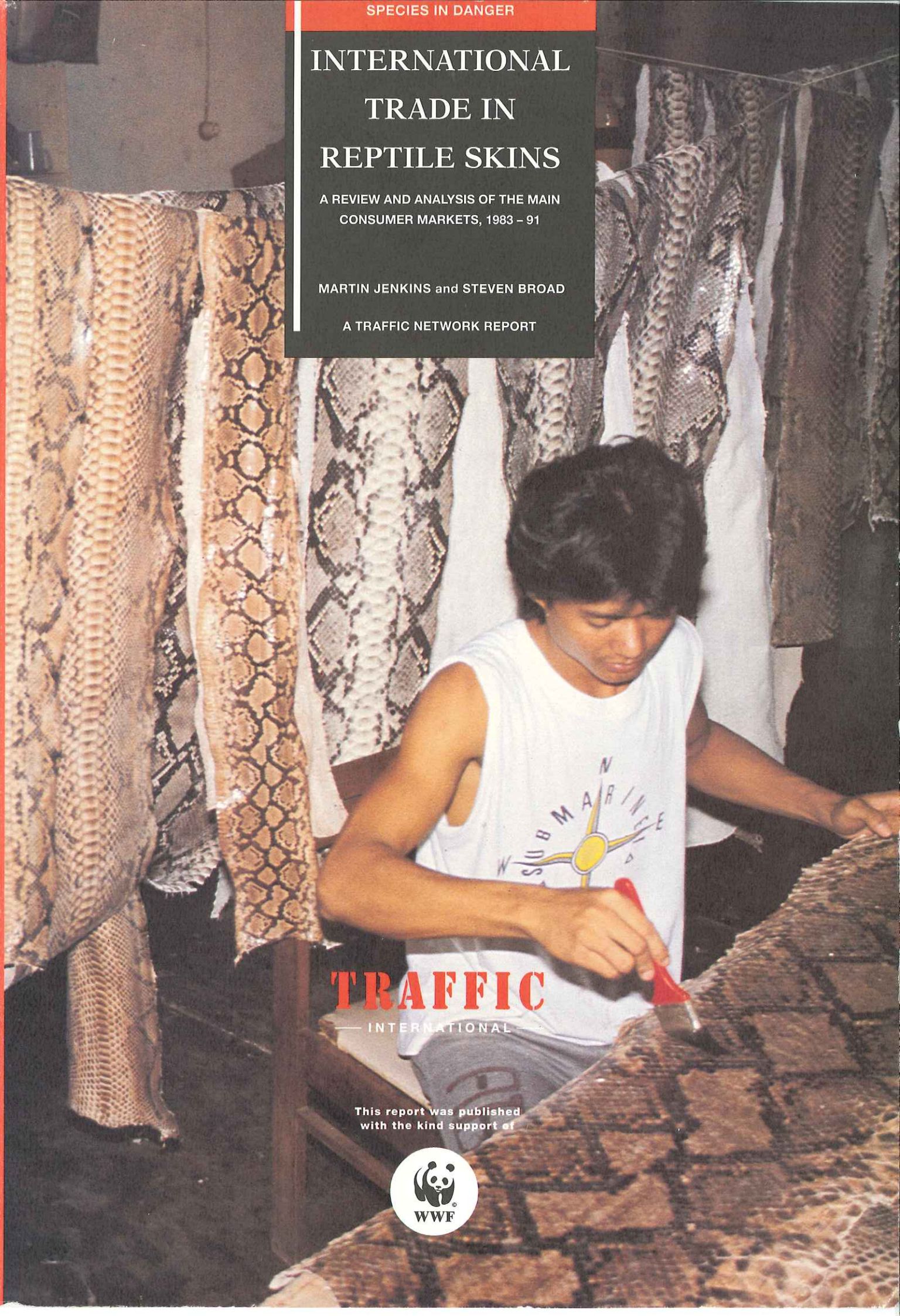
SPECIES IN DANGER

INTERNATIONAL TRADE IN REPTILE SKINS

A REVIEW AND ANALYSIS OF THE MAIN CONSUMER MARKETS, 1983 – 91

MARTIN JENKINS and STEVEN BROAD

A TRAFFIC NETWORK REPORT



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INTERNATIONAL TRADE IN REPTILE SKINS:

A REVIEW AND ANALYSIS OF THE MAIN CONSUMER MARKETS, 1983-91

Compiled and edited by Martin Jenkins and Steven Broad

The World Conservation Monitoring Centre contributed to the research and analysis for this report.

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Tim Swanson of Cambridge University produced a case study of reptile skin trade economics under contract to TRAFFIC International, which provided useful insight into the efficacy of current trade control regimes.

FOREWORD

A great deal of information has been gathered in recent years describing the numbers of reptile skins in trade, the conservation concerns behind the harvest of reptilian species and the options for improved regulation. Although many gaps remain in our current knowledge of the effects of reptile harvest and although severe control problems persist in some countries, this area of wildlife trade also harbours some of the more innovative recent developments in the sustainable use of wildlife resources. This report attempts to provide an overview of the trade and to fill one of the largest gaps in present knowledge: the nature, dynamics and influences of the leather industry and consumers who process and purchase the products derived from reptile skins. In doing so, it was hoped to provide insight into the demand which drives the trade, the potential for improved control and the economic framework in which the trade operates. It was also considered important to attempt to open a constructive dialogue with industry representatives, in the hope that this could lead to greater co-operation in developing appropriate conservation measures for species used in the trade.

The support received from the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has helped to focus this project. The end result is a good example of the strength of the relationship which exists between the TRAFFIC programme and the CITES Secretariat.

Jorgen B. Thomsen
Director
TRAFFIC International

INTRODUCTION

The international trade in reptile skins involves the harvest and use of millions of skins every year. A diverse range of species is used by the trade, including members of three of the four reptile orders (the Chelonia, Squamata and Crocodylia). This trade is not a particularly new phenomenon; many of the taxa found in trade have been used in the exotic leather industry for many decades.

Parker (1933) provides an overview of the trade in the early years of the century. The skin of crocodilians had been in large-scale commercial use for a considerable period with, for example, American Alligator *Alligator mississipiensis*[1] having been hunted intermittently since the beginning of the nineteenth century. However, large-scale trade in snake and lizard skins did not begin until around 1910, when skin of Javan and South American origin became available on an intermittent basis. In the mid-1920s a regular trade began, with supplies originating principally in the Sunda Islands and British India. By the late 1920s commercial collection of skins also took place in Sri Lanka (then Ceylon), Thailand (Siam), the Philippines, Mexico, Brazil, West Africa (with large-scale export from Nigeria), East Africa and Zimbabwe (Rhodesia).

In the mid-1920s the skins were used only for luxury articles, chiefly the upper leathers of high-priced shoes. By the 1930s they were being used for mass-produced shoes as well as bags and a wide variety of other fancy leather articles.

It appears that the scale of the trade was surprisingly similar to that prevailing today: in 1932 India alone exported *circa* two-and-a-half million skins and in 1931 the Dutch East Indies (now Indonesia) exported over two million skins, of which 80% were snakeskins and the remainder lizard skins. This compares with a very rough estimate of six million skins produced annually in Asia at present.

Indirect evidence indicates that the total trade may have grown to much higher levels in the intervening period. The historical peak of the crocodile skin trade was in the late 1950s and early 1960s. Japanese Customs import statistics for lizards (which are only reliable from this time onwards), indicate a similar peak at this time, with maximum trade (in 1959) at around eight times the average level in the 1980s.

The present state of the trade

Each year, at least 10 million reptiles are killed, processed and manufactured into products for the international reptile skin trade. All except a tiny percentage of these (namely around 100 000 crocodilians) are taken directly from the wild and the vast majority are harvested in tropical countries. Well over 40 species have been recorded in significant numbers in trade in the last decade. However, the great majority (85%) of the international trade which is recorded to species level is in only 11 species: one crocodilian (Spectacled Caiman *Caiman crocodilus*), four lizards (Argentine Teju *Tupinambis rufescens*, Common Tegu *T. nigropunctatus*, Water Monitor *Varanus salvator* and Nile Monitor *V. niloticus)*, and six snakes (Oriental Rat Snake *Ptyas mucosus*, Reticulated Python *Python reticulatus*, Dog-faced Water Snake *Cerberus rhynchops*, the Puff-faced or Asiatic Water Snake *Homalopsis buccata*, and the file or wart snakes *Acrochordus granulatus* and *A. javanicus*). Trade in each of these amounts to, at minimum, several hundred thousand individuals a year. In terms of numbers of skins, around 60% of this trade originates in Asia, 35% in South and Central America and five per cent in Africa. There is also a large, but at present unquantifiable trade in a small number of other species, chiefly snakes, in Asia.

Skins are usually exported in a raw state or at an early stage of tanning (crust tanned), either directly to countries with tanning and manufacturing industries, or via a third country which functions as a collection

and sorting centre (in most cases this is Singapore). Skins are processed and manufactured into a wide variety of products including belts, briefcases, shoes, handbags, wallets and watchstraps. The products are generally consumed by the fashion trade, sometimes in the country of manufacture, but often in other market countries. Increasingly, countries of origin, particularly in Southeast Asia, are developing their own tanning and manufacturing industries and may also be expected to grow in importance as consuming countries.

The influence of CITES on the reptile skin trade

Perhaps the most striking difference between the reptile skin trade in the 1930s and that in the 1980s and 1990s has been the development of CITES, the 1973 Convention on International Trade in Endangered Species of Fauna and Flora, which came into operation in 1975. CITES provides the international framework under which countries can attempt to enforce national trade restrictions, which may take the form of export bans, quotas, import restrictions or other measures.

Under CITES, two main control mechanisms have been applied to the trade. First, the Convention imposes prohibitions on commercial trade involving wild specimens of taxa considered to be threatened with extinction by trade (those listed in CITES Appendix I). The reptile skin trade has been subject to a large number of restrictive measures; at the time of writing a total of *circa* 70 reptile taxa appear in Appendix I of the Convention and a large number of national trade restrictions are in place, which influence the issuance of permits for trade involving species listed in CITES Appendices II and III. Some of the prohibitions imposed by CITES on trade in reptile taxa have affected species previously used in large volumes, such as the Indian Monitor *Varanus bengalensis*, certain crocodilians and marine turtles.

The second main control mechanism applied by CITES to the reptile skin trade, is the basic set of conditions listed in Article IV of the Convention text, which should be taken into account prior to the issuance of export permits for those species listed in Appendix II. The most important of these are set out in paragraph 2a of the Article, which demands that the exporting countries must have received scientific advice that the export of specimens of such a species "will not be detrimental to the survival of that species", and paragraph 3, which indicates that the trade in a species "should be limited in order to maintain the species throughout its range and at a level consistent with its role in the ecosystem in which it occurs and well above the level at which that species might become eligible for inclusion in Appendix I...". Suitable measures should be "taken to limit the grant of export permits for specimens of that species.".

Concern that the conditions set out in Article IV were not being met has led to a series of reviews undertaken on behalf of CITES examining significant trade in Appendix II species (Luxmoore *et al.*, 1988; WCMC *et al.*, 1993). Recommendations arising from these resulted in more detailed studies, in this context most notably of Asian pythons (Groombridge and Luxmoore, 1991), Asian varanids (Luxmoore and Groombridge, 1990), African varanids (de Buffrenil, 1991) and South American boids (Gorzula and Pilgrim, 1993; Waller and Micucci, 1993). These studies and others have allowed a considerable amount of information to be collected. Regrettably, the development and implementation of appropriate safeguards on harvesting based on this information has generally been very slow.

For some of the taxa included in Appendix I, notably marine turtles and crocodilians, the Convention has been the forum for the development or attempted development of various controlled production and harvest schemes. In the case of marine turtles, these have taken the form of captive production schemes, primarily for meat and tortoiseshell. Such schemes have been largely unsuccessful, owing to both

technical and political obstacles in their development, and all marine turtle species continue to be included in CITES Appendix I. As a consequence, the turtle skin trade has remained in decline. In the case of crocodilians, captive production of species otherwise prohibited from trade by the Convention has been far more successful. Production from crocodile farms and ranches has increased dramatically in recent years, controlled wild-harvests have been introduced and the conservation status of many populations has improved (Luxmoore, 1992). Probably owing to high unit value and the fairly strict pre-conditions imposed on the 'down-listing' of protected species from Appendix I to Appendix II, attempts to control the trade in crocodilian skins have produced a number of important innovations, including internationally funded status surveys, harvest/export quotas, skin tagging and increasing involvement of the leather industry in developing conservation-orientated controls. Some of these have begun to be applied to other taxa in trade.

Problems in monitoring the trade

Reporting requirements under CITES, which dictate that each Party submit annual reports detailing imports and exports of all taxa listed in the Appendices of the Convention, have resulted in the accumulation of a large body of statistical data on international trade in CITES-listed species.

Although the information provided by CITES reporting is far more detailed than that available before the Convention came into operation, it is nevertheless far from a complete reflection of trade, or necessarily accurate as far as it goes. Three major factors account for this. These are: illegal trade; poor and inconsistent reporting; trade in species not listed on CITES, between non-CITES Parties, or between CITES Parties with reservations for those species.

Illegal trade

There is considerable evidence that illegal trade, either through misdeclaration, under-declaration or non-declaration of shipments, is a widespread problem in the international reptile skin trade. The motivations for such trade and its possible impact are discussed in a later chapter. Here, it is sufficient to note that, being by its very nature unquantifiable, it seriously hampers accurate assessment of the trade.

Poor and inconsistent reporting

Inaccurate or inconsistent reporting of imports and exports of CITES-listed species is a widespread problem. Some countries have had a policy until recently of not reporting trade in Appendix II taxa; others, such as Japan, have not reported trade in Appendix I species for which they had reservations. This has undoubtedly led to considerable under-representation of trade in some taxa. A countervailing factor which may lead to over-representation of trade in this analysis is the reporting of shipments in different ways by importing and exporting countries. Reptile skins are commonly recorded by number of skins, by weight of skin, by length and by area. In the analysis of net trade, each of these categories has been summed separately and a conversion factor used to convert to approximate number of whole skins (see Appendix 2). This means that a single shipment reported, for example, by weight by the exporting country and by number of skins by the importing country will have been counted twice. However, the majority of transactions in the majority of taxa are now counted by number of skins and it thought that double counting has not significantly inflated the apparent levels of trade in most cases.

Non-CITES species

It is evident that for one group — the snakes — a significant percentage of international trade is in species which are either not listed in any of the CITES Appendices, or are listed in Appendix III, or have only very

recently been placed in Appendix II. These species are discussed in further detail under the section *Other Asian snakes*. Data for trade in these over the period 1983-89 have been obtained from a variety of sources, namely the incomplete CITES figures for trade in those species on Appendix III, US and some UK Customs import figures and Indonesian export figures. Some anecdotal information has also been obtained from traders and tanners. Indications from these sources are that this area may be the most important sector of the reptile skin trade in terms of numbers of animals used.

METHODOLOGY

Analysis of CITES annual report information, which is stored in centralized form at the World Conservation Monitoring Centre (WCMC) in Cambridge, UK, has provided the chief basis for the assessment of trade in indivdual species detailed here. The methodology used in the analysis is detailed in Appendix 1. National overseas trade (Customs) statistics were reviewed for most major market countries, also.

In order to gain a greater insight into the international reptile skin trade than possible by review of trade statistics alone, the TRAFFIC Network undertook an in-depth study of the three main consumer markets, the EC, Japan and the USA, during 1991. In each case, contacts were established and interviews arranged with industry representatives, including officers of national bodies, and individual tanneries, manufacturers and traders. Discussions were also held with government authorities responsible for the implementation of CITES.

REVIEW OF MAJOR TAXA IN TRADE

This section reviews utilization of the principal species involved in the skin trade.

Marine turtles

Seven species of marine turtle are usually recognized. These are the Leatherback *Dermochelys coriacea*, the Green Turtle *Chelonia mydas*, the Olive Ridley *Lepidochelys olivacea*, Kemp's Ridley *Lepidochelys kempi*, the Hawksbill *Eretmochelys imbricata*, Loggerhead *Caretta caretta* and Flatback *Natator depressa*. With the exception of *Lepidochelys kempi* and *Natator depressa*, all species are widespread, chiefly in tropical and subtropical waters. All species are regarded as threatened, according to IUCN.

All species of marine turtle have been exploited by humans for a wide variety of uses, although chiefly for meat, eggs and tortoiseshell. The large-scale use of turtle leather is a relatively recent phenomenon and judging by recent trends is likely to have proved a short-lived one. The trade has been almost entirely in two species, *Lepidochelys olivacea*, the most sought after species, and *Chelonia mydas* (Groombridge and Luxmoore, 1987). Both species have been included in Appendix I of CITES since 1977 and the only legal trade has been that between non-CITES Parties or Parties which have had reservations on the species involved.

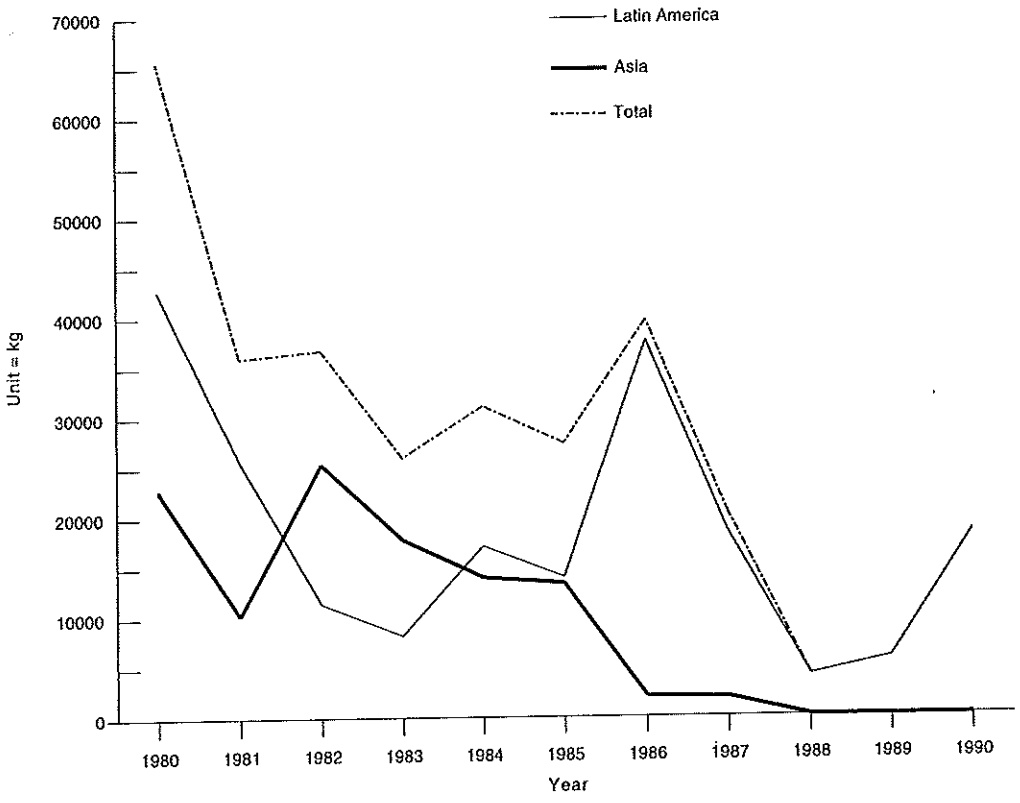
The use of marine turtle leather on a large scale began during the 1960s. Most turtle skin, which originated largely in Mexico, Ecuador, Pakistan and Indonesia, was tanned in Italy and France, although it was also used in Japan. Originally, all three countries maintained reservations on the species. France and Italy withdrew their reservations in 1984 and in consequence these countries do not feature to any extent in import figures for the period under discussion. In the 1980s, Japan came to dominate the trade as it maintained reservations on *Chelonia mydas* until 1987 and on *Lepidochelys olivacea* until 1991. Transactions in these taxa have not been be reported to CITES by Japan, and the only information is

therefore that from Customs statistics, which classify all Testudinidae together. Figure 1 shows imports to Japan, by weight and region of origin of skins, for the period 1980-90. Imports were at a high level during the early 1980s, but showed a marked drop from 1986-87, presumably coinciding with the withdrawal of the reservation on *Chelonia mydas* (the increase from 1985 to 1986 is likely to be due to a surge of imports before they became illegal). The marked increase from 1989 to 1990 is presumably increased import of *Lepidochelys* skins before this too became illegal in 1991.

Although trade in *Chelonia mydas* leather appears to have been relatively insignificant compared with other factors in its impact on wild populations of the species, the leather trade is believed to have had a major impact on populations of *Lepidochelys olivacea*. The trade in the 1960s and 1970s is discussed in some detail by Groombridge (1982), who reports estimates that at least two million *Lepidochelys olivacea* were landed in Mexico in the period 1965-69, almost exclusively for the international leather trade.

Figure 1

Testudinata skins imported to Japan, 1980-1990, by weight and region of origin



Source: TRAFFIC Japan.

Crocodilians

Of the 24 living species of crocodilian, at least 15 are or have been commercially traded for their skins on a regular basis (Brazitis, 1987); some trade has also occurred in the other nine species. Crocodilian leather is divided into "classic" and non-classic, the distinction being based on the quality of the leather. Classic skins are derived from species which lack or have poorly developed bony plates or osteoderms in the ventral area. They produce soft, supple leather and have scale patterns which are aesthetically pleasing when processed (Brazitis, 1987). There is considerable ambiguity as to which species the term classic

describes. The strictest definition includes only some species in the genus *Crocodylus* (chiefly the Nile Crocodile *C. niloticus*, the Salt-water Crocodile *C. porosus* and, before it was catastrophically depleted in the 1960s, Morelet's Crocodile *C. moreletii*, reputed to have had the highest quality skin of all). The most widely used definition includes all members of the genus *Crocodylus* and *Alligator mississippiensis*. In addition, the Gharial *Gavialis gangeticus*, False Gharial *Tomistoma schlegelii*, Black Caiman *Melanosuchus niger* and Broad-nosed Caiman *Caiman latirostris* are frequently included. It should be noted that all crocodilian species may produce poor quality, non-classic leather.

Improved tanning techniques now mean that osteoderms can be removed from the skins of other crocodilian species and there is an increasing tendency for the better quality leather from these other species, particularly from *Caiman crocodilus*, to be sold spuriously as classic leather. For the purposes of discussion here, the wider definition of classic species referred to above will be used; *Caiman crocodilus*, the only other crocodilian species in trade in significant numbers, will be treated separately.

All crocodilian species are listed in the Appendices of CITES. The status of the different species is given in Table 1.

The historical peak of the trade appears to have been in the late 1950s and early 1960s, when 500 000 skins per year are believed to have been harvested. In the late 1960s and early 1970s, around 300 000 skins were still in trade each year, but numbers then plummeted, owing largely to the overharvesting of accessible wild populations.

Initiation of farming and ranching and more effective management of some wild populations led, in the 1980s, to a steady increase in legal availability of skins of crocodilians and trade consequently grew from the years 1984 to 1990. Declared net trade in 1989 was around 165 000 skins, of which just under half were *Alligator mississipiensis* and the remainder *Crocodylus* spp. (see Figure 2). By 1990, trade had increased to nearly 220 000, virtually all this increase owing to a rise in the number of *A. mississippiensis* skins available. However, it is believed that trade has slumped considerably since then.

Crocodylus

Significant levels of trade (arbitrarily set at over 500 skins in any one year) were recorded for seven species of *Crocodylus* in the period 1983-89. These were, in order of abundance in trade, New Guinea Crocodile *Crocodylus novaeguineae*, *C. niloticus*, *C. porosus*, African Slender-snouted Crocodile *C. cataphractus*, Siamese Crocodile *C. siamensis*, Johnston's Crocodile *C. johnsoni* and American Crocodile *C. acutus*. Over the period 1983-89, an average of just over 70 000 skins of *Crocodylus* spp., in total, were recorded annually in world trade, according to CITES statistics. Of these, just over 40 000 (i.e. nearly 60%) were imported into Europe. Over the same period, Japan, the second-most important market, imported an average of just under 23 000 (i.e. 33%), these two markets therefore accounting between them for over 90% of CITES-recorded trade in skins of *Crocodylus* species. The two markets accounted for different proportions of the various species in trade, with the EC (European Community) dominating the market for African species and Japan that for Asian and Australian species.

Table 1

Status of the different species of crocodilian under CITES controls

CITES status	Species	Countries
Appendix I	*Alligator sinensis*	All countries
	Caiman crocodilus apaporiensis	All countries
	Caiman latirostris	All countries
	Melanosuchus niger	All countries
	Crocodylus acutus	All countries
	Crocodylus cataphractus	All countries
	Crocodylus intermedius	All countries
	Crocodylus moreletii	All countries
	Crocodylus niloticus	All except countries listed below for the species
	Crocodylus novaeguineae mindorensis	All countries
	Crocodylus palustris	All countries
	Crocodylus porosus	All except PNG, Indonesia and Australia
	Crocodylus rhombifer	All countries
	Crocodylus siamensis	All countries
	Osteolaemus tetraspis	All countries
	Tomistoma schlegelii	All countries
	Gavialis gangeticus	All countries
Appendix I Captive-breeding	*Alligator sinensis*	China
	Crocodylus niloticus	South Africa, Israel
	Crocodylus porosus	Australia, Thailand
	Crocodylus siamensis	Thailand
Appendix I Reservation	*Crocodylus niloticus*	Sudan
Appendix II	*Alligator mississippiensis*	All countries
	Caiman crocodylus (other subspecies)	All countries
	Paleosuchus palpebrosus	All countries
	Crocodylus trigonatus	All countries
	Crocdylus novaeguineae novaeguineae	All countries
	Crocodylus porosus	Papua New Guinea
Appendix II Ranching	*Crocodylus niloticus*	Botswana, Ethiopia, Kenya, Malawi, Mozambique, Tanzania, Zambia, Zimbabwe
	Crocodylus porosus	Australia
Appendix II Quotas	*Crocodylus niloticus*	Madagascar, Somalia*, South Africa, Uganda
	Crocodylus porosus	Indonesia

* zero quota

Source: WCMC.

Crocodylus novaeguineae

C. novaeguineae occurs in Indonesia, Papua New Guinea and the Philippines.

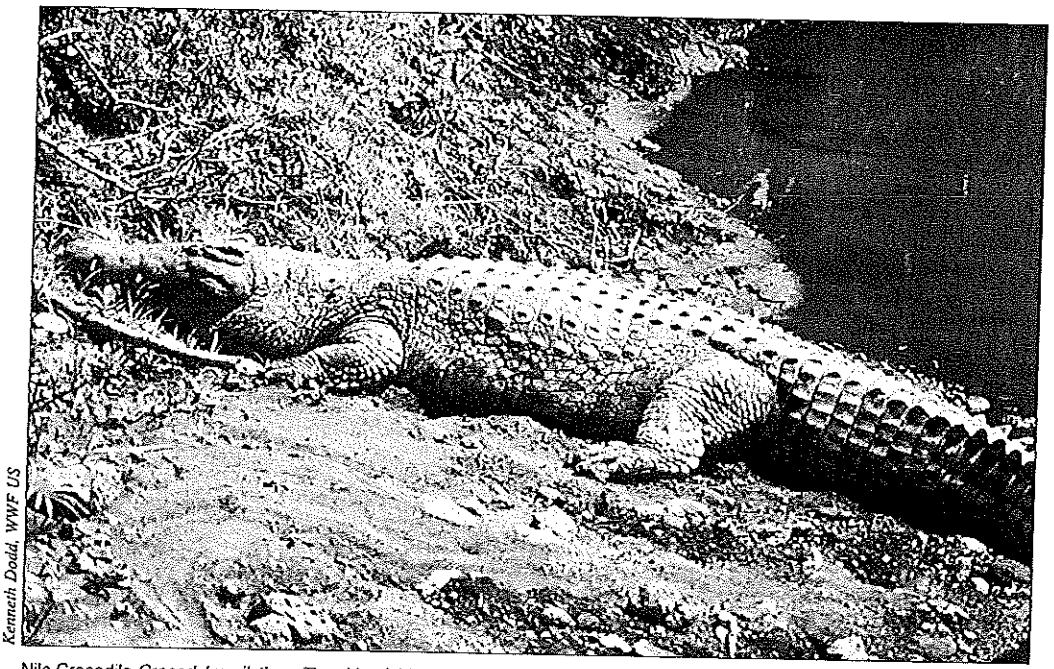
Over the period 1983-89, *C. novaeguineae* was the most abundant member of the genus *Crocodylus* in international trade, with an annual average of around 40 000 skins. Trade since 1985 has been fairly constant at around 45 000 skins annually, compared with around 30 000 for 1983 and 1984. Skins in trade derive from Papua New Guinea (ranched) and Indonesia (wild-harvested and ranched).

Japan has accounted for just over half of the trade, importing 22 000 skins annually, although this increased to nearly 34 000 in 1990. The EC imported virtually all the remaining skins recorded in trade — around 15 000 skins, annually, during the period 1983-89, over 90% of these to France and virtually all the remainder to Italy.

The Philippine subspecies, Mindoro Crocodile *C. novaeguineae mindorensis*, is listed in Appendix I of CITES and does not feature significantly in international trade. It is generally now regarded as a full species, *C. mindorensis*.

Crocodylus niloticus

Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Egypt, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Côte d'Ivoire, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zaire and Zambia.



Kenneth Dodd, WWF US

Nile Crocodile *Crocodylus niloticus*. The skin of this "classic" crocodilian is most in demand in France and Japan.

C. niloticus is a widespread species in sub-Saharan Africa. Ranching programmes have been approved in Botswana, Ethiopia, Kenya, Malawi, Mozambique, Tanzania, Zambia and Zimbabwe, and populations in these countries are included in Appendix II of CITES. Export quotas have been approved for Madagascar, Somalia, South Africa (captive-bred animals only) and Uganda (ranched specimens only) and these populations are also included in Appendix II of CITES. All other populations are included in Appendix I of CITES. For the period of this report, the Sudanese population was also included in Appendix II of CITES but has subsequently (following the eighth meeting of the Conference of the Parties to CITES, Kyoto, 1992) been returned to Appendix I.

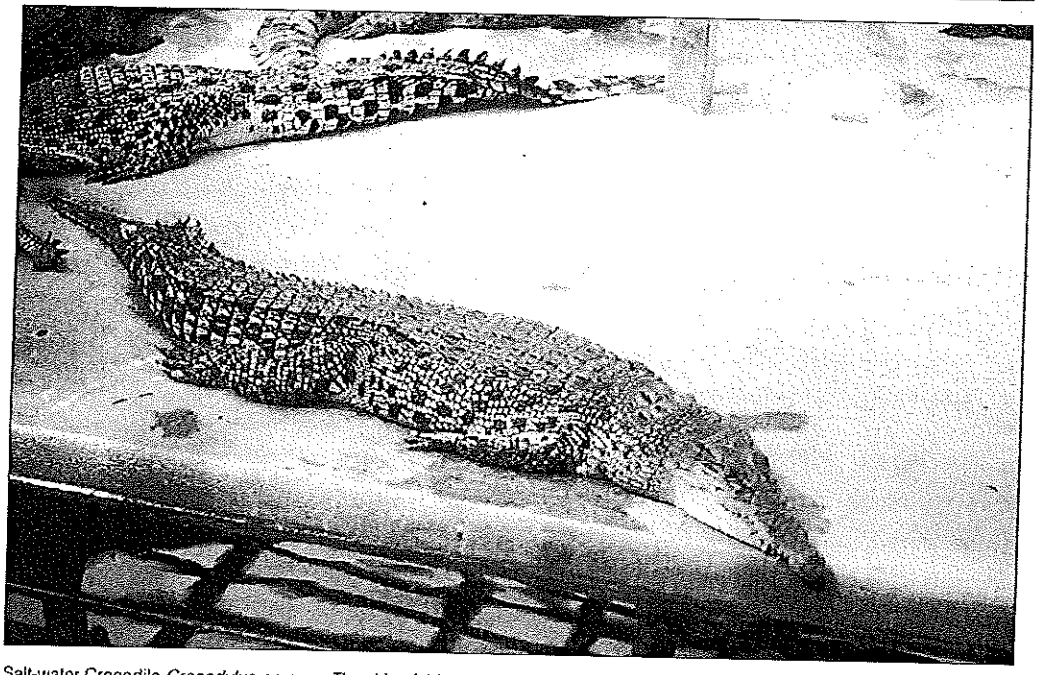
C. niloticus is the second-most abundant member of the genus in trade with an annual average of just over 23 000 skins recorded from 1983 to 1989. Declared trade slumped from 33 500 in 1983 to 7000 in 1984 but since then has shown a steady increase (see Figure 2), although this appears to have levelled off since 1989, as trade for that year and 1990 were at almost identical levels (40 000 skins). During this period, Zimbabwe has been the principal exporter (averaging 11 600 skins annually during 1986-90), followed by Sudan (just under 4000 skins annually for the same period) then Madagascar, Tanzania, Kenya, Mozambique and Botswana.

The EC was responsible for 86% of all declared imports of *C. niloticus* in the period, amounting to just under 20 000 skins a year. Within the EC, France dominates the trade, accounting for nearly 80% of recorded imports, or nearly 70% of all world trade. Of the remaining EC trade, Italy accounted for the majority, reporting average annual imports of around 2700 skins. However, Belgium has recently become a significant importer, recording totals of 1000 in 1988 and *circa* 4000 for 1989 and 1990, contrasting with an average of 200 for the years 1983-1987.

Over the period 1983-89, Japan has been an insignificant importer of *C. niloticus*, with average annual net imports of *circa* 800 skins and gross imports of just under 1200. However, it has shown a steady increase in import rates over the period, from 10 skins in 1983 to just over 4700 (net imports) in 1989. This trend has continued and in 1990 Japan was second only to France for *C. niloticus* imports, recording just over 12 500, or over 30% of the world total.

Crocodylus porosus

Australia, Bangladesh, Brunei, Cambodia, India, Indonesia, Malaysia, Myanmar, Palau, Papua New Guinea, Philippines, Solomon Islands, Sri Lanka, Vanuatu, Viet Nam. *C. porosus* is believed to be extinct in Thailand.



WCMC

Salt-water Crocodile *Crocodylus porosus*. The skin of this crocodile is reserved for the finest leather goods.

Over the period 1983-89, around 8800 skins of *C. porosus* a year were recorded in trade. Trade has increased over the period, from around 5500 in 1983 to just under 15 000 in 1989. As with *C. niloticus*, this increase has now levelled off, and only 12 000 skins were recorded in trade in 1990. Legal international trade originates in Australia (ranching programme approved in 1985), Indonesia (export quota first approved in 1985) and Papua New Guinea (ranching programme approved in 1983).

Trade in *C. porosus* is more evenly spread than that in *C. niloticus*. Japan, which held a reservation on this species until 30 November 1989, has been the single largest importer, averaging just under 4000 a year (45% of world trade). Moreover, Japanese imports steadily increased over the period, from 2000 in 1983 to around 9000 in 1989 and 10 000 (80% of world trade) in 1990. The EC accounted for just under 40% of world trade, virtually all (93%) of this to France. Trade to France has remained fairly steady from 1983 to 1989, at just over 3000 skins annually, although imports declined to 1200 in 1990.

Crocodylus cataphractus

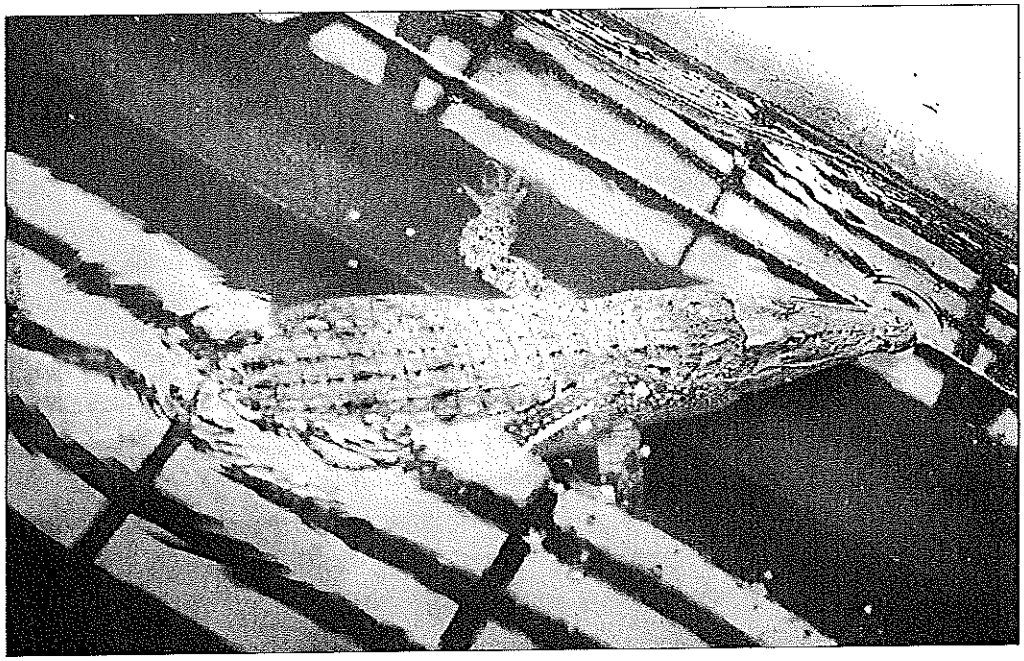
Angola, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, possibly Guinea Bissau, Liberia, Mali, Mauritania, Nigeria, Senegal, Sierra Leone, Tanzania, Togo, Zaire and Zambia.

Trade in *C. cataphractus* skin has averaged almost exactly 2000 skins a year for the period 1983-89. Trade was at a high level in 1983 (nearly 10 000 skins), dropped to 2000 skins in 1984 and then to insignificant levels for 1985-87. Since then it has increased, although only to 500-1000 skins a year. Apart from *circa*

2000 skins from Gabon in 1983, virtually all trade has originated in the Congo, which has had an annual export quota of 600 skins since 1987. Virtually all this trade (99%) went to the EC. Italy was responsible for importing almost all the 1983 skins; since then nearly all recorded trade has been to France.

Crocodylus siamensis

Indonesia and Cambodia and possibly in Brunei, Myanmar, Laos, Malaysia and Viet Nam. Probably extinct in the wild in Thailand.



WCMC

Siamese Crocodile *Crocodylus siamensis*. All supplies of these crocodiles' skin are now from farmed stock.

Trade in *C. siamensis* skin has averaged around 1000 skins a year for 1983-89, although has been increasing. None was recorded in 1983, while from 1987 to 1989 an annual average of 2000 skins was recorded, rising to 2800 in 1990. All supplies are now farmed. Japan has been responsible for around 70% of these imports, with virtually all the rest going to Italy.

Crocodylus johnsoni

C. johnsoni is endemic to Australia.

Trade in *C. johnsoni* has averaged 500 skins over the period 1983-89, although has been closer to 1000 skins annually since 1987. Singapore has been the major recorded net importer in 1989 and 1990, although this is likely to be an artefact of reporting. Japan reported imports of around 200 in 1987, 1200 in 1988 and 300 in 1990. The EC has imported insignificant quantities.

Crocodylus acutus

Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Peru, USA, Venezuela and probably Belize.

Around 1500 skins of *Crocodylus acutus* were recorded in trade, in total, in 1983-85. Since then only 65 skins have been recorded in trade, in total.

Alligator mississipiensis

A. mississipiensis is unusual in this report as it is the only important species considered whose range state, the USA, is also one of the major consuming regions under discussion.

The history of *A. mississipiensis* exploitation serves as a useful exemplar of the history of crocodilian exploitation in general. Large-scale, unregulated commercial hunting started at least as early as 1800. On average, about 50 000 *A. mississipiensis* skins were taken annually throughout the nineteenth century from just two states, Florida and Louisiana (Guggisberg, 1972). Hunting increased near the turn of the century and between 1880 and 1894 possibly two-and-a-half million *A. mississipiensis* were taken in Florida alone (Smith, 1891). The trade peaked at about 200 000 skins a year in the 1920s but by the 1930s, the hunting had dropped to less than half that amount (Reisner, 1991). The trade declined as a result of the enactment of prohibitive state protection and the decline in national alligator populations — only about 10 000 *A. mississipiensis* were taken in Florida in 1943 in spite of a legal open season and high market prices (Reisner, 1991).

Illegal trading of *A. mississipiensis* began to flourish in the late 1960s and early 1970s in the USA, when the international market began to pay US$35 a linear foot for *A. mississipiensis* skins (Reisner, 1991). In 1971, one dealer was caught and found to have illegally exported about 127 000 *A. mississipiensis* skins, about one-half of the estimated US population of the species at that time, in just three years (Reisner, 1991). Japanese Customs data confirm some of this illegal trade — in 1970, Japan imported almost 42 000 kg of US crocodilian hides and leather (Duplaix, 1979). Responding to this, additional protective measures were enacted, including the placing of the species in Appendix I of CITES in 1975, and enforcement was improved.

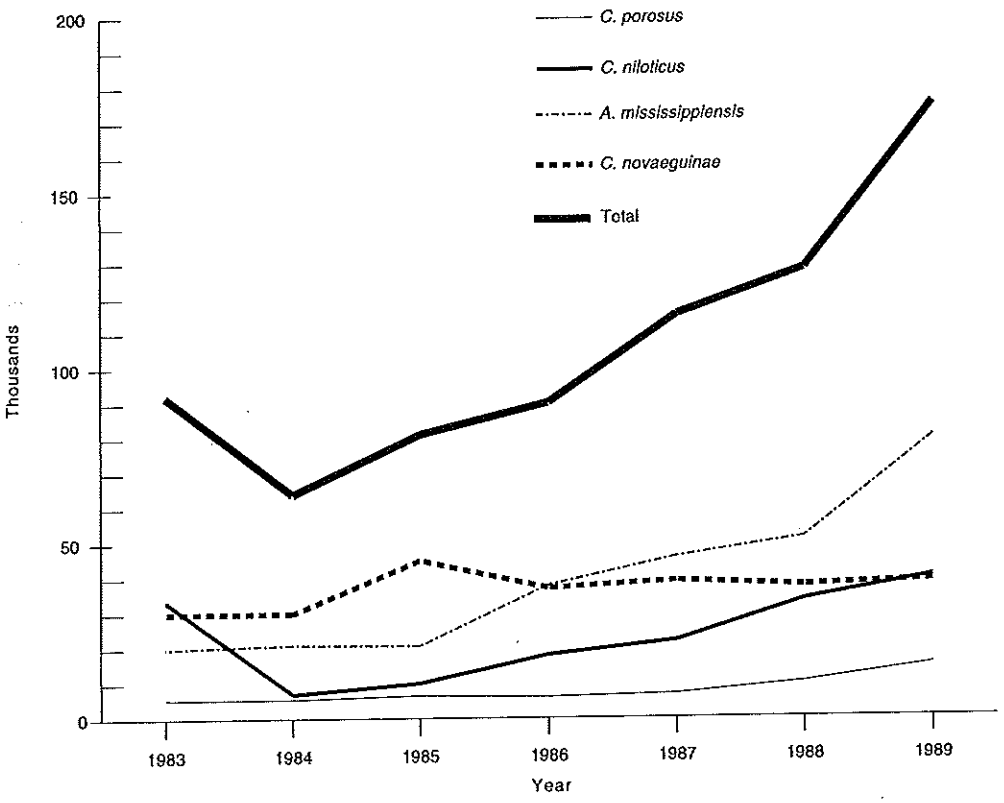
These moves were generally successful and in 1979 the species was transferred from CITES Appendix I to Appendix II. During the 1980s, production from captive-breeding, ranching and wild harvest developed quickly. Many skins are exported from the USA to Europe for tanning and some are subsequently re-imported to the USA (although, in recent years, exchange rate problems have led to fewer *A. mississipiensis* skins being re-imported to the USA). Exports of *A. mississipiensis* skins have increased from 20 000 in 1983 to nearly 80 000 in 1989. They originate mainly in Louisiana and Florida, but *A. mississipiensis* farms have recently become established in Texas and Georgia. France and Italy were the main destinations for these skins, importing about 60-80% of gross exports from the USA. Over half of these gross exports were retained in France and Italy rather than re-imported bu the USA (Luxmoore, 1991).

Over the period 1983-89, France was responsible for 64% of the total number of imports of *A. mississipiensis* skin into Europe, with Italy responsible for virtually all the remainder (34%). Total European imports accounted for just under 60% of recorded world trade, which itself shows a continuous rise from 1984 to 1989. Japan accounts for 26% of world trade over the same period, Europe and Japan together therefore accounting for 86% of declared world trade in *A. mississipiensis*.

Since 1988, Italian importers and tanners have increasingly turned their attentions to *A. mississipiensis*, which is now widely regarded in Italy as a substitute for classic skins of *Crocodylus* species, although is considered of somewhat inferior quality. *A. mississipiensis* skin is preferred because of the restrictions on imports to the USA of products made from other classic skins. The USA has traditionally been an

important market for classic crocodilian skin products, although demand has reportedly slumped in 1990 and 1991. Many traders and tanners consider the restrictions on import of non-alligator crocodilian skins and products into the USA to be designed to protect the domestic alligator industry.

Figure 2
Estimates of world net trade in skins of the four main species of classic crocodilian



Source: Luxmoore, 1992.

Classic crocodile skins — demands and future trends

Classic crocodilian skins are traditionally used to produce expensive, luxury items, often associated with renowned high-fashion names (e.g. Hermès, Gucci). This low-volume, high-cost market is regarded as much more stable than other sectors of the fashion industry and it appears to have been initially less affected by the general downturn in demand for fashion goods experienced since early 1990, associated with worldwide economic recession. However, with the prolongation of the recession, this market too has declined.

This downturn in demand, coupled with the rapidly increasing rate of production of farmed and ranched crocodilian skins, has led to a notable slump in prices for classic skins. At the International Leather Week in Paris in September 1991, the price of *A. mississipiensis* skin had dropped to US$35 per foot from US$65 per foot, its value at the end of the 1990 hunting season.

In 1992, this slump continued. It was reported that in both Europe and Japan many tanners were holding large stocks acquired at high 1988/90 prices, which now had to be sold at a loss, causing severe financial problems in the trade. In Europe, in particular, traditional skin buyers were operating at very low levels

and a number were not buying new stock at all. In Japan, there was a slow rate, but steady level of purchase by some buyers. Hide quality and size had become very significant factors in the trade and buyers were returning consignments that were not of uniformly high quality. In 1991, there was already a widespread feeling, particularly amongst Italian and Japanese tanners, that most classic crocodilian skins in trade are generally either too small, or of low quality, or both.

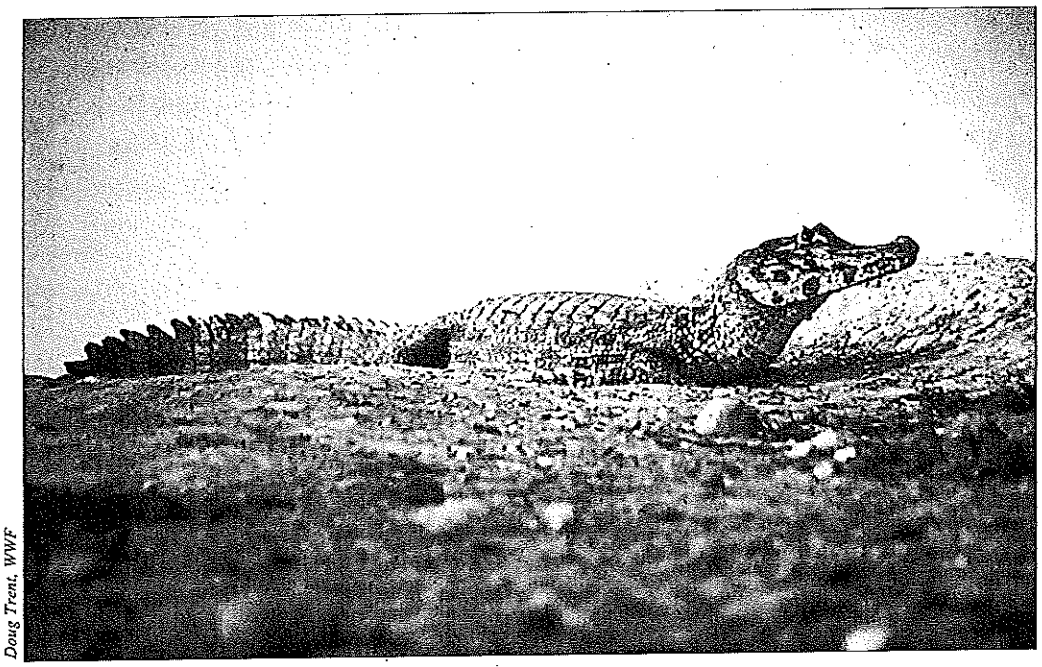
At the end of 1992, industry sources noted that the retrenchment in the trade was expected to continue for the foreseeable future, and manufacturers were thought likely to turn increasingly to less expensive and less controversial leathers. There were also signs that the trade may be becoming more geographically diverse, with new tanneries reported to be opening in areas such as Australia, Zimbabwe, South Africa and Singapore outside the traditional centres in Europe and Japan. At present, although France is the single most important importing and tanning country, Japan is believed to be by far the most important end-market, being estimated to account for 70% of all classic crocodilian products (Noburo Ishii, pers. comm., 1990). Such a strong dependence on a single market is generally not considered healthy for the trade in the long term.

Caiman crocodilus

Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba (introduced), Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico (introduced), Suriname, Trinidad and Tobago, Venezuela and USA (introduced).

Infra-specific taxonomy is complex. Four subspecies are generally recognized: Rio Apaporis Caiman *Caiman crocodilus apaporiensis*, Spectacled Caiman *C. c. crocodilus*, Brown Caiman *C. c. fuscus* and Yacare Caiman *C. c. yacare* (Luxmoore *et al.*, 1988), although the last of these is sometimes considered a full species.

Caiman crocodilus apaporiensis is included in Appendix I of CITES, while the other subspecies are included in Appendix II. As of 1988, skin exports were only permitted from Guyana, Venezuela, Bolivia and Colombia. A high proportion of international *C. crocodilus* trade has been of illegal origin, with the skins originating in countries which have banned export (Luxmoore *et al.*, 1988). Annual declared trade in the species for 1983-89 averaged nearly 1.2 million skins, over 10 times the total declared trade in all other crocodilians. Of this, just over 40% went to Europe, 30% to Japan, six per cent to the USA. Other major importing countries (up to 1986) were Austria, Switzerland and Hong Kong. Analysis of CITES and Customs statistics for *C. crocodilus* skins, as for other reptile skins in trade, is hampered by many factors, including the large number of different ways in which shipments may be legitimately reported, as well as the widespread mis-reporting of shipments. It is possible that substantial double counting occurs in the calculation of net trade in skins and the figures quoted here may therefore be over-estimates. However, this is almost certainly more than amply compensated for by the amount of mis-reported and un-reported trade. It was estimated in 1986 that the annual harvest of caiman skins in southern Brazil, Bolivia and Paraguay alone exceeded one million, much of it illegal (Hemley and Caldwell, 1986).



Doug Trent, WWF

Spectacled Caiman *Caiman crocodilus*. The skin of this animal provides a cheaper alternative to classic crocodilian leather.

Caiman skin is of lower quality than classic crocodilian skin, but is very competitively priced and is available in much larger quantities.

- *Japan*

Over the period 1983-89, Japan was the most important country for the legal import of *C. crocodilus* skins, averaging just under 320 000 declared skins per annum. This amounted to almost exactly 30% of the total declared world trade for the period. While imports from 1983-89 averaged just under 370 000 skins per year, imports in 1989 and 1990 showed a marked drop to 100 000-150 000 skins annually. However, if reports concerning the level of illegal trade to Italy are true (and if there is no equivalent trade to Japan), then it is possible that Italy rather than Japan is the world's largest trader in caiman skins.

Japanese dealers noted that skins of *C. crocodilus*, previously imported from Bolivia, Paraguay and a number of other countries, were now obtained mostly from Venezuela; numbers available had decreased, prices had increased dramatically and the sizes of sides available were not suitable for some manufacturing purposes.

- *The EC*

The EC accounted for around 40% of declared world trade in *C. crocodilus* skins during the period 1983-89. Italy and France between them account for just under 90% of the total, with Germany and Spain the only other countries recording notable imports (averaging just over 40 000 skins and 12 500 skins annually, respectively).

- *Italy*

The Italian market for caiman skins is undoubtedly the largest in Europe. The skins are mainly used by the shoe industry, but also for other forms of leatherware. Average yearly declared imports into Italy for the period 1983-89 were around 280 000 skins. For 1983-85 the average was around 460 000 skins. This declined to around 180 000 skins, annually, for the period 1986-88 and further declined to 30 000 in 1989, although increased again to around 100 000 in 1990. This increase in legal trade is a result of the appearance on the international market of Venezuelan sides.

Italian traders commented on the limited availability of different sizes of skins. At present, the only legal trade is in large sides from managed wild populations in Venezuela and sides and small skins from captive-breeding and ranching operations in Colombia. The former are in short supply, which leads to problems in the creation of a full spectrum of leather goods. However, it is also stated that these skins are difficult to process because they are heavily ossified, which would apparently severely limit their usefulness.

Import documents indicate that other caiman parts, such as skin from tails, bellies and legs, are imported. There are indications that import documents for leg skins have been used to re-export illegally imported caiman sides.

It is widely acknowledged that a large proportion of total caiman imports into Italy has been illegal; it is thus impossible to estimate the true extent of the trade. This trade is discussed in more detail in a later section.

- *France*

Average yearly declared imports of *C. crocodilus* skins into France for the period 1983-89 were just over 136 000, or approximately half the level of imports into Italy over the same period.

Illegal trade in *C. crocodilus* is known to occur but its scale is very difficult to estimate.

- *USA*

The USA only accounts for some six per cent of total declared trade in *C. crocodilus* skins. This may seem surprising in view of its strong trade links with South and Central America, and the fact that it is the dominant market for *Tupinambis*, the other major South American reptile in the skin trade, but may be explained by the perception that the *C. crocodilus* skin trade competes with the domestic *A. mississipiensis* industry.

Lizards

Available data indicate that only two genera of lizards, *Tupinambis* and *Varanus*, play a significant role in the international skin trade at present. Lizards in four other genera (*Dracaena, Iguana, Heloderma* and *Uromastyx*) appeared in notable numbers (10 000 or over) in the trade during the 1980s. Of these, apparent trade in the last two is likely to have been misdeclaration of skins on CITES permits.

Tupinambis

Tupinambis is a taxonomically confused genus of two, possibly three, species, very widely distributed in South America. The three taxa which may be recognized are Argentine Teju *Tupinambis rufescens*, Common Tegu *T. teguixin* and *T. nigropunctatus*, also known as Common Tegu, although generally *T. nigropunctatus* is included in *T. teguixin*. The genus is listed in Appendix II of CITES.

T. rufescens is recorded from Argentina, Brazil, Paraguay, Uruguay and possibly Bolivia.

T. teguixin (including *T. nigropunctatus*) occurs in Argentina, Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Trinidad and Tobago and Venezuela. Populations in the northern part of the range (Colombia, French Guiana, Guyana, Trinidad and Tobago, Venezuela and probably Ecuador, Peru and the northern parts of Bolivia and Brazil) are referred to *T. teguixin nigropunctatus*.

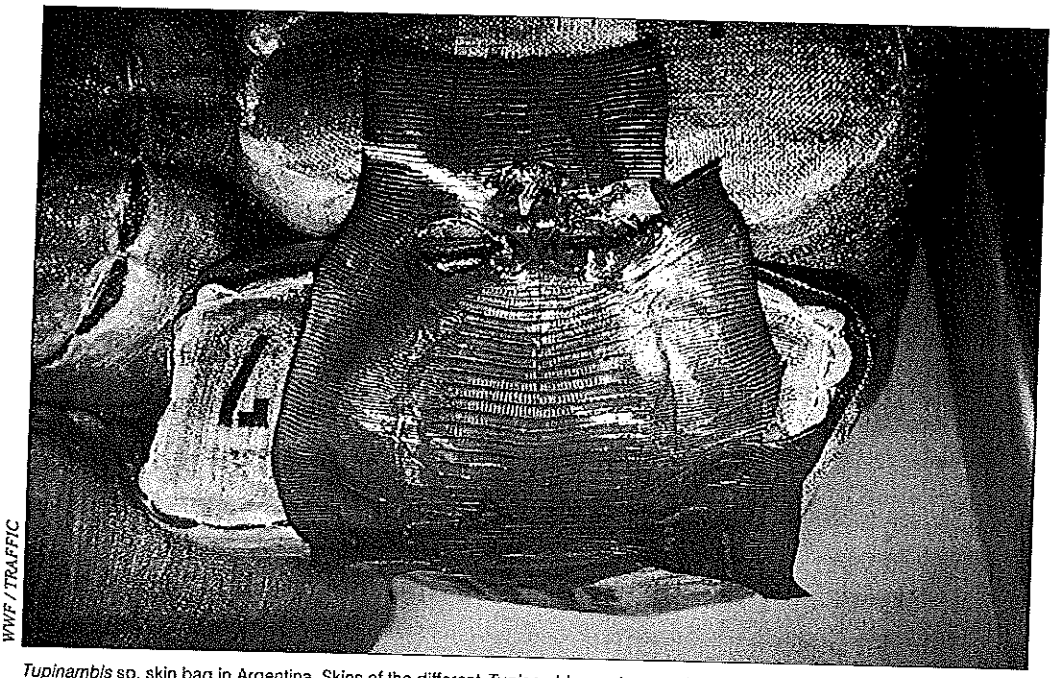
Skins of the different taxa are virtually indistinguishable when tanned. They are used almost exclusively in shoe manufacture and thus represent a distinct sector of the international reptile skin trade.

Available figures indicate that *Tupinambis* is the second-most important lizard genus in the international skin trade, with an average of 2.2 million skins traded annually during the period 1983-89, this being marginally less than the annual average for *Varanus* (2.3 million skins). If *T. nigropunctatus* is included within *T. teguixin*, then this species is the most numerous reptile in international trade (at least 1.7 million skins per year). Between them, the USA, the EC and Japan accounted for over 80% of recorded imports for the period, 1983-89. It should be noted that there is the strong possibility of substantial double counting in estimates of total trade, as transactions recorded by weight and by number of skins have been counted separately.

Overall trade in *Tupinambis* skins showed a decline in the mid-1980s, reaching a low in 1986 (1.6 million), but since then has increased again, to *circa* three million by 1989, equivalent to 1983 levels, although still representing a decline from a peak of around 3.5 million skins in 1981.

CITES figures indicate a marked shift in the principal species involved in the trade over the study period. Before 1987 there was insignificant recorded trade in *T. rufescens*; by 1989 it had become the most important taxon, with nearly 1.7 million skins recorded. Declared trade in *T. teguixin* (including *T. t. nigropunctatus*) declined over the period, from over 2.7 million in 1983 to between 800 000 and 1.2 million in 1989. This trend continued into 1990, when fewer than 550 000 skins of *T. teguixin* were recorded. The trend is associated with a shift to Argentina as the principal exporting country. In 1989 and 1990 no sizeable exports of skins from any other range state were reported. Before this, Paraguay, Brazil, Colombia, Uruguay and Bolivia all recorded substantial exports. However, it seems likely that a significant proportion of Argentinian exports have been originating in Paraguay, Brazil and Bolivia. In response to this, the Paraguayan Government established an annual export quota of 300 000 for 1992, on the basis that this was roughly equivalent to the number which had been previously illegally exported to Argentina.

Argentina, the major exporting country, has been attempting to manage harvest of *Tupinambis*. Fieldwork on the genus began in 1985 and in 1988 the *Comisión Nacional de Tupinambis* was established. In 1990, a management programme was initiated by the *Dirección de Fauna y Flora Silvestre*, initially prohibiting trade in skins less than 24cm wide and collecting data from the annual harvest, but intending later to include the development of a harvest monitoring programme and the establishment of annual quotas. Several captive-breeding projects for both species of *Tupinambis* in Argentina have been set up, but are not believed to be producing significant numbers of skins for export at present. In 1993, Argentina established a hunting quota of 1.1 million specimens of *Tupinambis* and an export quota of one million skins.



WWF / TRAFFIC

Tupinambis sp. skin bag in Argentina. Skins of the different *Tupinambis* species are almost indistinguishable once tanned.

- *USA*

This is by far the most important consuming country, accounting for just over one million skins annually, or around 55% of global trade, for the period 1984-89.

Trade to the USA has shown greater variation than that to the EC, ranging from *circa* 0.5 million to over 1.5 million skins annually. There are indications that this may be the result of a fashion cycle. Interest in lizard skin products (associated with Western-style clothing) reportedly reached very high levels in the early 1980s, owing to the popularity of the film *Urban Cowboy*. Such products appear to have fallen out of favour subsequently (in the mid-1980s) and now appear to have started some form of resurgence.

- *EC*

The Community accounted for 23% of total imports during this time (just under 0.5 million skins annually), with Italy being the most important importer within the EC, accounting for just under half the Community's imports. France accounted for a further 25% of the Community's trade, with Spain and Germany also importing notable numbers (over 30 000 skins annually).

- *Japan*

Overall, Japan only accounted for four per cent of total imports during this time. This masks a notable trend, as declared imports to Japan have declined during the 1980s, from over 300 000 skins annually in 1983 and 1984 to under 30 000 in 1988 and zero in 1989 (data incomplete).

Varanus

This genus comprises *circa* 37 species, widespread in tropical Asia, Africa and Australasia, whose centre of diversity is Australia. Four species — *Varanus bengalensis*, Yellow Monitor *V. flavescens*, Desert Monitor *V. griseus* and Komodo Dragon *V. komodoensis* — are included in Appendix I of CITES. The remainder of the genus is included in Appendix II.

According to CITES statistics, *Varanus* is the most important lizard genus in the skin trade. Over the period 1983-1989, an annual average of 2.3 million skins in trade was recorded. Substantial international

trade in the genus in the past 10 years has only been recorded in the following five species: *V. bengalensis*, *V. flavescens*, *V. exanthematicus* African Savanna Monitor, *V. niloticus* and *V. salvator*.

Japan and France are the two most important countries globally for *Varanus* imports, with, in general terms, Japan being predominant in the market for Asian skins (*V. bengalensis*, *V. flavescens* and *V. salvator*) and France in the market for African skins (*V. exanthematicus* and *V. niloticus*).

Russ Mittermeier, WWF US

Monitor *Varanus* sp. This lizard genus features more in trade than any other, and most skins are destined for Europe.

Varanus exanthematicus

Angola, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Malawi, Mali, Mauritania, Nigeria, Senegal, Sierra Leone, Somalia, Sudan, Tanzania, Togo, Uganda. It is also thought to occur in Benin, Burkina Faso, Burundi, Congo, Djibouti, Liberia, Niger, Rwanda, Zaire.

This species is widespead in Africa. Populations in southern Angola, Botswana, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe are now often referred to as a separate species, *Varanus albigularis*. However, they have been treated as *V. exanthematicus* in CITES statistics and are included as such here.

Trade in *V. exanthematicus* has averaged only 41 000 skins for the period 1983-89 and has shown great variation from year to year (from a low of 4297 in 1987 to a maximum of 144 460 in 1985). It is difficult to discern any overall trend from these years. However, 1980-1982 data show an average trade of *circa* 116 000, indicating a marked overall decrease in trade in this species over the decade. The species is not in high demand for the luxury leather trade as it has large, strongly keeled scales. De Buffrénil (1991) considered that live trade was more significant than the skin trade for this species.

Until 1985, the USA was the major reported importer of *V. exanthematicus*. Since then, the EC has been the most important market. The predominance of the USA in the first half of the decade is almost certainly

a reporting artefact: France, a major consumer of monitor skins, did not declare Appendix II imports prior to 1985 and Spain, another significant importer of monitor skins, was not a Party to CITES at that time. It is therefore very likely that substantial unreported trade to the EC took place at this time.

Exports during the first half of the 1980s were mainly from Nigeria, with Mali, Sudan and South Africa also contributing large numbers in different years.

Varanus niloticus

Angola, Benin, Botswana, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Egypt, Equatorial Guinea: including Bioko, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Lesotho, Liberia, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, Zaire, Zambia, Zimbabwe. It is believed also to occur in Burkina Faso, Burundi, Chad, Djibouti, Rwanda and Swaziland.

Very widespread in Africa, *Varanus niloticus* is the second-most abundant *Varanus* species in trade, with an annual CITES-reported trade of just over 500 000 skins for the period 1983-89. Major exporters are Cameroon and Mali, who between them account for around 80% of exports. Chad and Sudan account for a further 15% of the trade with other range states playing a negligible part in recorded trade (de Buffrénil, 1991).

The EC is undoubtedly by far the most important importing region, accounting for 78% of reported trade over the period 1983-89. France accounted for an average of just under 290 000 skins a year for this period, or around 60% of world trade. This proportion is likely to be an underestimate, for the reasons outlined under *V. exanthematicus* above. For the period 1985-88, for which more complete data are available, France imported an average of *circa* 350 000 skins each year, or 65% of a world total of *circa* 550 000 skins per year. *V. niloticus* is in numerical terms the most important species used by French tanneries, this being undoubtedly a reflection of the strength of France's trading links with Africa. Its main source of reptile skins is Mali, with lesser quantities from Cameroon, Sudan and Chad. World trade, and trade to France, showed a continuous increase from 1986 to 1989, with world trade in the latter year reaching nearly 860 000 skins, although it had declined to half a million in 1990.

After France, Italy was the most important importing country in the EC, recording an average annual trade of just over 50 000 skins for 1983-89, or less than one-fifth of the level for France. The UK, Spain and Belgium recorded average annual trade of between 15 000 and 20 000 for the same period. The UK imports mainly originated in Nigeria, in 1986 and 1987. Italian dealers and tanners report importing substantial numbers of skins from French dealers.

Outside the EC, Austria and Switzerland have imported significant numbers of *V. niloticus* skins. The USA was formerly a fairly important market, importing over 100 000 skins in 1980, but has shown a steady decrease over the decade and now plays an insignificant role in the market. Japanese importers have complained that international trade in *V. niloticus* is dominated by European dealers.

Varanus bengalensis and *Varanus flavescens*

Trade in these two Asiatic monitors is considered together.

V. bengalensis occurs in Afghanistan, Bangladesh, India, Indonesia, Iran, Malaysia, Myanmar, Nepal,

Pakistan, Sri Lanka, Thailand and Viet Nam. It probably occurs in Bhutan, Cambodia, and Laos although there are no definite records.

V. flavescens occurs in Bangladesh, India, Nepal and Pakistan. A report of the species in Thailand has not been confirmed.

V. bengalensis and *V. flavescens* have been included in Appendix I of CITES since 1975. Japan had a reservation on these from the date of its joining CITES (in 1980) until June 1991, and Thailand also took a reservation on *V. bengalensis* when it joined CITES in 1983, but subsequently withdrew it on 17 August 1987. Theoretically therefore, the only international trade between CITES parties for these species should have been between these two countries, or in pre-Convention stock. The vast majority of the recorded trade in the 1980s was declared as pre-Convention stock originating in Bangladesh. In addition, Thailand reported exporting commmercial shipments of skins to several CITES Parties in 1984 and 1985, notably to France, Hong Kong, Italy and the UK. There is no corresponding report of import of most of these skins, although in 1985 the UK reported importing 6500 skins of *V. salvator* from Thailand. The true identity of these skins is not known, but it seems possible that the skins were indeed of *V. bengalensis* and were deliberately misidentified on import.

For the period 1983-89, according to CITES statistics, Japan imported an average of just under 160 000 skins a year of *V. bengalensis*, constituting 95% of world trade, and 50 000 skins a year of *V. flavescens*, or 97% of declared world trade. However, Japan has had a policy of not reporting trade in species for which it holds a reservation and these figures therefore represent only shipments recorded by the exporting country (almost always Bangladesh). Japanese Customs statistics reveal that these are a considerable underestimate of trade to Japan. A comparison of these Customs statistics, for the two species combined, with CITES figures for the two species for the years 1983-87 is given in Table 2. It can be seen that CITES statistics have recorded only just over half (51%) of the trade revealed by analysis of Customs statistics.

The principal suppliers of skins other than Bangladesh were Pakistan (which became a Party to CITES in 1976 and was therefore exporting these illegally) and Singapore, acting as an entrepot, which did not join CITES until 1987. It seems very likely that many of the skins exported by Bangladesh in fact originated in India and were smuggled into Bangladesh for re-export. No imports to Japan of *V. bengalensis* were recorded in CITES declarations after 1986, nor of *V. flavescens* after 1987.

Table 2

Comparison of Japanese Customs statistics with CITES statistics for Japanese trade in *V. flavescens* and *V. bengalensis*.

	1983	1984	1985	1986	1987	average
Customs	755 000	743 000	772 500	469 000	442 000	636 300
CITES						
V. bengalensis	355 101	447 371	286 518	150 000	24 076	252 613
V. flavescens	103 000	56 000	196 220	0	0	71 040
Total CITES	**458 101**	**503 371**	**482 738**	**150 000**	**24 076**	**323 653**

Source: Luxmoore and Groombridge, 1990.

The skin of both species of monitor was relatively cheap on the wholesale market. *V. flavescens*, in particular, is not highly sought-after as the skin is coarse-grained and of small size. *V. bengalensis* skins

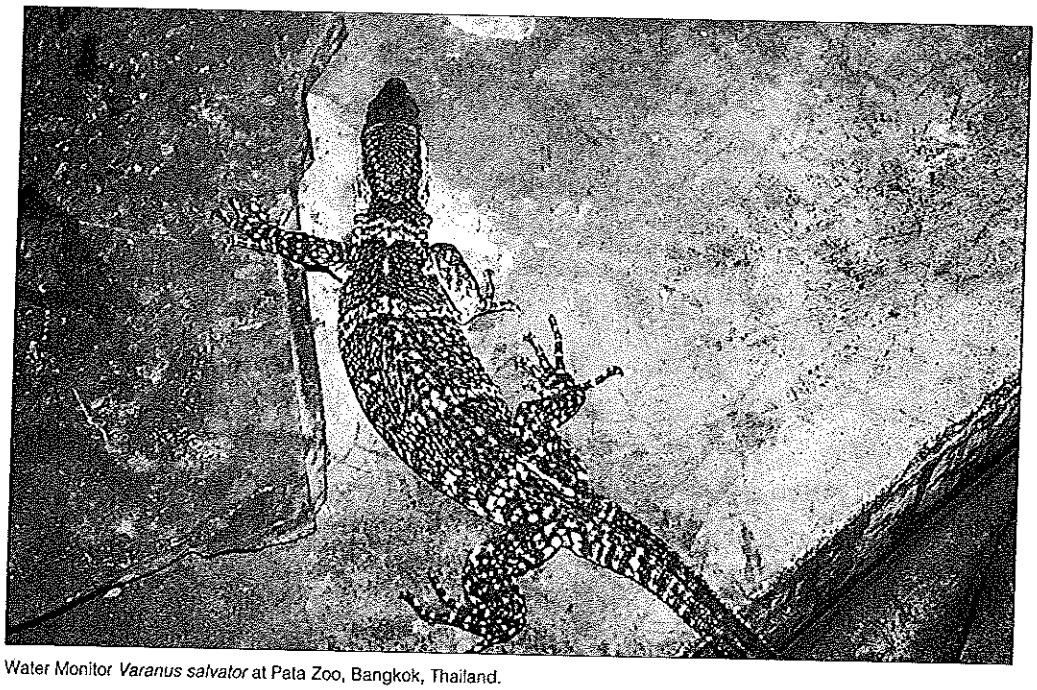
are similar in size to those of *V. salvator* (see below) but lack the attractive patterning of the latter species; it appears to be for this reason that they are less in demand and therefore considerably cheaper.

Varanus salvator

Bangladesh, Cambodia, China, Hong Kong, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Sri Lanka, Thailand, Viet Nam. It probably also occurs in Brunei.

Total declared net trade for *V. salvator* for the period 1983 to 1989 fluctuated between 1.0 and 1.9 million skins per year, with an average of 1.4 million, making it the second-most abundant lizard species in trade.

According to CITES statistics, Japan was responsible for around 34% of imports, the EC for 27% and the USA for nine per cent. Other countries which recorded significant imports were: Austria, Canada, Hong Kong, South Korea, Singapore and Switzerland. Reported trade increased over the period, averaging around 1.2 million for 1983-86 and 1.8 million for 1987-89. This trend continued in 1990, when recorded world trade reached 2.3 million skins. At least some of this increase is likely to be related to the apparent virtual disappearance of *V. bengalensis* and *V. flavescens* from the international market.



WCMC

Water Monitor *Varanus salvator* at Pata Zoo, Bangkok, Thailand.

The great majority of *V. salvator* skins in trade originates in Indonesia and is exported via Singapore.

- Japan

CITES annual reports indicate a marked increase after 1986 in the import of *V. salvator* skins by Japan (average of *circa* 320 000 skins annually for 1983-86, rising to 950 000 skins in both 1989 and 1990). This may represent a shift from *V. bengalensis* and *V. flavescens* to *V. salvator*, or there may possibly be some misdeclaration of skins of the first two species. Analysis of prices charged since 1987 may give some clue to this. As Luxmoore and Groombridge (1989) point out, *V. salvator* skins are (or were) considerably more expensive than those of the other two species (US$6 in 1987, compared with US$3 for *V. bengalensis* and US$1.6 for *V. flavescens* in the same year). Traditionally, *V. salvator* skins have been used to make highest quality goods, owing to their large size and attractive skin pigmentation, while the other two

species were used to make products for the less expensive bulk market. Unless there has been a marked expansion in the luxury end of the market, or a drop in price of *V. salvator* skins, then cheaper skins of the other two species may have been imported under misdeclarations. However, it is notable that the purchasing power of the yen increased markedly after 1987, and therefore *V. salvator* skins may have become relatively cheaper to Japanese importers than they were in the early 1980s.

- The EC

EC imports appear to have peaked at around 670 000 in 1987 and declined to 320 000 in 1989. Figures for 1990 indicate that this decline is continuing. Declared imports of *V. salvator* into the EC show a wider spread across countries than for *V. niloticus*. For the period 1983-89, France was the major importer, averaging just under 200 000 skins a year for 1983-89, but this accounts for only just over 50% of imports to the EC, compared with at least 75% of imports of *V. niloticus*. Other significant importing countries were Italy (22% of total EC trade), UK (16%) and Spain (eight per cent). The changing role of the UK is noteworthy as imports have increased from an average of around 10 000 in 1983-86 to nearly 100 000 in 1987, 130 000 in 1988 and nearly 180 000 in 1989, by which time the UK had become the major EC importer.

- USA

Although the USA accounted for less than 10% of total *V. salvator* skin trade for the period 1983-1989, there are indications that it is becoming increasingly important, as import figures show an increase in every year from 77 764 in 1984, to 245 000 in 1989, and 373 000 in 1990. It should be noted that the 1989 figure, based on CITES tabulations, is considerably higher than that given by the United States Fish and Wildlife Service (USFWS) (158 075), indicating the possibility of substantial double counting in this case.

Other genera in trade

Declared trade in other lizard species is, in numerical terms, only a fraction of that in *Varanus* and *Tupinambis*, although some of it may have a significant impact on the species concerned.

Dracaena

The genus consists of two very similar species, Caiman Lizard *Dracaena guianensis* and Caiman Lizard *D. paraguayensis*, listed in Appendix II of CITES. The former occurs in Brazil, Ecuador, Peru, possibly Paraguay and perhaps some of the other countries bordering the Amazon basin (Colombia, Bolivia, Venezuela); the latter is found in the Matto Grosso of Brazil, Paraguay and Bolivia. *D. paraguayensis* was not listed in CITES Appendix II until 1990. It is regarded as likely that a significant proportion of trade in 1983-89 recorded as *D. guianensis* in reality involved *D. paraguayensis*.

Declared trade in *D. guianensis* in the period 1983-89 involved *circa* 170 000 skins. Of these, *circa* 75 000 went to the USA, 52 000 to Japan and 34 000 to the EC. The trade has shown a dramatic decrease over the period, averaging around 60 000 skins annually in 1983-84, 25 000 in 1985-86 and subsequently declining to insignificant levels. The trend appears to have started before 1983, as 1981-82 world trade averaged circa 80 000 skins. There is now no legal export from known countries of origin.

Iguana

Very widespread in the Caribbean, central America and South America, the genus is of two species, Common Iguana *Iguana iguana* and West Indian Iguana *I. delicatissima*, which does not occur outside the Lesser Antilles, nor regularly in international trade. The genus is listed in Appendix II of CITES.

Iguana iguana

Antigua and Barbuda, Aruba, Belize, Bolivia, Brazil, British Virgin Islands, Colombia, Costa Rica, Ecuador, El Salvador, French Guiana, Grenada, Guadeloupe and dependencies, Guatemala, Guyana, Honduras, Mexico, Montserrat, Netherlands Antilles (Bonaire, Curacao, Saba), Nicaragua, Panama, Paraguay, Peru, Puerto Rico, St Lucia, St Vincent, Suriname, Trinidad and Tobago, US Virgin Islands and Venezuela.

International trade in skins of *I. iguana* is greatly overshadowed by trade in live specimens of the species for pets, which has exceeded 100 000 individuals per year. In the period 1983-89 the only significant trade in skins was of *circa* 17 500, imported by Spain in 1987. A further 1200 or so skins were imported by the USA in that year. Other than that, reported trade in skins has been non-existent or negligible.

Uromastyx

Comprising 11 species occurring in arid regions of north Africa, the Middle East and western Asia as far east as India, the entire genus is included in Appendix II of CITES. The only significant recorded trade in the last 10 years was of 40 000 skins of *Uromastyx* spp., imported into Spain from Benin in 1986. These are regarded as likely to have been a misdeclaration.

Heloderma

This is a genus of two species, the Gila Monster *Heloderma suspectum* and Beaded Lizard *H. horridum*, listed in Appendix II of CITES. The former occurs in Mexico and the USA and the latter in Mexico and Guatemala. The only trade recorded in the period was of a shipment of just over 38 000 skins, imported by Japan in 1987; however, as with *Uromastyx* above, this is thought likely to have been a misdeclaration.

Snakes

The variety of snake genera and species featuring prominently in the international skin trade is wider than for any other reptile group. Some 14 species in 10 genera of CITES Appendix II-listed snakes have been traded in significant quantities (over 1000 skins recorded in trade) in the period 1983-89. In contrast to crocodilians or lizards, snakes are important in trade in a significant number of species not listed in CITES Appendix I or II, making quantitative analysis difficult. The most important of these are included in the discussion below.

With the exception of three species of Latin American boids (Boa Constrictor *Boa constrictor*, Anaconda *Eunectes murinus* and Yellow Anaconda *E. notaeus*) and the African Rock Python *Python sebae*, all the species in trade in significant numbers (including non-CITES or CITES Appendix III species) are of Asian origin.

Boa

Argentina, Belize, Bolivia, Brazil, Colombia, Costa Rica, Dominica, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, St Lucia, Suriname, Trinidad and Tobago, and Venezuela.

The genus consists of one species, *Boa constrictor*, included (as part of the family Boidae) in Appendix II of CITES. Argentine Boa Constrictor *Boa constrictor occidentalis*, which occurs in Argentina, Paraguay

and possibly Bolivia, is listed in Appendix I. Trade is sometimes recorded to subspecific level, but has not been so considered here.

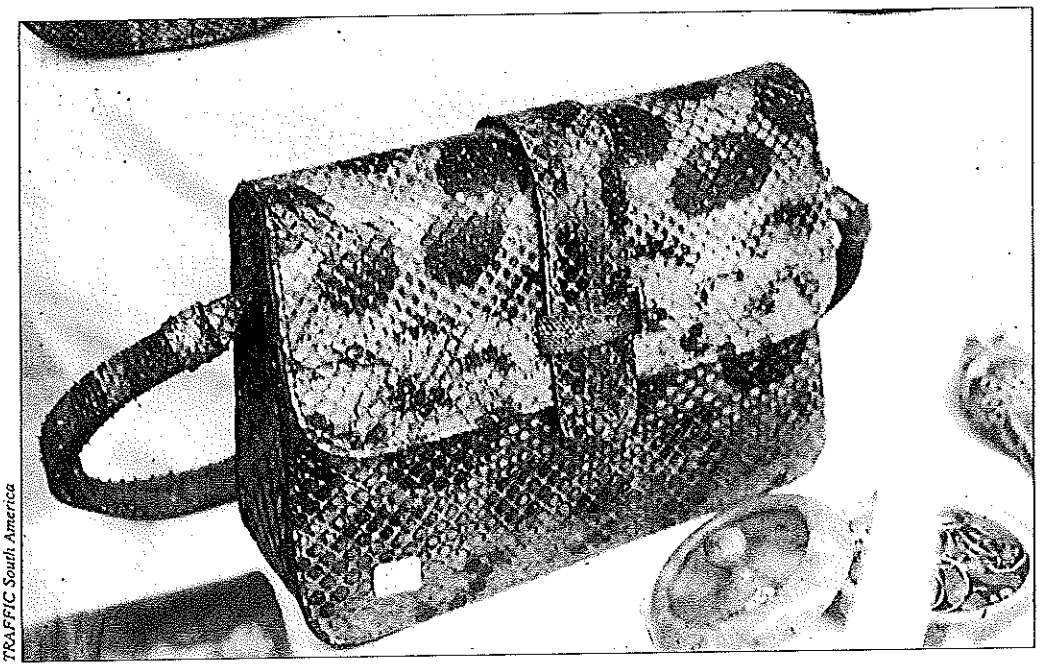
A total of some 275 000 skins was recorded in trade in the period 1983-89. There has, however, been a drastic decline over the period, from a high of over 161 000 skins in 1983, to 1800 skins in 1988, and 7000 in 1989. The 1983 imports appear to have been a peak in the 1980s, as figures for 1980-82 are substantially lower. A decline in trade after 1987 coincides with the transfer of *B. c. occidentalis* from Appendix II to Appendix I. *B. c. occidentalis* is the only subspecies of *Boa constrictor* recorded in Argentina, and one of two occurring in Paraguay. Prior to 1988, the major exporting countries were Argentina and Paraguay.

Between them, the EC and the USA accounted for over 90% of recorded world trade during the period, the EC for *circa* 57% and the USA for *circa* 35%. Within the EC, Italy accounted for 70% of total trade (or 40% of world trade) during the period, with Spain, France and Germany the only other countries recording significant imports. As with most other species considered here, the importance of Spain and France is likely to be underestimated.

Since 1988, virtually all recorded trade in the species has been in live specimens for the pet trade.

Eunectes

The genus comprises four species, of which two appear in any number in trade, *Eunectes murinus*, which occurs in Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Trinidad and Tobago and Venezuela, and *Eunectes notaeus*, which occurs in Bolivia, Brazil, Paraguay and Uruguay. The genus is included (as part of the family Boidae) in Appendix II of CITES.



TRAFFIC South America

Anaconda *Eunectes* sp. handbag on sale in Cayenne.

Fairly high numbers of both species have appeared in international trade in the 1980s (just over 80 000 skins of *E. murinus* and just over 130 000 skins of *E. notaeus* in the period 1983-89). The EC and USA between them accounted for the great majority of trade (*circa* 80% of *E. murinus* trade and 75% of *E. notaeus*). Identical quantities of *E. murinus* went to the USA and EC over the period (26 000 skins to

each), while the USA imported rather more *E. notaeus* (54 000 skins) than the EC (42 000 skins). Japan imported 4000 skins of *E. murinus* in 1985 and 1526 skins in 1989, but otherwise played an insignficant part in the trade.

Within the EC, Italy was the most important country for imports, accounting for over 80% of *E. murinus* and 58% of *E. notaeus*. The only other country of note was France, which imported virtually all the remaining skins of both species. Trade has fluctuated considerably from year to year and it is therefore difficult to discern trends.

Python

The genus of seven species, of which four appear regularly in trade in large numbers, is included (as part of the family Boidae) in Appendix II of CITES.

WCMC

Python *Python* spp. skins stacked for processing in Thailand.

Python sebae

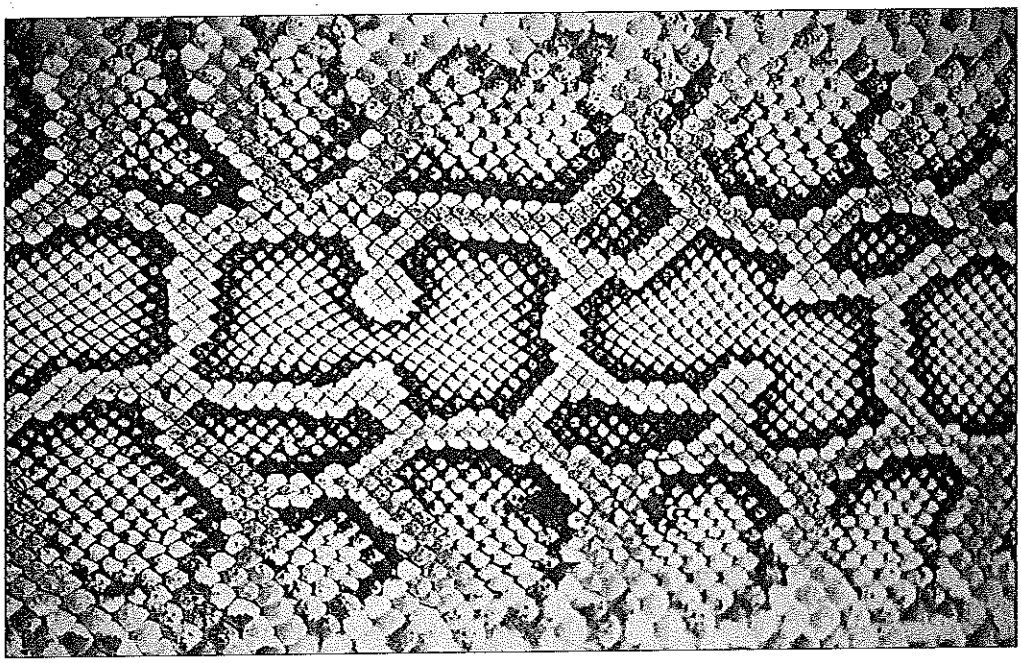
Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Liberia, Malawi, Mali, Mauritania (uncomfirmed), Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zaire, Zambia and Zimbabwe.

Python sebae is widely distributed in sub-Saharan Africa. Over 150 000 skins of *P. sebae* were reported in trade during the period 1983-89. The major exporting countries were Sudan, Ghana, Guinea, Mali (since 1986), Senegal and Togo. The EC and USA between them accounted for 77% of recorded imports, with the EC alone accounting for nearly 60% of world trade. Trade in the species showed a marked increase over the period, from a low of 782 skins in 1984 to nearly 65 000 in 1988 and over 50 000 in 1989. In particular, recorded trade showed an eight-fold increase between 1985 and 1986, to levels which have

subsequently been maintained. A large part of this is likely to be a result of Spain's joining CITES in mid-1986. From 1986 to 1989, Spain alone accounted for over 50% of recorded world trade in the species, suggesting strongly that trade in the first part of the period was under-recorded. However, imports to the USA also showed an increase over the same period (from 128 in 1983 to over 10 000 in 1988 and 11 000 in 1989), indicating that the trend may have been in part also a real phenomenon. Recorded imports declined to just over 20 000 in 1990.

Python molurus

Bangladesh, Cambodia, China, Hong Kong, India, Indonesia, Laos, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand and Viet Nam. The nominate subspecies occurs in south-west Bangladesh, India, Nepal, Pakistan, Sri Lanka.



WCMC

Burmese Python *Python molurus bivittatus* skin. Trade in this species is currently in decline.

The Indian Python *Python molurus molurus* is listed in CITES Appendix I and is not in commercial trade. The Burmese Python *Python molurus bivitittatus* is listed in Appendix II and was the second-most abundant boid in trade (after *P. reticulatus*) during the period 1983-89, with *circa* 700 000 skins in trade in total. However, trade has shown a very marked decline over the period, with an average of 160 000 skins annually in the period 1983-85, compared with around 50 000 for 1984-89. This trend continued into 1991, when only 13 000 skins were recorded in trade.

A high percentage of *P. molurus* skins in trade appears to have originated in Thailand, which recorded large exports in 1986 and 1987 (in 1985 Thai dealers were given a three-year period to clear stocks). Viet Nam was the recorded source of significant numbers of skins in the early 1980s, but reported trade declined greatly after 1986. Malaysia and Singapore both recorded exports of a notable number of skins, despite the non-occurrence of the species in either country. Exports from Singapore are believed most likely to have originated largely in Indonesia.

Between them, the EC, USA and Japan account for over 90% of the total trade for the period 1983-89. The EC is the major consumer, accounting for 64% of trade, with Italy the most important country, accounting for just over half of EC imports. The only other important country within the EC was France, which accounted for 25% of EC imports.

Imports to the EC appear to have peaked in 1985, at just under 160 000 skins, and then declined to just under 17 000 in 1988 and 4000 in 1989. Imports to the USA and Japan, which are at similar levels (means of 12 000 and 14 000 per annum, respectively), do not show any marked trend.

Python curtus

The Blood Python *Python curtis* occurs in Indonesia, Malaysia, Thailand and probably Brunei.

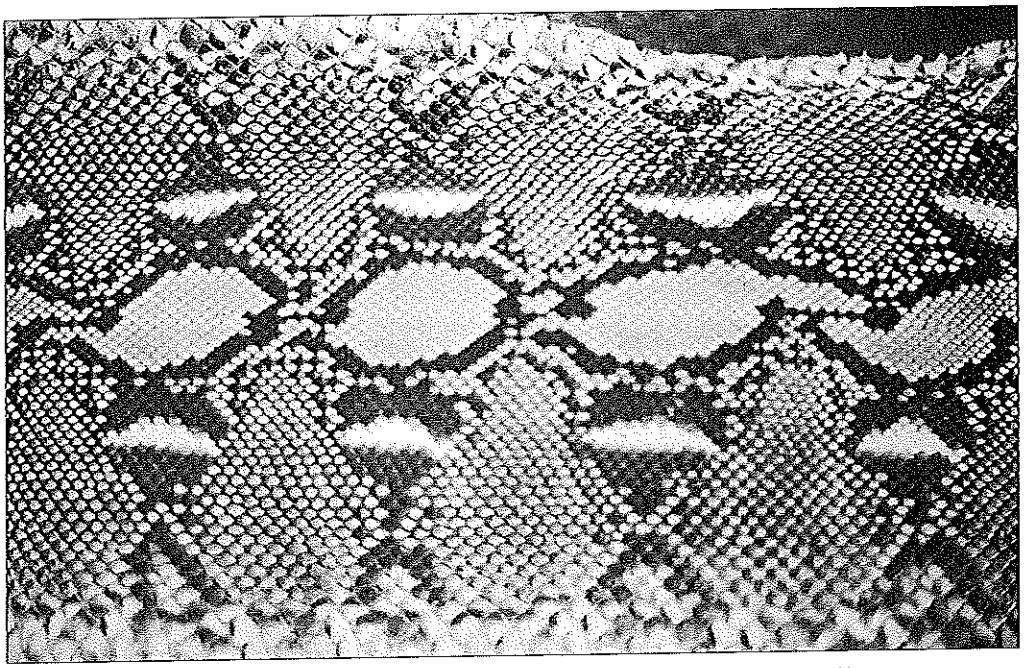
Accurate analysis of world trade in *P. curtus* is difficult because until 1988 trade was reported to CITES almost as frequently by length as by numbers of skins. These have been summed separately to derive estimates of total trade, leading to the strong possibility of double counting. That this is likely can be shown by comparing figures for US imports for 1984-1987 derived from USFWS statistics and from CITES tabulations. Data for 1989 and 1990 are almost entirely by skins and are therefore easier to interpret.

Total world trade (with the caveat indicated above) for 1983-89 was around half a million skins. Since 1986 this species has been the second-most abundant boid in trade. Virtually all trade originates in Indonesia, where the principal collecting area is northern Sumatra. Actual exports, at least for the years 1988 and 1989, have greatly exceeded the quotas set by the Indonesian authorities.

Virtually all trade was to the EC, the USA and Japan, except in 1986, 1988 and 1989. In 1986, just under 60% of trade went to these three, while in 1988 and 1989 the proportion was only around one-third. In 1986 and 1989, almost all the remainder was reported as net imports by Singapore, although it seems certain that most or all of these were subsequently re-exported as skins or as manufactured items. Trade for the period was fairly evenly split between the USA, EC and Japan, with the USA the most important (around 14 000 skins a year, again using the lower USFWS figures, compared with imports to the EC and Japan of around 12 000 and 11 000, respectively). World trade appears to have peaked in 1988 and has shown successive declines in 1989 and 1990. Within the EC, overall trade has been fairly evenly split between France and Italy. However, this may be a reporting artefact, as data for France are very incomplete before the mid-1980s. France imported nearly 11 000 skins in 1987 and 26 000 in 1988, compared with imports of 4000 and none, respectively, to Italy. However, neither France nor Spain have recorded any imports for 1989 and 1990, while Italy has recorded just under 2000 and under 4000, respectively. Data for 1990 indicate that the USA is still the major importer of this species, recording imports of just under 28 000 skins, compared with 4000 for the EC and 5500 for Japan.

Python reticulatus

Bangladesh, Brunei, probably Cambodia, India (the Nicobar Islands and possibly Assam), Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam.



WCMC

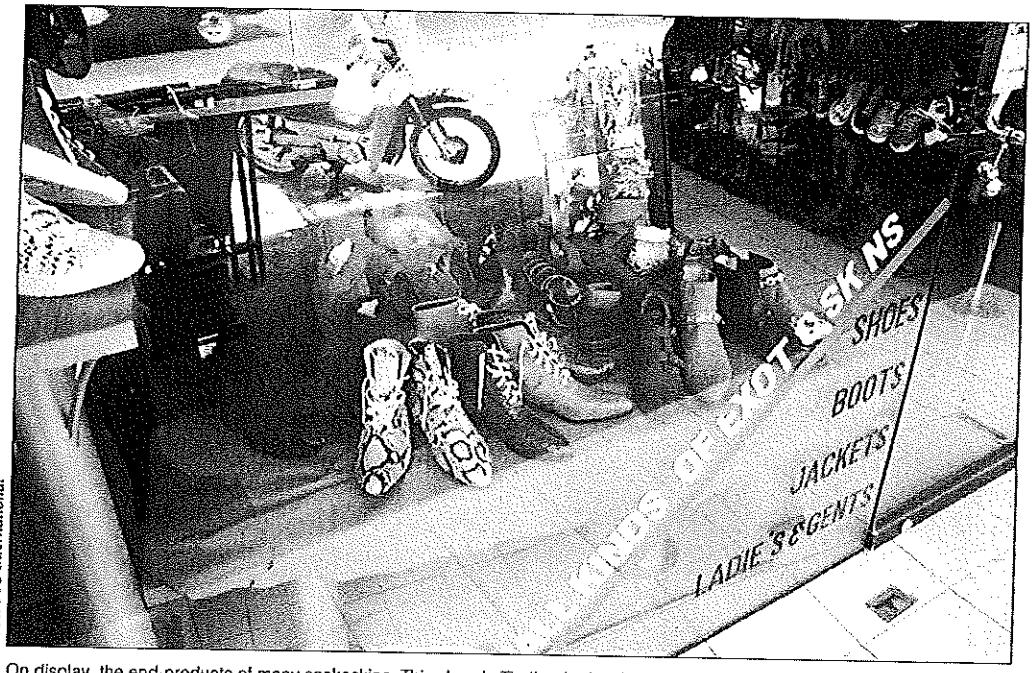
Reticulated Python *Python reticulatus* skin. Recently, the UK has become the major importer of this snakeskin.

Python reticulatus is the most abundant boid and the second-most abundant CITES-listed snake in trade, with over four million skins in total recorded during 1983-89. As with other snakes (particularly *P. curtus*), a breakdown of this trade is difficult because trade has been recorded in different units (chiefly lengths and individual skins); however, comparison of USFWS data with centralized CITES data indicate that the discrepancy is much less marked than with *P. curtus*.

Indonesia is by far the most important exporting country, accounting for over 70% of exports of whole skins in the period 1986-1990. Other range countries recording significant exports were Singapore, Malaysia and Thailand. Singapore serves as an entrepot and skins exported here undoubtedly originate in other Southeast Asian countries.

The EC, USA and Japan, between them, accounted for just under 70% of total import trade for the period 1983-89. During this period, Singapore was the only other country which recorded significant net import (over 100 000 were recorded as destination unknown in 1986). The EC was the major importer, averaging over 180 000 skins annually, followed by the USA (140 000 skins) and then Japan (80 000 skins). Trade has shown a marked increase over the period, from under 500 000 skins in 1983 to over 850 000 skins in 1989. This increase was most marked in Japan (35 000 skins in 1983 to over 140 000 in 1987 and 120 000 in 1988). However, recorded world trade dropped sharply in 1990 to under 300 000 skins.

Within the EC, overall figures for the years 1983-89 indicate that Italy is the major importer (average of 66 000 skins annually) followed by the UK (50 000), Spain (*circa* 30 000), France (20 000) and Germany (10 000). However, data for the years 1987-89 reveal a somewhat different picture, with the UK the major importer (over 90 000-140 000 skins annually), followed by Spain and Italy (*circa* 50 000 skins annually) and France (30 000 skins annually). The apparent increased importance of Spain may well be an artefact of reporting, in that imports to Spain pre-1986 are likely to have been seriously under-reported, but the new role of the UK as the major importer seems certainly to be a real phenomenon.



TRAFFIC International

On display, the end-products of many snakeskins. This shop in Thailand advertizes in English to attract tourist custom.

Other Asian snakes

Over the period 1983 to 1989, significant levels of international trade have been recorded in the skins of 27 other species of snake, all of Asian origin. Of these, only three — *Ptyas mucosus,* Common Cobra *Naja naja* and the Hamadryad or King Cobra *Ophiophagus hannah* — are listed in Appendix II of CITES. All these were formerly listed in Appendix III (by India) and were transferred to Appendix II in 1990. A further four — the Olive Keel-back *Atretium schistosum, Cerberus rhynchops,* Chequered Keel-back *Xenochrophis (= Natrix) piscator* and Russell's Viper *Vipera russellii* — are listed by India in Appendix III.

None of the remainder of the 27 is listed in the CITES Appendices. CITES data are therefore incomplete or absent for all these species, making analysis of trade patterns very difficult. However, some non-CITES trade data are available, principally from three sources. These are US import figures, which attempt to record all wildlife imports to species level, Indonesian export figures and UK import figures. In addition, a small amount of information was obtained from traders and tanners regarding imports of non-CITES species. These provide a first indication of the level of trade in these species. For most of these, 1990 figures are included in the analysis where possible.

Given the poor quality of the data for these species, it is very difficult to draw conclusions regarding trends in trade in any of these species, or in the snakeskin trade overall. Japanese import figures show a marked increase in import of snakeskins over the 1980s, but this is not paralleled by, for example, US import figures, which are generally regarded as reasonably reliable for non-CITES species. Interestingly, a large number of the species for which there is evidence of notable trade at present were listed by Parker (1933) as harvested in commercial quantities at that time, implying that their use is by no means a new phenomenon. These include almost all of the most abundant snakes in trade, including *Pytas mucosus, Homalopsis buccata,* Bocourt's Water Snake *Enhydris bocourti,* Rainbow Water Snake *E. enhydris, Cerberus rhynchops,* Karung *Acrochordus javanicus,* File Snake *A. granulatus,* and *Naja naja.* Species apparently not commercially exploited at that time, but which now feature in the trade include: Green

Whip Snake *Dryophis prasinus*, several *Elaphe* species (including Copperhead Trinket Snake *E. radiata*, Taiwan Stink Snake *E. carinata*, and Taiwan Beauty Snake *E. taeniura*), Hardwick's Seasnake *Lapemis hardwicki*, Sunbeam Snake *Xenopeltis unicolor* and the ratsnake *Zaocys dhumnades*.

A very preliminary analysis of trade in manufactured products (see **Analysis of the main consumer markets, USA**) further supports the contention that these species play a major role in the international reptile skin trade, and also draws attention to the importance of two countries — Hong Kong and Taiwan, which otherwise do not figure prominently in the trade.

Ptyas mucosus

Afghanistan, Bangladesh, Cambodia, China, Hong Kong, India, Indonesia, Iran, Laos, Myanmar, Nepal, Pakistan, Sri Lanka, Taiwan, Tajikistan, Thailand, Turkmenia, Uzbekistan, Viet Nam.

Very substantial international trade in *Ptyas mucosus* took place over the period 1984-89 (there are inadequate data for 1983 to allow any analysis). CITES statistics indicate an annual average of one-and-a-half million skins a year, but this is certainly an underestimate as trade will have been markedly under-recorded: for 1984, US import figures from USFWS (734 000 skins) exceeded the total net world trade as recorded by CITES (713 000). Peak trade in this period amounted to just under 2.7 million in 1986, but trade in 1990, the first year when there should have been reasonably complete reporting under CITES, reached 2.9 million, making it apparently the most abundant reptile species in trade.

The EC and USA, between them, accounted for over 70% of declared trade during 1984-89, with the EC alone accounting for just over half of all trade. However, in 1990, Hong Kong accounted for 65% of all declared world trade (net import of 1.8 million skins). It seems likely that Hong Kong was importing substantial quantities before this, but that much of the trade has gone unrecorded.

There is little observable trend in EC import figures, which have fluctuated around one million skins a year since 1986. The figure for 1990 was 900 000 skins. However, the pattern of imports to individual countries within the EC has varied considerably and is, in general, very different from that for other reptile species. Spain and the UK are the major importers, accounting for around 30% of total EC imports each. Spanish imports appear to have peaked in 1987 at over 700 000 skins and have subsequently declined to under 80 000 skins in 1988 and 1990. UK imports, in contrast, have increased from 80 000 in 1985 to 550 000 in 1989, this latter figure being equivalent to 85% of all EC trade for that year, although declined to just over 200 000 in 1990. The two other major importers over the period have been Italy and the Netherlands. Italy recorded virtually no trade before 1986, but has recorded substantial quantities since then (between 70 000 and 300 000 skins annually). The Netherlands, which otherwise has played an insignificant part in the reptile skin trade, reported major imports (*circa* 340 000 skins) in 1985 and 1986. Imports since then have been negligible. Belgium recorded large imports (100 000 skins) in 1987 and 1988 but has recorded none since then. Germany recorded very little trade, but recorded imports of 85 000 skins in 1987 and 300 000 in 1990, making it the second largest importer in the EC in that year.

In contrast to EC figures, US import figures have declined from *circa* 730 000 in 1984, to 140 000 in 1989, and 30 000 in 1990. Japanese figures are insignificant by comparison, but do show an increase from zero in 1984 to *circa* 70 000 in 1989, although by 1990 had declined to 14 000. It is unclear whether these changes reflect real changes in the trade or in the patterns of recording.

Naja naja

Afghanistan, Bangladesh, Cambodia, China, India, Indonesia, Iran, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Viet Nam and probably Bhutan and Brunei.

Recent taxonomic changes have split the taxon into several different species. Most new specific designations are not yet widely used; an exception is South Indonesian Spitting Cobra *Naja sputatrix*, which is the most commonly used designation for the Southern Indonesian populations of cobra otherwise known as *Naja naja sputatrix*. The CITES listing under *Naja naja* is generally accepted as including all the new taxa and it is intended that the Appendices be amended to reflect this.

Recorded trade for the period 1984-89 amounted to *circa* 450 000 skins. Around 60% of this was accounted for in 1986 when Thailand exported 270 000 skins to Taiwan. Most of the remainder was imported by the USA (100 000 skins), the EC (30 000 skins) and Japan (*circa* 11 000 skins). In addition, the USA recorded imports during the period of 170 000 skins classified as *Naja* spp.

In 1990, the first year when there should have been reasonably complete recording of trade, declared net trade amounted to *circa* 870 000 skins (i.e. nearly twice the total trade for the period 1984-89). Hong Kong recorded imports of 400 000 skins, Japan 230 000 and Taiwan 175 000. US imports remained fairly constant at 20 000-25 000 skins. Recorded EC imports were of fewer than 6000 skins.

Ophiophagus hannah

Bangladesh, Brunei, Cambodia, China, Hong Kong, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam.

Ophiophagus hannah was included in Appendix II of CITES in 1990. Recorded trade up to then was at low levels (maxima of *circa* 2500 skins imported by the USA in 1984 and 4000 imported by Singapore in 1989). In 1990, Hong Kong recorded imports of 20 000 skins.

WCMC

King Cobra *Ophiophagus hannah*, shown here at a snake farm in Thailand.

Cerberus rhynchops

Australia, Bangladesh, Cambodia, India, Indonesia, Malaysia, Myanmar, Palau Republic, Papua New Guinea, Philippines, Sri Lanka, Thailand, Viet Nam and possibly Brunei and Pakistan.

The species is widespread in Southeast Asia and Australasia. Despite being listed in only Appendix III of CITES, nearly three million skins of *Cerberus rhynchops* were recorded in CITES statistics between 1984 and 1989 (no trade was recorded in 1983). Of the total amount, under 20% (560 000 skins) was imported by the EC and five per cent (150 000 skins) by the USA. Of the EC imports, 95% were recorded by Spain. In 1990, Spain imported 130 000 skins, over half of recorded world trade. Figures for 1989 show Singapore as the major importer in that year, although the country is more likely to be acting as an entrepot than a manufacturing centre. Hong Kong also appears to be a major importing country, recording imports of 60 000 in 1989 and 100 000 in 1990.

Vipera russellii

Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Laos, Myanmar, Nepal, Pakistan, Sri Lanka, Taiwan, Thailand and possibly Viet Nam.

Around 330 000 *Vipera russellii* skins were recorded in trade, according to CITES, between 1985 and 1989 (there are no CITES records of trade in 1983 and 1984). The EC accounted for just over one-third of these (120 000 skins), of which 75% were imported by Italy in 1986. Virtually all the remainder were imported by the UK in 1988 and 1989. The USA recorded imports in all years from 1984 to 1989, totalling 66 000 skins. Data are evidently very incomplete and it is therefore not possible to speculate about trends.

Homalopsis buccata

This Asiatic water snake, which is not listed in the CITES Appendices, is widely distributed in Southeast Asia from eastern India to Indonesia. It is evidently traded in large numbers: Indonesia records the export of nearly two million skins over the period 1984-90. In the same period, the USA recorded imports of 1.3 million skins, including nearly 700 000 in 1989 and nearly 300 000 in 1990 (data incomplete for that year). There is little indication of any overall trend since 1985, and very little correlation between Indonesian export figures and US import figures for any given year.

Enhydris bocourti

Also a non-CITES species, this snake is found in Myanmar, Thailand, Cambodia, Viet Nam, and peninsular Malaysia.

The USA records imports of nearly 370 000 skins in the period 1984-90, with imports showing an increase each year from 1984 (no imports) to 1989 (over 200 000), the latter being the last year for which full data are available. This is likely to represent a real trend.

Enhydris enhydris

This species, not listed in the CITES Appendices, is very widespread, occurring throughout south and Southeast Asia, from Pakistan to the Sunda Islands.

Indonesia reports the export of nearly 170 000 skins in the period 1984-90, virtually all of these before 1987.

Enhydris chinensis

This species, the Chinese Water Snake, found in China and Taiwan, features in UK import figures for 1988 (22 000 skins) and US import figures for 1989 (2100).

Acrochordus

The *Acrochordus* snakes comprise three aquatic species in Southeast Asia and northern Australia. Two of these, *Acrochordus granulatus* and *A. javanicus*, are recorded in large numbers in international trade.

Indonesian export figures indicate 1.2 million skins of *A. granulatus* in trade in the period 1984-90. All except 50 000 of these (exported in 1990) were exported in the period 1984-86, three-quarters of these in 1984. The only other available data show a low level of imports (under 35 000 in total) to the USA over the period.

Slightly fewer *A. javanicus* skins (1.1 million) were recorded as exports by Indonesia in the same period. However, these were much more evenly spread over the period, and there is little discernible trend. US import figures total just over 400 000 skins for the period, again with little discernible trend. In addition, the UK recorded import of 60 000 skins in 1988.

Italian manufacturers reported in 1991 that there had been high demand in the mid-1980s for *Acrochordus*, but that this demand had now slumped considerably.

Xenopeltis unicolor

Just over 400 000 skins of this little-known Southeast Asian boid were exported by Indonesia over the period, nearly 70% of these in 1984 and 1985. Exports have continued since then at between 18 500 and 20 000 skins annually.

Sea snakes

There has been, in the past at least, a substantial international trade in sea snakes, originating largely in the Philippines, for export to Japan. There are few recent data, but the industry was described in the mid-1970s (Punay, 1975). Export was chiefly of three species: Erabu Sea Krait *Laticauda semifasciata*, Common Amphibious Sea Snake *L. laticauda* and *Hydrophis inornatus*. Two other species, Colubrine Amphibious Sea Snake *Laticauda colubrina* and *Hydrophis belcheri*, were also included in the commercial catch in considerably smaller quantities.

The industry, which was almost entirely centred on Gato Island, north of Cebu, was one of fairly long standing, having been established by the Japanese there in 1934. During the period 1971-1973, Japan recorded imports of 180 000-200 000 sea snakeskins, annually, from this source. In 1974, the volume processed in the Philippines was estimated at around 50 000 skins per month, with total exports projected to be 450 000 skins for that year. Punay estimated that Philippine waters had a potential future production of 100 000 mature skins per month, although the basis for this figure was not clear.

Other snake species

Other snake species which have featured in the reptile skin trade in the period 1984-1990 include Marbled Pit Viper *Agkistrodon rhodostoma*, Mangrove Snake *Boiga dendrophila*, Blue Krait *Bungarus candidus*, *Dryophis prasinus*, *Elaphe carinata*, *E. radiata*, *E. taeniura*, Annulated Sea Snake *Hydrophis cyanocinctus*, *Lapemis hardwicki*, *Xenochrophis piscator*, Red-necked Keel-back *Rhabdophis (= Natrix) subminiata*, the ratsnake *Ptyas korros* and *Zaocys dhumnades*.

ANALYSIS OF THE MAIN CONSUMER MARKETS

Three major markets, the EC, the USA and Japan, between them, account for between 75% and 85% of all net imports of reptile skins recorded under CITES. Other countries which record notable imports include Mexico, Hong Kong and Taiwan. The last two also import significant quantities of skins of snakes not listed in the CITES Appendices. However, these three countries serve principally as manufacturing centres for products which will then be re-exported. The final destination of certainly well over 80% of all reptile skin products is therefore the EC, USA or Japan.

Otherwise, as mentioned earlier, an extensive series of interviews was carried out with leather trade associations and with individual companies involved in the trade (importers, tanners and manufacturers), in order to gain an insight into the trade in these regions. Particular attention was paid to France, Italy, Germany, Japan and the USA.

The EC

The twelve Member States of the EC implement CITES controls under common legislation (chiefly EEC Regulation 3626/82). In anticipation of the formation of a single European market, this legislation largely removed requirements for licensing or monitoring of trade across borders shared by EC countries, with effect from 1 January 1994. As a result of the virtual removal of internal EC border controls for CITES species, the analysis of trade data to understand the nature and dynamics of EC trade in species listed in the CITES Appendices allows only the identification of total EC import levels and an indication of where specimens enter the Community and where they leave. In the case of reptile skins, a shipment could be imported to France from outside the EC, processed in Italy, manufactured into products in Germany, the products sold to a UK wholesaler and re-exported to the USA. The only transactions covered by import and export controls as set out in CITES would be the original import of skins into France and the final re-export of products from the UK. Despite these limitations, CITES annual report data provide a fair indication of the dynamics of the European industry.

According to CITES trade statistics, the EC was the world's largest importer of reptile skins in the period 1983-89, accounting for around one-third of total net imports. The total number of skins imported each year fluctuated between two and three million. Four countries — Italy, France, Spain, and the UK — dominated the trade, with the remaining eight countries accounting for only 10% of all reptile skins imported to the Community (Table 3).

The EC has been the largest single net importer of a wide range of species, including *Varanus niloticus*, *Crocodylus* spp., *Alligator mississipiensis*, *Caiman crocodilus*, *Eunectes* spp., *Boa constrictor*, *Python sebae*, *P. molurus* and *P. reticulatus*. For some of these, the EC dominates world trade (e.g. 80% of all *C. niloticus* imports, 60-80% of *A. mississipiensis* imports and nearly 60% of all *V. niloticus* imports) (Table 4).

The most numerous species imported was *Ptyas mucosus* with an annual average of nearly three-quarters of a million skins. As the species was only transferred from CITES Appendix III to Appendix II in 1990, trade in this species has almost certainly been considerably under-declared. Declared trade in the second-most numerous species, *Caiman crocodilus*, averaged just under half a million skins a year, but showed a marked decline from a peak of around one million in 1985 to 300 000 in 1988, as a result of stricter controls on its importation.

Around 450 000 skins of the two *Tupinambis* species were imported annually with declared trade showing a marked shift from *Tupinambis teguixin* to *T. rufescens*. Two species of monitor (*Varanus niloticus* and *V. salvator*) were imported in quantities of around 400 000 skins annually each.

Trade in each of the four major importing countries and Germany is discussed below. Germany is included because it has introduced a novel system for marking products, which, it has been suggested, could have wider application in the trade.

Table 3

Total imports of all reptile skins to different EC countries, showing (below) the percentage imported to each country, calculated from CITES annual reports.

Importer	1983	1984	1985	1986	1987	1988	1989	Average
Belgium	40491	32347	22257	15200	131955	121753	9438	53317
Denmark	1774	231	6	307	267	551	520	522
France	63286	768960	1120085	797422	1115737	1244797	817908	846885
Germany, F.R.	455425	68954	78450	21568	112075	55466	100352	127470
Greece	572	6638	5279	15151	2897	196	263	4428
Ireland								0
Italy	1477132	1054644	1093171	1114416	946531	641978	170744	928374
Luxembourg								1
Netherlands	2796	87124	352209	339056	50431	7306		119846
Portugal			302	3952	4038	1323	3	1374
Reunion		1						0
Spain	125641	160256	237259	959848	1221583	688899	142657	505163
UK	67054	21187	151113	317487	345120	770316	821584	356266
Total	**2234170**	**2200341**	**3060132**	**3584409**	**3930635**	**3532585**	**2063471**	**2943646**
Belgium	1.8	1.5	0.7	0.4	3.4	3.4	0.5	1.8
Denmark	0.1							0.0
France	2.8	34.9	36.6	22.2	28.4	35.2	39.6	28.8
Germany, F.R.	20.4	3.1	2.6	0.6	2.9	1.6	4.9	4.3
Greece		0.3	0.2	0.4	0.1			0.2
Ireland								0.0
Italy	66.1	47.9	35.7	31.1	24.1	18.2	8.3	31.5
Luxembourg								0.0
Netherlands	0.1	4.0	11.5	9.5	1.3	0.2		4.1
Portugal								0.0
Reunion		0.0						0.0
Spain	5.6	7.3	7.8	26.8	31.1	19.5	6.9	17.2
UK	3.0	1.0	4.9	8.9	8.8	21.8	39.8	12.1

Source: WCMC.

Table 4

Total imports of reptile skins to EC countries from 1983 to 1989 and average percentage of total world trade, calculated from CITES annual reports

Taxon	1983	1984	1985	1986	1987	1988	1989	Average	Average % of world trade
Chelonia mydas	3722	20	0	0	0	0	0	535	9.6
Crocodylia spp.	0	0	0	0	0	0	2	0	14.3
Alligator mississippiensis	6075	4951	6517	15712	25845	29323	43559	18855	58.4
Caiman crocodilus	669531	690932	990844	410136	180728	307917	71007	474442	41.1
Crocodylidae spp.	0	0	8	0	0	0	0	1	6.7
Crocodylus acutus	146	0	0	0	0	0	59	29	16.9
Crocodylus cataphractus	9878	2030	0	10	149	1193	559	1974	84.1
Crocodylus johnsoni	0	157	0	0	2	0	12	24	14.6
Crocodylus niloticus	32616	4782	8071	13877	22136	23992	32486	19709	84.3
Crocodylus novaeguineae novaeguineae	6292	9973	17600	28179	12727	8285	23028	15155	42.8
Crocodylus porosus	999	1544	4140	4934	3783	2836	5267	3357	45.3
Crocodylus siamensis	0	0	200	147	1131	393	0	267	21.9
Crocodylus spp.	0	3	1	0	2	0	0	1	20.7
Melanosuchus niger	0	450	0	0	0	0	0	64	14.2
Osteolaemus tetraspis	0	6	18	4	0	11	57	14	21.7
Dracaena guianensis	10668	5422	0	17668	0	0	0	4823	13.5
Iguana iguana	0	0	0	0	17563	174	0	2534	27.3
Tupinambis rufescens	0	0	4300	0	56121	280711	34018	53593	23.9
Tupinambis spp.	21589	0	0	161808	88425	85457	86955	63462	53.0

Table 4 — continued

Tupinambis teguixin	480562	216851	402916	595448	447602	51553	34469	318486	22.1
Tupinambis teguixin nigropunctatus	255321	208680	726	5	1	0	0	66390	6.7
Uromastyx spp.	0	0	0	40000	0	0	0	5714	14.3
Varanus bengalensis	0	8008	8666	6000	0	0	0	3239	4.2
Varanus exanthematicus	19834	13113	302	43867	1	64899	23	20291	49.6
Varanus flavescens	0	274	96	0	0	0	0	53	0.1
Varanus niloticus	177263	260671	344773	248723	567237	634989	552666	398046	78.4
Varanus salvator	111804	381436	459655	256697	672450	566408	266009	387780	27.0
Varanus salvator cumingi	0	0	0	11045	2651	2460	0	2308	16.5
Varanus spp.	3	0	0	1709	16756	4	0	2639	28.3
Atretium schistosum	0	0	0	0	0	25000	0	3571	12.6
Boa constrictor	74393	19873	13314	12861	2046	503	500	17641	46.7
Boa constrictor constrictor	16826	10464	0	0	1	0	0	3899	24.0
Boa constrictor occidentalis	0	0	0	0	809	0	0	116	12.8
Boidae spp.	0	0	0	57	1	0	0	8	14.1
Cerberus rhynchops	0	3026	66584	222513	128549	91559	30001	77462	26.2
Eryx muelleri	0	0	0	1	0	0	0	0	14.3

Source: WCMC.

France

Imports

According to CITES statistics, France and Italy import the largest numbers of reptile skins in the EC. French legislation to enforce CITES and related EC Regulations is relatively powerful, especially the Customs Code, which has special CITES-related provisions. Pre-1985 CITES figures are not reliable, as France did not record imports of Appendix II species at that time. For the period 1985-89, France imported between 0.8 million and 1.25 million skins annually, this being just over 30% of the EC total, a higher proportion than for any other EC country.

No data were available for species not listed in the CITES Appendices. Three of the five companies involved in the importation of reptile skins to France indicated that they did not use non-CITES species.

Overall, France is the major world importer of skins of *Alligator mississipiensis*, *Crocodylus niloticus* and *Varanus niloticus*. The last, together with *V. salvator*, was in absolute terms the most numerous reptile skin imported into France, followed by *Caiman crocodilus* and *Tupinambis* spp. skins. France recorded imports of relatively few snakeskins, particularly in cases of the cheaper species, such as *Ptyas mucosus* and *Naja* spp., although it imported a significant quantity of python skins, notably *Python curtus* and *P. reticulatus*.

France's trading links with Africa are particularly strong. Its main source of reptile skins is Mali, with lesser quantities from Cameroon, Sudan and Chad. As with other countries, a large quantity of skins derive from Southeast Asia (Indonesia, Singapore and Thailand) and South America (Argentina, Bolivia, Paraguay, Colombia and Venezuela).

Levels of illegal trade are difficult to estimate. Those French Customs authorities which provided information on illegal trade indicated that the majority of cases uncovered involved attempted importation of manufactured reptile skin products without CITES documents. However, there were some noteworthy commercial skin shipments. In 1987, a company attempted to import 5000 skins of *Caiman crocodilus yacare* from Bolivia with an invalid Israeli re-export document and in 1990 a shipment of *Caiman crocodilus* skins without CITES documents was intercepted while being transported from Argentina to Switzerland, via France.

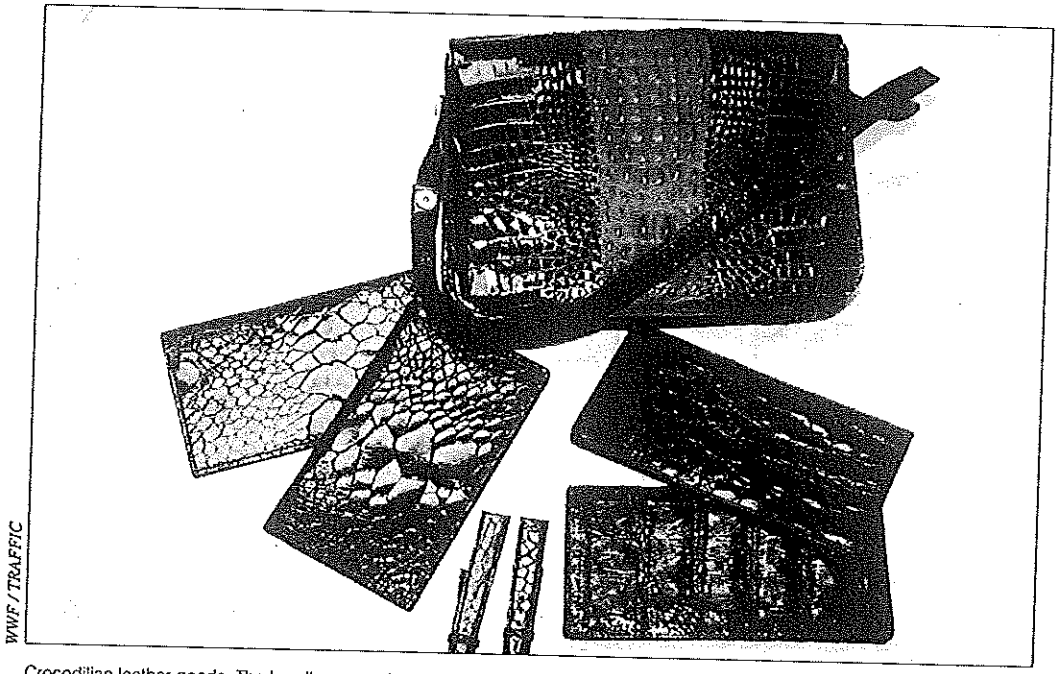
The industry

The French reptile skin industry is long-established as a distinct sector of the country's leather industry. Most skins are imported by or on behalf of the major tanning companies, which sell processed skins to manufacturers of leather items. In 1990, there were four reptile skin tanners and one skin importer in France (four in Paris and one in the Loire region). These were small or medium-sized enterprises which had specialized in the reptile skin trade for many years, the oldest dating from 1928. Together, they employed a total of 269 staff who, according to *Conseil National de Cuir* (National Leather Council) figures, represented eight per cent of the total workforce of French tanneries dealing in smaller exotic and domestic skins. The same source estimated that reptile skin tanners accounted for approximately 10% of sales from this sector dealing with smaller skins in 1990. The four tanneries work almost exclusively with reptile skins (between 83% and 100% of the sales from each firm). Numbers of employees have decreased in four of the companies during the last decade, but the number employed by the fifth has remained stable. Four of the companies belong to a trade association, the *Syndicat National des Tanneurs de Reptiles* (the National Union of Reptile Skin Tanners), which aims to represent the industry in negotiations with government and international organisations. There appears to be keen competition between the main

French tanneries and they are of international importance in terms of buying power and industry investment. Two of the companies have invested in overseas subsidiaries based in the USA, Italy and Switzerland.

The manufacturing sector in France can be divided into distinct groups: shoe manufacturers and manufacturers of fine leather goods (bags, wallets, small leather goods, etc); watchstrap manufacturers are sometimes included in the latter category but they also operate outside the mainstream leather industry.

According to the *Conseil National de Cuir*, 357 companies were involved in the manufacture of fine leather goods in France in 1990, employing 14 511 staff with annual sales worth Ff5903 million (US$1180 million). The president of the *Syndicat National de la Maroquinerie* (National Fine Leather Goods Union) reported that around 50 of these companies used reptile skins to some extent, but only a few used them exclusively. Most production is carried out by small family companies, half of which employ fewer than 50 people per company, each tending to specialize in the manufacture of a particular leather item. Most reptile skin production is based in Paris, but the watchstrap manufacturers are located largely in Doubs. Fine leather goods manufacturers buy the majority of their skins from French tanneries, ordered on a short term basis and often pre-cut. The French industry includes some of the most renowned fashion labels with major worldwide marketing ability, but most manufacture is carried out by small companies on their behalf. This fine leather sector of the industry organizes regular export marketing trips to Far Eastern markets.



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Crocodilian leather goods. The handbag seen here is made from caiman *Caiman crocodilus* skin, popular in France.

The footwear manufacturing sector of the French leather industry is largely decentralized and based in rural areas. Nearly 40 000 employees produced 167 million pairs of shoes in 1989. There are no data available to indicate what proportion of this sector uses reptile skins.

Italy

Imports

Whether France or Italy is the more important importer of reptile skins in the EC is difficult to assess for a variety of reasons. Between 1983 and 1989, Italy accounted for over 30% of all CITES-recorded imports to the EC, more than any other EC country. However, imports to France and Spain were underestimated in the early part of the period, leading to a probable over-estimation of the relative importance of Italy (for the years 1985-89 France declared significantly more imports than Italy). In opposition to this, there is evidence of substantial illegal (undeclared) importation to Italy and of large-scale re-imports from other EC countries, as well as of notable use of non-CITES snake species. Certainly figures quoted below for the number of people employed in the industry would imply, if accurate, that Italy is by some distance the most important country in the trade in the EC. CITES data show an overall decline in imports, from 1.5 million skins imported in 1983 to 0.6 million in 1988. Again, other sources indicate that this decline may not be real, or at least not as marked as it appears, as there may have been large quantities of skins imported in 1988 through illegal channels.

The most numerous skins in reported trade were *Caiman crocodilus* and *Tupinambis* spp., followed by *Varanus salvator*, *Ptyas mucosus*, *Python reticulatus* and *V. niloticus*. Declared imports seem to have declined equally for all species, with the notable exception of *Ptyas mucosus* which was only recorded in trade from 1986 onwards.

In global terms, Italy does not at present dominate declared trade in any single species although it was formerly the most important user of *Python molurus* and *Boa constrictor*, world trade in both of which has now declined to low levels. However, its role in the *Caiman crocodilus* trade is second only to Japan, according to CITES statistics. As much illegal trade to Italy has involved this species, it seems likely that Italy is in fact the world's major user of *C. crocodilus*. Italian imports of *Alligator mississipiensis* skins are noteworthy, despite being small in absolute terms. These are the main classic crocodilian skins imported directly by Italy, although trade sources indicate that other species enter via France. No data were available to quantify imports of skins of non-CITES species. However, industry sources indicated that snakes, chiefly *Acrochordus javanicus*, *Homalopsis buccata* and *Enhydris bocourti*, are used in some quantity. This may be supported by the fact that considerable quantities of *Pytas mucosus* and *Vipera russelli* skins are imported by Italy, these having very similar usage to non-CITES species.

In 1983, Italy's reptile skin imports were reported to have originated in a large number of different source countries. By 1988, declared countries of origin were far fewer in number and included, notably, Indonesia, Argentina, Bolivia, Paraguay, Venezuela and Colombia. Contacts with importers in mid-1991 indicated that the main sources at that time were Argentina (*Tupinambis* spp.), Venezuela (*Caiman crocodilus*), Indonesia (*Varanus salvator* and *Python* spp.) Singapore (*Python* spp.) and Thailand (*Ptyas mucosus*). Italian traders may have received significant numbers of Latin American reptile skins via Spain. Traders reported the import of classic crocodilian skins and African lizard skins from France and Southeast Asian snake and lizard skins from the UK. Information from several importers indicates that these imports may total over half a million skins each year. This is impossible to verify, but these intra-EC sources probably increase Italy's real share of the European trade significantly.

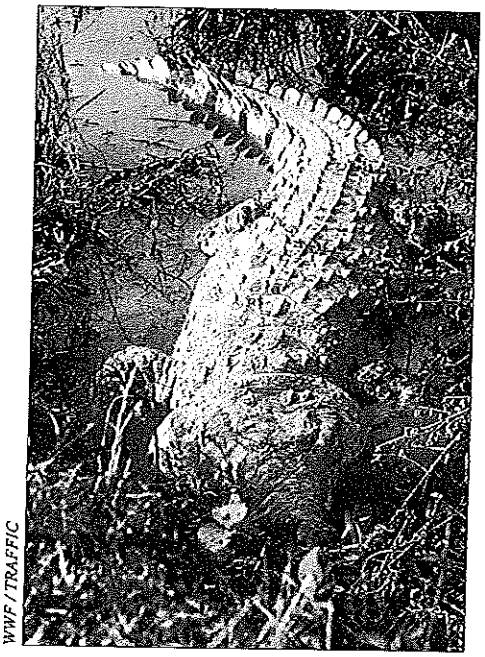
Italy's illegal trade in reptile skins is subject to a great deal of rumour and conjecture. Although it seems likely that only a relatively small number of Italian traders are engaged in organizing illegal imports, their activities have coloured the international reputation of the Italian reptile leather industry as a whole. Information collected for the present report illustrates many cases of large illegal consignments of reptile

skins discovered on arrival in Italy or in other countries but clearly en route to Italy. The main species involved have been from South America, notably *Caiman latirostris*, *C. crocodilus*, *Melanosuchus niger* and *Eunectes* spp. However, while significant illegal trade can be shown to have occurred, it is impossible to estimate accurately its importance and it is quite possible that unattributed sources indicating a value of tens of millions of US dollars are exaggerated.

Since the period under discussion in this report, there have been major changes in the implementation of CITES in Italy. In late 1991, the CITES Standing Committee was made aware of the very poor CITES implementation procedures in Italy, the lack of an adequate legislative and administrative framework and the consequent large-scale illegal trade. The Standing Committee granted Italy a three-month period (extended to five months) from January 1992 to resolve these problems. Unfortunately little action was taken by the Italian authorities, other than the approval by the Italian Parliament of a law drafted in early 1991. This absence of progress led to the Standing Committee's urging all CITES Parties in June 1992 to ban all trade in CITES-listed species with Italy. The Italian authorities reacted to the ban by setting up a new system for the implementation of CITES, entailing the passing of two ministerial decrees. As a result of these changes, and the apparent willingness of the Italian authorities to ensure the adequate enforcement of the regulations, the Standing Committee suspended its recommendation in February 1993.

The industry

The Italian leather industry has been an important economic activity for many centuries, but it was not until the early twentieth century that reptile skins began to be used in significant numbers. In the 1920s and 1930s, most of the reptile skins in trade came from Italian Somaliland and Ethiopia. By the 1950s, the industry had grown enormously and the processing and manufacture of items from reptile skins became a specialized branch of the leather industry. During the 1960s the trade was dominated by classic crocodilian skins, including species such as *Crocodylus moreletti*, *C. acutus*, the Orinoco Crocodile *C. intermedius*, *C. siamensis*, *Caiman latirostris* and *Melanosuchus niger*, which no longer appear in trade in large quantities. The industry was subject to increasing regulation of skin supplies during the 1970s and 1980s and the diversity of species used increased dramatically.



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Orinoco Crocodile *Crocodylus intermedius*, once heavily traded for its "classic" crocodilian skin.

The Italian reptile skin industry is a specialized sector of an extremely large leather industry. Most of the importers and tanners are based in the two main industry centres, one in northern Italy (chiefly Lombardi) and the other in Tuscany. The main ports of entry for skins destined for northern Italy are Milan, Chiasso, Domodossola and Genoa, while skins destined for Tuscany enter via Pisa, Livorno and Florence. The two main regions have slightly different industry structures: in northern Italy skins are imported by tanneries directly and by wholesale importers, who arrange tanning at small family-owned companies and then stockpile skins for onward sale; in Tuscany a significant proportion of the import trade is dominated by brokers, who act as agents for specialized tanners by arranging purchases in exporting countries and receiving commission on each transaction.

The reptile skin tanning and finishing process is complicated, involving a number of stages and different techniques for different types of skins. Italian tanneries rarely carry out all stages of the tanning process on their own premises. Most skins are already in crust (semi-tanned) on arrival, but a few species still arrive in a raw state, especially from the USA and African countries, where there are few or no tanneries. Industry sources indicated that increasing numbers of tanned skins are being imported by manufacturers from producer countries, owing to improved quality of processing in many exporting countries. Italian companies have invested in the establishment of tanneries in a number of countries, especially in Latin America, in order to reduce labour and other production costs. Both reptile skin importers and tanneries tend to hold considerable stockpiles of skins. Some operators reported individual stocks of over 700 000 skins, which implies that total Italian stockpiles number several million skins.

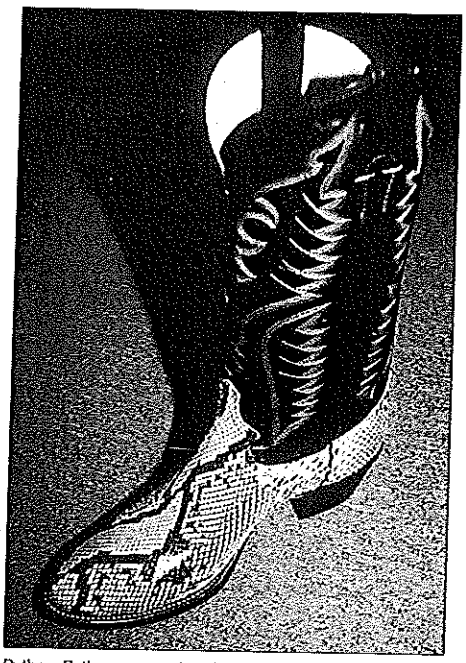
An attempt was made to identify all companies which import reptile skins into Italy. The majority of trade was found to be controlled by 15 tanneries (six of them in northern Italy), 14 wholesale importers and two skin brokers. In addition, 11 leather item manufacturers were found to import skins on a more or less regular basis. Most of the tanneries, wholesalers and brokers were found to deal almost exclusively in reptile skins. According to the *Unione Nazionale Industria Conciaria* (UNIC — the National Union of the Tanning Industry), the reptile skin sector employed about 3000 people in 1990 in tanneries, as importers and leather item manufacturers, this representing a marked decline over the preceding decade. This figure contrasts markedly with the given figure of 257 employees in the French reptile skin industry, although this only applies to tanners and importers and these figures should in any case be viewed in relation to the size of Italy's general leather industry: UNIC listed 2700 tanneries altogether in 1990, employing 29 000 workers.

Manufacturing of reptile skin products is not as geographically restricted within Italy as the tanning industry. Shoemakers using reptile skins were not found to specialize in this type of leather to any great extent, but some companies were identified which concentrate on the manufacture of other leather items from reptile skins. It is impossible to estimate the number of companies or individuals involved in the manufacture of items from reptile skins in Italy. A large proportion of the work in this sector of the leather industry is carried out by artisans working in very small family companies, unaffiliated to any of the main trade organizations. The shoemaking sector alone was estimated to involve 8800 companies, employing about 113 000 people in 1990, according to the *Associazione Nazionale Calzaturifici Italiani* (ANCI — the National Association of Italian Shoemakers). The proportion of these companies using reptile skins is impossible to estimate. Information for other manufacturing sectors is also poor. In 1990, 86 of the 419 members of the *Associazione Nazionale Manifatturieri Pelli e Succedanei* (AIMPES — Italian Association of Manufacturers Skins and Substitutes) were listed as normally using reptile skins.

The market

According to industry representatives, classic crocodilian skins are subject to stable demand, not particularly affected by fashion trends. The traders indicated that they were obliged to use more *Alligator mississipiensis* skins, owing to poor quality of production of some of the other species available, and the fact that the USA imposes prohibitions on the importation of some other crocodilian species. *Caiman crocodilus* skin remains one of the most important elements of the trade. Although supply from Venezuela and Colombia was increasing, there were some worries about the lack of full skins of sufficient size for the manufacture of some items. It proved impossible to estimate the basic demand for caiman skins, but there was little doubt that the reduced legitimate supply in the late 1980s provided considerable incentive for illegal importation.

The demand for lizard skins was considered to be subject to the fluctuating influences of fashion. In 1990-91, the market concentrated on *Tupinambis* skins for shoe manufacture. *Dracaena guianensis* had been popular in the mid-1980s and there is some low level demand for skins of *Varanus* spp. (mostly obtained from other EC countries).



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Python *Python* sp. cowboy boot. Western film-style clothing made from reptile skin is popular with sectors of the US market.

Snakeskin trade was considered the sector of the market most influenced by fashion. Production was quite diverse, with most skins used for shoemaking, but also for the production of belts, wallets, watchstraps and handbag trim. *Python reticulatus* was reportedly the most sought-after species, despite being the most expensive of the snakeskins. *Ptyas mucosus*, at the other end of the price range, was used in the largest quantities and demand was considered very stable. *Acrochordus javanicus* was very much in fashion in the mid-1980s, mainly for shoe manufacture, but fashion changes and increasing prices have reduced import dramatically.

Interviews with traders indicated that in 1991 the industry was suffering a recession, owing to the generally poor economic climate. There was a certain amount of pessimism about the immediate future of the industry.

Spain

Imports

As CITES did not enter into force in Spain until August 1986, the only two years with full data available for this analysis were 1987 and 1988, when Spain imported an average of just under a million reptile skins, making it second only to France as a reptile skin importer in the EC. The absence of trade data for earlier years makes the identification of import trends impossible, although declared imports declined by 40% from 1988 to 1989. The main species imported were *Ptyas mucosus*, *Tupinambis teguixin*, *Cerberus rhynchops*, *Python reticulatus* and *Varanus salvator*. The principal reported countries of origin were Indonesia, Argentina, Thailand and Singapore. Imports of non-CITES species are not subject to licensing and import figures are not collected. It seems very likely, however, that Spain imports a significant number of non-CITES snakeskins: 65% of all CITES-recorded reptile skin imports are snakes, chiefly the non-luxury species *Cerberus rhynchops* and *Ptyas mucosus*, which fill essentially the same market niche as a number of the non-CITES snake species discussed earlier. The likelihood of significant non-CITES snakeskin imports is to some extent supported by the observation that 80% of recorded products exported by Spain to the USA in the period 1984-1990 were of snakeskin.

Levels of illegal skin imports to Spain proved impossible to establish. Industry sources indicated in 1991 that regular offers of CITES-listed species without appropriate documents were made to them by foreign traders. It was suggested that some Spanish traders may purchase illegally imported skins on a regular basis, but this was impossible to verify. Spain does not have any national legislation creating offences and penalties in relation to CITES or EC CITES Regulations, the only applicable legislation being the general

contraband law, which has severe limitations when applied to wildlife imports. At the time of the present study, Spanish Government authorities had no record of any case of illegal reptile skin importation. Interviews with Customs officers indicated that the level of knowledge of reptile skins was very low and that import control enforcement was largely restricted to classification of skins as either CITES-listed, or not.

The industry

Very little is known about the history of the Spanish reptile skin trade. Interviews carried out in 1991 indicated that some reptile skin traders had been in business in Spain since the early 1970s. By the late 1980s the levels of imports indicated by CITES data placed Spain in a position of great importance in the European trade. According to the *Consejo Espanol de Curtidores* (CEC — the Spanish Tanners Council), in 1991 there were six skin importers, three skin exporters, 25 reptile skin manufacturing companies and six tanners/wholesale distributors involved in the reptile skin industry. Only one of the tanning companies deals exclusively in reptile skins (and not also in domestic animal skins). Parts of the tanning process are often carried out under contract by small firms. The main centre of reptile skin processing in Spain is in the region of Valencia. The main shoe manufacturing centres, which consume most of the skins used in Spain, are in Valencia, Elda (Alicante), Almansa (Murcia) and Inca (Baleares). It is impossible to estimate the number of skins actually used in Spain and the number re-exported to other European countries, but some traders indicated that substantial numbers have been re-exported to France and Italy in the past.

There is no available estimate of the number of people employed in the reptile skin industry in Spain. Most of the firms are small, family-run, and with few employees. The only firm dealing exclusively with reptile skins has nine employees. Industry sources indicated that the number of people employed in this sector had decreased in recent years, owing to decreased demand for reptile skins by the manufacturing companies. A general recession in the Spanish reptile skin industry began to take place after 1987. The main factors perceived as causing this were: fashion changes affecting demand; unfavourable dollar/peseta exchange rates affecting trade with the USA (the main market for manufactured products); competition from Far Eastern and Southeast Asian manufacturing centres; competition from fake reptile leather products manufactured in Italy; and administrative restriction caused by improved implementation of CITES. Interviews with industry representatives indicated that there was poor understanding of CITES and EC controls and very little communication with SOIVRE, the Spanish CITES Management Authority.

UK

Imports

The UK was the fourth-largest importer of reptile skins in the EC during 1983-1989, but it is notable that it was the only country which showed overall increased trade during this period, importing a total of over 800 000 skins in 1989. In 1988, the UK came second (to France) in total numbers of skins imported. The great majority of the skins were of *Ptyas mucosus*, *Varanus salvator*, *Python reticulatus* and *V. niloticus*.

Close examination of CITES trade data reveals that the UK plays a considerable role as an importer and re-exporter of skins to the USA. This is reflected in the US import statistics detailed in Table 7. It is quite possible that significant proportions of its net imports are also re-exported, to other EC countries, and therefore do not appear in CITES annual reports.

The Industry

Although not subjected to such close examination during the present study as that of other EC countries, the UK reptile skin trade industry is fairly well-known from previous work carried out by TRAFFIC. A small number of traders (perhaps three during the 1980s) dominate the vast majority of the country's trade. Interviews with one of these dealers in 1989 revealed that the bulk of that company's imports were *Varanus*, *Python* and *Ptyas mucosus* skins, imported for tanning and finishing (including fancy colour applications).

Most skins were subsequently re-exported to the USA for manufacturing into products, but some skins were re-exported to EC Member States, chiefly France and Italy. The trader interviewed stated that other UK traders played a similar role in the trade and very little manufacture was currently carried out in the country.

Germany

Imports

Although featuring prominently in other aspects of wildlife trade, available data indicate that Germany is not a major importer of reptile skins, accounting for less than five per cent of declared imports to the EC for the period 1983-89. Its main imports were of *Caiman crocodilus*, *Tupinambis* spp., *Python reticulatus* and *Ptyas mucosus*, deriving mainly from Paraguay (mainly *C. crocodilus*, imported in 1983), Indonesia and Argentina.

Sources in industry indicated that there may be substantial imports of skins of non-CITES snakes, but no quantitative data were available. The main importer of non-CITES reptile skins in Germany did not respond to the questionnaire survey carried out for the present study in 1991.

Illegal trade in reptile skins certainly exists in Germany. During the past five years, there have been two confiscations of large illegal crocodilian skin shipments. However, rumours of German wholesalers' possession of substantial illegal stocks have proved impossible to verify.

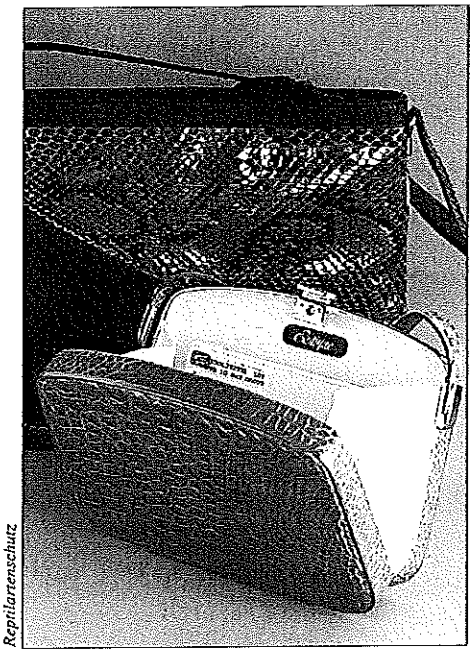
The history of the reptile skin trade in Germany appears to reveal long-term decline, starting with the worldwide decrease in availability of classic crocodilian skins in the 1960s and 1970s. As early as 1972, German skin-importers and manufacturers met with conservationists to discuss voluntary trade restrictions for some species. The 1970s also saw the decline of the Indian reptile skin export trade, which had supplied very large numbers of skins to Germany in the past. Since the introduction of CITES, the trade is reported to have declined significantly owing to regulation and adverse publicity generated by certain animal welfare and conservation organizations.

Research in mid-1991 suggested that there were at that time about 35 organizations involved in reptile skin trade in Germany, all of them members of the *Internationaler Reptilleder-Verband e.V.* (IRV — the International Reptile Leather Association). Replies to enquiries were received from 20 of these organizations — five were skin importers, two tanneries, 12 product manufacturers and one was a product importer. The companies explained that the proportion of their business concentrating on reptile skins had declined dramatically in the past decade. Some of the companies had reduced staff because of the decline in reptile skin trade. One reported a decline in turnover by 94% since 1980. Only five of the companies contacted indicated that their concentration on reptile skins had remained constant. Overall, respondents were extremely pessimistic about their trade in future.

The German product-marking system

Germany has been the site of the development of a unique reptile skin trade control mechanism based on the marking of manufactured products. The aim of the system, first introduced in 1986, is to allow any product on sale in the country to be traced back to the consignment of skins from which it was made. It was developed by IRV in consultation with Government authorities and various conservation organizations and it is administered by a non-profit-making body, *Reptilartenschutz e.V.* (RA — Reptile Species Protection Association), made up of members of the industry. Development between 1985 and 1990 required the investment of DM 530 000. The system has had an advisory board made up of RA members, a representative of the German CITES Scientific Authority and representatives of two conservation organizations. In future it is likely to be administered by the Government.

The marking system employs a "species protection tag" attached to all products made from skins imported legally into Germany and subsequently entered into a computer system, which tracks the progress of skins through the finishing and manufacturing processes. The tags, attached to each item by an IRV seal, include reference to the CITES import document, species, country of origin and manufacturer. The system is promoted by the industry as a means of guaranteeing legality of the origin of products, in the hope that this will reassure consumers concerned about the conservation implications of the purchase of reptile skin items. During 1987 and 1988 the number of tags issued annually was in the region of 45 000. In late 1989, watchstraps were included in the system for the first time and during 1990 (the first full year of their inclusion) 402 176 tags were issued.



Reptilartenschutz

The numbered tag on this reptile skin handbag indicates to the consumer that it was legally imported into Germany, and gives coded information on the origin of the skin.

Evaluation of the system, carried out by WWF Germany in 1989 and under the present study during 1991, indicates that it has significant benefit in terms of customers' ability to investigate the true nature of their purchases. Furthermore, a number of illegal shipments were discovered during the cross-checking carried out under the scheme.

The main shortcomings were, firstly, that products manufactured in other countries (especially those within the EC and therefore effectively within the same CITES border as Germany) are not marked, but they do appear on sale in Germany and, secondly, that retailers sometimes use the system to make inaccurate claims, for example, that all marked products are from skins of captive-bred stock. The former problem is only of concern if consumers are not selective, but enabling selectivity is the main aim of the system. Overall, it appears that the system is an effective means of providing information to customers, but the effect on illegal trade is difficult to assess, while the system is essentially self-regulated by the trade. Its applicability to other countries must be assessed in light of the relatively small size of the German market.

Japan

Imports

CITES statistics indicate that Japan comes third in the world, after the EC and USA, in importance for reptile skin trade, accounting for around 30% of crocodilian skins in world trade, 20% of lizard skins, but less than five per cent of the estimated world trade in snakeskins.

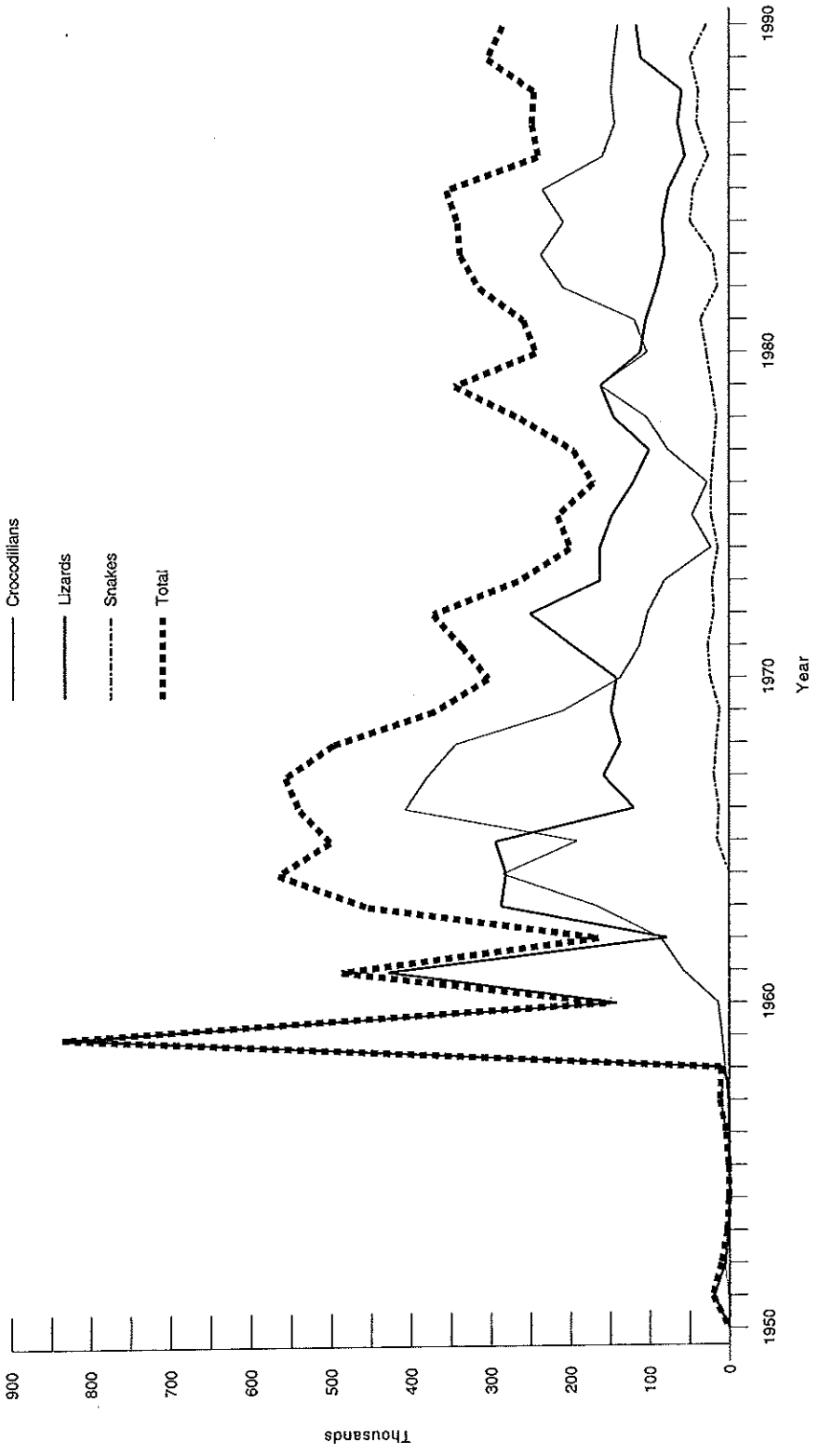
Japan is noteworthy in having had reservations for at least part of the study period on six CITES Appendix I reptile species featuring in the skin trade. These are *Chelonia mydas* and *Varanus griseus* (reservations withdrawn in 1987); *Crocodylus porosus* (reservation withdrawn in 1989); *Lepidochelys olivacea* and *V. bengalensis* and *V. flavescens* (reservations withdrawn in 1991). As a result, transactions in these species were undertaken without proper CITES documentation and information about them was not included in Japan's CITES annual reports. This has made it virtually impossible to control illegal transactions in these species and created considerable difficulty in quantifying the trade.

Over the period 1983-89 Japan was, according to CITES statistics, the most important country for the import of the Appendix I species listed above, as well as for *Crocodylus novaeguineae*, *C. siamensis*, *C. johnsoni*, *Caiman crocodilus* and *Varanus salvator*. However, trade in *C. siamensis* and *C. johnsoni* was at a low level, and it is likely that, with illegal imports taken into account, Italy in fact imported more *C. crocodilus*. In recent years Japan has also become the major consumer of *Python molurus*.

Japanese Customs statistics provide an excellent historical record of reptile skin imports: data for crocodilians and lizards are available from 1950 to 1990 and snakeskin imports are documented from 1965 to the present (Figure 3).

Figure 3

Imports of reptile skins into Japan, 1950 to 1990



Source: TRAFFIC Japan.

Crocodilian skin imports have two main peaks, one in 1965 and the other around 1983-1985. Lizard skin imports reached an unprecedented peak in 1959, never since surpassed, imports having continued at a reasonably steady level between 100 000 and 200 000 until the 1980s, during which imports remained below 100 000 until 1989. Snakeskin imports show a generally increasing trend since 1965. Customs statistics indicate that the average annual declared value of Japanese reptile skin imports during the period 1980-1990 was over US$23 million: 1989 imports totalled US$48 million. When compared to Japan's total import of wildlife and wildlife products (animals only), the value of reptile skin imports accounted for 9.2% of the total declared value during 1980-1990; 1990 reptile skin imports made up 16% of the value of wildlife imports during that year.

The industry

The first reptile skin industry association in Japan was founded in 1965 and was made up of about 25 skin dealers. Over the following 15 years the membership of the main association, the Japan Reptile Association, peaked at almost 50 members and three other reptile trade organizations included over 20 other dealers. In 1979, these organizations merged to form the All Japan Association of Reptile Skin and Leather Industries (AJARSLI), which had 29 members in 1991. The following summary of information relating to the Japanese industry is based on questionnaire responses from 14 members of AJARSLI and interviews in 1991 with officers of the Association.

Most of the Japanese reptile skin trading companies have a long history of involvement in the trade. The oldest company has been in this business for 50 years and the average for the respondents was just over 30 years in the trade. Approximately 90% of reptile skin imports appear to be handled by AJARSLI members (shared between six tanners, eight importer/wholesalers, six importers and nine brokers); the other 10% is handled by about 10 dealers and two tanners, who do not belong to the association. Most of the industry is based in Tokyo, but a small number of companies are in the Osaka area. The companies which responded to the questionnaire employed a total of 202 staff, this number having increased from 164 in 1980. Ten of the companies dealt exclusively in reptile skins and products.

The species most sought after and used by Japanese dealers were: *Alligator mississipiensis*, *Crocodylus porosus*, *C. novaeguineae*, *Caiman crocodilus*, *Varanus salvator*, *V. bengalensis* and *Python reticulatus*. A number of supply problems were noted, including for *C. crocodilus*, as discussed on under the section *Classic crocodile skins — demands and future trends*. A decrease in supplies of *Varanus* spp. skins from Bangladesh was also of concern to importers. Other concerns related to the small size of farmed classic crocodilian skins available and the poor quality of skins of many species now on the market. With regard to international competition for skin supplies, Japanese dealers noted difficulty in obtaining *A. mississipiensis*, *C. niloticus* and *Varanus niloticus* skins, the trade in which was generally controlled by European dealers.

Information from traders indicated that a number of non-CITES snake species are consumed by the Japanese market. Import data are not available, but the following species were reportedly used by the Japanese industry: *Acrochordus* spp., *Laticauda* spp., False Cobra *Cyclagras gigas*, *Enhydris* spp., *Homalopsis* spp. and *Lapemis* spp.

AJARSLI members estimated that the current Japanese market for finished reptile skin products, in terms of value, consists of 65% handbags, less than 10% belts, less than 10% watchstraps, five per cent wallets and a small number of other products, like name-seal cases.

Twelve members of AJARSLI provided answers to a question asking what they considered to be the main motivating factors behind reptile skin product demand for the three main species groups in trade. For products made from crocodilian skins, quality was stated to be the main priority, followed by price, throughout the period examined. In the case of lizard skin products, the reverse was true, with price thought to be of more concern to consumers than quality. For snakeskin items, price, quality and design were the main factors, identified in order of importance. For all three reptile groups, design was thought to have increased in importance to consumers in recent years.

The Japanese traders were also asked about competition in the domestic market for finished products. Various responses were given, but most felt that products manufactured overseas were gaining in market importance, and were generally estimated to claim about 20-30% of the domestic market in 1991. Two main reasons were identified for this trend. Firstly, European-made products were considered of high quality, reasonable price and many department stores consequently imported fashionable name brands directly themselves. Secondly, there was competition from very cheap products manufactured in Singapore and Thailand, which significantly undercut prices which had to be charged by Japanese manufacturers to support high labour costs. Opinions about these trends varied: some dealers thought increased competition healthy for the domestic market, while others considered that they would eventually be forced to diversify their operations to include other leather products.

USA

Imports

The USA is undoubtedly the largest importing country of reptiles and reptile products in the world. Over the seven-year period of 1984-1990, the USA imported nearly 18 million whole reptile skins valued at about US$340 million, equivalent to about 2.5 million skins valued at almost US$49 million, annually. Seventy-three percent of the these skins were of reptile taxa listed on the CITES Appendices. During this same period, the USA imported over 190 million reptile skin manufactured products valued at about US$1.8 billion (*circa* 27.3 million valued at about US$257 million annually). Reptile skin and product trade accounted for over 40% of the total declared value of wildlife imports to the USA in 1989, which was US$1.1 billion.

A little more than half of the imported skins were lizard skins, 38% were snakeskins, about three percent were crocodilian skins, and less than 0.01 percent were turtle skins. The remaining eight percent of the skins were not identified to any taxa. Over 70% of all the trade consisted of only seven taxa: *Tupinambis* spp., *Ptyas mucosus*, *Homalopsis buccata*, *Python reticulatus*, *Varanus salvator*, *Enhydris bocourti* and *Caiman crocodilus* (see Table 5). Significantly, two of these (*Homalopsis buccata* and *Enhydris bocourti*) are non-CITES species and a third (*Pytas mucosus*) was only included in CITES Appendix II in 1990, having been previously listed in Appendix III.

Table 5

Top 17 reptile taxa imported into the USA, 1984-1990*

Scientific Name	Totals	Yearly average
Tupinambis spp.	7 489 821	1 069 974
Ptyas mucosus	1 773 387	253 341
Homalopsis buccata	1 645 448	235 064
Python reticulatus	937 718	133 960
Varanus salvator	925 021	132 146
Enhydris bocourti	561 247	80 178
Caiman crocodilus	493 212	70 459
Acrochordus javanicus	456 916	65 273
Lapemis hardwicki	412 841	58 977
Naja spp.	193 992	27 713
Varanus exanthematicus	176 914	25 273
Cerberus rhynchops	149 835	21 405
Naja naja	121 262	17 323
Python curtus	108 160	15 451
Xenopeltis unicolor	90 979	12 997
Python molurus bivittatus	79 041	11 292
Alligator mississipiensis	77 472	11 067

* 1990 import data incomplete

Source: TRAFFIC USA.

The USA is the most important country for the import of *Tupinambis* spp., *Dracaena guianensis*, *Eunectes* spp., *Python curtus*, and *P. reticulatus*. It is also the only country of origin of *Alligator mississipiensis*, the second-most abundant crocodilian in trade.

Just under 60% of the seven-year total of reptile skin imports came directly from the country of origin of the skin, two-thirds of this amount originating in Latin America. Virtually all these imports (98%) originated in eight countries (Table 6). Those imports which were not from their country of origin (i.e. had been re-exported) came mainly from Europe (Table 7).

Table 6

Major countries of origin~ of whole reptile skins (>10 000 skins/year) imported to the USA, 1984-1990*

	Total no. items	Average	Range	Level of imports Low	High
Argentina	6 352 225	908 175	410 346-1 367 953	1986	1989
Thailand	1 919 933	274 276	0-740 139	1984	1989
Taiwan	722 853	103 264	1 959-372 509	1990	1989
Philippines	264 569	37 796	381-16 205	1984	1986
Venezuela	255 613	36 516	4 632-89 723	1984	1985
Indonesia	146 278	20 897	21-101 796	1987	1990
Japan	89 133	12 733	0-59 471	1989	1986
Singapore	87 166	12 452	0-52 646	1989	1984

~ Includes only imports exported direct from the country of origin.

* 1990 import data are incomplete

Source: TRAFFIC USA.

Table 7

Main countries re-exporting+ whole reptile skins (>10 000 skins/year) to the USA, 1984-1990*

	Total no. items	Average	Range	Level of re-exports Low	High
UK	1 384 361	197 766	115 897-330 090	1988	1984
Germany, FR	755 234	107 890	5 434-68 378	1990	1987
Singapore	754 779	107 826	46 157-244 710	1987	1990
France	737 966	105 424	43 799-195 711	1990	1984
Italy	713 132	101 876	40 019-182 923	1990	1989
Japan	674 314	96 331	0-368 006	1990	1984
Spain	607 537	86 790	29 772-196 445	1984	1987
Taiwan	606 887	86 698	4 272-128 090	1988	1990
Hong Kong	306 700	43 814	5 209-105 789	1990	1984
Switzerland	98 159	14 023	10 312-27 843	1988	1984

+ Includes only re-exports, i.e. imported from intermediary countries.

* 1990 import data are incomplete.

Source: TRAFFIC USA.

Legislation

US legislation and regulation of the reptile trade, particularly that of crocodilians, is more restrictive and often more prohibitive than required by CITES. Reptile trade is regulated primarily by two wildlife laws, the Endangered Species Act (ESA) of 1973 and the Lacey Act. The Lacey Act prohibits the importation of any wildlife and parts and derivatives that were taken or exported illegally from their country of origin.

There are only 28 reptile species, subspecies, or populations listed on ESA that occur, or have occurred in the international commercial skin trade, all crocodilians except for Indian Python *Python molurus molurus*,

a CITES Appendix I subspecies. The only legal crocodilian skin imports allowed under US law include those of *Alligator mississipiensis*, the New Guinea Crocodile *Crocodylus novaeguineae novaeguineae*, the Papua New Guinean population of *C. porosus*, two subspecies of *Caiman crocodilus*, Dwarf Caiman *Paleosuchus palpebrosus* and Schneider's Smooth-fronted Caiman *P. trigonatus*, and direct imports of the Zimbabwean-ranched populations of *C. niloticus*.

The industry

Fifty-four percent of the almost six million skins imported during 1988-89 were imported by six importers. Only nine other importers imported more than 10 000 whole reptile skins each during this same period, and these only accounted for a further six per cent of trade. The six main importers imported 92% of all Asiatic watersnake skins, 85% of *Tupinambis* skins, 92% of *Lapemis hardwicki* skins, and 51% of *Enhydris bocourti* skins imported during the two-year period.

Although there were at least 20 reptile tanneries in the 1970s (King, 1978), by 1991 there was only one tannery operating in the USA. This tannery, located in Georgia, processes reptile skins from the crust right through the final polish stages. This facility has been tanning reptile skins only since 1980, but has been processing mammal skins since 1923. In mid-1991, it offered the following tanned skins for sale: *Alligator mississipiensis*, *Caiman crocodilus crocodilus*, *C. c. fuscus*, *Varanus salvator*, *V. niloticus*, *Python reticulatus* and *P. curtus*. The company which owns the tannery annually imports a number of unprocessed reptile skins, exports and re-exports processed reptile skins and also subcontracts with US dealers, importers, and manufacturers to process domestic and imported reptile skins.

A report in late 1991 indicated that a second tannery had begun operation in Louisiana and in the recent past another tannery in Florida was processing a small number of reptile skins (probably fewer than 1000) annually. The latter tannery suffered economic setbacks and closed in the late 1980s. However, the owner was planning to reopen the facility and begin processing skins in late 1991 or early 1992. There are indications that two or three other persons or companies are interested in establishing reptile, primarily *Alligator mississippiensis*, tanneries in Tennessee and Louisiana but by October 1991 these facilities had not yet begun processing. (D. David, pers. comm.).

There is only one national trade association for reptile and other exotic skins in the USA, the International Exotic Leather Council (IELC). IELC "believes definite steps must be taken to ensure a consistent supply by policing [the].....industry, joining with responsible conservation groups in careful management of the world's renewable resources, and in educating the general public about renewable resources" (Anon., 1985).

As part of its exotic-skin trade study and analysis, TRAFFIC USA posted surveys to exotic-skin importers and exotic-skin boot manufacturers in 1991, with a return rate of 15%. Although the sample size is very small for any statistical analysis, two questions were extracted for the purposes of this overview, relating to consumer demand and the availability of skins. According to the respondents, there has been a definite decrease in consumer demand for reptile skins around the turn of the decade. All respondents indicated a decrease in demand for *Python* spp., 60% indicated a decline for *Tupinambis* spp., 75% for watersnake, and 64% for *Ptyas mucosus*. Information for the other taxa included in the survey (Crocodylidae, Alligatoridae, Varandiae and Boidae) is not so clear. These very preliminary results suggest that there may be a decline in US reptile skin imports in the early 1990s. The responses regarding questions on skin availability were mixed and not as clear as those for consumer demand.

The trade in manufactured products

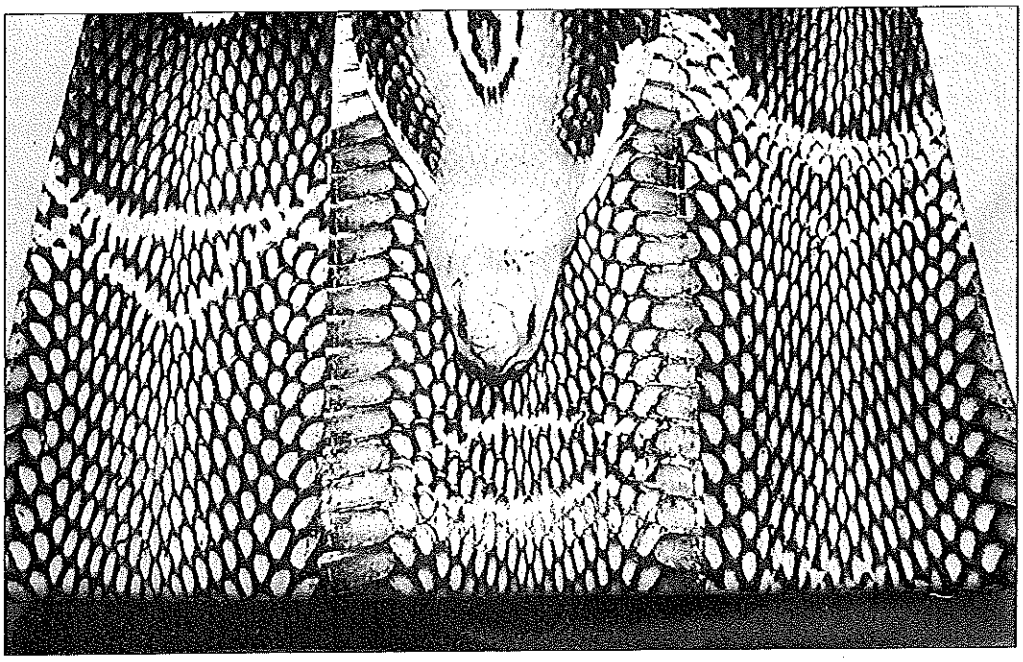
CITES annual reports also record the international trade in products manufactured from leather of those species listed in the Appendices. However, analysis of this trade is much more problematic than analysis of trade in skins, for several reasons (Luxmoore and Groombridge, 1990). There is little consistency in the terms used to describe products: a "leather item" may refer to any product containing leather, from a shoelace to an overcoat; it is often very difficult to identify skins when only small pieces, often dyed, may be used; often a single item may be composed of several different types of leather; many items apparently made of reptile skin may in fact be embossed cow leather. In addition, reporting of products is usually much more erratic than reporting of unworked skins. Even where reporting is reasonably accurate it is usually very difficult to interpret the statistics, and particularly to relate the information to the numbers of animals used.

Nevertheless, examination of these statistics may give some interesting insights into the trade which may go otherwise unremarked. Of particular interest in this regard are the statistics compiled by the US Customs service, which include data on non-CITES species.

The US import trade in manufactured goods

A very large number of countries — around 150 — were reported as countries of export or re-export of manufactured reptile skin products imported into the USA during 1984-90. However, 94% of all the products imported during the seven-year period were from only 15 of these countries (Table 8).

Nearly 70% of Hong Kong's reptile skin exports to the USA were of snakeskin and a further 25% were of unidentified, presumably non-CITES species, implying strongly that in the vast majority of cases these were also snakeskin. Similarly, over 60% of Taiwan's products exported to the USA were made of snakeskin and a further 37% were from unidentified taxa, also presumably all or virtually all snakeskin. Over 80% of Spain's exports and 63% of Italy's to the USA were also of snakeskin.



WWF / TRAFFIC

Cobra Elapidae skin handbag. More snakeskin products are imported into the USA than products of any other sort of reptile skin.

At the very least, therefore, over 50% and almost certainly over 70% of the reptile skin products reportedly imported into the USA in the period 1984-1990 were of snakeskin, mostly of non-CITES species. As the USA is responsible for more imports of reptile skin products than is any other country, then this may be taken as a reasonable indicator of the global situation. The relative importance of snakeskin, in terms of the number of animals this represents, is likely to appear somewhat exaggerated as, on average, snakeskin products (particularly those made from non-boids) are smaller than those made from skins of other taxa. Nevertheless, these data clearly indicate that a very substantial proportion of world trade in reptile skins is in non-CITES listed species (chiefly Asiatic snakes) and therefore operates outside CITES controls.

Table 8

Major countries exporting/re-exporting+ (>100 000 items/year) products manufactured with reptile skin, 1984-1990*, to the USA

Country	Average no. items	Cumulative total of items
Hong Kong	9 841 872	68 893 106
Taiwan	6 233 949	43 637 640
Spain	2 564 093	17 948 671
Italy	2 517 633	17 623 431
Thailand	737 388	5 161 715
China	706 495	4 945 465
Philippines	528 675	3 700 725
Switzerland	506 259	3 543 882
Germany, FR	503 036	3 521 253
Canada	467 693	3 273 849
Austria	313 019	2 191 134
France	344 979	2 414 855
Indonesia	224 232	1 569 621
Argentina	215 877	1 511 136
Mexico	119 837	838 856

+ includes both direct imports and imports from intermediary countries

* 1990 import data are incomplete

Source: TRAFFIC USA.

ILLEGAL TRADE

There is widespread evidence of extensive illegal international trade in reptile skins. The two main motivations for such trade are avoidance of fiscal controls and of conservation-related controls. The former is quite evidently not peculiar to the reptile skin trade: international shipments of innumerable commodities are carried out illegally to avoid the payment of taxes and duties. Shippers may under-declare the value or quantity of goods or may attempt to avoid border controls completely by concealment. Although not obviously of direct conservation concern, smuggling to avoid fiscal controls could be of major importance in a trade of such high value as that in reptile skins. If a large proportion of the trade remains unrecorded, for whatever reason, it becomes extremely difficult to assess the real amounts traded and the impact of any control systems, such as quota schemes, which may be in place.

A major incentive for illegal importation is the lower price that skins command in countries of origin. This enables finished illegal skins to be offered at a lower price than finished legal skins, or tanneries to increase their profit margins considerably. This can be clearly shown in trade in *Caiman crocodilus* skin in Italy. It is not unusual to see finished caiman skins being sold to the manufacturing industry at prices that are similar to, or lower than those paid legally for semi-tanned or raw skins in the country of origin. For example, *C. crocodilus* skin prices quoted by sources in the Italian industry, in 1990, indicated that legal skins could be bought in Venezuela for US$40-50 per square foot and sold in Italy after processing for US$70-80 per square foot. This compares with reported prices of illegal caiman skins of US$25-32 per square foot in exporting countries. If processing costs are assumed to be the same for illegal and legal skins, they could be offered in Italy in finished form for US$55-62 per square foot.

Illegal trade may also be the only means by which particular commodities can be obtained. These may be skins of completely protected species or skins of particular sizes. These two factors apply particularly to trade in crocodilian skins. The great majority of classic crocodilian skins in trade are now from ranched or farmed sources. To be economically viable, farms have to harvest the animals when they are still relatively small, leading to a marked shortage in trade of large skins. Because of overharvesting of most wild populations, animals which can supply such skins are now largely confined to protected wild populations. There is thus considerable incentive to poach from such populations. Imports of *Caiman latirostris* and *Melanosuchus niger* skins into Italy during the 1980s demonstrate incidence of such illegal trade.

A large proportion of the illegal trade discovered or thought likely to have been taking place during the period under review concerns skins of taxa not themselves banned from trade, but legally protected in their country of origin. Notable examples are the smuggling of *Tupinambis* skins from Paraguay into Argentina for re-export, the illegal export of *Caiman crocodilus* skins from Brazil (often *via* the Netherlands Antilles), and the probable smuggling until 1987 of *Varanus bengalensis* and *V. flavescens* skins from India into Bangladesh for re-export to Japan. Uncovering illegal trade of this nature in importing countries is extremely difficult unless the skins in question show consistent variation, according to their geographical origin, allowing this to thereby be determined.

Not only does illegal harvest and export directly affect the populations exploited, it can also undermine farming and ranching efforts, which generally produce more expensive skins, and efforts to control wild harvest by quotas or size limits.

DISCUSSION

Conservation aspects and prospects for sustainable management of the reptile skin trade

In terms of the number of animals taken annually, the trade in reptile skins for the leather market is clearly one of the most important aspects of international trade in wildlife. It is also a phenomenon of some economic importance, even if it is only a very minor part of the leather industry as a whole. Available data indicate that the declared import value alone for reptile skins imported into the EC, Japan and the USA exceeds US$150 million per year. The value added during processing and manufacture into leather items is impossible to quantify accurately. However, an indication of its magnitude may be gained from US import figures, which indicate that during the period 1984-90, the USA alone imported each year *circa* 27.3 million reptile skin manufactured products valued at about US$257 million.

The reptile skin industry employs large numbers of people in some EC countries and Japan; in Italy, for example, the industry apparently employs 3000 individuals. The number of people employed in the USA

appears to be relatively small compared to the declared import level, reflecting the reliance of the US market on processing outside the country.

The present study identified almost 40 main tanning operations in the principal importing countries. Although some parts of the skin finishing process are often carried out by other firms and a number of tanneries have now been established in exporting countries, it appears that these 40 tanneries control a large proportion of the world trade. A significant proportion of these tanneries deal entirely or very largely with reptiles.

In contrast to the tanning sector of the industry, the product manufacturing sector is large and diverse. In Europe and Japan it is largely a cottage industry, based around small family-run companies, often manufacturing to order for name-brand leather goods suppliers.

The great majority of the skins used in this trade originate in tropical or sub-tropical countries for which they derive a noteworthy income. It is clearly in the interests of the exporting countries and those involved in the processing and sale of reptile skin products in the market countries that this trade is sustained in a stable way in the future. To ensure this, both a stable or expanding market and assured supply are needed. Both of these may prove increasingly problematic in the future.

The future of the market

With the exception of classic crocodilian products, for which demand appears fairly constant, although affected by underlying economic trends, most reptile skin products appear to be subject to fluctuating demand, depending on whether or not they are in fashion. To a large extent such fashion changes, up to the present at least, seem to have been cyclical and not necessarily coincident in the various market areas. Suppliers and manufacturers have therefore been able to ensure reasonable stability over the medium to long term by balancing periods and market areas of high and low demand. This activity is greatly helped by the fact that skins can be stockpiled at various stages of processing for periods of years if necessary. However, longer lasting changes may start to disrupt this. In particular, growing environmental awareness in the major consuming regions, notably the USA and Europe, appears to be leading to an increasingly negative attitude to consumptive wildlife use and is very likely to result in a long-term decline in the demand for wild reptile products, particularly if these are perceived to have been harvested in an essentially uncontrolled fashion.

With the exception of classic crocodilian skins, the majority of which now come from farmed or ranched sources, virtually all reptiles in the skin trade are indeed harvested in an unsupervised way. There are, it seems, almost no instances for species other than classic crocodilians, and possibly for Venezuelan populations of *Caiman crocodilus*, where the reptile skin industry can be shown to have ensured that skins used come from a sustainable source, let alone to have contributed to the conservation and management of the species involved. Moreover, a significant part of the industry has been involved, almost certainly knowingly, in illegal trade for many years, most notably that of *C. crocodilus* skins. The single exception to this has been the involvement of the Argentinian leather industry in the *Tupinambis* project, described below.

Without a significant change in this *modus operandi*, it is difficult to see how a long-term decline in the acceptability of reptile skin products will be reversed. To a certain extent, a decline in the traditional market countries may be offset by the opening up of new markets, particularly in Southeast Asia, where these constraints are likely to be less severe. However, it seems very likely that many of these markets will

satisfy an increasing proportion of their demand with domestic production, and therefore not involve traditional manufacturing centres at all.

The future of the supply: conservation and sustainable harvest

The long-term sustainability of the trade from the supply side also remains an intractable issue.

Establishing a direct link between the international trade in reptile skins and changes in the status of wild populations of the species involved has generally proved extremely problematic. The major exceptions to this have been crocodilians and some populations of *Lepidochelys olivacea*.

The history of crocodilian exploitation offers a salutory example of the result of unregulated exploitation. Historical evidence (which is largely qualitative and usually anecdotal) indicates that most populations which have been subject to such exploitation have collapsed. For some populations this collapse may only have occurred after many years. As discussed under the earlier section on this species, it seems that the *Alligator mississipiensis* population sustained high and unregulated hunting for a century and a half (from the start of the nineteenth century to the mid-twentieth century) before harvest levels were significantly impaired. For some other species, such as *Melanosuchus niger* and *Crocodylus moreletii*, population collapses have occurred after apparently only a few decades of intensive exploitation. Other species, most notably *Caiman crocodilus*, have remained abundant despite intensive exploitation, although there is no guarantee that they will remain so. This difference in response may in part be explained by differences in life-history parameters between the species, but also by differences in hunting intensity: skins of classic crocodilians are sufficiently valuable, and crocodilians in general sufficiently easy to hunt, that it has proved worthwhile and possible to reduce many populations to collapse.

For most crocodilian species, remedial action, in the form of prohibition or severe restriction on trade, was only undertaken once the situation was perceived to be critical. Action was instigated almost invariably by conservationists and government agencies, not by those involved in the industry, although the latter have subsequently become involved in attempts to re-establish trade in a sustainable way, chiefly through investment in captive production and, to a lesser extent, in conservation research.

For other groups of reptiles there still remains the possibility of developing management systems for sustained harvest before population collapses occur. A prerequisite for such a system is an understanding of the effects of harvest on populations of the species involved. There are however, serious problems with attempting to reach this understanding. Historically, very few studies have been carried out of reptile population levels, and even fewer longitudinal studies (i.e. monitoring changes over time). This has been partly the result of lack of investment in ecological research on most reptile species, but also because of the considerable methodological difficulties involved.

Even if population data were available, it would be difficult to disentangle the effects of harvesting for the international skin trade from other factors affecting populations, both anthropogenic (e.g. harvest for other uses (food, medicine), incidental killing (as pests), and habitat modification or conversion) and natural. For these reasons, even extensive studies of the trade and its effects (e.g. Groombridge and Luxmoore, 1991; Luxmoore and Groombridge, 1990; de Buffrénil, 1991; Fitzgerald *et al.*, 1991 and in prep.) have relied largely on anecdotal observation for evidence of changes in status brought about by collecting for the trade.

To date, the only reasonably long-term studies to try to ascertain the impact of collection on wild populations and to use this to develop scientifically based management plans have been a study of

Tupinambis in Argentina, carried out by Fitzgerald and colleagues, since 1985 (Fitzgerald *et al.*, 1991 and in prep.), and of *Caiman crocodilus* in Venezuela (Thorbjarnason, 1991).

These projects, and the *Tupinambis* project in particular, may serve as a useful paradigm for further projects, in that they have treated taxa not currently considered threatened with extinction, which have been traded in large numbers over a significant period of time. Moreover, the life history parameters of *Tupinambis* which have a signficant impact on its demography and response to exploitation are similar to those of other exploited reptiles.

The most important life history parameters in this regard are a long life span, a large clutch size, several years of growth before reproduction and high hatchling mortality. The proportion of females reproducing and hatchling mortality are both strongly influenced by environmental variation. Modelling of populations with these characteristics indicates that population growth rates are highly sensitive to environmental fluctuation and can therefore show large changes from year to year.

Fitzgerald concluded, on the basis of his models, which used a range of coefficients of variation for egg production and hatchling mortality, based on studies of a number of lizard species, that for species with life histories like *Tupinambis* the high variation in yearly reproductive success was the principal factor enabling populations to be sustained. The long life span of the lizards enabled populations to withstand sequences of bad years for recruitment even with sustained periods of adult mortality, as the effects of 'boom' years of recruitment accumulated to allow relatively rapid recovery of populations. This would not occur if variability in annual recruitment were low.

This has a series of implications for exploitation and management of wild populations of *Tupinambis* and other similar species. On the one hand, it explains how they have tolerated high harvest levels over long periods of time without becoming threatened with extinction. On the other, it indicates that the development of management policies based on stable, sustainable yields is likely to be extremely problematic and may not be feasible if harvests are at all substantial (that is, close to, or at some theoretical maximum sustainable yield).

This is because for any such regime to operate successfully, its impact on the population in question must be understood. Under any given management scenario, stochastic perturbation is likely to greatly outweigh the effects of the management regime on the population, at least in the short or medium term. Any realistic effort to disentangle the two, and therefore to measure the effect of the management regime on the population, will require population data over a considerable number of years: Fitzgerald concludes that data sets spanning decades would be required to estimate population trends with any precision. This is clearly an unrealistic proposition in most conceivable circumstances. He further notes that *Tupinambis*, as other species, are difficult and costly to study in the wild, and population monitoring based on field studies cannot be considered feasible. As demographic data are required for management, indirect methods would have to be used, of which the most obvious for a harvested resource is analysis of annual harvest. However, a number of confounding factors have to be accounted for before harvest data can be related to population, and at least some of these may prove intractable.

Fitzgerald suggests that to try to circumvent these problems it may be advisable to implement adaptive management regimes, whereby populations are subject to relatively extreme manipulations whose effects may be easier to detect. These run the risk that possibly irreversible population collapses may occur. The apparent resilience of *Tupinambis* and other similar species to high and variable harvests, their generalist nature and usually large population size reduce, but certainly do not eliminate, the likelihood of such

collapses. Moreover, if the aim is sustained use of the species as a harvestable resource, there is a risk that unstable supplies could reduce the short-term economic benefit of exploitation and increase incentive to shift to other activities which may be more environmentally damaging (Fitzgerald, 1993).

However, the most obvious alternative approach, entailing very precautionary conservative management regimes, may itself be unsatisfactory as there is at present no evidence to indicate whether current harvest levels for these species are sustainable or not in the long term. In addition, there is very low probability of evaluating the effects of small changes in the management regime with any accuracy. There are many cases where sophisticated and conservative fisheries management regimes have been put in place but have not prevented unforeseen population collapses.

As well as these theoretical impediments to the establishment of controlled harvest regimes, there will be important practical difficulties: the reptiles involved in the skin trade are typically harvested over a wide geographical range by a large number of collectors, many of whom operate on a casual or opportunistic, part-time basis. It is difficult to see how any quota system for hunting (as opposed to export) will be enforcable in an equitable fashion under these conditions.

These observations have considerable bearing on the feasibility of effectively implementing Article IV of CITES for many, if not most, of the reptile species harvested for the reptile skin trade in any number. They imply that it will probably be unrealistic ever to hope to set harvest quotas based on scientifically derived estimates of maximum sustainable yields. Indeed, it is difficult to see how any substantial harvest quota will be able to be shown unequivocally to be sustainable. This problem is particularly pertinent at present because there is increasing pressure within the CITES arena to ensure that countries comply with Article IV before permitting exports. Such pressure often takes the form of calls for bans on exports until compliance with Article IV is demonstrated.

On the other hand, most of the species which feature in trade at present are clearly not threatened with extinction and are capable of bearing a significant harvest. In contrast to classic crocodilians, these species are unlikely to be exterminated completely by hunting for the skin trade. This is for two major reasons. First, most of the species involved are relatively widespread and are unlikely ever to be subject to uniformly high hunting intensity throughout their range. Second, most of the species in trade do not appear to be sought-after because they are that species, but rather because they represent a more generalized commodity available at a given price and in a given quantity and quality. To some extent, therefore, harvest may be self-regulating in that once a particular species has been reduced in number, hunters' search effort will increase, but the value of the skins is unlikely to do so, and may even decrease (as the latter is in general not dependant on rarity but on quality and size). Returns per unit effort will therefore decrease and it is likely that hunting effort will be directed to other species or areas. If this assumption is correct then there is little justification from the point of view of species conservation for stopping the trade entirely. Indeed, it may even be argued that there is justification for removing many of the species involved from the CITES Appendices, it being unclear exactly what positive role CITES listing plays at present in their management and conservation.

Many of the above points clearly have wider implication than simply regulation of reptile species used in the skin trade. They can be seen as addressing the fundamental role of CITES as it concerns species not immediately threatened with extinction by commercial international trade. The vast majority of species listed in the Appendices to the Convention are just such species. Moreover, there is increasing pressure to use the Convention to regulate international trade in major wildlife commodities such as timber and fish

from marine fisheries. It is clear, therefore, that the the emphasis of the Convention is likely to shift even further away from the mere banning of trade in highly threatened species (i.e. as is intended by Appendix I listing). This being the case, it becomes more pressing than ever that the problems discussed above are resolved.

Large-scale commercial captive breeding has not been developed at all for any of the species considered here, with the exception of some crocodilians, although there are some experimental breeding facilities, e.g. for *Tupinambis* in Argentina. Intuitively, it seems unlikely that such facilities will be economically viable under present conditions, as the price of skins involved is simply too low. Were the price structure of the market to change drastically — as a result, for example, of wild-collected skins becoming unobtainable, then it is possible that captive breeding could become an ecomomic proposition. It is also possible, however, that the market would simply shift to other sources of 'fancy leather' (e.g. embossed and dyed cow-leather, fish-skin and bird leather).

CONCLUSIONS

This report documents a large-scale element of wildlife trade, involving a diverse selection of reptile species. Some species have been threatened by trade demand, but the majority are unresearched, though apparently not under immediate threat. For those reptile species listed in CITES, estimation of trade volumes is possible and increasingly attention has focused on the need for management of the trade in reptiles, but important markets (in Southeast Asia and parts of the Far East) and some species (mainly non-CITES snakes) remain poorly known and in need of research.

The industry in the three regions studied employs many people, but it is generally a small sector of a far larger leather industry, subject to fashion swings, economic pressures and a need for consistent high-quality raw materials. It is clear that most precautionary measures adopted to date have been driven by conservationists and regulators, but the industry must address the question of taking responsibility for deciding whether it wants to use reptile skins from wild populations in the long term and, if so, how it will ensure continued supply and reassure conservationists that reptile populations can survive the demands placed on them.

However, the major shortcomings in the reptile skin industry at present in terms of its ability to serve as a paradigm for wildlife utilization are the almost complete lack of demonstrable sustainability and the absence of any significant linkage between the trade and conservation action at habitat or species level.

RECOMMENDATIONS

Clearly the major recommendation to emerge from this report is that the issues outlined above should be addressed.

More specific recommendations concern the improvement of enforcement of current controls, improvement in reporting techniques and the identification of further areas of research.

- Most importantly, the reptile skin industry (traders, tanners, manufacturers, etc.) should be encouraged to convene a forum to discuss and seek consensus regarding its future. Such a forum should address the the major issues raised above, including the lack of demonstrable sustainability of the industry's resource base, the current widespread failure to comply with Article IV of CITES, and the lack of any linkage between the industry and conservation of species or habitats. The possibility of using the adoption of responsible, sustainable harvest as a marketing tool should be investigated, and the industry should examine ways in which it can play a more positive role in supporting and promoting research into the biology and status of the species it uses.

- Greater efforts should be made to control illegal trade, particularly that in CITES Appendix II taxa. Now that internal trade barriers within the EC have threoretically been removed, particular attention should be paid to avenues into the EC, most notably the Netherlands Antilles (not yet a Party to CITES) and French Guiana. Efforts should also be made to harmonize controls of individual taxa in countries of origin, to reduce opportunities for trading in skins by misdeclaring their origin.

- The effectiveness of the German system for marking products, which has now been in operation for eight years, should be assessed to determine whether it should be promoted elsewhere.

- An attempt should be made to harmonize transactions reported by CITES, with all countries reporting in the same units if possible. For purposes of analysis, number of individual skins is clearly the most useful measure. More generally and meanwhile, CITES Parties should strive to improve regulation of trade subject to the Convention's terms, to encourage and support good conservation practice, to extinguish illegal trade, improve reporting standards for monitoring and seek demonstration of sustainability.

- More work is needed on the analysis of effects of harvest on wild populations. As discussed above, this is a difficult, not to say insoluble problem. Nevertheless, it must be pursued if it is intended to develop management strategies for harvest which is sustainable in the long term.

- A more comprehensive study of the non-CITES snakeskin trade should be undertaken. At present there appears to be little difference in terms of biology and harvest regimes between many reptiles species included in Appendix II of CITES and others which are not. Some of the latter may be appropriate for Appendix II-listing, and/or for national protection.

- A survey of the role of the "new" consumer markets, particularly in Southeast and east Asia should be undertaken, as these are apparently playing an increasingly important role in the trade.

REFERENCES

Anon. (1985). Convention on International Trade in Endangered Species of Wild Fauna and Flora. Fish and wildlife facts, FWS-F-039. USFWS, Washington DC.

Brazitis, P. (1987). Identification of crocodilian skins and products. In: Webb, G.J.W., Manolis, S.C. and Whitehead, P.J. (eds), *Wildlife Management: Crocodiles and Alligators*. Surrey Beatty & Sons Pty Ltd in assocation with The Conservation Commission of the Northern Territory.

de Buffrénil, M.V. (1991). Données bibliographiques et statistiques sur la biologie et l'exploitation des varans Africains (*Varanus niloticus* et *Varanus exanthematicus*). Unpublished report to the CITES Secretariat.

Duplaix, N. (1979). TRAFFIC USA report on the world trade in crocodilian products. Testimony no. 2 before the subcommittee on fisheries and wildlife conservation, Hose Subcommittee on Merchant Marine and Fisheries. TRAFFIC USA, Washington DC.

Fitzgerald, L.A. (1993). PhD thesis. Unpublished.

Fitzgerald, L.A., Chani, J.M. and Donadío, O.E. (1991). *Tupinambis* lizards in Argentina: implementing management of a traditionally exploited resource. In: Robinson, J.G. and Redford, K.H. (eds), *Neotropical Wildlife Use and Conservation*. University of Chicago Press, Chicago.

Fitzgerald, L.A., Porini, G. and Lichtschein, V. (in prep.). El manejo de *Tupinambis* en Argentina: Aspectos Historicos, Estado Actual y Perspectivas Futuras.

Gorzula, S. and Pilgrim, K. (1992). Snakes of the family Boidae in the Cooperative Republic of Guyana: an assessment of the trade and status of six species in 1992. Ministry of Agriculture, Guyana and CITES Secretariat. Unpublished report.

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

Groombridge, B. and Luxmoore, R. (1991). Pythons in South-east Asia. A review of distribution, status and trade in three selected species. CITES, Secretariat, Lausanne.

Guggisberg, C.A.W. (1972). *Crocodiles. Their Natural History, Folklore and Conservation.* Stackpole Books, Harrisburg.

Hemley, G. and Caldwell, J. (1986). The crocodile skin trade since 1979. In: Crocodiles: proceedings of the 7th working meeting of the Crocodile Specialist Group of the Species Survival Commission of IUCN. Caracas, October 1984. IUCN, Gland.

King, F.W. (1978). The wildlife trade. In: Brokaw, H.P. (ed.), *Wildlife and America. Contributions to an understanding of American wildlife and its conservation*. Council on Enviromental Quality, USFWS, Forest Service and NOAA. US Government Printing Office, Washington DC.

Luxmoore, R. (1991). World trade in crocodilian skins, 1988-1989. Prepared under contract to the International Alligator and Crocodile Trade Study. World Conservation Monitoring Centre, Cambridge.

Luxmoore, R. and Collins, L. (1993). World trade in crocodilian skins, 1989-1990. Prepared under contract to the International Alligator and Crocodile Trade Study. World Conservation Monitoring Centre, Cambridge.

Luxmoore, R. and Groombridge, B. (1990). Asian Monitor Lizards. A review of distribution, status, exploitation and trade in four selected species. CITES, Secretariat, Lausanne.

Luxmoore, R., Groombridge, B. and Broad, S. (1988). *Significant Trade in Wildlife: A Review of Selected Species in CITES Appendix II.* Vol. 2: Reptiles and Invertebrates. IUCN Conservation Monitoring Centre, Cambridge and CITES Secretariat, Lausanne.

Parker, H.W. (1933). The collection of reptile skins for commercial purposes with reference to the possibilities in Empire Countries. Report by the Advisory Committee on Hides and Skins, Imperial Institute. Imperial Institute, London.

Punay, E.Y. (1975). Commercial sea snake fisheries in the Philippines. In: Dunson, W.A. (ed.), *The Biology of Sea Snakes*, University Park Press, Baltimore.

Reisner, M. (1991). Alligators. In: *Game Wars. The Undercover Pursuit of Wildlife Poachers.* Viking Penguin, Penguin Books, New York.

Smith, H.M. (1891). Bulletin of the US Fish Commission. In: Ditmars, R.L. (1907). *The Reptiles of North America: A Review of Crocodilians Lizards, Snakes and Turtles and Tortoises Inhabiting the United States and Northern Mexico.* Doubleday and Company Inc., New York.

Thorbjarnarson, J. (1991). The spectacled caiman harvest program in Venezuela. In: Robinson, J.G. and Redford, K.H. (eds), *Neotropical Wildlife Use and Conservation*. University of Chicago Press, Chicago.

Waller, T. and Micucci, P.A. (1993). Estado actual del conocimiento de la biologiá, comercio y conservación de las boas neotropicales: generos *Boa* L. y *Eunectes* Wagler (1830) (Reptilia: Serpentes: Boidae). Unpublished report, TRAFFIC Sudamerica.

World Conservation Monitoring Centre, IUCN/SSC Trade Specialist Group and TRAFFIC International (1993). *Significant trade in wildlife: a review of select animal species in CITES Appendix II.* Draft report to the CITES Animals Committee.

NOTES

[1] Contrary to general practice in previous recent *Species in Danger* reports, scientific names are used throughout in this text. Where possible, the common synonym is given preceding initial reference to a species. This is because several less common species do not, by definition, have commonly used names and, furthermore, because the trade name for the skin of some species is different to that of the species itself, and thus the scientific name was preferred, to minimize potential confusion.

Appendix 1

Methodology for calculating world trade in skins and sides of reptiles listed in the CITES Appendices, 1983-1989

This study analyses all trade in skins and sides of reptiles recorded in the annual reports submitted by the Parties of CITES for the years 1983 to 1989, to estimate the annual net trade volume in each species.

Net trade was calculated as follows: in each year, the volume of trade from country *a* to country *b* (T(a,b)) was estimated from either volume of exports to country *b* reported by country *a* or the volume of imports from country *a* reported by country *b*, the larger of the two values being taken for each pair of trading partners. The gross exports from country *a* (GE(a)) were then estimated from the sum of its reported export trade to all other countries (1 to n):

$$GE(a) = \sum_{i=1}^{n} T(a,i)$$

and its gross import trade (GI(a)) from the sum of its imports from all other countries:

$$GI(a) = \sum_{i=1}^{n} T(i,a)$$

The minimum net export trade (NE(a)) was then calculated as the difference between gross exports and gross imports:

$$NE(a) = GE(a)\text{-}GE(a),$$

and minimum net import trade (NI(a)) as:

$$NI(a) = GI(a) \text{-}GE(a),$$

negative values being ignored in both cases. The minimum volume of international trade (T) was then calculated as the sum net imports or net imports, both values being equal:

$$T = \sum_{i=1}^{n} NI(i) = \sum_{i=1}^{n} NE(i)$$

Trade reported as "sides" was converted to whole skins by multiplying by a factor of two. All calculations were performed separately on trade reported in units of length, area or weight. These were then converted to numbers of whole skins using the conversion factors shown in Appendix 2 and added together.

This calculation inevitably involves some double counting where transactions are reported in different years by importing and exporting countries. Terms reported in different units (e.g. m^2 and kg) cannot necessarily be added together. The practice of reporting on the basis of permits issued rather than actual quantities traded will also result in some inflation of trade levels. There are undoubtedly some residual errors in the database. Nevertheless, the data provide a first estimation of the overall levels of trade and of longer trends.

Appendix 2

Factors used to convert reptile skins reported in different units into whole skins

Order	Species	kg	m	m²
Lizards	*Dracaena guianensis*	0.05	0.25	
	Tupinambis	0.04	0.25	
	Varanus niloticus	0.07	0.25	0.09
	Varanus salvator			
	Varanus (other species)	0.04	0.25	
Snakes	*Boa*	0.1	1.4	
	Eunectes murinus	0.15	2.1	
	Eunectes notaeus	0.1	1.4	
	Python curtus	0.1	1.2	
	Python molurus	0.25	3.5	0.7
	Python reticulatus			
	Python sebae			
Other snakes		0.05	1.2	
Crocodilians	*Caiman crocodilus* spp.	0.26	1	0.4
	Crocodilus novaeguineae spp.	1.3	0.25	
	Crocodilus porosus	2.47		

Source: WCMC.