were returned for sale either as live animals or skins.

434. Quotas: Indonesia issues quotas for *C. porosus* exports annually (Table 7), which match the CITES quota for wild-harvested skins and ranching and takes into account exports based on captive breeding. The downturn in prices has generally restricted exports. Under the new proposal, quotas for *C. porosus* will be voluntarily established by Indonesia (by LIPI), as they are for all wildlife subject to export.

	1995	1996	1997
Ranchs	5,000	6,000	6,000
Nature	1,500	1,500	1,500

435. Marking Systems

4351. National: To avoid abuses PHPA (since 8 February 1991) require all raw skins (farm culls and wild-harvested) to be tagged for internal purposes with tags bearing the Company name. They are easily identiable from the CITES tags.

4352. International: All crocodile skins exported from Indonesia bear a CITES approved non-reusable export tag ("Brooks" Tag), colour-coded for species and bearing country codes and unique numbers. Tag numbers are ordered by PHPA in October the previous year based on estimates given by ICFA. At the time of attachment by an authorized PHPA officer, local farm tags are removed.

436. Export Procedures: Applicants for export permits must 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, in order to obtain a permit. Packages of crocodile skins are sealed following verification and the complete contents are confiscated should seals be broken or interfered with.

44. Enforcement

441. General: Enforcement of wildlife trade regulations is the responsibility of the Forest Security Teams throughout Indonesia. In Irian Jaya the Forest Security Team comprises representatives of the Military, Police, PHPA, Regional Forestry, and Provincial Government. Crocodile activity has slowed with the downturn in prices: two successful arrests (26 and 6 skins) have been made in the last two years.

442. Export Verification: Inspections are conducted by PHPA when CITES tags are attached and when shipments are packed and sealed for export; it now includes inspection through to the loading on aircraft.

443. Illegal Trade: Increased management skills, enforcement and co-operation with neighbouring countries have all assisted in reducing the illegal exports of crocodile skins to a level that is considered biologically insignificant. Despite the archipelago structure of Indonesia, the isolation of Irian Jaya, and the many trading routes that exist between Indonesia and neighbouring nations no significant illegal shipments have

been detected over the last few years. Continued vigilance and co-operation with the ICFA and neighbouring countries is essential to maintaining that situation.

45. Monitoring: The central monitoring goals are to determine whether the population is increasing, decreasing or remaining stable, and whether the harvest is sustainable.

451. Wild Population: Finances permitting, and not withstanding their limitations, PHPA undertake annual spotlights counts in some of the tidal rivers in Irian Jaya that contain exclusively *C. porosus* (Table 2) and in areas with mixed *C. porosus* and *C. novaeguineae* (Table 3; species not identified). Results are consistent with mainstream densities reflecting local hunting activity, which follows skin prices. The heavily vegetated swamps which appear to contain the bulk of the coastal *C. porosus* population, are impossible to survey with known methods. [Helicopter counts of nests were tested by the FAO Project but over and above their expense, they proved impractical due to canopy cover].

452. Harvest: Despite fluctuations due to market demand, monitoring the harvest is considered the most appropriate method of detecting any definitive slide towards unsustainable use (ANNEX 2). The programme operated by Indonesia's largest farm (C.V. Bintang Mas) is now being extended to farms with good record-keeping skills. It will allow early detection of any slide towards unsustainable use and results may be able to be correlated with field surveys.

453. Exports: Total skin exports (Tables 5 and 6) are monitored independently through the issuance of export permits; export data are included within the annual reports to CITES.

454. Farms, Ranches, Stock - Live/Skins: There are currently 31 registered crocodile farms within Indonesia with current stocks (June 1993) of 20,800 *C. porosus* [Table 1; 21% of these are committed to captive breeding (Table 4)] and 57,851 *C. novaeguineae*. Within Irian Jaya, five major farms are the nucleus of the crocodile industry and are responsible for the benefits that extend back to remote villages in Irian Jaya. Farms are required to report stocks to PHPA monthly, who forward data to the ICCTF for analysis (Tables 4 and 6). Spot checks on farms are carried out by PHPA officers and ICCTF staff. Strict compliance with reporting procedures has been difficult to achieve with some farms, although the situation steadily improves with ICFA assistance.

46. Reporting: Within Indonesia's annual report to the CITES Secretariat, will be a report on the ranching programme for *C. porosus* that details:

- enforcement (detection of any illegal activities)
- monitoring results (quotas, ranch stocks, wild harvests, wild population, exports)
- programme assessment (details of progress made and the identification of any problems).

47. Protected Areas: Within Indonesia the government has established a network of conservation areas (Fig. 4; Table 8) 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 descending order by nature reserves, game reserves, recreation forests and grand forest parks. Figure 4 shows the geographic distribution throughout the archipelago of four types of conservation area and Table 8 summarises the areas of land within each province that have been designated under each classification. Kimaam Wildlife Reserve, Bintuni Bay Nature Reserve, the recently gazetted Lorentz National Park, Forest of Sungai Sembilang associated with tributaries in South Sumatera Province,

Perdamaran Island and Berbak Nature Reserve all contain significant tracts of *C. porosus* habitat, although the population size in these areas remains to be determined. To conserve *C. porosus* the Government of Indonesia has chosen Kimaan Wildlife Reserve, Bintuni Bay Nature Reserve, Lorentz National Park and Berbak Nature Reserve as central conservation areas.

48. Research: A research station was established at Sorong (Irian Jaya) during the FAO Project. This station is maintained by PHPA as a research, education and training centre, although activities are limited by funding shortages.

49. Training: In addition to some PHPA staff undertaking academic courses in wildlife management at overseas universities, staff from PHPA (4), LIPI (3) and some private farms (2) attended an intensive training course in crocodile conservation, management and sustainable use in Darwin, northern Australia, in April 1993. It included training with survey techniques, management principles, standardized survey techniques, data analysis, reporting procedures, general biology, trade and captive husbandry.

5. References

Cox, J.H. 1985. Crocodile nesting ecology in Papua New Guinea. FAO-DPI Field Document No. 5 (DP/PNG/74/029). 201 pp.

Cox, J.H. 1992. Terminal Report, Project Findings and Recommendations for Follow-up Action. FAO-PHPA Project GCP/INS/060/Jpn. Development of the Crocodile Industry on a Sustainable Basis, 96 pp.

Cox, J.H., Frazier, R.S., and Maturbongs, R.A. 1993. Freshwater crocodiles of Kalimantan (Indonesian Borneo). Copeia 1993(2): 564-566.

MSPE. 1992. Indonesia country study on biological diversity. Bubl. by Kependudukan dan Lingkungan Hidup - Republik Indonesia (Ministry of State for Population and Environment). Jakarta. 209 pp.

Frazier, R.S. 1989. Crocodile monitoring consultancy in Irian Jaya, Indonesia. Final Report. FAO-PHPA Project GCP/INS/060/Jpn. Development of the Crocodile Industry on a Sustainable Basis. 75 pp.

Groombridge, B. 1982. The IUCN Amphibia-Reptilia Red Data Book. Part 1. Testudines, Crocodylia, Rhynchocephalia. 426 pp. (IUCN: Gland, Switzerland).

Groombridge, B. 1987. The distribution and status of world crocodilians. Pp. 9-22 in "Wildlife Management: Crocodiles and Alligators", edited by G.J.W. Webb, S.C. Manolis and P.J. Whitehead. (Surrey Beatty and Sons: Sydney).

Hollands, M. 1987. The management of crocodiles in Papua New Guinea. Pp. 73-89 in ""Wildlife Management: Crocodiles and Alligators", edited by G.J.W. Webb, S.C. Manolis and P.J. Whitehead. (Surrey Beatty and Sons: Sydney).

Messel, H. 1993. Report by Chairman of the CSG on progress with crocodile management in Indonesia. 4 pp.

Messel, H., Jelden, D. and Hemley, G. 1992. Summary report of the Crocodile Specialist Group Review Committee on Crocodile Management in Indonesia, 16 pp.

Messel, H., Vorlicek, G.C., Wells, A.G. and Green, W.J. 1981. Surveys of tidal river systems in the Northern Territory of Australia and their crocodile populations. Monograph No. 1. The Blyth-Cadell Rivers system study and the status of *Crocodylus porosus* in tidal waterways of Northern Australia. 463 pp.

PHPA. 1991. A Proposal to transfer the Indonesian population of *Crocodylus porosus* Schneider (1801) from Appendix I to Appendix II of CITES.

Webb, G.J.W. 1992. Monitoring saltwater crocodiles (*Crocodylus porosus*) in the Northern Territory of Australia. Pp. 404 to 418 in "Wildlife 2001: Populations", ed. by D.R. McCullough and R. Barrett. (Elsevier Applied Science: London and New York).

Webb, G.J.W. and Jenkins, R.W.G. 1991. Management of crocodilians in Indonesia: A review with recommendations. (Australian National Parks and Wildlife Service: Canberra). 48 pp.

Webb. G. and Manolis, S.C. 1989. "Crocodiles of Australia" (Reed Books: Sydney). 160 pp.

Webb, G.J.W., Manolis, S.C., Whitehead, P.J. and Letts, G.A. 1984. A proposal for the transfer of the Australian population of *Crocodylus porosus* Schneider (1801), from Appendix I to Appendix II of CITES (Conservation Commission of the Northern Territory: Darwin). 82 pp.

Annex 1

COMPLIANCE WITH CITES RESOLUTIONS

Resolution Conf. 1.1

Crocodylus porosus within Indonesia were included in Appendix I in 1979. However, Indonesia maintains that its *C. porosus* population, although depleted relative to historical abundance (23.), does not comply with the requirements for Appendix I according to Resolution Conf. 1.1.

The population within Irian Jaya is continuous with that in Papua New Guinea, and was and still is utilized in a similar way, in similar habitats (23.); the PNG population was retained on Appendix II.

The rationale for Indonesia's position is that *C. porosus* in Indonesia does not meet the Biological Criteria of Resolution Conf. 1.1:

1. *Scientific reports on population size or geographic range of the species over a number of years*, or *scientific reports on the population size or geographic range of the species based on single surveys*

No reports were provided. The range appears largely unchanged (21.), although population size is clearly reduced relative to historical abundance (23.). The population has declined due to hunting, but the current population sustains the use being made of it, particularly in Irian Jaya. Results suggest annual fluctuations around a stable mean (23.), that reflect fluctuations in hunting pressure due to season and market price.

2. *Reports by reliable observers other than scientists on the population size or geographic range of the species over a number of years or reports from various sources on habitat destruction, heavy trade or other potential causes of extinction.*

No such reports were provided. Notwithstanding that in some parts of Indonesia significant areas of wetland are now used for agriculture, a very high proportion of the wetlands in other parts, particularly Irian Jaya, are in a near pristine condition (22.). Overall, some 44% of Indonesia's mangroves and 47% of its freshwater swamps remain (MSPE 1992). There has been continual trade in *C. porosus* since the 1960's, although the full extent of this trade was not monitored and no reliable reports on it are available.

In contrast to the Indonesian population of *C. porosus* not meeting the requirements for Appendix I, it does meet those for Appendix II (*species need not currently be threatened with extinction, but there should be some indication that they might become so*), and Indonesia believes the requirements under Appendix II for ranching will greatly assist the conservation and management of the species within Indonesia.

Resolution Conf. 3.15

a) Not Endangered

In Irian Jaya, *C. porosus* have supported an annual harvest since the 1960's. Densities are low relative to historical abundance but are not necessarily declining (23.).

b) i) Benefits to Conservation

Ranching of *C. porosus* in Indonesia:

- directs hunting at the most easily replacable segment of the population - juveniles;
- provides commercial incentives for the maintenance of adults;
- results in capital investment in crocodiles, thereby creating commercial pressures to ensure compliance with monitoring and management obligations (none of which exist under Appendix I), while providing a source of financial assistance for such programmes;
- provides economic reasons for prioritizing *C. porosus* with regard to the allocation of government funds for wildlife conservation and management;
- places a tangible economic value on what is otherwise considered by many people to be simply a dangerous predator on people and their domestic stock that in the interests of public safety would be best eradicated;
- gives an economic reason that can be used to maintaining swamps in their natural state;
- in Irian Jaya, in particular, establishes one means through which economic development can occur through the sustainable use of wildlife rather than through conventional development dependent on gross habitat alteration.

b) ii) Product Marking

A sophisticated identification and marking system has been developed (436.).

c) i) Detrimental Impact

Ranching is restricted to animals less than one year of age and it has been recognized by CITES [Resolution Conf. 8.22; operative statement b)] that ranching of hatchlings should be accepted as a matter of course (i.e. it is unlikely to be detrimental). Past hunting and the alienation of habitats has no doubt reduced Indonesia's population of *C. porosus* to a new level. Monitoring of the wild population, the harvest and of exports (23. and 322.), mainly in Irian Jaya, are consistent with a sustainable harvest. Monitoring elsewhere has been restricted to one-off surveys.

c) ii) Biological and Economic Success

The harvest has been sustained for many years and despite the general downturn in the price of crocodilian skins, those of *C. porosus* remain in demand. Established ranches which are not relying on captive breeding (e.g. C.V. Bintang Mas in Irian Jaya) continue to function in a commercially viable manner.

c) iii) Humane Manner of Operation

Firearms are prohibited in Indonesia. Animals are generally killed by traditional methods, particularly an axe blow, which destroys the brain. In farms, the spinal cord is also severed.

c) iv) Reintroductions

Provision for reintroductions are embodied within the licence conditions (4335.).

c) v) Methods of Marking and Identification

Methods have been described (436., 437., 444.).

(c) (vi) Reporting

A summary of the operation of the ranching programme will be included in Indonesia's annual report to CITES (46.).

Resolution Conf. 8.22

Captive breeding of *C. porosus* is well established within Indonesia (454.), and has been for many years, but it contributes little to total exports (453.), which are largely the result of the ranching programme. Uncertainty about the ranching and harvest programme caused government to encourage commercial operations to pursue captive breeding with stock derived through the ranching programme and/or captive breeding in other establishments. The acquisition of stock through the ranching programme and from captive-breeding operations has not been detrimental to the wild population.

a) Changes in Direction

The ranching proposal includes details of the ongoing subadult harvest.

b) Safeguards

Harvest controls (43.), monitoring (45.) and a restocking capability (345.) are in place.

c) and d) Wild-adult Harvest

No wild harvesting of adult *C. porosus* is permitted within Indonesia; the maximum size limit is below the size at which female *C. porosus* reach maturity.

MONITORING AT THE RANCH LEVEL

The limited resources available for wildlife conservation and management in Indonesia are by necessity allocated to the most critical projects. These are subject to change from time to time, for a variety of reasons.

Aware of this situation and its possible impact on the long-term monitoring of crocodiles, Webb and Jenkins (1991) emphasized the need to improve and consolidate the monitoring carried out by commercial operators as part of their commercial operations.

This system relies on a commitment to accurate record-keeping by commercial operators. The skills to do this vary greatly from operator to operator, and there may be limits to the extent to which all ranches can comply to the same standard. Nevertheless, it can and does provide valuable long-term insights into the sustainability of the harvest. The results from Indonesia's largest ranch (C.V. Bintang Mas), which is combined with a tannery, are presented here.

The areas within Irian Jaya from which C.V. Bintang Mas have collected live juvenile *C. porosus* and *C. porosus* skins during the period 1988 to 1992, are on Fig. 1. Areas from which only *C. novaeguineae* have been collected (i.e. from which no *C. porosus* are known), are not included.

The company is based in Jayapura, and most of its activities occur in the remote Mamberamo River region. The company does not have hunters *per se*, but rather buys stock from village hunters and people at the village level who trade locally. The company does not have any exclusive rights to the area, and when market prices are high, must compete with other companies. Access is by plane, helicopter and boat.

The numbers of crocodiles purchased are in Table 1. The company has size-based information, but only the numbers of crocodiles are treated here. The period covered by the data takes in the peak of hunting pressure during 1989-1990, when skin prices were particularly high. Some regions were only visited once in a year, whereas others were visited on a monthly basis ("N" in the table refers to the number of visits or discrete purchases from a region in one year). When prices were high, it was possible to visit more areas, and more widespread areas, than is the case now, with lower prices.

Price has a dramatic affect on the intensity of hunting in any one area. At the present time, prices for *C. novaeguineae* are particularly low, and in some areas hunting is much reduced.

In most areas, *C. porosus* represent a relatively small percentage of the total crocodiles harvested and provided for sale. The two species are hunted and traded as a single resource, and from a practical point of view, it is impossible to do otherwise regardless of whether the skins of *C. porosus* are exported or not.

In any overview, there are many biases in data of this type, but in the long-term, it provides a definitive index of the harvest and can be expected to give early warning of any long-term slide towards unsustainable use. The more widespread implementation of this particular system is being encouraged, as it could greatly improve the understanding of the dynamics of crocodile harvesting, particularly in Irian Jaya. The resources needed to collect, collate and analyse the data on a regular basis may not, however, be available at all times.

FIG 1. MAJOR WETLANDS CONTAINING CROCODILIANS

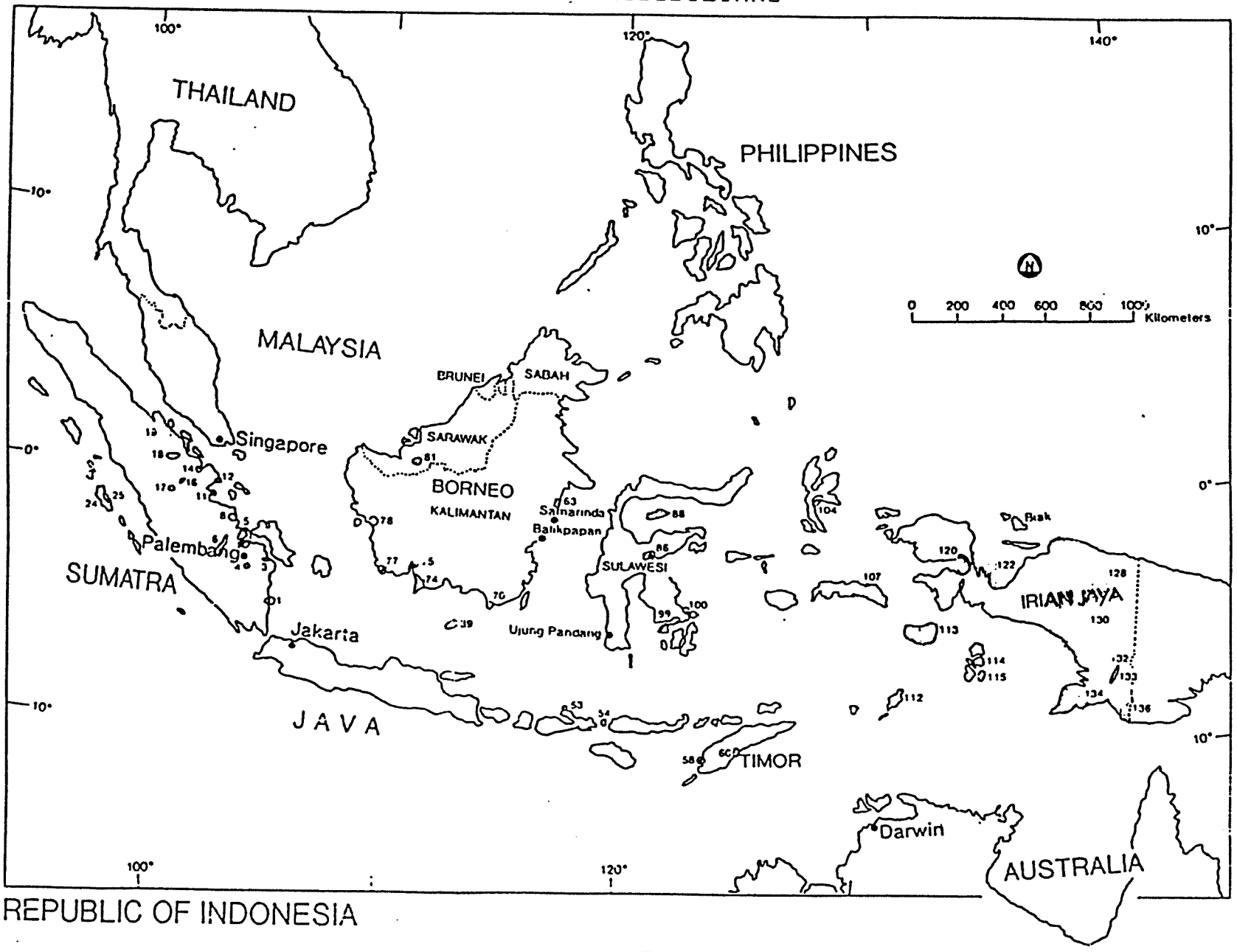
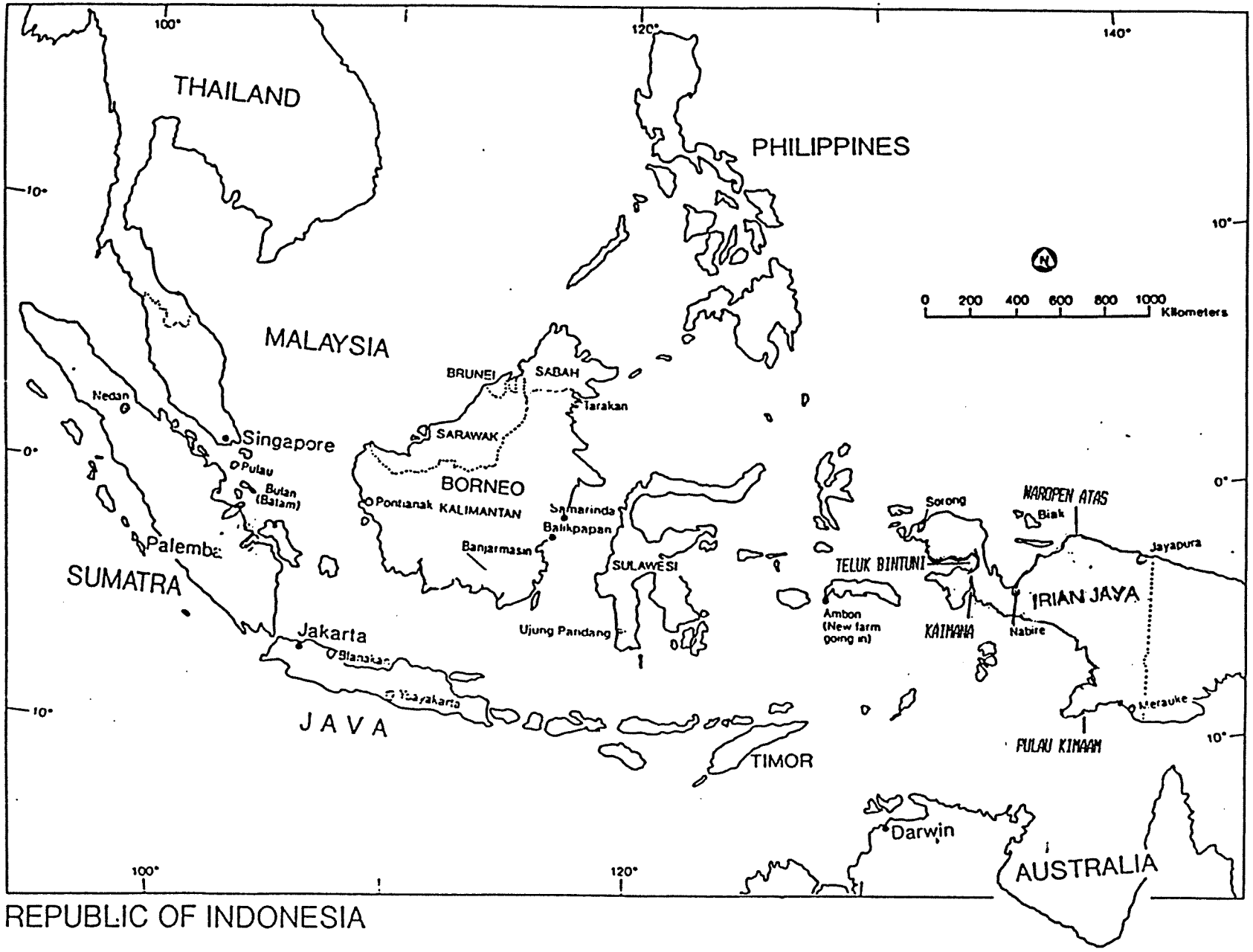


FIG 2. AREAS SURVEYED BY FAO AT LEAST ONCE



REPUBLIC OF INDONESIA

FIG 3. LOCATION OF CROCODILE REARING ENTERPRISES

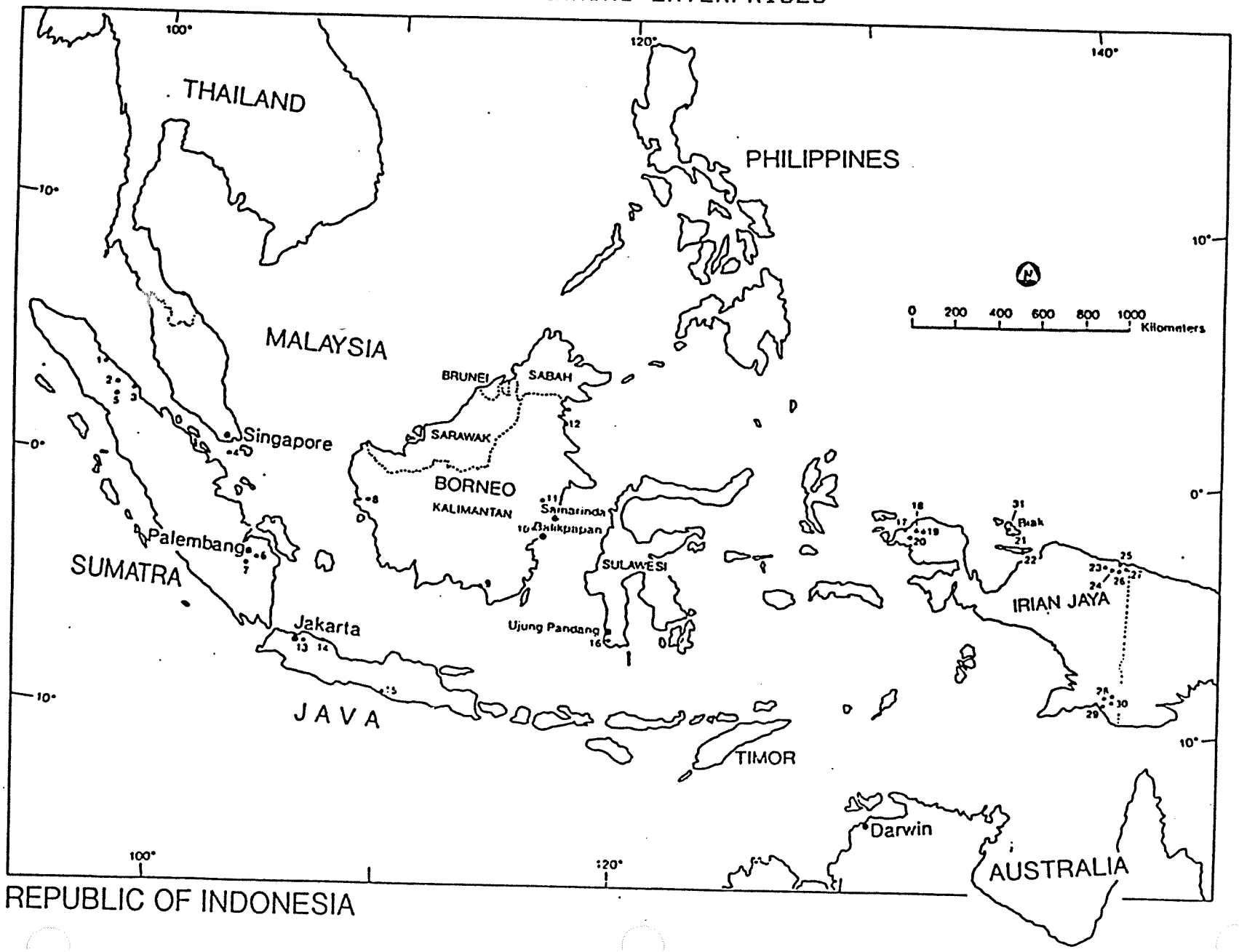
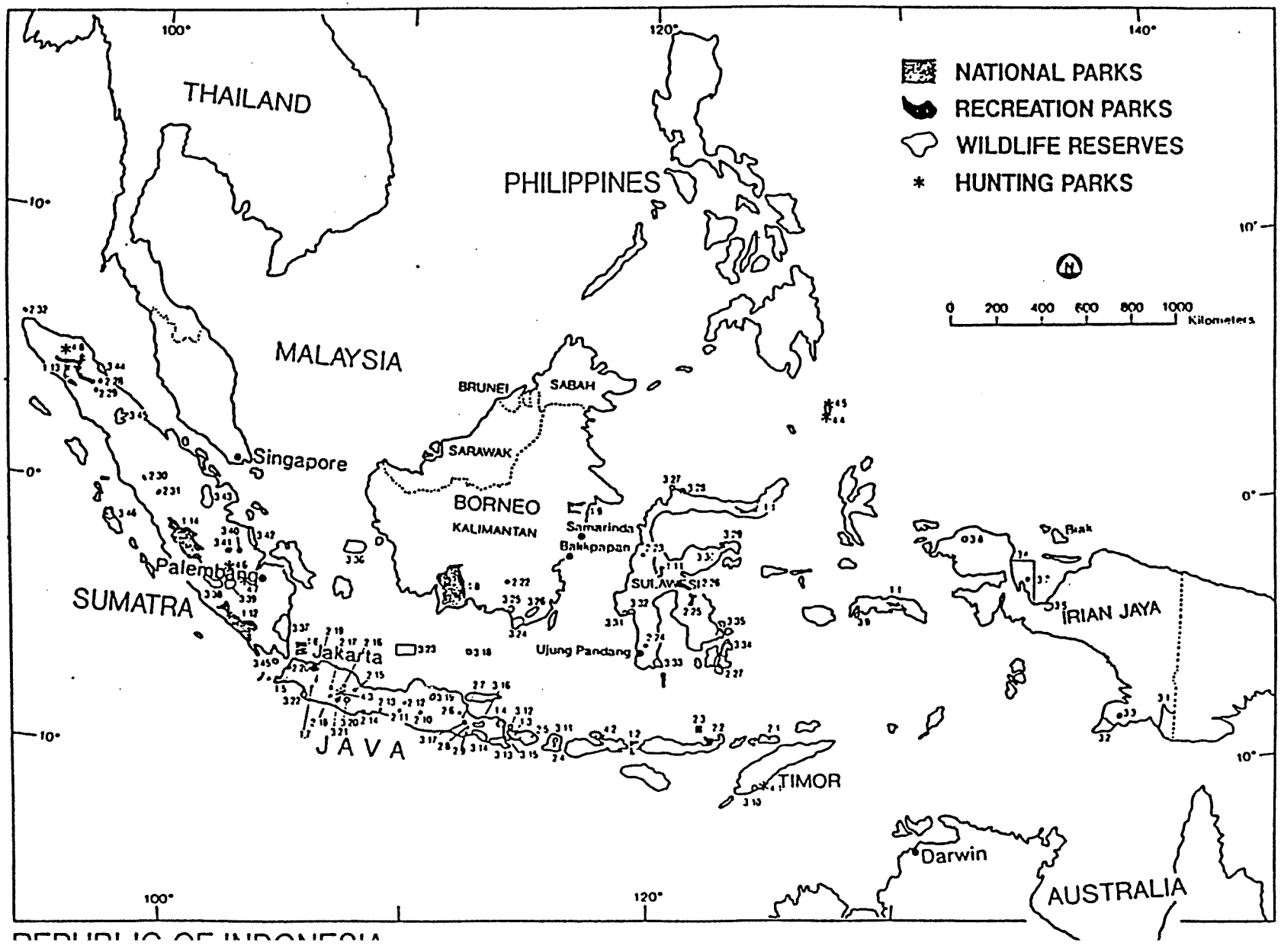


FIG 4. LOCATION OF INDONESIAN PARKS AND RESERVES



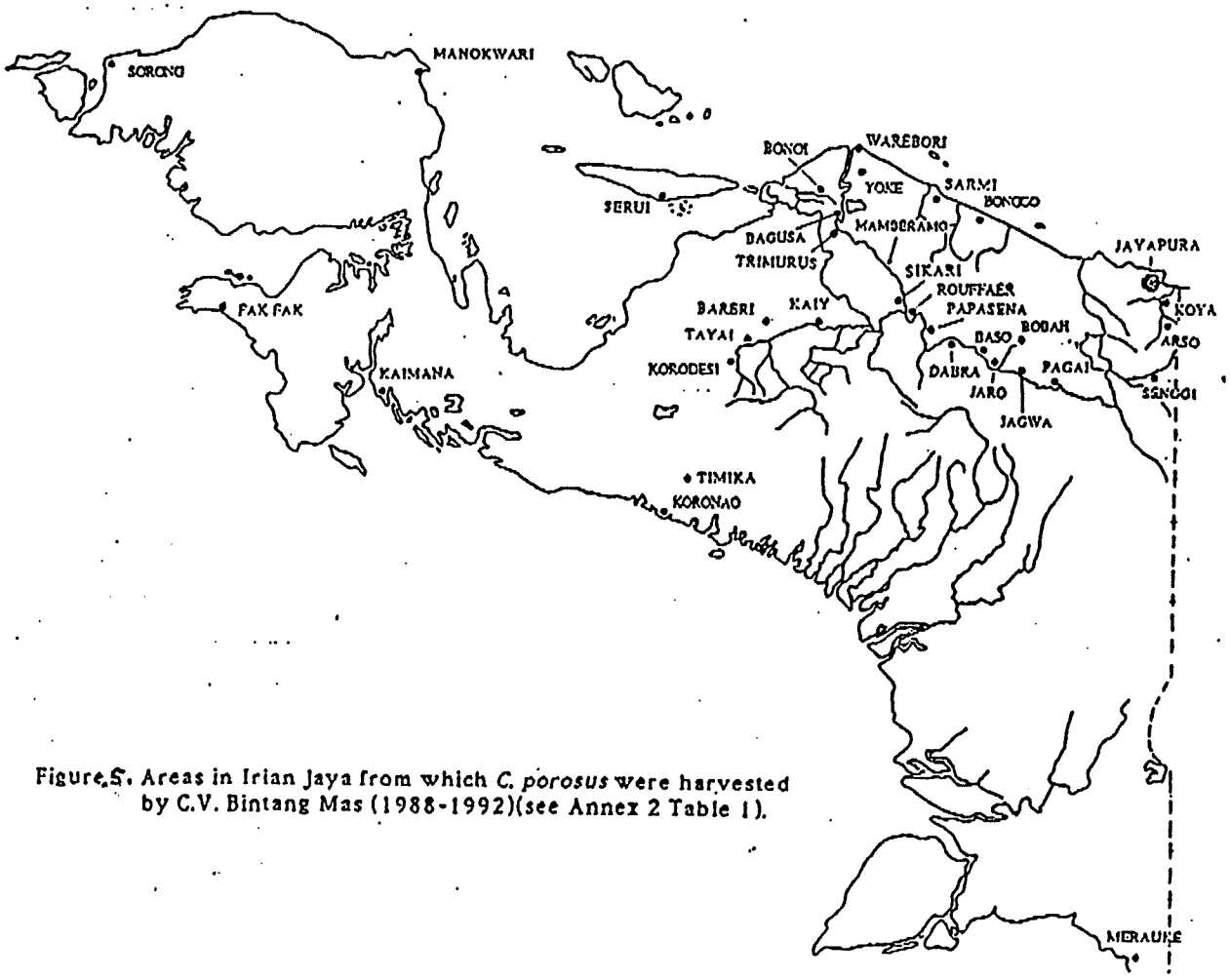


Figure 5. Areas in Irian Jaya from which *C. porosus* were harvested by C.V. Bintang Mas (1988-1992)(see Annex 2 Table 1).

TABLE 1 :

DISTRIBUTION OF CROCODILES IN MAJOR WETLANDS

NUMBER	NAME OF LOCATION	C.p	T.s	C.n	C.s
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 National 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	+	-	-	-
99	Watumohae	+	-	-	-

TABLE 1 CONTINUED

NUMBER	NAME OF LOCATION	C.p	T.s	C.n	C.s
100*	Tanjung Peropa	+	-	-	-
104	Wasile Bay	+	-	-	-
107	Wetlands in Manusela Proposed National Park (Wac Mual and Wac Nua Reserves)	?	-	-	-
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 Memberamo-Foja National Park	+	-	+	-
130	Wetlands in Lorenz National Park	+	-	+	
132	Sungai Digul	+	-	-	-
133*	Wetlands in Danau Bian Game Reserve	+	-	+	-
134*	Pulau Kimaam	+	-	+	-
136*	Wasur and Rawa Biru	?	-	-	-

Note :

- Number in left hand column refer to those cited in "A Directory of Asian Wetlands"
- The presence of *Crocodylus siamensis* in the Indonesian Archipelago was not detected until the 1991 visit by Webb and Jenkins.

- C.p : Crocodylus porosus
- T.s : Tomistoma schlegelii
- C.n : Crocodylus novaeguineae
- C.s : Crocodylus siamensis

* Reserves

Table 2 : Spotlight survey results for *C. porosus* in Irian Jaya

Survey Location	Y E A R									
	1988		1989		1990		1991		1992	
	Km	obs./km	Km	obs./km	Km	obs./km	Km	obs./km	Km	obs./km
Pulau Kimaam	306[1] 112[2]	1.39 1.09	239[3] 94[4]	0.66 0.90			165[5] (94)	1.01 (1.12)		
Teluk Bintuni	401[1]	0.31			108[2]	0.22	296[3] 164[4]	0.10 0.12	164 (164)	0.19 (0.19)
Waropen Atas					195[1]	0.04	156[2]	0.14		
Kaimana			27[1]	3.06	26[2]	1.85	27[3]	2.45		

Superscript notation:

1. Initial survey in series
2. Second survey in series
3. Third survey in series
4. Fourth survey in series
5. Fifth survey in series

Note :

1). Waropen Atas surveys not replicated by river system or lenght surveyed.

2). Second Kaimana survey slightly truncated

3). Parenthetical bold figures represent survey portions which are exact replicates of prior surveys.

TABLE 3 : SPOTLIGHT COUNT RESULTS IN UPSTREAM AREAS OF IRIAN JAYA WHERE *C. POROSUS* AND *C. NOVAEGUINEAE* COEXIST

SURVEY LOCATION	SAMPLE LOCATION	DATE	SURVEY DISTANCE (Km)	TOTAL OF UNKNOWN SPECIES	CROCODILE CLASS					DENSITY OF UNKNOWN SPECIES (CROC/Km)
					H	Y	J	A	Eo	
DAS Memberamo	Telaga Imabu	09.10.92	7	23	-	4	-	-	19	3.3
	Maberamo Mati	10.10.92	4	8	-	1	-	2	5	2
	Magri Mati	10.10.92	9.4	5	-	1	-	2	2	0.5
	Prawa	10.10.92	5	8	-	2	1	1	4	1.6
	Nakambi	10.10.92	4.8	1	1	-	-	-	-	0.2
T O T A L			30.2	45	1	8	1	5	30	1.5
DAS Foronai	Telaga Jaruwi	June 92	6.4	5	0	4	1	0	0	0.8
	Telaga Bundar	June 92	2.74	6	2	2	0	0	2	2.2
	Telaga Sukun	June 92	8.5	12	1	6	0	0	5	1.4
	Telaga Waisaru	June 92	7.7	2	0	0	0	0	2	0.3
T O T A L			25.34	25	3	12	1	0	9	1.0
DAS Foronai	Telaga Jaruwi	July 92	6.4	12	7	3	0	0	2	1.9
	Telaga Bundar	July 92	2.74	2	1	0	0	0	1	0.7
	Telaga Sukun	July 92	8.5	10	5	2	1	0	2	1.2
	Telaga Waisaru	July 92	7.7	4	3	0	0	0	1	0.5
T O T A L			25.34	28	16	5	1	0	6	1.1
DAS Foronai	Telaga Jaruwi	Dec 92	6.4	4	0	2	0	0	2	0.6
	Telaga Bundar	Dec 92	2.74	2	0	0	0	0	2	2.7
	Telaga Sukun	Dec 92	8.5	5	4	0	0	0	1	0.6
	Telaga Waisaru	Dec 92	7.7	1	0	0	0	0	1	0.1
T O T A L			25.34	12	4	2	0	0	6	0.5

Table 3 : Continued

Survey Location	Sample Location	Date	Survey Distance (km)	Total Crocs	Croc class H	Y	J	A	EO	Density (croc/ km
Okaba	Bian I	Oct 92	55	14						0.25
Okaba	Bian II	Oct 92	30	10						0.33
Kimaam	Tabonji	Oct 92	20	8						0.40
Kimaam	Padua	Oct 92	25	12						0.48
	Total		130	44						0.36
DAS Memberamo	T.Imabu	Oct 93	2.5	49	33	2	2	4	8	12.6
	MMB	Oct 93	4.0	15	4	-	-	-	11	3.75
	MMK	Oct 93	2.5	7	5	-	-	-	2	2.8
	Magri Mati	Oct 93	2.5	11	8	3	-	-	-	3.14
	Prawa	Oct 93	5.0	13	9	3	1	-	-	2.6
	Nakambi	Oct 93	4.8	5	4	-	1	-	-	1.04
	Total		21.3	100	63	8	4	4	21	4.32
DAS Foronai	T.Jaruwi	Sept 93	6.4	12						1.87
	T.Bundar	Sept 93	2.74	2						0.78
	T.Sukun	Sept 93	8.5	10						1.17
	T.Wai-saru	Sept 93	7.7	4						0.51
	Total		25.34	28						1.08

Note : T - Telaga (Lake)
MMB - Memberamo Mati Besar
MMK - Memberamo Mati Kecil

Table 4. Licenced Crocodile Farms in Indonesia per June 1993

No.	Name of Farms	Location	No of *C. porosus*		No of *C. novaeguineae*	*T. schlegelii* and *C. siamensis*	Total No of Crocodiles
			Raising Stock	Breeding Stock			
1	ALAM MURNI BAHANA	Medan, North Sumatra	1112	688	3925	-	5725
2	ALAS WATU UTAMA	Banjarmasin, S. Kalimantan	203	-	-	8 Ts	211
3	ALIAN RUSWAN	Simpang Gambus, N. Sumatra	639	76	-	-	715
4	BINA TANGKAR PERDANA	Pulau Bulan, Riau	723	-	4664	-	5387
5	BINTANG MAS	Jayapura, Irian Jaya	1574	309	28970	-	30853
6	BUDIMAN	Palembang, South Sumatra	546	99	-	77 Ts	722
7	DWI TUNGGAL	Serui, Irian Jaya	254	-	736	-	990
8	FAJAR BARU	Sorong, Irian Jaya	570	-	997	-	1567
9	HARAPAN KALTIM UTAMA	Tarakan, East Kalimantan	1950	304	-	-	2254
10	INHUTANI II	Sentani, Irian Jaya	147	-	1394	-	1541
11	LEO JAYA	Jakarta, DKI Jakarta	121	151	4	1 Ts	277
12	MAKMUR ABADI PERMAI	Samarinda, E. Kalimantan	787	1535	-	32 Ts, 316 Cs	2670
13	MODAN BARU	Sorong, Irian Jaya	628	40	98	-	766
14	NIKMAT	Merauke, Irian Jaya	86	4	75	-	165
15	PEMBANGUNAN JAYA	Pontianak, W. Kalimantan	-	92	-	-	92
16	PERHUTANI	Blanakan, West Java	112	15	-	-	127
17	PERKASAN JAGAT KARUNIA	Batam, Riau	566	602	2201	6 Ts	3375
18	PINANG MAS	Jambi, East Sumatra	99	12	-	42 Ts	153
19	PRAKARSA DESAIN UTAMA RESPATI	Arso, Irian Jaya	32	-	392	-	424
20	PROYEK PHPA	Sorong, Irian Jaya	551	-	1978	-	2529
21	RAMLIE	Biak, Irian Jaya	20	-	192	-	212
22	REPTILINDO EKAPRATAMA	Biak, Irian Jaya	604	-	3970	-	4574
23	RIDHA	Nabire, Irian Jaya	219	-	1825	-	2044
24	SENTANI VALLEY	Sentani, Irian Jaya	153	10	1559	-	1722
25	SULI CITRA MALUKU	Ambon	-	-	86	-	86
26	SUMBER KARYA	Ujung Pandang, South Sulawesi	519	-	223	-	742
27	SURYA RAYA	Balikpapan, E. Kalimantan	925	-	-	29 Ts, 7 Cs	961
28	TAMAN BUAYA ASAM KUMBANG	Palembang, S. Sumatra	788	-	-	6 Ts	794
29	TAMAN BUAYA INDONESIA	Jakarta, DKI Jakarta	975	446	62	65 Ts	1548
30	TIMUR SAKTI ABADI	Merauke, Irian Jaya	1443	7	4500	-	5950
31	YAKITA MULIA	Binjai, North Sumatra	50	14	-	4 Ts	68
	TOTAL		16396	4404	57851	270 Ts, 323 Cs	79244

Table 5. Indonesian *C. porosus* Skin Exports 1987-1992

Year	Total Number of Skins	Origin		
		% Br	% Rr	% Wild
1987	824	0.0	35.9	64.1
1988	2,069	0.0	35.9	64.1
1989	2,767	0.0	11.6	88.4
1990	2,035	0.0	0.0	100
1991	1,908	0.0	9.3	90.7
1992	1,352	0.0	86.0	14.0
Total	10,955	0.0	178.7	421.3
Mean	1,83	0.0	29.8	70.2

Note : CP = C. porosus; Br = captive breeding; Rr = rearing;
Wild = wild-harvested;
Country of import : Japan, France, Singapore, Hongkong, Italy, Germany, United Kingdom and USA.

INDONESIAN CROCODILE CONSERVATION TASK FORCE (ICC TASK FORCE)

TABLE 6 : CROCODILE SKIN EXPORTS (JAN - JUN 1993)

NO.	NAME OF COMPANY	EXPORT OF CROCS SKINS JAN 93-JUNE 93				
		CNN	CP	TS	CS	TOTAL
1	ALAM MURNI BAHANA	-	-	-	-	-
2	ALAS WATU UTAMA	-	-	-	-	-
3	ALIAN RUSWAN	-	180	-	-	180
4	ALONA JAYA	-	-	-	-	-
5	BAYATA	-	-	-	-	-
6	BINA TANGKAR PERDANA	-	-	-	-	-
7	BINTANG MAS	1757	-	-	-	1757
8	BUDIMAN	-	-	-	-	-
9	DWI TUNGGAL	-	-	-	-	-
10	EKA NINDYA KARSA	-	-	-	-	-
11	FAJAR BARU	-	-	-	-	-
12	HARAPAN KALTIM UTAMA	-	-	-	-	-
13	INHUTANI II	-	-	-	-	-
14	LEO JAYA	-	-	-	-	-
15	MAKMUR ABADI PERMAI	-	-	-	-	-
16	MODAN BARU	-	-	-	-	-
17	NIKMAT	-	-	-	-	-
18	PEMBANGUNAN JAYA	-	-	-	-	-
19	PERHUTANI	-	-	-	-	-
20	PERKASA JAGAT KARUNIA	-	-	-	-	-
21	PRAKARSA DESAIN UTAMA RESPATI	-	-	-	-	-
22	PROYEK FAO/PHPA	-	-	-	-	-
23	RAMLIE	102	-	-	-	102
24	REPTILINDO EKAPRATAMA	-	-	-	-	-
25	RIDHA	-	-	-	-	-
26	SENTANI VALLEY	456	44	-	-	500
27	STOCK BORSUMA	-	-	-	-	-
28	SULI CITRA MALUKU	-	-	-	-	-
29	SUMBER KARYA	-	-	-	-	-
30	SUMBER MURNI	137	579	-	-	716
31	SURYA RAYA	-	-	-	-	-
32	TAMAN BUAYA ASAM KUMBANG	-	-	-	-	-
33	TAMAN BUAYA INDONESIA JAYA	-	-	-	-	-
34	TIMUR SAKTI ABADI	-	-	-	-	-
35	YAKITA MULIA	-	-	-	-	-
	TOTAL	2452	803	-	-	3255

Table 7. Crocodile Skin Export Quotas

Crocodile Skin Export Quotas				
Year	C. novaeguineae Wild	C. porosus Ranched	Wild	Total C. porosus
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	20,000	3,000	3,000	6,000
1992	20,000	7,000	1,500	9,700 (1200 from the existing stock in 1992)
1993	20,000	7,000	1,500	8,500
1994	20,000	7,000	1,500	8,500
Ps. Quotas for C. novaeguineae are self-imposed by the Republic of Indonesia				

TABLE 8 : AREAS OF INDONESIAN PARKS AND RESERVES

NATIONAL PARKS

	LOCATION	HECTARES
1.1	C A Way Maul	35,800
1.2	S M P Komodo	31,000
	S M P Padar	1,533
	S M P Rinca	8,196
1.3	S M Bali Barat	19,365,8
1.4	Ijan Merapi Ungup	2,560
1.5	C A Ujung Kulon	39,120
1.6	T L Pulau Seribu	108,000
1.7	C A Arcadomas	2
	C A Cimungkat	56
1.8	S M Kotawaringa/Sampit (T G Puting)	335,000
1.9	S M Kutai	200,000
1.10	C A Bulawa	75,200
1.11	S M Lore Kalamanta	131,000
1.12	S M Sumatera Selatan	286,800
1.13	S M Kappi	142,800
	S M Langkat Barat	51,900
1.14	C A Gn Indrapura	221,130
	C A Bukit Tapan	66,500

RECREATION PARKS

	LOCATION	HECTARES
2.1	T W Tuti Adegae	5,000
2.2	T W Gugus Tlk Maumere	62,450
2.3	?	-
2.4	T W Surana DI	52
2.5	T W Panelokan	540
2.6	T W Tretes	10
2.7	T W Gunung Baung	195.5
2.8	T W Ranu Pani Regulo	96
2.9	T W Ranu Darungan	380
2.10	C A Pulau Nusa and Noko	15
2.11	C A Plawangan Turgo	198.5
2.12	T W Tuk Songo	6.5
2.13	T W Gunung Selok	126.2
2.14	T W Pangandaran	37.7
2.15	T W Lingga Jati	11.5
2.16	T W Gn Tampomas	12.5
2.17	C A Yunghun	2.5
2.18	C A Kawah Kamojang	7.5
2.19	T W Jember	50
2.20	T W Carita	95
2.21	T W Tg Kluang	2,000
2.22	T W Bukit Tang Kiling	533
2.23	T W Air Terjun Wera	250
2.24	T W Bantimurung	18
2.25	T W Danau Towuti	65,000
2.26	T W Danau Matano/ Mahalano	30,000
2.27	T W Tirta Rimba/ Air Jatuh	500
2.28	C A Sibolangit	90.15
2.29	T W Lau Debuk	7
2.30	T W Rimbo Panti	570
2.31	T W Lembah Harau	27.5
2.32	?	

TABLE 8 CONTINUED

WILDLIFE RESERVES

	LOCATION	HECTARES
3.1	S M Wasur	206,000
3.2	S M P.Dolok	600,000
3.3	Pulau Pombo	100
3.4	T W Telok Yotefa	1,650
3.5	T W Nabire	100
3.6	Teluk Cenderawasih	80,000
3.7	S M P.Angrameos	2,500
3.8	T W Sorong	949,90
3.9	Taman Laut P Kasa	1,100
3.10	S M P.Manipo	3,000
3.11	X V - Lombok	?
3.12	S M P.Menjangan	150
3.13	Banyuwangi Selatan	62,000
3.14	S M Meru Betiri	58,000
3.15	S M P.Kalong, Burung dan Gadung	43
3.16	S M Dataran Tinggi Yang	14,145
3.17	T W Laut Pasir Tengger	2,67
3.18	Pulau Bawean	725
3.19	T W Sumber Semen	17,1
3.20	S M Gn Sawal	5,400
3.21	C A Telaga Bodas	261,15
3.22	S M Cikepuh	8,127,5
3.23	Karimun Jawa	7,026
3.24	S M Pleihart Tanah Laut	35,000
3.25	T W P.Kembang	60
3.26	S M Peleihari Martapura Perl	6,400
3.27	T B P.Karakellang Utara	16,600
3.28	T B P.Karakellang Selatan	5,600
3.29	S M Pati-pati	198
3.30	S M Lombuyan	3,665
3.31	S M Lampoko dan Mampie	2,000
3.32	S M Lampoko dan Mampie	
3.33	S M Bontobahari	4,000

WILDLIFE RESERVES

LOCATION		HECTARES
3.34	S M Buton Utara	82,000
3.35	S M Tanjung Peropa	38,937
3.36	C A L Kep Karimata	77,000
3.37	S M Way Kambas	130,000
3.38	S M Gumai Pasemah	45,883
3.39	S M Isau-isau Pasemah	12,114
3.40	S M Bentayan	19,300
3.41	S M Dangku	29,080
3.42	S M Berbak	190,000
3.43	S M Keramutan	120,000
3.44	S M Karanggading	15,765
3.45.1	S M Dolok Surungan	23,800
3.45	C A Gunung Krakatau	2,500
3.46	S M Taitai Batti	56,500

HUNTING PARKS

LOCATION		HECTARES
4.1	T B Dataran Bena	11,370
4.2	T B Tambora Selatan	30,000
4.3	T B Mesigit Kareumbi	12,420,7
4.4	TB P.Karakellang Selatan	5,600
4.5	TB P.Karakellang Utara	16,600
4.6	Beanakat	30,000
4.7	T B Subajeriji	65,000
4.8	T B Lingga Isaq	80,000

Note :

C A - Nature Reserve Taman Laut-Marine Reserve
S M - Game Reserve
T B - Hunting Reserve P - Island
T W - Recreation Forest

ANNEX 2

Table 1. Records of *C. porosus* (Cp) purchased in Irian Jaya by C.V. Bintang Mas, located in Jayapura. Areas are on Annex 2 Fig. 1. "N" = the number of purchases from a particular area in each year. "Cn" = *C. novaeguineae*. Means, SE's and Minimum and Maximum refer to the mean purchase in any one year.

AREA	YEAR	N	LIVE CAUGHT JUVENILES							WILD HARVESTED SKINS						
			TOTAL Cn	TOTAL Cp	%Cp	Mean Cp	SE Cp	Min. Cp	Max. Cp	TOTAL Cn	TOTAL Cp	%Cp	Mean Cp	SE Cp	Min. Cp	Max. Cp
ARSO	1988	2	19	0	0%	-	-	-	-	0	0	-	-	-	-	-
	1989	12	251	54	18%	4.5	3.1	0	36	847	38	4%	3.2	0.9	0	9
	1990	12	136	13	9%	1.1	0.7	0	8	443	20	4%	1.7	0.7	0	8
	1991	12	393	17	4%	1.4	0.5	0	5	456	43	9%	3.6	1.2	0	16
	1992	12	565	21	4%	1.8	0.7	0	8	312	12	4%	1.0	0.3	0	3
BAGUSA	1989	4	200	23	10%	5.8	3.8	0	16	64	0	0%	-	-	-	-
	1990	7	209	13	6%	1.9	1.0	0	6	151	8	5%	1.1	0.9	0	6
	1992	2	0	0	-	-	-	-	-	9	0	0%	-	-	-	-
BARERI	1991	5	331	2	1%	0.4	0.4	0	2	32	0	0%	-	-	-	-
	1992	1	189	0	0%	-	-	-	-	0	0	-	-	-	-	-
BASO	1989	5	184	37	17%	7.4	7.4	0	37	597	6	1%	1.2	0.7	0	4
	1990	10	4289	478	10%	47.8	13.4	0	132	1075	64	6%	6.4	2.1	0	20
	1991	12	2752	190	6%	15.8	4.1	0	42	815	133	14%	11.1	2.3	0	29
	1992	7	2403	309	11%	44.1	17.0	2	120	250	18	7%	2.6	1.0	0	6
BOBAH	1990	6	90	0	0%	-	-	-	-	308	0	0%	-	-	-	-
	1991	1	0	0	-	-	-	-	-	16	1	6%	-	-	-	-
BONGGO	1988	1	17	0	0%	-	-	-	-	0	0	-	-	-	-	-
	1989	9	174	4	2%	0.4	0.3	0	3	1711	74	4%	8.2	3.7	0	28
	1990	8	42	0	0%	-	-	-	-	950	70	7%	8.8	4.9	0	1
	1992	3	44	0	0%	-	-	-	-	8	1	11%	0.3	0.3	0	1
BONOI	1990	5	173	302	64%	60.4	30.2	0	133	29	15	34%	3.0	3.0	0	15
DABRA	1988	3	319	5	2%	1.7	1.2	0	4	0	0	-	-	-	-	-
	1989	9	229	14	6%	1.6	1.3	0	12	653	30	4%	3.3	2.4	0	22
	1990	2	160	0	0%	-	-	-	-	5	0	0%	-	-	-	-
	1991	8	752	50	6%	6.2	4.3	0	32	283	23	8%	2.9	1.2	0	10
	1992	10	2352	143	6%	14.3	5.8	0	6.3	229	17	7%	1.7	1.1	0	11
FAK FAK	1990	1	0	0	-	-	-	-	-	48	2	4%	2.0	-	-	
JAGWA	1989	2	0	0	-	-	-	-	-	590	3	1%	1.5	1.5	0	3
	1990	10	1845	72	4%	7.2	2.6	0	20	787	45	5%	4.5	3.3	0	34
	1991	8	1068	56	5%	7.0	4.4	0	37	246	12	5%	1.5	0.8	0	6
JAKO	1988	2	273	0	0%	-	-	-	-	0	0	-	-	-	-	-
	1989	5	638	190	23%	38.0	34.3	0	175	82	4	5%	0.8	0.8	0	4
	1990	8	1533	109	7%	13.6	5.5	0	35	963	106	10%	13.2	7.3	3	64
	1991	8	632	61	9%	7.6	3.4	0	23	21	8	28%	1.0	0.9	0	7
JAYAPURA	1989	4	25	2	7%	0.5	0.5	0	2	0	0	-	-	-	-	-
	1991	2	129	1	1%	0.5	0.5	0	1	0	0	-	-	-	-	-
KAIMANA	1990	7	0	0	-	-	-	-	-	1368	108	7%	15.4	5.5	0	34
	1991	3	318	13	4%	4.3	4.3	0	13	513	30	6%	10.0	2.5	7	15
	1992	3	187	13	7%	4.3	2.3	0	8	232	31	12%	10.3	4.7	1	15
KAIY	1988	5	850	5	1%	1.0	0.6	0	3	0	0	-	-	-	-	-
	1989	7	407	1	<1%	0.1	0.1	0	1	214	6	3%	0.9	0.6	0	4
	1990	5	188	3	2%	0.6	0.2	0	1	13	0	0%	-	-	-	-
	1991	8	16	2	11%	0.2	0.2	0	2	62	3	5%	0.4	0.4	0	3
KORONAO	1990	3	0	0	-	-	-	-	-	51	10	16%	3.3	3.3	0	10
KORODESI	1989	5	347	2	1%	0.4	0.2	0	1	0	0	-	-	-	-	-
KOYA	1991	3	4	1	20%	0.3	0.3	0	1	0	0	-	-	-	-	-
MAMBERAMO	1990	1	0	0	-	-	-	-	-	55	0	0%	-	-	-	-
	1991	1	144	4	3%	4.0	-	-	-	4	0	0%	-	-	-	-
MANOKWARI	1990	6	0	0	-	-	-	-	-	266	18	6%	3.0	1.2	0	7
	1991	2	0	0	-	-	-	-	-	46	3	6%	1.5	0.5	1	2

(Annex 2; Table 1 continued)

AREA	YEAR	N	LIVE CAUGHT JUVENILES							WILD HARVESTED SKINS						
			TOTAL Cn	TOTAL Cp	%Cp	Mean Cp	SE Cp	Min. Cp	Max. Cp	TOTAL Cn	TOTAL Cp	%Cp	Mean Cp	SE Cp	Min. Cp	Max. Cp
MERAUKE	1988	1	84	2	2%	2.0	-	-	-	0	0	-	-	-	-	-
	1989	7	560	48	8%	6.9	3.9	0	26	298	38	11%	5.4	5.4	0	38
	1990	6	606	165	21%	27.5	18.1	0	104	505	114	18%	19.0	12.5	0	71
	1991	7	467	140	23%	20.0	12.5	0	86	435	48	10%	6.9	3.3	0	18
	1992	6	214	16	7%	2.7	1.5	0	8	331	102	24%	17.0	15.0	0	92
PAGAI	1988	4	384	0	0%	-	-	-	-	0	0	-	-	-	-	-
	1989	8	328	1	<1%	0.1	0.1	0	1	303	2	1%	0.2	0.2	0	1
	1990	9	353	2	1%	0.2	0.2	0	2	608	4	1%	0.4	0.3	0	2
	1991	12	1310	40	3%	3.3	1.4	0	13	425	21	5%	1.8	0.8	0	8
	1992	12	4775	376	7%	31.3	11.6	0	144	1063	83	7%	6.9	3.4	0	41
PAPASENA	1989	5	21	3	13%	0.6	0.6	0	3	90	1	1%	0.2	0.2	0	1
	1990	1	86	4	4%	4.0	-	-	-	0	0	-	-	-	-	-
	1991	3	163	13	7%	4.3	3.0	0	10	56	2	3%	0.7	0.7	0	2
	1992	6	1108	72	6%	12.0	3.4	3	25	222	4	2%	0.7	0.3	0	2
ROUFFAER	1989	10	990	34	3%	3.4	1.8	0	15	1054	17	2%	1.7	1.1	0	11
	1990	12	2389	131	5%	10.9	4.6	0	54	738	41	5%	3.4	2.8	0	34
	1991	12	2378	135	5%	12.3	3.3	0	39	548	12	2%	1.1	0.5	0	4
	1992	9	1532	81	5%	9.0	3.9	0	36	256	17	6%	1.9	1.0	0	9
SARMI	1989	3	7	0	0%	-	-	-	-	9	0	0%	-	-	-	-
	1990	2	9	0	0%	-	-	-	-	7	0	0%	-	-	-	-
	1991	7	0	0	-	-	-	-	-	110	12	10%	1.7	0.8	0	5
	1992	2	4	0	0%	-	-	-	-	3	0	0%	-	-	-	-
SENGGI	1988	1	18	0	0%	-	-	-	-	0	0	-	-	-	-	-
	1990	1	0	0	-	-	-	-	-	12	0	0%	-	-	-	-
	1991	2	8	1	11%	0.5	0.5	0	1	0	0	-	-	-	-	-
	1992	3	101	1	1%	0.3	0.3	0	1	8	0	0%	-	-	-	-
SERUI	1989	5	3	48	94%	9.6	9.6	0	48	75	14	16%	2.8	2.6	0	13
	1990	8	255	86	25%	10.8	7.0	0	57	336	71	17%	8.9	4.5	0	38
	1991	6	346	251	42%	41.8	18.8	0	104	152	34	18%	5.7	2.6	0	12
	1992	1	25	110	82%	110	-	-	-	5	17	71%	17.0	-	-	-
SIKARI	1988	4	172	7	4%	1.8	1.4	0	6	0	0	-	-	-	-	-
	1989	6	270	58	18%	9.7	7.3	0	45	69	16	19%	2.7	2.7	0	16
	1990	1	3	0	0%	-	-	-	-	13	0	0%	-	-	-	-
SORONG	1989	1	1	0	0%	-	-	-	-	0	0	-	-	-	-	-
	1990	1	0	0	-	-	-	-	-	165	1	1%	1.0	-	-	-
TAYAI	1988	1	112	0	0%	-	-	-	-	0	0	-	-	-	-	-
	1989	2	0	0	-	-	-	-	-	36	1	3%	0.5	0.5	0	1
TIMIKA	1989	1	0	0	-	-	-	-	-	43	6	12%	6.0	-	-	-
	1990	4	34	9	21%	2.2	2.2	0	9	57	12	17%	3.0	3.0	0	12
TRIMURUS	1989	1	0	0	-	-	-	-	-	19	2	10%	2.0	-	-	-
	1990	2	52	2	4%	1.0	1.0	0	2	53	0	0%	-	-	-	-
WAREBORI	1988	2	164	7	4%	3.5	0.5	3	4	0	0	-	-	-	-	-
	1989	2	0	0	-	-	-	-	-	222	6	3%	3.0	2.0	1	5
	1990	5	131	97	43%	19.4	10.5	4	61	0	0	-	-	-	-	-
YOKE	1990	1	3	31	91%	31.0	-	-	-	0	0	-	-	-	-	-