

Conservation Status of Freshwater Turtles in Papua New Guinea

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The island of New Guinea represents one of the world's last great wilderness areas where native peoples still rely to a great extent on the natural resources and biological diversity present in their environment. Freshwater turtles are an integral part of that environment, and their utilization by native peoples constitutes an age-old relationship. However, with an increasing human population and advancing development and westernization, all natural resources, including turtles, are increasingly threatened in New Guinea.

Much of the turtle diversity present in New Guinea has only recently begun to be understood, and the number of recognized taxa is increasing steadily, with many new species yet to be described. For analysis of patterns of distribution and systematics, the turtles of Papua New Guinea (PNG) in eastern New Guinea are best understood by also documenting their distribution in the adjacent Indonesian province of Irian Jaya in western New Guinea.

Freshwater turtles are distributed throughout most of the lowland areas of New Guinea, being separated into primarily northern vs. southern distributions by the central mountain ranges, where no turtles are known to occur. The eastern end of the island is relatively depauperate in terms of freshwater turtles, with diversity being the greatest in the central southern lowlands.

There are at least 13 species of freshwater turtles currently recognized to occur on the island of New Guinea (Table 1), of which 11 are named and 10 occur in PNG itself. As of 25 years ago, only 6 species of freshwater turtles were recognized to occur in New Guinea: *Carettochelys insculpta* (Ramsay, 1886), *Pelochelys bibroni* (Owen, 1853), *Emydura subglobosa* (Kreffft, 1876), *Elseya novaeguineae* (Meyer, 1874), *Chelodina siebenrocki* (Werner, 1901), and *Chelodina novaeguineae* (Boulenger, 1888). Other named taxa of turtles from New Guinea have previously been synonymized under these taxa: *Emydura albertisii* (Boulenger, 1888) under *E. subglobosa*; *Elseya schultzei* (Vogt, 1911) and *Elseya branderhorsti* (Ouwens, 1914) under *E. novaeguineae*.

Over the last quarter century, 3 new species of New Guinea turtles have been described: *Chelodina parkeri* (Rhodin and Mittermeier, 1976), *Chelodina reimanni* (Philippen and Grossmann, 1990), and *Chelodina pritchardi* (Rhodin, 1994a). In addition, 2 New Guinea species have recently been recognized as consisting of 2 or more taxa. The giant softshell turtle, *Pelochelys bibroni*, has been formally split into 2 species: *P. bibroni* in the south and *P. cantorii*

(Gray, 1864) in the north (Rhodin et al., 1993; Webb, 1995). Whether the northern form referred to as *P. cantorii* is the same taxon as the widespread southeast Asian form of the same name is not known — in fact, they are most likely different species, with the northern New Guinea form probably an isolated and undescribed species. The New Guinea snapping turtle, *Elseya novaeguineae*, has recently been recognized to consist of at least 4 distinct taxa: *E. novaeguineae* in the northern lowlands, *E. branderhorsti* in the southeastern Irian lowlands, an undescribed *Elseya* sp. 1 in the southern lowlands, and an undescribed *Elseya* sp. 2 in northwestern Irian (Rhodin, unpubl. data in prep.).

In addition, another species of snake-necked turtle of the Australasian faunal realm, *Chelodina mccordi* (Rhodin, 1994b), has recently been described from Roti Island in eastern Indonesia, where it is isolated, endemic, extremely restricted, and already critically endangered (Rhodin, 1996; Samedi and Iskandar, this volume). Although specimens of *C. mccordi* have recently sold for up to US\$2000 each by western pet retailers, the species is now considered commercially extinct by Indonesian wildlife traders who can no longer obtain it (D. Iskandar, *pers. comm.*); the species has gone from description to near-extinction in only 5 years, an indication of the extreme pressures the pet trade can place on isolated and rare species.

Freshwater Turtles in Papua New Guinea

We now summarize information on the distribution, status, and trade of the 10 species of freshwater turtles known to occur in Papua New Guinea. These results are summarized in Table 2.

Carettochelys insculpta

The pig-nose turtle (Fig. 1) is probably the most distinctive of New Guinea's turtles. Sole surviving member of the family Carettochelyidae, the species is an isolated and relictual form of a previously wide-spread family with an extensive near-global fossil record.

The distribution of *C. insculpta* in the New Guinea region includes northern Australia where it occurs in the Daly River and other drainages of Northern Territory (Georges and Rose, 1993). In New Guinea it is found in the southern lowlands from the Purari River region of central PNG in the east to at least the Timika region of Irian in the west, possibly occurring as far west as the Lake Yamur

Table 1. Species of freshwater turtles in the greater New Guinea (NG) region, including Papua New Guinea (PNG), Irian Jaya, Indonesia, and Roti Island, Indonesia.

Family	Species	Common Name	Occurrence		Distribution
			PNG	Irian	
Carettochelyidae	<i>Carettochelys insculpta</i>	Pig-nose turtle	x	x	southern NG lowlands
Trionychidae	<i>Pelochelys bibroni</i>	New Guinea giant softshell turtle	x	x	southern NG lowlands
	<i>Pelochelys cantorii</i>	Asian giant softshell turtle	x	x	northern NG lowlands
Chelidae	<i>Emydura subglobosa</i>	Red-bellied short-necked turtle	x	x	southern NG lowlands
	<i>Elseya novaeguineae</i>	New Guinea snapping turtle	x	x	northern NG lowlands
	<i>Elseya branderhorsti</i>	White-bellied snapping turtle	–	x	southeastern Irian
	<i>Elseya</i> sp. 1	Red-bellied snapping turtle	x	x	southern NG lowlands
	<i>Elseya</i> sp. 2	Serrated snapping turtle	–	x	northwestern Irian
	<i>Chelodina siebenrocki</i>	Siebenrock's snake-necked turtle	x	x	southern NG coastal
	<i>Chelodina parkeri</i>	Parker's snake-necked turtle	x	x	southern NG inland
	<i>Chelodina novaeguineae</i>	New Guinea snake-necked turtle	x	x	southern NG lowlands
	<i>Chelodina pritchardi</i>	Pritchard's snake-necked turtle	x	–	southeastern PNG
	<i>Chelodina reimanni</i>	Reimann's snake-necked turtle	–	x	southeastern Irian
<i>Chelodina mccordi</i>	Roti snake-necked turtle	–	–	endemic to Roti	

region. It is most commonly found inland in primarily riverine habitat (Liem and Haines, 1977), but also occurs along the coast where it occasionally enters the sea to nest on marine beaches (Rhodin and Rhodin, 1977).

Populations in New Guinea have historically been abundant throughout the range, but appear to have suffered declines over the last few decades (Rose et al., 1982; Georges and Rose, 1993; Georges et al., in press). The species is widely and heavily exploited in New Guinea for its meat and eggs and is an important component of the subsistence economies of local peoples (Pernetta and Burgin, 1980; Rose et al., 1982; Mambai, 1997). Over 20,000 eggs were harvested and sold in Kikori markets over a 5-month period in 1981–82 (M. Rose, unpubl. data). The species is especially vulnerable due to its nesting habits which are partially synchronous and somewhat predictable on exposed sandbanks and shores of rivers and other water bodies, similar in many respects to the nesting habits of marine turtles.

Local subsistence consumption continues today, as does legal trade to local regional food markets. In addition, illegal trade in the species apparently occurs along the southern PNG–Irian border, where villagers living close to the border stockpile specimens and then trade or barter these animals along the coast with seafaring traders from Merauke in southeastern Irian. These specimens are primarily intended

for the international pet trade and huge numbers of the species are exported from Merauke to Jakarta and then internationally to multiple distribution centers (Samedi and Iskandar, this volume). What percentage of the enormous Merauke trade in *C. insculpta* represents animals from PNG is not known.

Pelochelys bibroni

The New Guinea giant softshell turtle (Fig. 2) is the largest and most beautifully patterned turtle from New Guinea, reaching shell sizes of over 1 meter in length. Originally assumed to be simply an isolated population of the wide-spread Asian species originally carrying the same name, Rhodin et al. (1993) demonstrated that the southern New Guinea population was different and distinct. Webb (1995) formalized this distinction and restricted the name *P. bibroni* to this southern New Guinea population, referring the wide-spread Asian species to the previously described *P. cantorii*.

Pelochelys bibroni is endemic to New Guinea, but its distribution includes both Irian Jaya, Indonesia, and Papua New Guinea. Its distribution extends across the southern lowlands of New Guinea, from the Port Moresby region in the east, to the southern lowlands of Irian Jaya, where its western extent is not well documented, but reaches at least as far as the Timika region. It appears to be most abundant

Table 2. Population status and trade threats for species of freshwater turtles in Papua New Guinea. Conservation status reflects actual or proposed status according to IUCN Red List criteria (IUCN, 1996).

Species	Population Status	Trade Threats	Conservation Status
<i>Carettochelys insculpta</i>	Relatively abundant, becoming depleted	Regional food markets, illegal export for pet trade	Vulnerable
<i>Pelochelys bibroni</i>	Uncommon	Regional food markets	Vulnerable
<i>Pelochelys cantorii</i>	Relatively scarce	Regional food markets, curio masks for export	Endangered
<i>Emydura subglobosa</i>	Abundant	Regional food markets	Lower Risk: Least Concern
<i>Elseya novaeguineae</i>	Abundant	Regional food markets, curio masks for export	Lower Risk: Least Concern
<i>Elseya</i> sp. 1	Abundant	Regional food markets, illegal export for pet trade	Lower Risk: Least Concern
<i>Chelodina siebenrocki</i>	Common, restricted	Illegal export for pet trade	Lower Risk: Near Threatened
<i>Chelodina parkeri</i>	Uncommon, restricted	Illegal export for pet trade	Vulnerable
<i>Chelodina novaeguineae</i>	Relatively common	Illegal export for pet trade	Lower Risk: Least Concern
<i>Chelodina pritchardi</i>	Scarce, restricted	Illegal export for pet trade	Endangered



Figure 1. The pig-nose turtle, *Carettochelys insculpta*, from the Fly River region, Western Prov., PNG. Photo by Jeffrey W. Lang.

in the trans-Fly region of Western Province in PNG, especially in the Lake Murray and Fly River drainage, but is relatively uncommon, being encountered much less frequently than the more common *C. insculpta*.

The species is apparently exploited whenever encountered, being prized both for its eggs and meat, and is consumed locally or sold in local or regional food markets. There is no evidence of international pet trade in this species from PNG.

Pelochelys cantorii

The Asian giant softshell turtle is also a large species, but without the dramatic shell pattern found in *P. bibroni*. Whether the northern New Guinea populations here referred to as *P. cantorii* are distinct from the widespread Asian form of the same name is not known, but



Figure 2. The New Guinea giant softshell turtle, *Pelochelys bibroni*, for sale in a market at Debapare, Strickland River, Western Prov., PNG. Photo by Jeffrey W. Lang.

preliminary work indicates this may indeed be an undescribed isolated and restricted species endemic to New Guinea (Rhodin et al., 1993).

The distribution of *P. cantorii* in New Guinea includes the northern lowlands as far east as Madang, including both the Sepik and Ramu drainages of PNG. Its western extent into the northern lowlands of Irian Jaya includes the Jayapura region, the Mamberano drainage, and the Nabire region on the southern shore of Cenderawasih Bay. Whether there is sympatry, allopatry, or intergradation with southern *P. bibroni* in the far western lowlands of New Guinea is not known. The species appears to be scarce throughout its range.

Exploitation of *P. cantorii* is similar to that for *P. bibroni*, with significant local consumption and local market trade for food and eggs. In addition, the bony carapaces of *P. cantorii* are used for the production of ornamental curio turtle masks manufactured primarily in the Sepik region (notably the Chambri Lakes area) for sale to the tourist industry (Rhodin et al., 1993). Large numbers of these masks, usually made from shells of the smaller hard-shelled turtle, *Eseya novaeguineae*, but also including significant numbers of *P. cantorii*, are sold as artifacts at many tourist locations both in northern PNG and in Port Moresby. The full extent of this trade is not known, but appears to be quite robust, with hundreds if not thousands of masks available for sale at any given time. There is no evidence of international pet trade in this species from PNG.

Emydura subglobosa

The red-bellied short-necked turtle (Fig. 3) is a beautiful small species of hard-shelled turtle that occurs throughout the lowland regions of southern New Guinea. It is probably the most common and abundant turtle species in New Guinea.

The distribution of *E. subglobosa* includes the entire southern lowlands of PNG and Irian Jaya. The eastern extent reaches to the Kemp Welch River basin east of Port Moresby (Rhodin, 1993), and it reaches as far west as the Lake Yamur



Figure 3. The red-bellied short-necked turtle, *Emydura subglobosa*, from the Kemp Welch River area, Central Prov., PNG. Photo by AGJR.

region of Irian Jaya. It is the most widely distributed species in southern New Guinea, extending further east than the southern *Elseya* sp.

Despite apparent records to the contrary (Iverson, 1992), the species does not occur naturally in northern New Guinea. Most northern records of *E. subglobosa* represent misidentified *Elseya novaeguineae*. However, there appear to be scattered populations of introduced *E. subglobosa* in various northern locations, probably representing escaped or released animals from the domestic food market trade. For example, specimens of *E. subglobosa* have been recorded from high elevations in the central mountains at Goroka, and from the northern island of New Britain where no natural populations of freshwater turtles are known to occur, but where the huge natural foods market in Rabaul probably deals occasionally in freshwater turtles imported from mainland PNG.

Local subsistence consumption of *E. subglobosa* is common, with many villagers keeping animals alive in villages for a short time awaiting slaughter for special occasions. Legal trade to local and regional food markets also occurs. In addition, illegal trade in the species apparently occurs along the southern PNG – Irian border, where villagers living close to the border stockpile specimens and then trade or barter these animals along the coast with seafaring traders from Merauke in southeastern Irian, as for *C. insculpta*. These specimens are primarily intended for the international pet trade and large numbers of the species are exported from Merauke to Jakarta and then

internationally to multiple distribution centers (Samedi and Iskandar, this volume). What percentage of the Merauke trade in *E. subglobosa* represents animals from PNG is not known. Legal export from PNG occurs only rarely, with only a single animal of this species documented over the last 3 years.

Elseya novaeguineae

The New Guinea snapping turtle is a wide-spread species of relative abundance that occurs throughout the lowland regions of northern New Guinea. Previously considered to be distributed throughout New Guinea, the southern populations are in fact at least two separate species (Rhodin, unpubl. data in prep.).

The species is distributed from the Popondetta region of northeastern PNG in the east, all the way to the Vogelkop Peninsula of northwestern Irian in the west, making it the most widely distributed chelonian in New Guinea. The systematic relationships of the various populations in this wide distribution have not yet been elucidated, and further taxonomic study is clearly necessary. The type locality for *E. novaeguineae* is on the southwestern shore of Cenderawasih Bay on the southeastern Vogelkop. The previously described species *Elseya schultzei* from the Tami River near Jayapura might possibly represent a distinct taxon, as may the northwestern Vogelkop populations from around Sarong. There is also a possibility that the Sepik and eastern PNG populations are distinct. An isolated population on Waigeo Island might well be distinct. The species has also been recorded extra-liminally in the Palau Islands (Aoki, 1977) where it may have been introduced but was not found in recent surveys (Crombie and Pregill, 1999). The species may also occur as an introduction on Malaita, Solomon Islands (Dahl, 1986).

Trade in the species includes extensive local consumption and local and regional food markets, especially promi-



Figure 4. Eggs and adults of the New Guinea snapping turtle, *Elseya novaeguineae*, for sale in a market at Angoram, Sepik River, East Sepik Prov., PNG. Photo by Jeffrey W. Lang.



Figure 5. Curio mask made from shell of the New Guinea snapping turtle, *Elseya novaeguineae*, for sale in tourist store in Port Moresby, Central Prov., PNG. Photo by AGJR.

ment in the Sepik River region (Fig. 4), but we have seen it for sale in food markets all over northern PNG. In addition, as for *P. cantorii*, there is a robust trade in *E. novaeguineae* shells used in the ornamental curio trade (Fig. 5) for sale as artifacts to tourists. Hundreds if not thousands of these shell masks are readily available for sale to tourists all over northern PNG and in Port Moresby.

There does not appear to be any significant illegal trade in this species across the northern PNG – Irian border between Vanimo and Jayapura, primarily due to fairly rigorous local border controls. The international pet trade in this species appears to emanate primarily from Sorong on the Vogelkop Peninsula in northwestern Irian.

A few shipments of this species have also appeared in the international food markets of Hong Kong and southern China, but the animals seen were in poor shape due probably to lengthy travel from northern PNG or Irian (P. Crow, *pers. comm.*). As of now, the Chinese food market trade does not yet appear to have impacted turtles of New Guinea. However, as populations of heavily traded species in southeast Asia are depleted, the export routes for the pet trade currently emanating from New Guinea will probably convert and begin to trade increasing amounts of turtles primarily for the food trade.

Elseya sp. 1.

The red-bellied snapping turtle is a still undescribed species representing the southern populations of what was previously considered to be *E. novaeguineae* (Rhodin, unpubl. data in prep.). The species is distinguished from northern *E. novaeguineae* by a combination of characters including a striking red plastron in juveniles and sub-adults and a generally rounder carapace, with *E. novaeguineae* having a yellow plastron and more oval shell.

The species is distributed from the Purari River region of PNG in the east to at least the Timika region of Irian Jaya in the west. Further west in the Berau Gulf region of Irian it appears to be replaced by *Elseya* sp. 2, a second undescribed species distinguished by a prominently serrated and keeled shell. In the southeastern Irian lowlands around Merauke, the species appears to occur sympatrically with *E. branderhorsti*, a large species with limited distribution characterized by a white plastron. Animals of this species complex have also been recorded from the Aru Islands of Indonesia on the Sahul shelf between New Guinea and Australia, but whether these represent a new species or not is not known. The species appears to be relatively abundant, with similar population levels as *E. novaeguineae* and *E. subglobosa*.

Local subsistence consumption of *Elseya* sp. 1 is common, with many villagers keeping animals on hand for special occasions. Legal trade to local and regional food markets also occurs. In addition, illegal trade in the species apparently occurs along the southern PNG – Irian border, where villagers living close to the border stockpile specimens and then trade or barter these animals with traders from



Figure 6. Parker's snake-necked turtle, *Chelodina parkeri*, from the Western Prov., PNG. Photo by AGJR.

Merauke in southeastern Irian, as for *C. insculpta* and *E. subglobosa*. These specimens are primarily intended for the international pet trade and large numbers of the species are exported from Merauke to Jakarta and then internationally to multiple distribution centers (Samedi and Iskandar, this volume). What percentage of the Merauke trade in *Elseya* sp. 1 represents animals from PNG is not known.

Chelodina siebenrocki

The snake-necked turtles occur only in the southern lowlands of New Guinea, with the relatively large, non-descript Siebenrock's snake-neck turtle being restricted to the southern coastal areas of Western Province in PNG and adjacent southeastern Irian. Its inland distribution is markedly limited, being replaced there by *C. parkeri*.

There is limited local consumption of *C. siebenrocki*, but in general snake-necked turtles are not a highly desired food item and do not appear to be present in the regional food market trade (the relatively strong musk odor and snake-like appearance contribute to the reluctance of people to eat them). Populations of *C. siebenrocki* appear to be relatively robust, although the limited distribution may make the species vulnerable to continued exploitation. Some illegal trade in the species may occur along the southern PNG – Irian border destined for the international pet trade, but the species is very common in the Merauke area and most international shipments probably consist primarily of locally-caught Irian animals. In addition, the species is not very valuable or desired on the pet market, which also lessens demand for illegal export from PNG.

Chelodina parkeri

Parker's snake-necked turtle (Fig. 6) is among the most beautifully patterned of all the snake-necked turtles of either New Guinea or Australia. As a result it has become heavily exploited by the international pet trade and commands extremely high retail prices by western reptile dealers. It has a very limited distribution which also renders it vulnerable.

The species is distributed in the inland areas of the trans-Fly region of Western Province in PNG, notably Lake Murray and the Fly and Aramia rivers. The species probably also occurs in inland southeastern Irian portions of the Fly River watershed, however, no actual localities have been documented there yet. It does not occur in coastal areas where it is replaced by *C. siebenrocki*. It is relatively uncommon within its area of distribution, and has only a limited area of occurrence.

As with *C. siebenrocki* there is no significant trade in the species to local or regional food markets, but it may occasionally be eaten locally. In view of the high demand for the species there is probably illegal trade occurring across the PNG – Irian border, especially inland and west of the Lake Murray region, with the animals destined for the international pet trade for export from Merauke in southeastern Irian. How many of the animals exported from Merauke represent illegal PNG specimens vs. legal Irian animals is not known, but it is suspected that most animals of supposed Irian origin are probably illegally exported from PNG.

Chelodina novaeguineae

The New Guinea snake-necked turtle is a small and relatively non-descript species that does not appear to figure prominently in either the local food or illegal pet trade. It was the first snake-necked turtle to be described from New Guinea, with its type locality in southern coastal Western Province of PNG. Subsequent discovery of other populations of similar animals throughout the Australasian faunal region led to an apparently huge expansion of its range to eventually include most of southern New Guinea, most of northern Australia (Iverson, 1992), and Roti Island west of Timor in Indonesia (Lidth de Jeude, 1895). With subsequent systematic analysis of these various widespread populations, however, *C. novaeguineae* itself has come to be restricted to southwestern PNG and possibly southeastern Irian with other populations previously referred to as "*C. novaeguineae*" representing separate species: *Chelodina reimanni* (Philippen and Grossmann, 1990) from the Merauke region of southeastern Irian, *C. pritchardi* (Rhodin, 1994a) from the Kemp Welch River area of southeastern PNG, and *C. mccordi* (Rhodin, 1994b) from Roti Island, Indonesia. The northern Australian populations of "*C. novaeguineae*" are also distinct and have previously received the invalid name *C. rankini* (Wells and Wellington, 1985), and are now in the process of being formally described (W.P. McCord and S.A. Thomson, in review).

Chelodina novaeguineae now appears restricted to the Western Province of PNG from about the Bamu River in the



Figure 7. Pritchard's snake-necked turtle, *Chelodina pritchardi*, from the Kemp Welch River area, Central Prov., PNG. Photo by AGJR.

east to approximately the PNG – Irian border, although it may possibly occur in southeastern Irian as well. To the west it appears to be replaced by, or possibly intergrade with, *C. reimanni*, which has not yet been recorded from PNG; to the east it does not appear to extend to the central Gulf Province and a large range discontinuity occurs between *C. novaeguineae* and *C. pritchardi* further to the east. *Chelodina novaeguineae* occurs both inland (notably the Lake Murray region) and coastally, encompassing to a certain extent the combined distributions of inland *C. parkeri* and coastal *C. siebenrocki*.

There is limited local consumption of *C. novaeguineae*, but in general snake-necked turtles are not a highly desired food item and do not appear to be present in the regional food market trade. Populations appear to be relatively robust. Some illegal trade in the species may occur along the southern PNG – Irian border destined for the international pet trade.

Chelodina pritchardi

Pritchard's snake-necked turtle (Fig. 7), a distinctive member of the *C. novaeguineae* complex closely related to *C. longicollis* of Australia (Rhodin, 1994a), is PNG's only documented endemic turtle species, with no occurrence in Irian Jaya or Australia. It has an extremely limited distribution and has only been recorded from three known localities in the Kemp Welch River basin southeast of Port Moresby in southeastern PNG (Rhodin, 1994a). Its range is isolated

and discontinuous from other members of its species complex, and it may represent a relictual species of previous Australian origin occurring on the periphery of a widely distributed pre-“*C. novaeguineae*” ancestor (Rhodin, 1994a).

There is limited local consumption of *C. pritchardi*, but in general snake-necked turtles are not a highly desired food item and do not appear to be present in the regional food market trade. The species appears to be relatively scarce within its range, which it shares with only the relatively common *E. subglobosa* (Rhodin, 1993). There has been no legal export of *C. pritchardi* except for the holotype at the time of the species description. All animals present in the international pet trade have been exported illegally and continued trade in this threatened species poses a major risk to its continued survival. It is highly endangered due to its restricted range, limited known localities, and continued illegal trade for the pet industry. In many respects the status of *C. pritchardi* parallels the biology and potential fate of the even more critically endangered *C. mccordi*.

General Comments

Trade in turtles from PNG is strictly regulated by law as proscribed by the Fauna (Protection and Control) Act (Parker, 1981) (this Act is currently in the process of being amended). Papua New Guinea is also a CITES signatory since 1975. All exports of all turtles require permits to be issued by the Conservator of Fauna (currently the Dept. of Environment and Conservation). No turtles are listed by PNG as Protected Species, which would limit legal permitted export to at most 4 animals to legitimate approved zoological institutions. However, all marine turtles and two freshwater turtles, *C. insculpta* and *P. bibroni* are listed as Restricted Species, with narrow guidelines limiting any legal export to only a few animals for legitimate scientific purposes. The rest of the non-protected and non-restricted turtle species may be exported only with issued export permits, and then only for approved legitimate scientific and zoological purposes. Export of curios incorporating wildlife parts (e.g., turtle shell masks) also requires export permits.

At least on paper, PNG protects its wildlife and turtle resources fervently from export, with proper concern for their continued utilization at the local level by the native population. Unfortunately, control and enforcement of these regulations is badly lacking, and very few export permits for turtles are actually issued. A search of permits issued during the last 3 years yielded evidence of only a single specimen of *E. subglobosa* exported to Hawaii in 1996. Permits were also previously obtained in 1987 for export of one *C. novaeguineae* (actually *C. pritchardi*), and in 1977 for a few specimens each of *C. siebenrocki*, *C. novaeguineae*, *E. subglobosa*, and *E. novaeguineae*, with only one specimen each of *C. insculpta* and *P. bibroni* (AGJR, pers. obs.).

Trade in New Guinea turtles at present appears to be restricted primarily to the international exotic pet industry.

There appear to be significant levels of illegal export trade along the southern PNG – Irian border, as described above for the different species traded along this route. Some of this trade may pass through Daru, an off-shore regional port and air facility with a long history of illegal wildlife trade and also a major regional market for the sale of marine turtle meat. No similar trade appears to occur along the northern PNG – Irian border. The reasons for the difference reflect the higher levels of border control present along the northern border. Illegal export via air or ship from major ports such as Port Moresby probably also occurs, especially for vulnerable species like *C. pritchardi* which occurs close to Port Moresby. The Dept. of Environment and Conservation has inadequate manpower and resources to inspect and control these probable avenues of illegal trade.

As mentioned above for *E. novaeguineae*, the international food trade does not yet appear to have significantly impacted populations of turtles in New Guinea. However, as populations of heavily traded species in southeast Asia are depleted, the export routes for the pet trade currently emanating from New Guinea will probably convert and begin to trade increasing amounts of turtles primarily for the food trade.

If the freshwater turtle fauna of Papua New Guinea is to continue to survive as a viable and sustainable resource base for utilization by the native population, and if we are to avoid the consumption of this resource in international exotic pet and food markets, then stricter adherence to existing laws and necessary control and inspection at probable export sites needs urgently to be implemented.

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