CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA

Sixth Meeting of the Conference of the Parties

Ottawa (Canada), 12 to 24 July 1987

Interpretation and Implementation of the Convention

Trade in Ivory from African Elephants

SECRETARIAT REPORT ON OPERATION OF THE QUOTA SYSTEM

1. At its fifth meeting (Buenos Aires, 1985), the Conference of the Parties adopted Resolution Conf. 5.12, "Trade in Ivory from African Elephants", establishing new procedures for the control of international trade in ivory from African elephants. These procedures are collectively referred to as the "ivory export quota system", and the key element is the opportunity for establishment of an annual ivory export quota by each state having a population of African elephants and wishing to export raw ivory.

2. Non-Party producer states may also submit an export quota, and any non-Party wishing to import, export or re-export raw ivory must meet all requirements of the Resolution. Unless a non-Party has informed to the contrary, it is assumed to be not conforming with the requirements.

3. The Secretariat was directed to co-ordinate the implementation of the system including maintaining a central database, receiving annual quotas from producer countries and circulating them, preparing a manual of procedures for implementing the system and providing advice on the conservation status of African elephants. An implementation manual, "Ivory Trade Control Procedures", was written by the Secretariat and distributed to all Party and non-Party countries in November 1985. The report, "Establishment of African Ivory Export Quotas and Associated Control Procedures" prepared by Rowan B. Martin (the draft was distributed as document Inf. 5.3 at the Buenos Aires meeting) was finalized and distributed. These documents were prepared in the three CITES working languages, English, French and Spanish. A full-time Co-ordinator has been employed since early 1986 with contributions from one trade association, two individuals and one government (see document Doc. 6.24, "Financing Secretariat Co-ordination of African Elephant Ivory Trade Controls").

   A separate series of numbered "Ivory Notifications" was begun in December 1985 to disseminate information concerning ivory export quotas and ivory trade controls. These have been distributed to Party and co-operating non-Party states and other interested agencies or individuals, including ivory trade associations.

4. The first ivory export quota year was 1986. The following is a summary of quotas for 1986 and 1987 (as of 15 June 1987) and 1986 trade figures as derived from permits and reports received.

IVORY EXPORT QUOTAS

(N) = Non-Party	1986 Quota			1987 Quota	
Country	No.Tusks	Comments	Exports	No.Tusks	Comments
Angola (N)	0			0	
Benin	0			0	
Botswana	520		64	520	
Burkina Faso (N)	0			0	
Cameroon	300	Incl. 150 stock	100	300	
Central African Republic	0			800	
Chad (N)	0			320	
Congo	1,200		610	3,784	Incl. 2,584 stock
Côte d'Ivoire (N)	0			0	
Equatorial Guinea (N)	0			0	
Ethiopia (N)	700	Incl. 436 stock	640	530	
Gabon (N)	0			2,600	
Ghana	0			0	
Guinea	0			0	
Kenya	2,000			2,000	Incl. 800 stock
Liberia	0			0	
Malawi	20	Polished	20	370	Incl. 350 polished
Mali (N)	0			0	
Mauritania (N)	0			0	
Mozambique	120	Total stock	96	200	
Niger	0			0	
Nigeria	0			0	
Rwanda	0			0	
Senegal	0			0	
Sierra Leone (N)	0			0	
Somalia	17,002	Total stock	16,986	0	
South Africa	12,100	Incl. stock	4,195	14,000	
Sudan	12,971	Current stock	12,971	21,500	Total stock
United Republic of Tanzania	16,400		1,867	18,150	
Togo	0			0	
Uganda (N)	0			156	Current stock
Zaire	10,000		1,425	15,000	
Zambia	5,800		2,001	8,500	
Zimbabwe	14,000		507	9,000	
	93,133		41,482	97,730	

Quotas are to be submitted to the Secretariat in writing by 1 December for the next calendar year. African countries with an elephant population are considered to have a zero quota in any year for which a quota has not been received by the Secretariat. Of the 33 countries with an African elephant population, 14 submitted quotas totaling 93,133 tusks for 1986, and as of 15 June 1987, 17 submitted quotas totaling 97,730 tusks for 1987. Three

non-Party states have submitted quotas; Ethiopia for 1986 and 1987, and Gabon and Uganda for 1987. These non-Party quota submissions were accompanied by written commitments to comply with the CITES ivory control procedures.

5. Resolution Conf. 5.12 provided a one-time opportunity to register stocks of currently held ivory which might be destined for international trade. Such stocks had to be reported to the Secretariat not later than 1 December 1986. Twelve states registered 118,884 tusks and 5,003 raw ivory cut pieces as follows:

Country	No. of Tusks	No. of Cut Pieces	Notes
Belgium	2,456		
Burundi	17,848		
China	4,394		
Djibouti	1,997 (see comment below)		
Federal Republic of Germany	1,450		
Hong Kong	28,477 (see comment below)		
Japan	2,872	3,017	Cut pieces more than 40 cm
Macau	2,452		
Portugal	1,089		
Singapore	55,819	1,986	
Spain	22		
United Kingdom	8		
	118,884	5,003	

Stocks were registered for non-Party states only if the Secretariat received a written commitment to fully comply with Resolution Conf. 5.12 and the Ivory Trade Control Procedures. In addition, Singapore deposited its instrument of accession to CITES on 30 November 1986. Although Djibouti made a timely registration of its stocks and a written commitment to comply was subsequently received, there appears to be an internal problem with the eligibility of a portion of the stock for registration and the matter is not yet resolved. Hong Kong submitted an additional 42,220 kg. of raw ivory cut pieces which were not included by the Secretariat since the number of pieces could not be specified. Stocks of raw ivory in states not having an African elephant population which were not registered by 1 December 1986 are not eligible for re-export unless they were imported after 1 January 1986 in accordance with CITES requirements.

The Secretariat has received several comments, and is aware of newspaper articles, concerning the registration of ivory stocks of illegal origin, suggesting that such ivory should not have been registered or should have been confiscated from the owners or subject to the payment of a penalty or fine. Singapore and Burundi, countries which registered the largest stocks, have been identified in particular, since all the ivory registered by Burundi and most of Singapore's stocks left the countries of origin illegally. It must be recognized that under Burundi or Singapore law, at least prior to the commitment to comply with CITES, it was not illegal to import ivory without country of origin documents, and consequently there was no basis for confiscation or any other action against owners/importers. It was only after those governments agreed to comply with CITES procedures that they became obliged to prevent the import/transit/re-export of, or to confiscate, ivory without proper CITES documents. Under

Resolution Conf. 5.12, country of origin permit numbers/legal origins were not prerequisites for stocks to be eligible for registration and subsequent trade. The Secretariat was therefore obliged to accept the registration of stocks and consider ivory acceptable for re-export, if a non-Party state agreed to comply with CITES ivory control procedures.

An additional point, and one of perhaps greater significance, is the very clear intent of the Parties in including recommendation 1) in the Resolution. It was well known that such stocks existed and that some of the ivory registered would therefore be of illegal origin. What was not realized by most delegates and observers was the magnitude of some stocks. The final decision by the Parties was to provide for full registration to avoid jeopardizing the new system by preventing countries from allowing, on a continuing basis, subsequently acquired illegal ivory from entering international trade by declaring it to be "old stock" or "pre-Convention".

6. The Ivory Trade Control Procedures Manual prepared and distributed by the Secretariat recommends a set of procedures for permit issuance that will enable the Secretariat to verify the authenticity of export and re-export permits for importing countries, and that make it very difficult to move raw ivory under forged or altered documents. For this aspect of the co-ordination function to work effectively it is essential that exporting and re-exporting countries notify the Secretariat and foward a copy of the permit, including tusk mark data, immediately upon issuance, and that importing countries allow consignments to enter only after the Secretariat has verified the authenticity of a permit.

   The country of import is advised by telex of the permit details when a copy is received and entered into the log by the Secretariat, usually within one day of receipt. A copy is then forwarded to the Wildlife Trade Monitoring Unit where permit details, including tusk marks, are entered into the computer.

7. The Wildlife Trade Monitoring Unit of IUCN's Conservation Monitoring Centre at Cambridge has been contracted to process raw ivory tusk and other permit data and to report and analyze raw ivory trade statistics. The Unit's report to the Secretariat for 1986 prepared by John R. Caldwell is found as Annex 1 to this document.

   Since each tusk is entered into the computer, the Unit can also assist the Secretariat with ivory permit verification. A copy of each permit for raw ivory is sent to WTMU, normally within 2-3 days of receipt, and the tusk details will normally be entered into the computer within 14 to 28 days of permit issuance. This will generally allow the Secretariat to alert an importing country of a potential permit problem before the consignment arrives. For most countries, once a consignment has been allowed to enter, there is little legal recourse against an importer unless complicity in the illegality can be proven.

   The instance of deliberate falsification of tusk numbers involving two series of permits for consignments from a Hong Kong exporter to a Macau importer that is mentioned in the WTMU report is a good example of how the system can prevent trade in illegal ivory using CITES documents. It also illustrates the importance of timely submission of permit copies to the Secretariat - if Hong Kong had not promptly forwarded the permits, the consignments would have been allowed to enter, since the Secretariat had notified Macau of their validity by telex as soon as copies of the permits were received.

There have been delays in Secretariat validation on only a fraction of the total number of permits received, and these because exporting/re-exporting states did not promptly send copies of permits to the Secretariat, due to apparent alteration of documents or because essential information such as consignee location or tusk data was missing. Some traders have presented these few instances as representing the norm, portraying the new controls as being burdensome and causing unreasonable delays (particularly when the importing state has an Appendix II import permit requirement) and urged Management Authorities and the Secretariat to loosen control procedures. Most of the circumstances that have resulted in delays have been identified and resolved so that there should not be a recurrence of those problems with these states.

8. It has already become evident that the Secretariat has not been sent copies of many raw ivory export documents (primarily because some exporting countries incorrectly believed that the ivory control procedures do not also apply to personal/tourist and hunting trophies), and that importing countries accepted consignments without contacting the Secretariat to verify authenticity. Many of the documents did not contain required information such as complete consignee address, number or weight of tusks and tusk marks. Since many exporting/re-exporting countries have not submitted a summary of 1986 raw ivory exports as requested by the Secretariat, a complete picture of the problem will not be available until Annual Reports are received in late 1987.

9. From permits and reports received to date, 85,205 tusks entered legal trade in 1986, of which 41,482 tusks (188.5 tonnes) were exported from quota states against the 93,133 total of all quotas submitted. In addition to this amount (but included in the overall total), the 17,848 (89.5 tonnes) tusks registered by Burundi were re-exported to Belgium in late 1986. It is conservatively estimated that this represents less than half the raw ivory which left the African producer countries in 1986. At least another 300 tonnes left illegally, a large part of it via Burundi and the United Arab Emirates to Singapore and the markets of Asia. Analysis of the stocks registered in Burundi disclosed the following pattern of origin: Zaire 40%, United Republic of Tanzania 30%, Zambia 20% and Sudan, Kenya, Uganda, Mozambique, Malawi, Zimbabwe and Botswana the remaining 10%.

   The Secretariat is aware of illegal shipments that were seized during 1986 and 1987 in Hong Kong, China, Japan, Belgium, United Republic of Tanzania, Kenya, Zambia and Chad. Those for which specific information is available are discussed in document Doc. 6.19, "Review of Alleged Infractions".

10. Implementation of the quota system has made it more difficult to move illegal ivory from the African continent. Important to this was the 1986 enactment of CITES legislation by Macau and the accession to CITES of Singapore, both of which had been major Asian entrepots for illegal ivory. Burundi had for several years been the major entrepot on the African continent, and the commitment of that Government to establish controls on ivory was considered a major accomplishment. However, there are indications that Burundi may not be honouring its commitment: a shipment of 26 tonnes without CITES documents was re-exported from Burundi to Singapore in late 1986 via the United Arab Emirates; a United Kingdom airfreight company has apparently been asked to arrange for import of one tonne of ivory claimed to have been confiscated over the last ten years - the letter appears to bear the seal and signature of the Burundi Director of Customs; and there are continuing reports of illegal ivory entering Burundi from neighbouring countries. The Secretariat has had no success in

The following is a summary (1986 and 1987 to June) of countries that have issued export permits/re-export certificates for raw ivory without notifying the Secretariat of issuance or not forwarded a copy of the document at all or until at least six months following issuance, and countries that appear to have allowed import without Secretariat validation of the document:

Country of Destination	Country of Export/Re-Export (1986 and 1987 to June)															
	AU	BE	BW	CF	CG	CM	ET	FR	GB	MW	MY	MZ	TZ	ZM	ZR	ZW
AT													2			6
AU											1					3
AR													2			1
BE													1			
CA					1	3							1			1
CH						1										
CY										1						
DD												1				
DE			10			6							3			11
DK													1			
EG										1						
ES						1							4			7
FR					1	28	1*			1			14			1
GB			1							8			1			1
GR										1					2*	3
HK		1	2						1					3	1	2
IN									5					3		
IL										1						
IT					1	1				1			4			4
JP	1			2*				1				1	9			
LK													1			
MX													4			
NG						1										
NL										1						1
NO													1			
OM																1
SE												1				1
TW			1							13						1
US			1			2			1	10			38	1		60
ZA										8						16
ZR										1						

* Entry apparently denied

This information has been included for the purpose of alerting states to a potential problem in their permit issuance or import clearance procedures and not to cause embarrassment. It should be examined with the understanding that the list is not complete and that some consignments may not actually have been shipped. Fraudulent, invalid or illegally altered documents have been discovered involving raw ivory from Burundi, Central African Republic, Congo, Hong Kong, Macau, Somalia, United Republic of Tanzania and Zaire since the start of the system.

its attempts to communicate with that Government on these matters, and it is felt that Parties should directly urge Burundi to provide an explanation of these matters and to honour its commitment to comply with the CITES ivory control procedures.

The United Arab Emirates continues to be one of the most important entrepots for illegal ivory. Due to continuing illegal trade in CITES species to and through that country, and an unwillingness to correct the situation despite repeated attempts at communication by the Secretariat, the Parties had been urged to prohibit trade in CITES species with the United Arab Emirates on 28 November 1985 in Notification No. 366. That country has deposited an instrument of denunciation of the Convention that will be effective on 27 January 1988 (see document Doc. 6.20).

As control procedures have been tightened and states which formerly served as entrepots for raw elephant ivory have implemented trade controls, the Secretariat has become aware of increasing efforts to establish ivory manufacturing operations in locations such as West Africa, the United Arab Emirates and Taiwan. Since CITES controls are less strict for worked ivory than for raw ivory, the intent is to launder illegal tusks through these operations to facilitate movement in international trade.

To minimize the opportunity for use of this loophole, it is extremely important that CITES documents are required for the export and re-export of all commercial consignments of worked ivory. Countries such as Hong Kong which consider manufactured ivory as being "not readily recognizable" under Article I of the Convention, and therefore requiring no CITES documents for import and export, provide an almost irresistible incentive for the illegal trade to use it as a means of circumventing CITES controls (see document Doc. 6.23, "Trade in Worked Ivory from African Elephants").

11. Resolution Conf. 5.12 acknowledges that establishment of an annual export quota for raw ivory should be considered as part of the management of an elephant population by a state. However, it must be recognized that a number of states do not yet have management programmes and also that quotas established during the initial years will not be very accurate or realistic for a number of reasons, including, a lack of current data on populations and level of illegal take, and inadequate infrastructure to establish or carry out wildlife management and utilization programmes and effective anti-poaching activities.

Adoption of the quota system was only a beginning, a framework whereby the Parties can assist African producer countries in protecting and managing their elephant populations through co-operation on a set of trade control procedures that goes somewhat beyond the norm for a CITES Appendix II species. For the importing countries this involves an extra measure of vigilance in acceptance of documents for consignments of ivory. For the producer countries it means establishing quotas that are realistic, following the trade control procedures as carefully as possible, and reducing the opportunity for poachers to continue to operate.

On behalf of the African states with an elephant population, and to comply with the mandate of the Secretariat to provide advice on the conservation status of the African elephant, the IUCN-SSC African Elephant and Rhino Specialist Group (AERSG) was asked to analyze the relationship between the 1986 and 1987 ivory export quotas and levels of trade that actually occurred, in relation to current elephant populations and related factors. Since each quota represents an individual national decision and a unique set of circumstances, the analysis must obviously be performed on a

country-by-country basis. The matter was included on the agenda of the May 1987 AERSG meeting at Nyeri, Kenya, and it is expected that a paper will be completed in time for the Ottawa meeting, and be included as Annex 2 to this document. It is hoped that this information will be of value to the quota states in assessing the quota levels they have established and in developing quotas for the coming year.

If the AERSG is willing and producer states consider the information useful, the Secretariat hopes to have the analysis done on a continuing basis. It is also hoped that technical assistance in determining quotas can be provided to individual Party and non-Party states that request it. Although the Secretariat advised that it would try to arrange for assitance to countries in preparing the 1987 quota submissions, (Ivory Notification No. 12, dated 19 November 1986), none was requested.

CONCLUSIONS AND RECOMMENDATIONS

a. Effectiveness of the system is totally dependent on how realistic states are in establishing quotas, and the level of co-operation and vigilance of all ivory exporting and importing countries in controlling trade in raw and worked ivory. Some countries are still not following recommended control procedures, i.e. exporting and re-exporting states are not sending copies of documents to the Secretariat upon issuance, are exporting to non-co-operating, non-Party states, and not including required information such as complete tusk marks; importing countries are allowing consignments to enter without verification of authenticity by the Secretariat and with improper documents, and are allowing unmarked tusks to enter. If countries continue to ignore recommended control procedures the effectiveness of the system will be reduced.

b. To minimize the opportunity for illegal ivory traders to circumvent controls, states should require CITES documents for all commercial consignments of worked ivory (see document Doc. 6.23), and raw ivory cut pieces entering international trade should be marked in accordance with recommended procedures. The Secretariat is of the opinion that current recommendations for the marking of raw ivory in Resolution Conf. 3.12 are not realistic, and has submitted a proposed resolution on this subject for consideration by the Parties (see document Doc. 6.22).

c. The AERSG should be requested to assist CITES by analyzing ivory export quotas on a continuing basis, with the results of these analyses to be available for use by the quota states.

Technical assistance in establishing annual quotas and in establishing proper CITES ivory control procedures should be made available to range states on an individual basis when requested.

The Secretariat suggests that when the country of origin cannot be specifically identified, and national law permits, a portion of the proceeds from the disposal of confiscated illegal ivory by importing countries be made available for this purpose, to obtain the biological data necessary for management programmes and for improving the implementation of control procedures.

THE EFFECT OF RECENT LEGISLATIVE CHANGES ON THE PATTERN OF THE WORLD'S TRADE IN RAW IVORY

A report to the CITES Secretariat by

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INTRODUCTION

This report has been written under the consultancy contract of the CITES Secretariat with the IUCN Conservation Monitoring Centre (CMC). The aim of the report is to outline changes in the pattern of the world's trade in raw ivory during 1985 and 1986, to show how the new ivory quota system is operating from the standpoint of trade statistics and to detail the part that CMC's Wildlife Trade Monitoring Unit (WTMU) plays in that system. Although Belgium, UK and France are important in the world's ivory trade, it was decided that this report should concentrate on Japan and Hong Kong as most of the ivory in international trade goes to or through these markets and they are, therefore, the best indicators of changes in trade patterns. In addition, the report makes some comment on the average weight of tusks in trade and the degree to which this value can be used for determining the effect the trade has on natural elephant populations.

SOURCES OF INFORMATION

The main sources of information for this report are the CITES annual reports for Hong Kong for the years 1979 - 1986, which apart from 1979 list both the number of tusks and the weight of ivory in each shipment, and Japanese Customs statistics for the same period, which only give the total weight of ivory but include waste and powder. For 1986 additional information was available to WTMU in the form of the export permits issued for exports of ivory under the quota system, which were provided by the CITES Secretariat. Although not all of the ivory exporting countries fully understood the new ivory control procedures, and failed to send some, or all, of the copies of their export permits to the CITES Secretariat, it is believed that most of the major commercial shipments were traced.

In some earlier reports on the ivory trade (WTMU, 1983; Caldwell, 1984) the average weight of tusks in trade was estimated for Japan on the basis of re-exports to Japan from Hong Kong. In 1984 however, Japan for the first time provided details of both numbers of tusks and their weight, in a draft report to CITES, which allowed a much more accurate calculation of average tusk weight to be made. However for 1985 the Japanese annual report to CITES recorded tusk imports either by weight or by number but not by both. Although some of Japan's imports can be traced in annual reports of other CITES Parties, insufficient data are available to calculate accurately the average weight of tusks being exported from Africa. As the information on average tusk weight for 1985 is so poor, and in view of the reliance of both Japan and Hong Kong on each other and on other non-producer countries for their sources of ivory in 1985, and with so much more detailed information available on the individual tusks traded in 1986, it was not considered worthwhile to estimate a global average tusk weight for 1985.

Information on seizures of ivory, on available stocks of ivory and on export quotas for 1986 and 1987 was taken from numbered Ivory Notifications issued by the CITES Secretariat. Calculation of the number of tusks in each 0.5 kg weight class was done by the WANG VS computer.

CHANGES IN THE TRADE PATTERN DURING 1985 - 86

An earlier report by WTMU (Caldwell and Barzdo, 1985) outlined a period of dramatic change in the pattern of the world's ivory trade that took place throughout 1983 and 1984. During that period, the relative importance of Hong Kong as the centre of the ivory trade was being overturned in favour of Japan. The root cause of this imbalance was that, while Hong Kong's legislation effectively implemented CITES for ivory, Japan's did not. Gradually the number

of legitimate suppliers of ivory in Africa became reduced for Hong Kong, which subsequently became more and more reliant upon Japan as a source of supply. During 1984, Hong Kong's imports of raw tusks fell to 260 tonnes (t) compared to 565 t the year before; 66% of these were imported via Japan as is shown in Figure 1a. In addition, Hong Kong's carving industry was becoming increasingly reliant upon cut pieces and ivory scrap (125 t being imported in 1984), again mainly imported from Japan. This is shown in Figure 1b. The two incidents that had brought about this change in the trade pattern were Sudan's ban on exports of raw ivory, introduced at the end of 1983, and Belgium's accession to CITES and subsequent tightening of controls through Europe in January 1984. The combined effect of these two events was to force much of the trade to centre upon Burundi as the main outlet of ivory from Africa to Japan, with the United Arab Emirates (UAE), Macau and Singapore becoming important as staging posts.

In 1985 two further events took place which were to have very significant effects on the world's ivory trade. At the fifth meeting of the Conference of the Parties to CITES, held in Buenos Aires, Argentina, in April, the CITES Secretariat was given the mandate to form a special ivory unit. At the same time the major ivory producer and consumer nations agreed to operate a quota system in which the countries with elephant populations would set export quotas based on sound management principles and the ivory importers would only accept ivory coming from countries that had agreed to the quota system. The special ivory unit of the Secretariat was to co-ordinate trade between exporting/re-exporting and importing countries and to monitor the trade. Earlier in 1985 a consultant had been employed by the CITES Secretariat and funded by the EEC to investigate the different ways a quota system could be operated and how reasonable export quotas could be estimated from known elephant populations to allow sufficient ivory for both international trade and any internal carving industries that might exist (see Martin, 1985). At that time fears were expressed by some traders that the quotas would be set at such a low level that there would be insufficient raw material for them to continue in business.

The second significant event for the ivory trade in 1985 was the introduction of new legislation in Japan that, for the first time, required the presentation of a valid export licence from the country of origin before import would be allowed. The effect of the legislation, passed in April 1985, was not immediately apparent and, by the end of June, there was little sign that anything had changed. Milliken (1985) pointed out that although a few token shipments had been stopped, ivory was still flooding into Japan with unrealistic origins being specified such as Uganda and Rwanda, which have very few elephants remaining.

The effect of the new legislation became obvious in the second half of 1985. Up to the end of June, Japan had imported 235 t of raw ivory and appeared to be well set to reach an end-of-year total similar to that achieved in the two previous years, 473 t and 474 t in 1983 and 1984 respectively. In fact, only another 70 t were imported in the second half of the year and several shipments were refused entry.

Hong Kong imported only 41 t of ivory directly from Africa in 1985, the tusks coming from South Africa, Sudan (despite the ban a few exports were allowed to meet previous commitments), Tanzania and Zimbabwe only. The remaining 71% of Hong Kong's imports arrived via Belgium, China, France, Japan, Switzerland and the USA. Japan was again the major supplier, accounting for 57% of the raw tusks and most of the 94 t of ivory scrap and cut pieces imported.

The main effect, therefore, of the Japanese legislation was to create a block at the importing end of the trade route. Fears that the soon-to-be-introduced quota system would severely restrict exports from Africa may have encouraged some traders to move as much ivory as they could out of the continent before the system began operating in January 1986. The result was that large stockpiles began to build up throughout 1985, and to a certain extent in 1986, at the various staging posts mentioned earlier, viz UAE, Burundi, Macau and Singapore.

Under the quota system, producer countries have to inform the CITES Secretariat of their annual quota, preferably by the end of the year previous to the one to which it applies. Countries that have not submitted a quota are deemed to have a zero quota until a quota is notified, and may not export raw ivory. All tusks exported, including personal hunting trophies, are covered by the quota system and each should carry a unique mark composed of, as a minimum, the two-letter ISO code of the country of origin, the number of the tusk, the year of marking and the tusk weight in kilogrammes.

Table 1 shows the export quotas for 1986 and the number of tusks actually exported.

Table 1.

Ivory exported from Africa under the quota system - 1986

Country	Quota	No. tusks exported	Weight (kg)	mean wt. /tusk
Botswana	520	14 (1)	-	-
Cameroon	300	100 (1)	-	-
C.A.R.	0	8 (2)	-	-
Congo	1200	610	8186.5	13.4
Ethiopia	700	640	4549.9	7.1
Ghana	0	0	-	-
Kenya	2000	0	-	-
Malawi	20	20 (1)	-	-
Mauritania	0	0	-	-
Mozambique	120	96	1548.8	16.1
Niger	0	0	-	-
Somalia	17,002	16,986	51,184.0	3.0
South Africa	12,100	4195 (3)	31,828.2	7.6
Sudan	12,971	12,971	59,525.6	4.6
Tanzania	16,400	1867 (4)	13,172.8	7.1
Zaire	10,000	1425	5538.5	3.9
Zambia	5800	2001	7739.3	4.0
Zimbabwe	14,000	507 (5)	5598.3	12.1
Total	93,133	41,440	189,108.0	4.58
Burundi (6)	18,148	17,841	89,464.4	5.0
Total	108,441	59,461	278,572.4	4.71

Notes

(1) some permits issued, not received by WTMU.

(2) 2 permits issued, refused by Management Authority of France.

(3) includes a few re-exports origin Botswana, Namibia and Zimbabwe

(4) includes 10 for which weights were not listed on the export permits

(5) includes 43 for which weights were not listed on the export permits

(6) Burundi became eligible to re-export stockpiled ivory registered with the CITES Secretariat, on a once only basis, following Ivory Notification No. 11 of 14 October 1986.

The most obvious trend in the pattern of trade during 1986 was the continued strong decline in Japan's gross imports. During that year only 79 t were imported (see Fig. 2a), the lowest amount since 1965, and of that amount 27 t was imported via Hong Kong. Hong Kong's gross imports of raw tusks (Fig. 2b) remained steady at the 1985 level of 142 t but, unlike the previous few years, virtually none was imported via Japan. This is shown in Fig. 1a. The amount of cut pieces and scrap imported by Hong Kong was also lower (56 t) as is shown in Fig. 1b. In order to calculate the net quantity imported by Japan and Hong Kong together, their gross imports have been summed and the trade between the two countries discounted. This indicates that the Japanese and Hong Kong markets between them imported about 265 t in 1985 and only 195 t in 1986, far less than in previous years (see Fig. 2c). The creation of large stockpiles outside these countries however, meant that the part played by the end-markets in the Far East was far less important than in previous years. In order for the carving industries of Japan and Hong Kong to have continued without a disastrous rise in unemployment it must be assumed that the dealers there already held considerable stocks of raw ivory.

One of the first effects of the quota system was to reinstate Sudan as a major exporter. The quota for that country, of 12,971 tusks, was fulfilled in 32 shipments, all but two of which went to Hong Kong. The average weight of the tusks was only 4.6 kg and it is perhaps significant that 1145 or almost 9% of these tusks weighed 0.5 kg or less. The weight distribution of the tusks, and the fact that Sudan requested a quota of 21,500 tusks for 1987 to cover existing stocks, suggests that the 1986 exports came from a much larger stock than was actually exported. Indeed, the Management Authority in Sudan has recently informed the CITES Secretariat that all the stocks exported in 1986 and included in the 1987 quota was stock in hand in 1985; it is assumed that no further stocks are held in the country (but see cautionary note in the discussion of average tusk weights).

The only producer country to export more ivory than Sudan in 1986 was Somalia. Somalia, which only became a Party to CITES in March that year, had a stock of an estimated 17,002 tusks owned by the Somali Government. This stock weighed about 51 t and was stored in the police compound at Mogadishu. After inspection by two officers of the CITES Secretariat, this ivory, with an average tusk weight of only 3 kg, was released for sale and was sold in its entirety to a trader in Hong Kong. As reported in the Traffic Bulletin, this sale cleared up one of the problems in establishing the ivory control procedures, as it had been feared that the Somali stock might be used to cover a laundering operation for illegally obtained tusks (Caldwell, 1986).

Although Japanese Customs statistics recorded ivory from the Central African Republic as having been imported in early 1986 this was not in contravention of the zero quota. This ivory had in fact been sold and exported, much of it through Belgium, in late 1985.

Of the other African countries with quotas in 1986, none appears, on the basis of permits received by WTMU, to have achieved its set quota. Ethiopia filled 91% of its quota of 700 tusks with one shipment to Hong Kong of 640 tusks averaging 7.1 kg, and Mozambique filled 80% of its quota of 120 tusks with one shipment of 96 tusks, averaging 16.1 kg, to Japan. Congo only used 51% of its quota, Zambia apparently reached 38% and South Africa only 35% (for average tusk weights see Table 1). Kenya had a quota of 2000 tusks but apparently exported none.

Three of the largest quotas were those for Tanzania, Zimbabwe and Zaire, being 16,400, 14,000 and 10,000 tusks respectively. However exports from those countries totalled less than 4000 tusks, or less than 10% of the given quota. In the cases of Tanzania and Zaire, at least the equivalent of their quotas was probably exported illegally via Burundi (Parker, pers. comm.). Another of the reasons behind the unfulfilled quotas may have been the problem of the large amount of stockpiled ivory and a natural unwillingness amongst some of the traders to buy yet more ivory when they had large amounts of capital tied up in those stockpiles. Table 2, which lists the stocks of ivory registered with the CITES ivory unit before the 1 December 1986 deadline, shows how much ivory was tied up in this way. From the stocks in Burundi, Macau and Singapore plus an unknown quantity in UAE it would appear that at least 400 - 500 t had been accumulated in stockpiles over the preceding 18 months. This figure probably represents frozen assets worth something in excess of US$ 50 million, assuming a value for raw ivory of US$ 100 per kg.

Table 2.

Stocks of raw ivory registered with the CITES Secretariat

Country	Number of tusks	Weight (kg)
Belgium	2,456	16,150
Burundi	18,148	89,464
China	4,394	19,027
F.R.Germany	1,450	10,886
Hong Kong	28,477	178,510
Japan	2,872	32,579
Macau	2,452	22,293
Portugal	1,089	14,017
Singapore	55,819	270,474
Spain	22	161
United Kingdom	8	139
Total	99,039	653,700

NB. Almost 47 t of cut pieces are held in Singapore and Macau plus an unknown amount in Hong Kong. Djibouti also registered ivory stocks before 1 December 1986 but has not yet made a formal commitment to comply with the Ivory Trade Control Procedures.

The problem of ivory stockpiled in non-producer countries had been recognised by the fifth meeting of the Conference of the Parties to CITES and there was a clause built into Resolution Conf. 5.12, which set up the quota system, to allow these stocks to legitimately enter trade without compounding the problem. The clause only allowed stocks registered with the CITES Secretariat by 1 December 1986 to be traded. Thus currently held stocks could be run down without the danger that stocks of ivory obtained in contravention of the quota system could be built up again, either in those countries having previously registered stocks, or in others.

Thus, throughout much of 1986, there was a lot of understandable anxiety amongst traders with capital tied up in stockpiles. At the same time it was important for the CITES Secretariat that these stockpiles should be used, as the presence of such a large reservoir of ivory outside the quota system would have rendered that system very difficult to operate or to police in any realistic way. Governments of countries holding such stockpiles were thus under a certain amount of pressure from two directions, to persuade them to agree to comply with the ivory control procedures and to register stocks before the 1 December deadline.

It appears that before the final deadline for registration arrived there was considerable movement between stockpiles as traders tried to find the most economical way to get their ivory back into trade. For example, Macau only registered stocks of 22 t whereas several times that amount had been seen there earlier in 1986 by an officer of the CITES Secretariat. It was suggested by the Macau Authorities that much of this was smuggled out, probably to Singapore, or entered the domestic carving industry. China imported some 19 t in April and May which had been illegally imported from Macau and Singapore; this was subsequently confiscated. It is also believed that at least 100 t of Singapore's declared stock had recently been imported from Somalia, Burundi and Dubai.

Burundi was the first of the major non-producer countries to register its stockpiled ivory, and virtually all of it was shipped to Belgium in late 1986. Much of it was subsequently re-exported to Hong Kong, arriving in early 1987, and some to China and Japan.

Until recently it was fairly easy to import ivory to Japan on the basis of a certificate of origin, the validity of which was very rarely checked. For this reason it is thought that large-scale smuggling of ivory was unnecessary. It is now suspected that the new legislation, that requires the prior presentation of a valid export permit from the country of origin, has led to increased smuggling of ivory.

In January 1986 Belgian Customs officers seized 10 t of raw ivory at Antwerp harbour, the tusks being in two containers said to contain "Bee-wax", and in another incident 1.5 t was discovered in a shipment of malachite in Lisbon, Portugal. In June 1986, Zambian authorities seized 564 tusks weighing about 6 t which were found in a concealed compartment of a truck going to Burundi. Other seizures are known to have occurred in both Tanzania and Kenya.

WTMU's ROLE IN THE IVORY CONTROL SYSTEM

At the beginning of 1986, WTMU was contracted by the CITES Secretariat to set up and maintain a computerised database on the Wang VS 65 computer at Kew, London, that could account for all raw ivory in trade. This is made possible by each tusk having a unique number composed of country code, registration number, year and weight in kilogrammes.

Permits for export of raw ivory, accompanied by the relevant tusk data sheets bearing all the unique numbers of the tusks in the shipment, are normally sent to the CITES ivory control unit where the initial checking procedures are carried out before the ivory is actually shipped. Full details are immediately forwarded by post to WTMU for entry into the computer.

The details of each ivory transaction are entered into the computer, via a dedicated telephone link, at IUCN's Conservation Monitoring Centre in Cambridge, of which WTMU is a part. The data are entered on a series of linked input screens, the first of which takes all the details appertaining to the export permit and the transaction itself. These can include the following: exporting country, export permit number, the date on which the permit was issued, the year for which the tusks form part of the quota, the actual date of export, the importing country, the date of import and import permit number, the number and weight of whole tusks, the number and weight of cut pieces which have been marked in accordance with the ivory control procedures, the number and weight of unmarked cut pieces or scrap, the total weight of the shipment and whether it was the exporter, the importer, or both who reported the transaction. It is also possible to indicate, in cases where information has been reported by both exporter and importer, which information source is considered to be the more accurate.

The second input screen allows the input of all the available data about the tusks, normally typed in directly from the tusk data sheets accompanying the export permit. The following information, if it is available, can be entered on this screen: the two-letter ISO code of the country that marked the tusk, a district code if one is present (up to six characters are allowed for this), the number marked on the tusk, the year of marking, the weight marked on the tusk in kilogrammes, the country of origin of the tusk if it is different to the marking country, the length of the tusk in centimetres, the state of the specimen (i.e. if it is a whole tusk or a cut piece), the circumference of the tusk at the lip mark, the sex of the elephant, the age of the elephant and the source of the tusk, i.e. whether it has come from an animal killed for a hunting trophy, from a culling operation, from an elephant control operation, poached and seized ivory, etc. For the purposes of the CITES ivory control unit, the first five of these tusk criteria make up a tusk's unique number, however the computer does not recognise weight as part of that number, thus allowing for the small changes in weight that may occur during shipment.

In order to speed-up the input of data, the computer can automatically generate the country code, the district code and the year, etc. if these details are constant throughout a shipment or part of a shipment, and can also generate the actual tusk numbers if these are sequential. In this instance the only data entered manually are the tusk weights. The computer is also capable of copying details of individual tusks, part shipments or even entire shipments from one permit to another to speed-up input in the case of re-exports.

When all details of an ivory shipment have been entered into the computer, a printout is produced showing all the details of the permit and the tusks. This allows the typist to check the accuracy of the input. To allow for easier cross-checking the computer also calculates and outputs the total number of tusks entered and the total weight of the shipment. In addition, the computer checks each of the tusks in the shipment against all the tusks already in the database and reports any inconsistencies such as tusks being exported from a country other than the one that last imported them.

All instances of irregularities are immediately telephoned to the CITES ivory control unit in order that investigations can be instigated as speedily as possible. Tusk information is entered into the computer as soon as it is received by WTMU; in most cases therefore, full details are in the computer within 14 to 28 days of the export permit being issued which means that, under normal circumstances, an importing country can be warned of a potential problem before the ivory is actually imported.

During 1986, many cases of duplicate tusk numbers have arisen, and all have been communicated to the CITES Secretariat. However, duplicate tusk numbers do not necessarily indicate deliberate falsification, although this is the first thing to be investigated, and five different reasons for this phenomenon have become clear throughout 1986. Many problems have been caused by marks being written in felt pen which subsequently prove difficult to discern. In some cases accidental misreading or typographical errors have been the cause. A technical error in South Africa caused several hundred tusks to be given the same number by authorities in both Transvaal and the Orange Free State. In Sudan the first trader to begin marking and exporting tusks under quota misunderstood the system and began marking the tusks on each of his five export permits with number 1. This problem was eventually solved when the trader in Sudan payed for the tusks to be remarked in Hong Kong with a suffix A, B, C, D, or E before they were re-exported.

The fifth reason for duplicate numbers is deliberate falsification. Towards the end of 1986, a Hong Kong trader exported some ivory to Macau and subsequently applied for several permits to export more shipments, also to Macau. When the computer showed that many of the tusk numbers had been used on the earlier permit the CITES Secretariat was immediately informed. Subsequent action by the Hong Kong authorities was to cancel the new permits and investigations were instigated by the authorities in both Hong Kong and Macau.

Throughout 1986 WTMU computerised details of approximately 700 ivory export permits, totalling 91,000 tusks, plus a stock of 52,000 tusks registered by Singapore. WTMU also aided the CITES Secretariat in establishing a standardised permit checking system in Lausanne. In addition to the output of tusk details from the computer, WTMU now has the facility to list the permits issued for all exporting countries, either singly or collectively, and conversely all imports for all importing countries. It is hoped that, in the future, WTMU and IUCN/SSC's African Elephant and Rhino Specialist Group will liaise closely in order that more analytical work can be done on the effect of trade on wild populations. To this end, WTMU has recently developed a programme to allow the computer to sort details of all the tusks exported by any country into specific weight classes in order to construct histograms showing the weight distribution of the tusks in any individual country's raw ivory exports.

IMPLICATIONS OF AVERAGE TUSK WEIGHT

In many recent studies of the world's ivory trade the average weight of tusks has been used as some kind of indicator of the effect of the trade upon wild populations. Pilgram and Western (1984) have also used this value in a mathematical model predicting the effect of different offtake regimes from elephant populations. There appears to have been a decrease in the average weight of tusks traded by Japan and Hong Kong between the late 1970s and the mid-1980s which has suggested that, overall, more elephants are being killed each year to provide roughly the same amount of ivory to the trade. Thus population structures in the wild were being altered and the average age of animals killed for the trade was falling. Average tusk weights have been estimated and calculated using various sources of information and by various

means in recent years but the general consensus of opinion is that the average weight has been declining. This can probably be explained by a general change in hunting technique, from selective to non-selective hunting; i.e. instead of hunting animals with heavy tusks, whole families are killed and all available ivory is taken. This fits in well with known facts concerning the increase in organised poaching in the early 1980s and tusk weight distribution might therefore be expected to be comparable with that obtained during the culling operations in Zimbabwe in recent years.

For the weight of tusks in trade to act as a measure of the wild population, two assumptions have to be made: firstly that tusks entering trade are in some way representative of the populations they were taken from, and secondly that the distribution of tusk weights around the mean weight is regular, or at least predictable.

In fact, tusks in international trade are unlikely to provide an accurate representation of the structure of the population from which they have been taken for many reasons. During the 1970s a substantial amount of the ivory in trade was either found or deliberately hunted and in the case of hunted ivory it is likely that there was a bias towards bulls carrying heavy ivory. Data from that period are very incomplete and difficult to analyse and Parker's outstanding account of the ivory trade (1979) is the best available information from this period.

At the present time, and in the past few years, ivory entering the international market is and has been from many and varied sources and has been obtained in several ways. Countries that support an internal ivory carving industry, such as South Africa, Zimbabwe and Zambia are more likely to export large tusks, that have a high value on the international market, than the smaller, substandard tusks that can be used by the domestic carving industry. Thus in order to estimate the effect of the trade on South Africa's elephant population one must take full account of the internal trade, for which data are very difficult to obtain, or the results would be totally spurious.

Another problem is determining exactly from which population a tusk has come. During the early 1980s, most of the tusks in trade for which we have good data on both number and weight came out of Africa via Sudan. It has been shown (Caldwell and Barzdo, 1985) that perhaps as much as two-thirds of this ivory was being re-exported and the country of origin was unknown. The shipments must have contained both hard, forest ivory from Congo and Zaire and soft, savanna ivory from elsewhere in Africa, and thus came from many different and widely scattered elephant populations.

When tusks are stored for several years, as was the case of the ivory exported from Somalia in 1986, there are two problems involved in studying their weight distribution. Firstly they may lose weight from dehydration. Secondly they may be systematically replaced, that is the larger and more valuable tusks being removed (usually illegally) and being replaced by smaller, less valuable tusks in order to maintain the same number of tusks. It is therefore difficult to say precisely that old stockpiles of tusks are in any way representative of the elephant population from which they were taken or, indeed, of the present elephant population.

A further problem is knowing how long the tusks have been kept before export. For many countries, e.g. Tanzania, South Africa, Zimbabwe, etc. the shipments exported each year contain not only tusks collected and marked in that year, but also tusks collected and marked several years before. In this case further study is possible, however this can be compared directly with the situation involving exports from Sudan and Somalia where it is known that tusks marked in 1986 were from animals killed as long ago as five years previously.

The second major problem with the reliability of the average tusk weights is that the distribution of weights around the mean will depend on the source and origin of the tusks and, for different killing, regimes this distribution may vary markedly. For example, in the case of elephants hunted specifically for maximum ivory yield there is likely to be more hunting pressure on larger animals than on smaller ones and the tusk weights are likely to be distributed evenly around the average weight or may even show a bias towards tusks heavier than the mean. For tusks coming from a culling programme of the type carried out in recent years in Zimbabwe, or from well organised mass poaching, the bias in weight distribution is going to be towards the smaller tusks as a result of the number of juvenile elephants involved.

In order to investigate the validity of the use of average traded-tusk weights as a factor in modelling elephant populations, and to look more closely at exports from the major producer countries, the number of tusks in each 0.5 kg weight class as a percentage of the total number of tusks has been calculated and the distribution of weight classes is shown in the form of histograms in Fig. 3.

If we assume that Burundi has been the collection point for tusks gathered in a non-selective way from most of Central and East Africa, and that there is little or no significant carving industry there, we may expect that the tusks exported from there would show the kind of weight distribution that could be expected from natural elephant populations. The result (shown in Fig. 3a) is a smooth skewed curve with a peak at about 3 kg, to the left of the mean tusk weight of 5.0 kg (see Table 1). If we further assume that most of the ivory stockpiled in Singapore was originally exported via Burundi we might expect the weight distribution curve of Singapore to show similarities with that of Burundi. In fact, as can be seen in Fig. 3b, the curves are almost identical. Figure 3c is the histogram produced when the tusk data from both Burundi and Singapore are combined.

The largest direct export of ivory from Africa in 1986 was 16,986 tusks from Somalia with an average weight of 3.0 kg. Figure 3d shows that their weight class distribution follows a broadly similar pattern to that of the combined Singapore/Burundi tusks but that the peak is at 2 kg rather than 3 kg and the bias towards the smaller tusks is more pronounced. This tends to lend some veracity to the rumour that the tusks had been subject to selective replacement whilst in storage.

Zairean tusks showed a similar pattern to those for Somalia for both 1985 and 1986 (Fig. 3e) but the number of tusks was much fewer. Again the highest proportion were in the 2 kg weight class rather than at the mean weight of 4 kg (see Table 1).

Sudan's export of 12,971 tusks, however, did not fit the same pattern (Fig. 3f). The pattern shown here is of similar quantities of tusks in each 0.5 kg weight class up to about 5 kg with a decline in the numbers of tusks weighing more than that. This pattern implies that the tusks may have been sold selectively according to weight but the presence of so many very small tusks suggests that the Sudan export of 1986 was only a proportion of a much larger stock. It was originally thought, by the CITES Secretariat, that the quota for 1986 covered all existing stocks but this clearly was not the case as Sudan announced a quota of 21,500 tusks for 1987. It is now believed that this latest quota represents the total remaining stock of tusks in Sudan, however R. Martin (pers. comm.) has suggested that the Sudanese traders used to operate by first obtaining an export order and export permit before obtaining sufficient tusks to fill the order. This system may, however, have ceased operating since the start of the quota system.

Figure 3g shows the weight class distribution of the tusks exported from Congo during 1986 and until April 1987. This demonstrates no real pattern identifiable with population structure and shows a fairly even distribution around the mean (13.4 kg, see Table 1) with a slight bias towards the lighter tusks. The 1986 data also show the bias that can occur on weighing - there being more tusks at each whole kilogramme class than at the half kilogramme intervals.

Table 3

Ivory export quotas for 1987 (as of 6 May 1987)

Country	Number of tusks	Notes	Change from 1986
Botswana	520		0
Cameroon	300		0
Chad	320		+320
Congo	3784	inc stocks of 2584	+2584
Ethiopia	530		-170
Gabon	2600		+2600
Kenya	2000	inc stocks of 800	0
Malawi	370	inc 350 polished	+350
Mozambique	200		+80
South Africa	14 000		+1900
Sudan	21 500	existing stock	+8529
Tanzania	16 000		-400
Uganda	156	existing stock	+156
Zaire	12 000*		+2000
Zambia	8500		+2700
Zimbabwe	9000		-5000
Total	91,780		-1353

* = provisional

Figure 3h shows the tusk weight class distribution of South African exports in 1986, which demonstrates a much broader distribution around the peak than shown by the Burundi/Singapore tusks but again this peak is lighter than the average tusk weight of 7.4 kg (see Table 1) and it appears likely that the prominence of small tusks would have been greater if the tusks used for the domestic carving industry had been included.

Tanzania's tusk weight class distribution (Fig. 3i) shows a similar pattern to that of South Africa with a larger proportion of small tusks, peaking in the 3 - 4 kg classes. This is again less than the average tusk weight of 7.0 kg (see Table 1). According to some knowledgeable sources, much of Tanzania's real export of ivory, perhaps even as much as or more than three times the official figure, was exported illegally via Burundi (Parker, pers. comm.).

Thus the weight distribution around the mean value is very varied and depends upon several independently operating factors. A generalised figure such as the average weight of tusks in trade is dependent upon so many variables that, on its own, it is not representative of any one population of elephants, nor is it representative of elephants in general. At best it can be used as a marker, to point towards areas of the trade or elephant management strategies which may require closer attention.

THE FUTURE

Table 3 shows the ivory quotas so far notified for 1987. It also indicates where these differ from those for 1986. Recently, much of the ivory trade has been concerned with shuffling stockpiled ivory from one place to another and generally coming to terms with the new operating procedures. This was one of the main factors that brought about such reduced import levels during 1986. That stockpiled ivory will almost certainly enter the end-markets during 1987 and may reduce the immediate demand for new stocks from Africa.

There are several potential consequences. Firstly, if producer countries are unable to dispose of their ivory through the quota system, it may cause general dissatisfaction with the overall working of the ivory control procedures. If this is coupled with a continued high level of illegal trade, via Burundi to the UAE, then the quota system may become unworkable. It is disturbing that at least one of the world's most well-known illegal traders (who, despite his Oriental origins, is not considered welcome in either the Japanese or Hong Kong ivory traders associations) is known to be moving Chinese ivory carvers into Dubai and Taiwan. Under current legislation, Hong Kong does not recognise worked ivory as a "readily recognisable part or derivative" under CITES and there is therefore a loophole in the ivory control procedures that may allow ivory, simply worked in Dubai or any of the other Arab Emirates, or indeed Taiwan, to be imported perfectly legally without any of the difficulties of CITES controls. There is also currently a significant trade between Japan and Hong Kong in cut pieces of ivory and there are considerable differences of opinion about how, and if, they should be marked. This will need to be sorted out in the near future by the CITES Secretariat and the Parties involved.

A second possible problem is the build-up of considerable stockpiles of ivory within the producer countries in Africa. Although the large stocks held in Somalia have now been sold there still remains a large amount of ivory in store in Sudan. Hopefully this will be cleared in 1987. This problem is very difficult to solve as any action taken at the consumer end of the trade route will take some years to take effect at the producer end. Although further imports may be reduced, it will take a long time for the message to get through to the poacher in Africa that it is no longer as easy as it was to sell illegally obtained ivory. Thus stockpiles will inevitably build up in Africa and will always tend to move towards the easiest outlet. This is not necessarily a deliberate action to reduce the effectiveness of the quota system, but could occur as a natural result of the recent changes in legislation.

Although both of these stumbling blocks have to be overcome, it seems most likely that the quota system will gradually have its effect throughout the international ivory trade system. Already ivory with legitimate paper-work is selling for several times the price it would without papers. If, as is likely, the markets learn better how the procedures work, it should be possible to maintain a regular supply of ivory from Africa, with a steady price, that will satisfy the demands of the trade and promote better elephant conservation. By the end of 1987 the new ivory control procedures should really begin to work in the manner they were intended.

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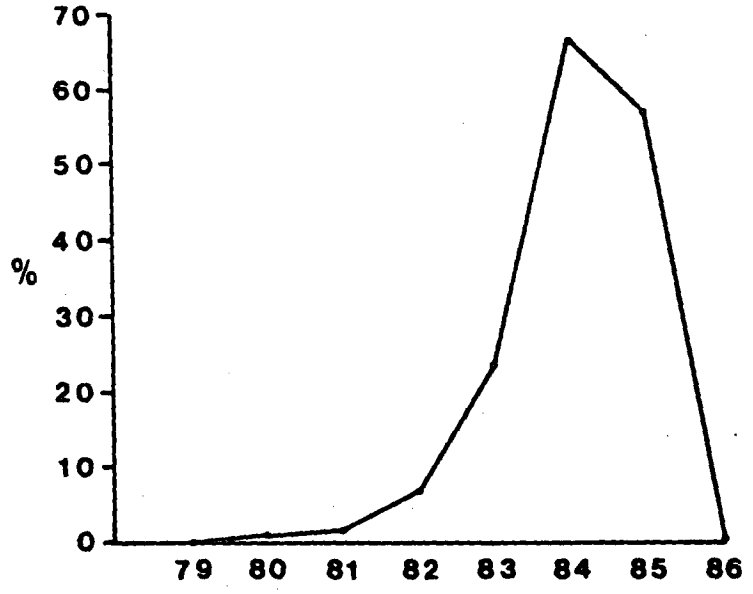
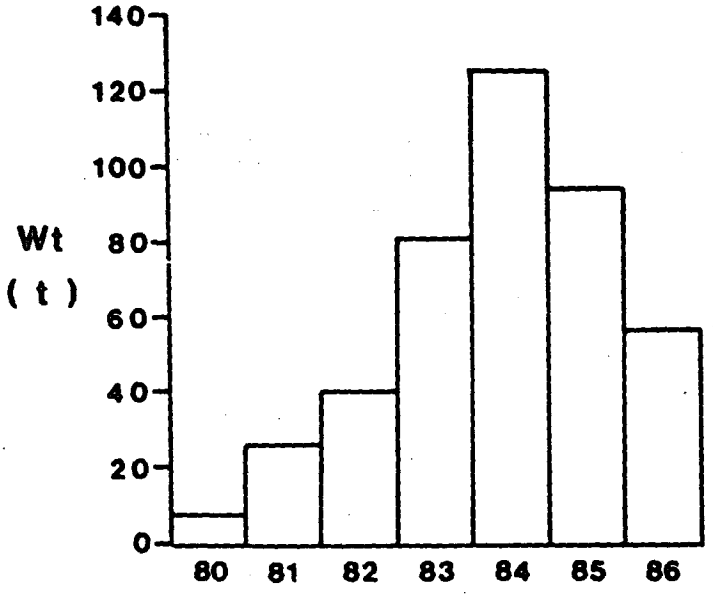
FIGURE 1

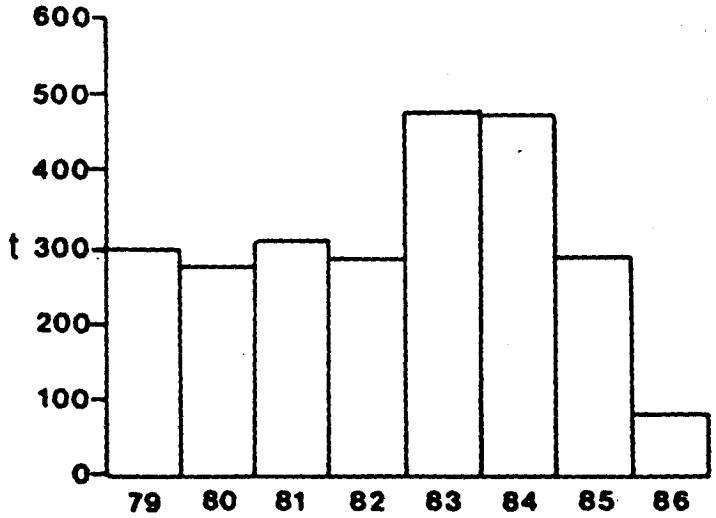


a. Percent of Hong Kong's import of raw ivory (whole tusks) imported via Japan 1979 – 1986

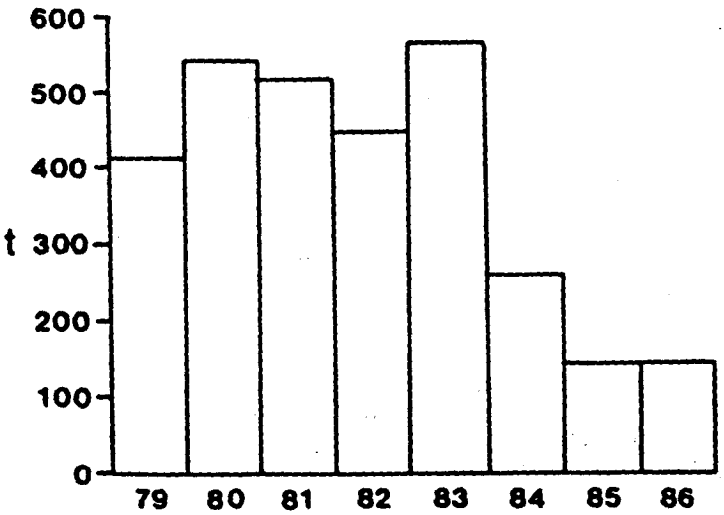


b. Hong Kong's import of raw ivory (cut pieces and scrap) 1980 – 86 [from annual reports to CITES]

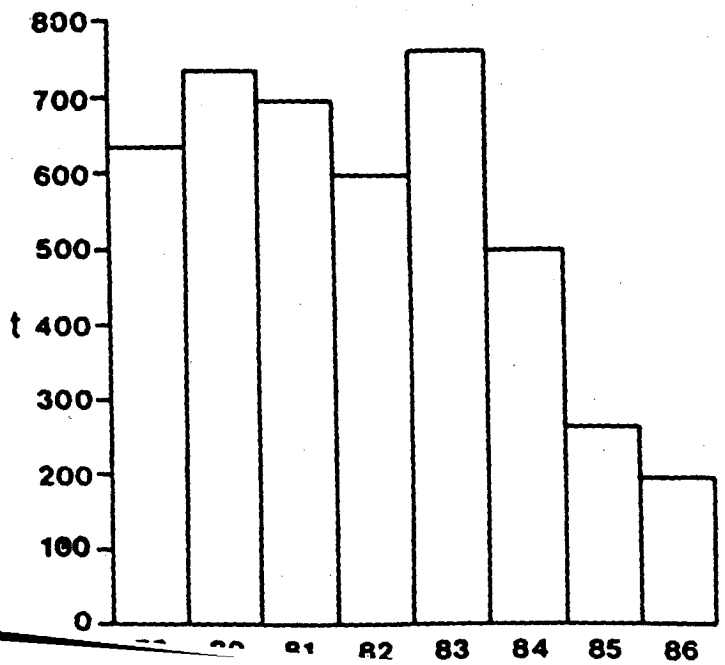
FIGURE 2



a. Japan's gross import of raw ivory (including waste) 1979-1986 [from Customs statistics].



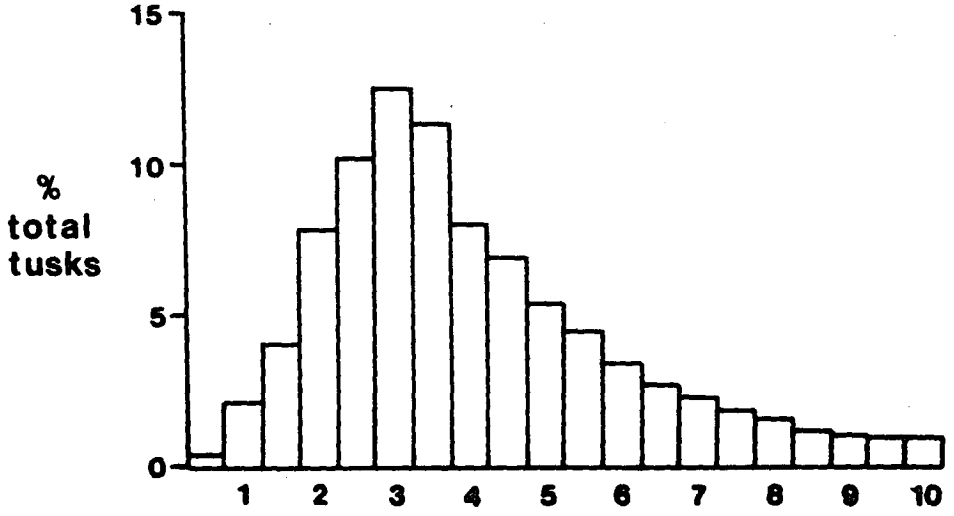
b. Hong Kong's gross import of raw ivory (whole tusks) 1979-1986 [from annual reports to CITES].



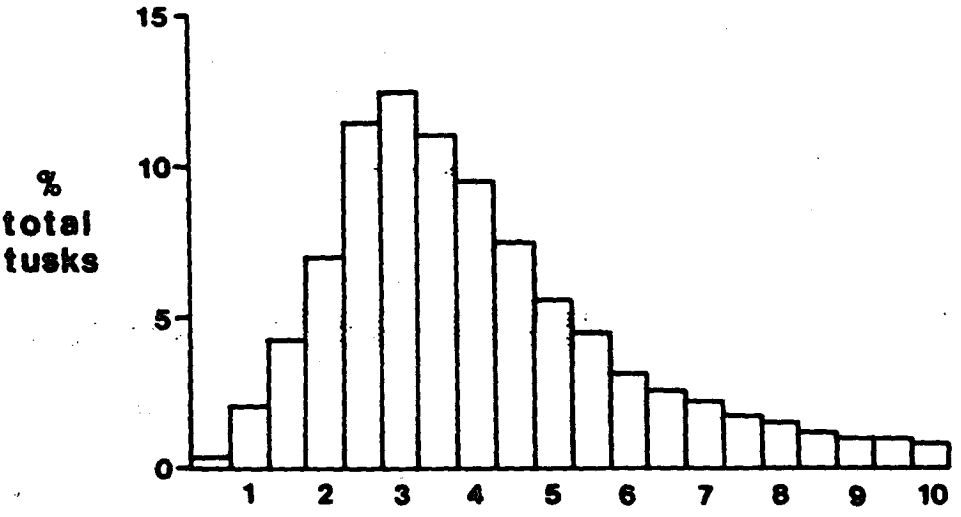
c. Hong Kong and Japan's combined import of raw ivory (less trade between them) 1979-1986.

FIGURE 3 (a-i)

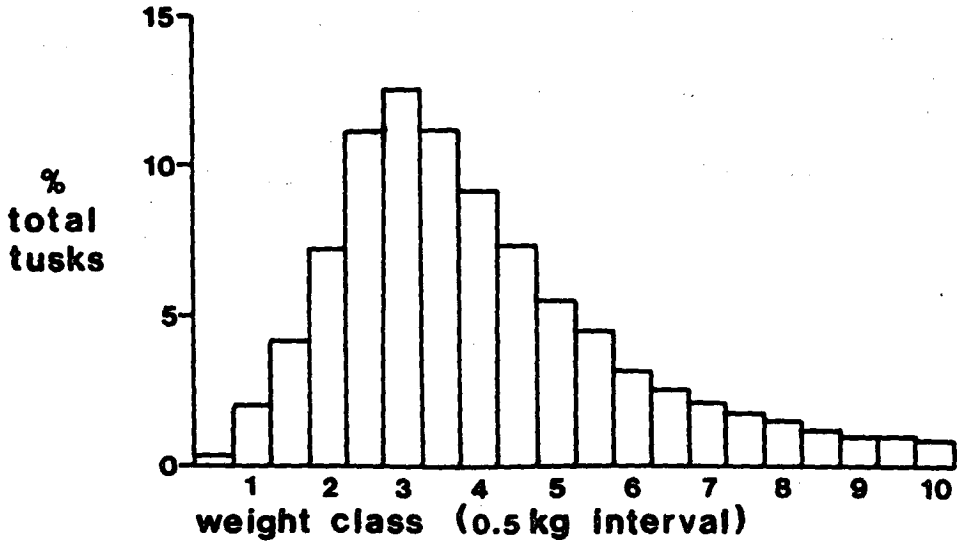
a. BURUNDI 1986 n=17813



b. SINGAPORE 1986 n=52805



c. SINGAPORE AND BURUNDI COMBINED 1986 n=70618



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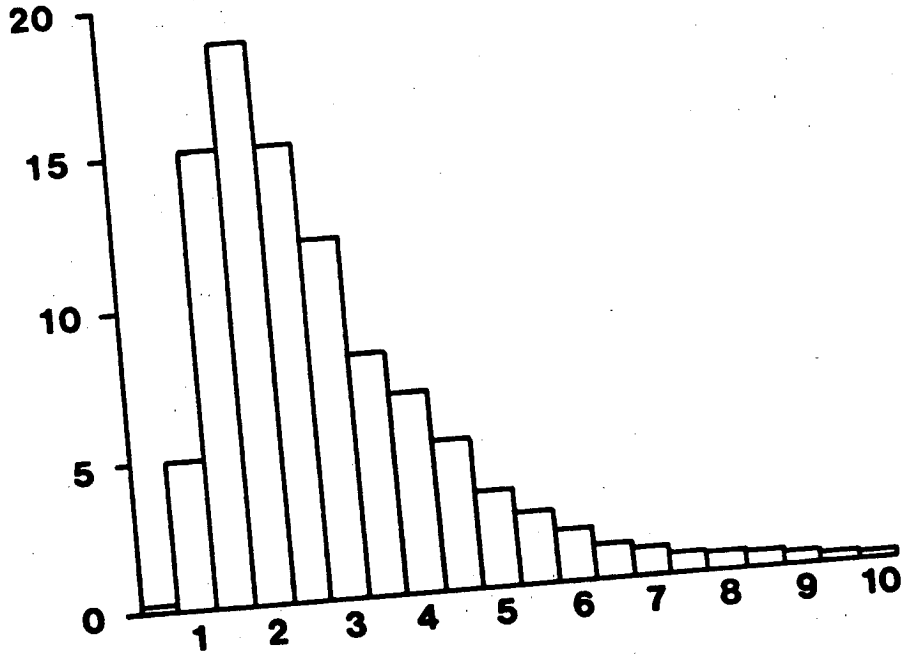

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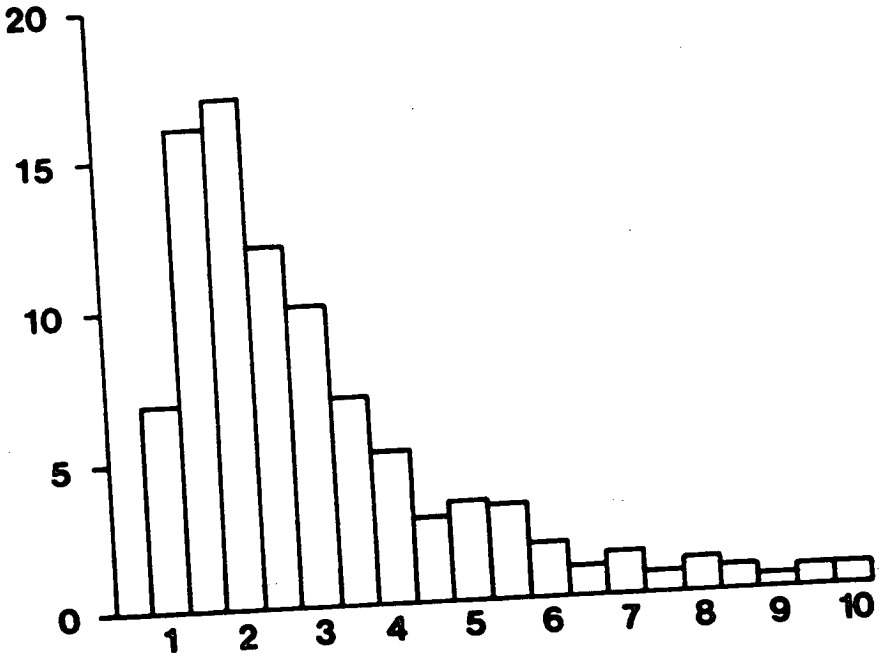

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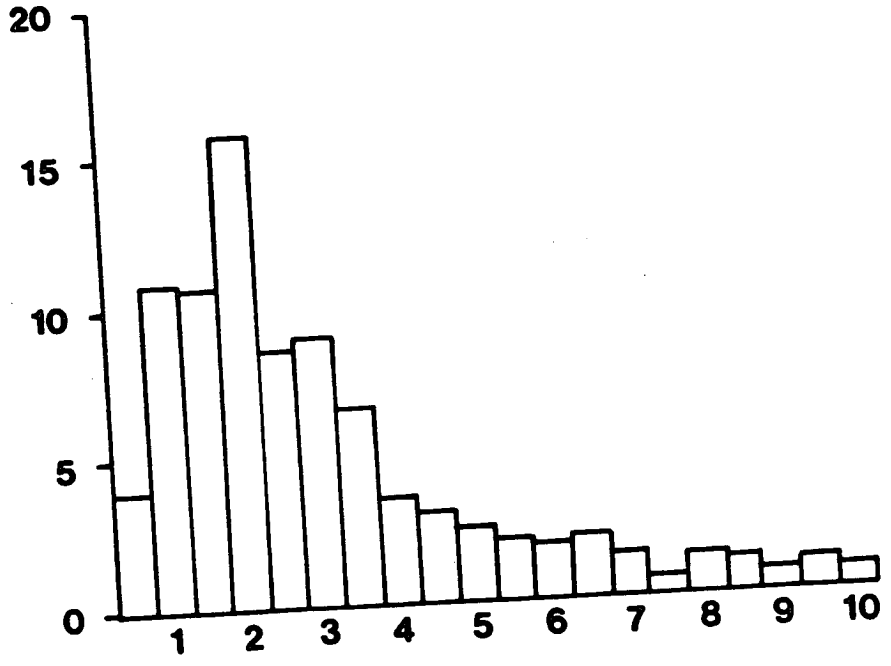
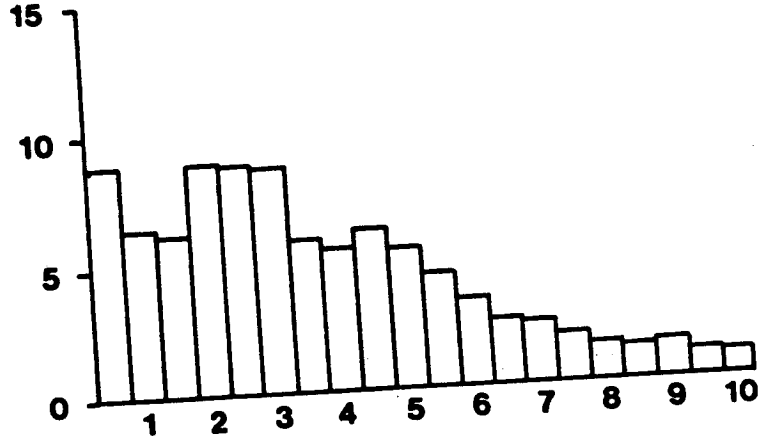
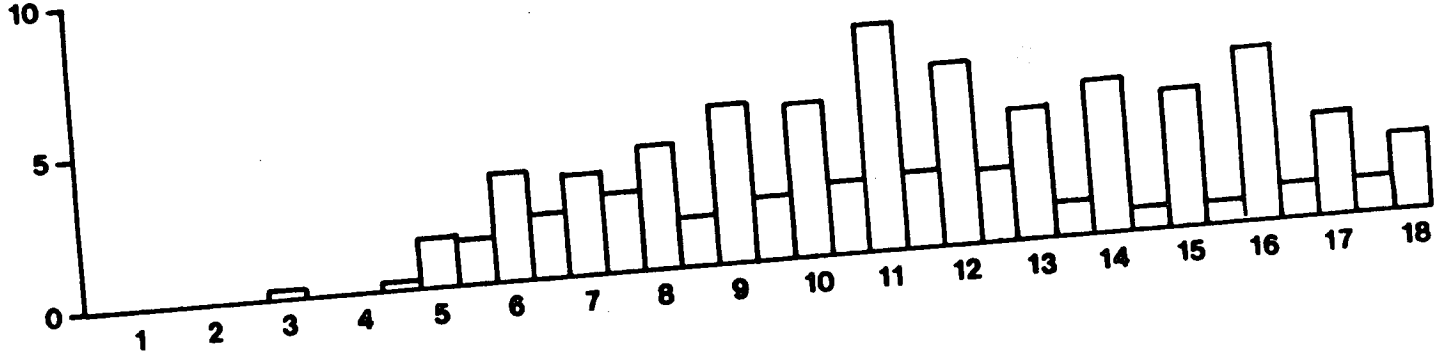


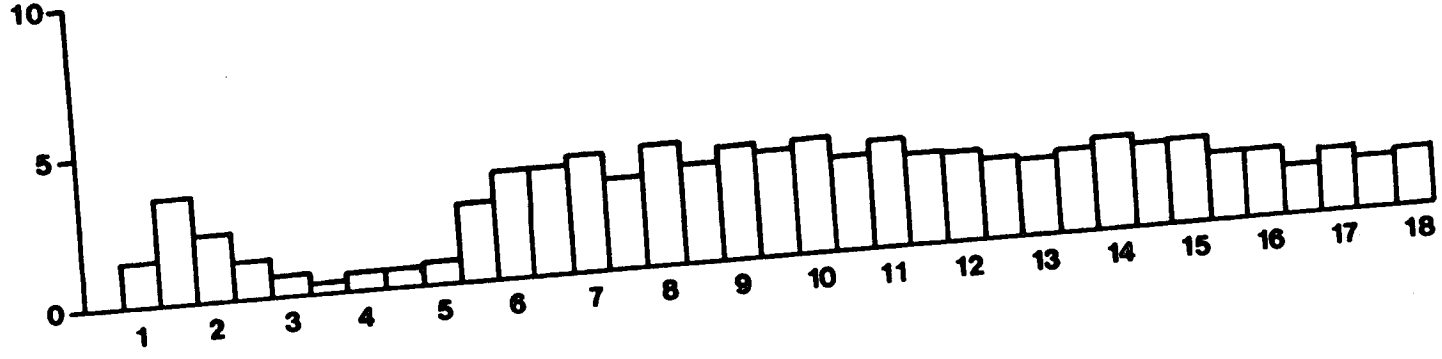
f. SUDAN 1986 n = 12971



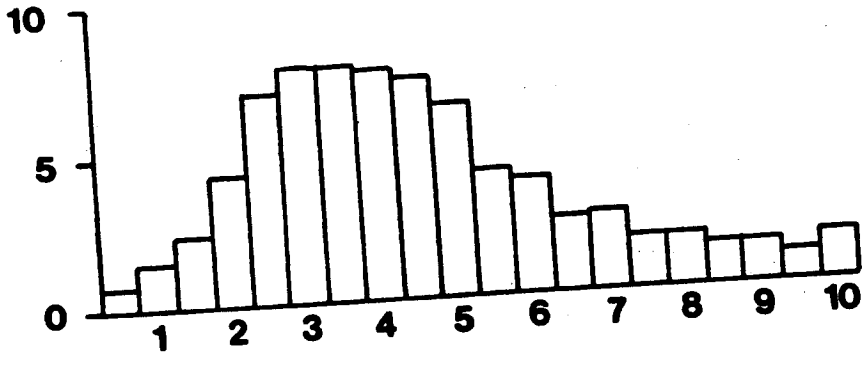
g. CONGO 1986 n= 610



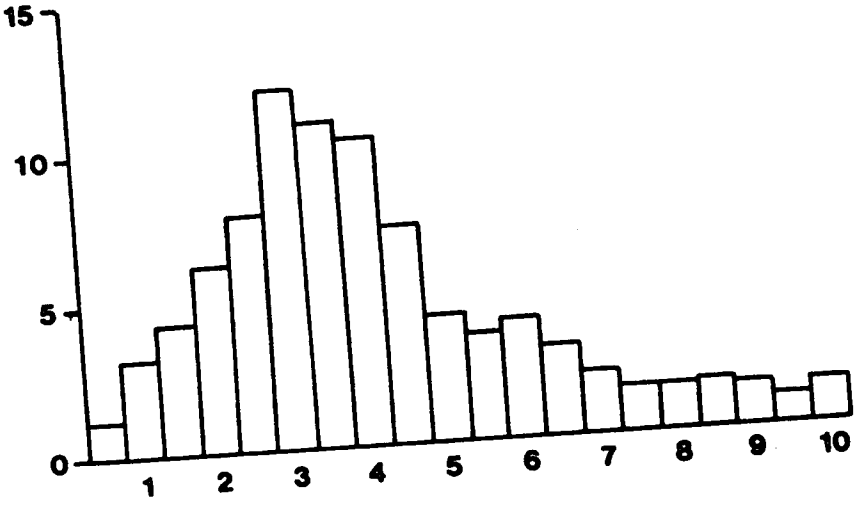
g. CONGO 1987 n= 2520



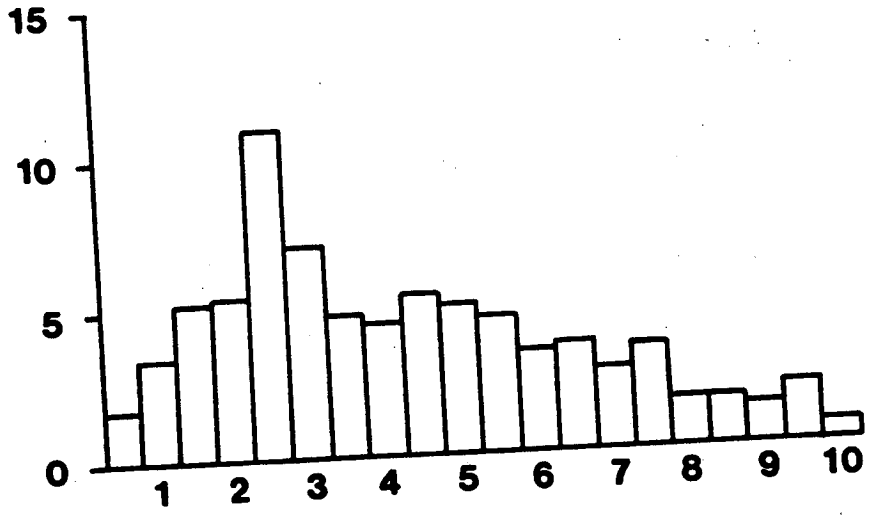
h. **SOUTH AFRICA 1986** n = 3925



i. TANZANIA 1986 n= 1581



j. **ETHIOPIA 1986** n=640



ELEPHANT POPULATION ESTIMATES, TRENDS, IVORY QUOTAS AND HARVESTS

Report to the CITES Secretariat
from
The African Elephant and Rhino Specialist Group

Population Estimates

Estimates for the African elephant population (Table 1) are taken from the AERSG meeting held at Hwange in 1981, Martin's report to the CITES Secretariat on the quota system in 1985, and the recent AERSG meeting at Nyeri, Kenya in May 1987. A report on populations from Burrill and Douglas-Hamilton was not available at the time of completing this report on 11 July 1987 (see Addendum page 615). Notes on these estimates are as follows:

1. The West African data are not particularly significant in the context of the CITES quota system. The West African population is less than 3% of the total African population, and no countries from West Africa have set quotas for ivory export. The data for all countries are too poor to allow a meaningful statement of population trend.

2. The Central African data is equally poor. The Zaire elephant population could lie anywhere between 100,000 and 800,000 animals. The apparent increases in the Cameroun and Gabon elephant populations over the past 6 years are a reflection of the estimates rather than any real increase. Recent work by Richard Barnes suggests that the Gabon population is about 55,000 animals, however the Gabonaise authorities have estimated the population at 93,000 in their latest quota submission and the AERSG group working on Central Africa put the population at 76,000. This should illustrate the level of accuracy involved.

3. In East Africa there has been no recent survey for Ethiopia and the Estimate of the Wildlife Conservation Organisation for their quota submission has been taken to apply to all three years. The Kenya decline from 65,000 elephants to 35,000 elephants is spectacular and data can be expected to be better than most countries. The 1987 Somalia estimate of 6,000 is no more than an educated guess based on reports of deteriorating range conditions in the country. Similarly, the latest estimate of 40,000 elephants in the Sudan has no sound backing.

   The Tanzanian estimates since 1981 are doubtful, but if the decline in the Selous Game Reserve population can be taken as an indicator, elephants are unlikely to be present at densities greater than 1/sq. km anywhere in United Republic of Tanzania. Recent estimates by the government (quota submission) of 20,000 elephant in Rungwa (1,200 sq. km.) and 50,000 in Moyowosi (6,000 sq. km) are unlikely.

4. In the Southern Region, estimates vary from excellent to very poor. Counts in Botswana, South Africa, Namibia and Zimbabwe are likely to be fairly accurate, whilst in Zambia, Mozambique and Angola the information is either incomplete or absent.

The 1987 estimates can be summarized as follows:

Western region	16,290
Central region	375,800
Eastern region	190,720
Southern region	181,600
Africa (total)	764,410

It would appear that the African population has decreased by some 36% since 1981. However, it is stressed that the data for some of the largest populations on the continent (e.g. Zaire) are extremely crude.

It is necessary to point out that the population estimates critically affect the deductions made later in this report. If indeed elephant populations in certain countries (Zaire, Sudan, Kenya, United Republic of Tanzania, Mozambique and Zambia) have declined as greatly as the AERSG figures indicate, then this implies very large quantities of ivory entering the world market.

Trends

The data for individual countries in the Western and Central regions are not good enough to present clear trends. The decline in numbers has been estimated for the regions as a whole. In East Africa, the regional trend fits the model of Pilgram and Western for a population which is being subjected to a constant harvest. We have modelled crudely the harvest of elephant required annually to correspond with the estimates in 1981, 1985 and 1987 for all regions, assuming a constant harvest and an annual population growth rate of 3%.

Region	Net rate of decline in 1987 (% per annum)	Annual offtake of elephant
Western	-1.7	770
Central	-2.8	22,500
Eastern	-18.9	51,500
Southern	-11.3	29,300
Africa	9.3	104,000

In the Western and Central regions, the above figures have been used to calculate an expected offtake from individual countries based on the proportion which each country forms of the regional population.

In East Africa, certain individual country estimates of trend and harvest (Kenya, Somalia, Sudan and United Republic of Tanzania) have been made using the same technique as used for regions. The Ethiopian estimate has been taken from their quota submission, and the estimates for Rwanda and Uganda are relatively insignificant.

Attention is drawn to the very spectacular current annual rates of decline in Somalia (33%), Sudan (30%), United Republic of Tanzania (16%) and Kenya (13%). The corresponding numbers of elephants being killed annually are 3,500, 18,500, 22,200 and 6,600. If these estimates are anywhere near the truth, then these four countries are contributing as much ivory as the entire quota declared for Africa in 1986.

In the Southern Region, the above modelling procedure is not appropriate to be applied across the board. Elephant conservation and management in the countries of the region ranges from excellent to very bad. The Angolan estimate is based on the regional average since there is no better recent information. The Botswana population has increased markedly since 1981, but the data reflect more a revision of estimates than any real trends (it would be impossible for an elephant population to increase from 20,000 to 51,000 in 6 years). The Malawi estimate is based on Malawi's quota submission with a small allowance for illegal hunting. The Mozambique and Zambian estimates have been calculated from the constant harvest model and show very large downward trends. In the Zambian case, this trend may improve with the new initiatives in the Luangwa Valley. In South Africa and Zimbabwe, the trends are determined by management rather than illegal hunting. South Africa's population is being held constant at about 8,000 animals and the Zimbabwean population is being reduced to about 34,000 animals.

The downward trends for many countries are sufficiently large to predict extinction in the near future. However, the lesson from West Africa suggests that it is unlikely to happen (at least at the rate predicted). Once the animals carrying significant ivory have been eliminated, the pressures are likely to decrease. Conservation awareness will also increase as in the case of the black rhino. This is small cause for comfort. The situation is one of appalling conservation and mismanagement. Economically, rather small short-term gains are being sacrificed for far greater profits which could be made under sensible management.

Production

Assuming a constant harvest situation for most of Africa, the ivory production will have been the same in 1986 and 1987. The foregoing analysis of trends leads to an estimate of population of some 193,000 tusks per annum. At a mean tusk weight of 5 kgs, this is nearly a 1,000 tonnes annually (Parker maintains that the world ivory trade has remained more or less constant at this level for many years).

Quotas

The 1986 and 1987 quotas declared by producer countries account for less than half of the production from Africa. The proposition is lowest in the Central region where about 1/4 of the ivory produced is accounted for by the quota. In the Eastern and Southern regions, the proportions are about 50% and 65% respectively.

In some individual countries, the quota is greater than 100% of production. This applies when a country claims relatively large stocks of old ivory on hand (e.g. Somalia, which recently exported about 50 tonnes of stock on hand, and South Africa, which produces relatively little ivory but has a large ivory industry). The Zimbabwe quota is greater than the number of tusks which were produced simply because fewer elephants were killed in 1986 than intended.

It is important to note that at this stage of the 1986/87 quota system, it is somewhat early to judge the validity of claims of large existing stocks of ivory. Such declared stocks should work their ivory out of the system within one or two quota years. Thereafter, the appearance of any new stockpiles should be apparent.

Legal Exports of Ivory Against Declared Quotas

Only 45% of the total quota declared by producer countries appears to have been used according to data from the CITES ivory unit and WTMU. Only Sudan, Ethiopia, Malawi and Mozambique exported amounts close to those declared. In certain cases (e.g. Zimbabwe), although the quota provided a contingency for a large number of tusks to be exported, most of the ivory was consumed in domestic carving industries.

No countries exceeded their quotas. However, this is a Pyrrhean victory. The trend data indicate that large numbers of elephants were killed in the 1986 quota year, and the inevitable conclusion is that most of this ivory was not recorded as legal trade. When legal exports are compared with elephants killed, they account for only 22% of the production. The tusks of some 89'000 elephants entered the trade illegally.

Two situations account for this:

> In certain countries, the authorities intend well but are unable to enforce the law. Although the state claims ownership of the resource, it is entirely powerless to implement its policy.
>
> In other countries, widespread corruption mocks all attempts at rational management of elephant populations.

Burundi had no quota and exported 23,000 tusks in 1986 (WTMU data). Unofficial estimates are that considerably more (50,000 tusks) left the country. Burundi derives most of its ivory from the United Republic of Tanzania, Zaire and Zambia. Even an amount of 50,000 tusks accounts for only a quarter of the predicted illegal trade. There is good evidence to suggest that large quantities of ivory are moving from central Africa to the Côte Ivoire and other West African countries, that significant trade takes place through the Sudan, and that some ivory leaves Africa directly from the east coast.

It is wrong to assume that all of the unaccounted-for production leaves Africa as raw ivory. A large quantity goes into the domestic carving industries. This is particularly true of most of the Central and West African countries. There is urgent need for a quantitative study of the internal carving industry in Africa.

Certain countries show a negative value for the illegal harvest of elephants. This apparent contradiction arises when a country has a relatively low production of ivory but intends nevertheless to export a large quantity (e.g.'South Africa and Somalia). This situation can only pertain while countries have existing stocks. It should be noted that with an annual production of less than 1,000 tusks, the accumulation in South Africa either represents about 14 years of production (which is commercially unlikely) or recently acquired significantly large stocks.

Individual Quota Submissions

Of the 18 countries which submitted non-zero quotas in 1986 and 1987, only the following submitted their quotas in the full format recommended by CITES Secretariat: Cameroun, Chad, Congo, Ethiopia, Gabon, Malawi, United Republic of Tanzania, Zambia and Zimbabwe.

Before discussing individual countries, it is perhaps worth restating the intended function of the quota submission. The forms developed by Martin are intended to reflect the management policies for elephants in any given

country. Quotas should be the end results of a logical process whereby a country estimates its elephant populations, calculates how many will die as a result of its management policy and, after allowing for existing stocks, provides an estimate of raw ivory which may enter the international trade.

Estimates for large amounts of ivory which may be confiscated should not appear on the quota submission (e.g. Zambia, United Republic of Tanzania), since it is not a result of desired management. If large amounts of ivory should be acquired in the quota year, there is no difficulty in advising the CITES Secretariat that this will be exported over and above the original quota (in effect, the quota can be revised at any time during the year).

There is no obligation for any country to use the format provided for submitting quotas. Nevertheless, by not doing so, there will inevitably remain an atmosphere of doubt surrounding the sincerity of intentions of any country which simply states a number of tusks to be exported. This is particularly true if the quota is a large number, and particularly if it is known that the country does not have a policy to exploit elephants.

In the case of the Sudan which banned all ivory exports in 1983, quotas were submitted to clear 13,000 tusks in 1986 and 21,500 tusks in 1987. This represents about 18,000 elephants. It would not be a sustainable yield from a population of 350,000 elephants, let alone the current estimated of about 100,000 elephants from the authorities in the country, or the AERSG estimate of 40,000 elephants.

The Tanzanian quota submission for 1987 is bound to give rise to query. In 1986, a quota of 16,000 was submitted of which only 2,000 tusks were exported. This year, the quota is for 18,000 tusks, of which about 7,000 will arise from elephants dying in the quota year, 2,000 are current stocks and 9,000 will be confiscated during the year. This implies that poaching cannot be prevented.

It is clear from many of the detailed submissions that the method of deriving the quota is not fully understood. Certain submissions contain arithmetic errors and contradictions. In one country, where there is no policy to cull, crop, or control problem elephants, large numbers in each of these categories have been entered.

Very good submissions were received from Chad, Congo, Ethiopia, Malawi, Zambia and Zimbabwe. These reflect the management policies of the countries and are biologically realistic.

Conclusions

There is undoubtedly a massive illegal ivory trade operating over and above the legal quota system. Some criticisms have been levelled at the quota system because of this. This is not logical. The quota system was the brainchild of the producer countries, and it was an attempt to bring this situation under control. Properly used, the quota system is no more than a statement of intent by producer countries arising from their management policies. It appears to be working in those countries where law enforcement is effective. More importantly the quota system, in conjunction with data on elephant numbers and trends, has provided the means for determining the extent of both the legal and illegal trade in ivory. Properly used, these data can provide basis for programmes to reduce and eventually eliminate the illegal trade in ivory.

It may be tempting for Parties to propose a complete ban on the ivory trade. The futility of pursuing a legal export system while the vast bulk of trade remains illegal appears to provide sound grounds for such an action.

Nevertheless, such a proposal is unlikely to succeed and the following points need to be taken into account:

- It is apparent that the illegal trade is already highly successful. A ban would not work. It has not worked for rhino horn.

- The investment in ivory worldwide is too great to countenance a ban. Such an action may well result in the withdrawal of several Parties from the Convention.

- It is highly undesirable for all trade to become illegal. This leads to a situation where nothing can be monitored or controlled.

- The quota system is in its infancy and the illegal trade is still of such magnitude that it is too early to judge its effectiveness.

- Some countries are managing and conserving their elephant populations satisfactorily. They should not be penalised by the default of others.

- There is a need to address elephant management and law enforcement problems in the producer countries.

- There are still approximately 3/4 of a million elephants in Africa. The species is not yet endangered but will become so if the illegal trade continues at present levels.

The AERSG believes that positive management for the conservation of elephants in Africa is more likely to succeed than ineffectual international trade bans.

TABLE 1. ELEPHANT POPULATION ESTIMATEES, TRENDS, IVORY QUOTAS AND HARVESTS

COUNTRY	Population estimates			Trend	Elephant killed	Est'd No of tusks	QUOTA (Tusks)	Quota as % of el.	Tusks exported	% of quota	Exports as % of ele.	Illegal harvest	QUOTA 1987	Old Stock
	1981	1985	1987	% p.a.	in 1986	produced	1986	killed	1986	used	killed	(No. El.)		
WEST AFRICA														
Benin	1,250	2,300	2,100	-	99	189	0	0.0	0	-	0.0	99	0	
Ghana	970	1,000	1,100	-	52	99	0	0.0	0	-	0.0	52	0	
Guinea	800	800	320	-	15	29	-	0.0	0	-	0.0	15	0	
Ivory Coast	4,800	4,800	3,300	-	156	296	-	0.0	0	-	0.0	156	0	
Liberia	2,000	800	650	-	31	58	-	0.0	0	-	0.0	31	0	
Mali	780	700	600	-	28	54	-	0.0	0	-	0.0	28	0	
Mauritania	40	0	20	-	1	2	0	0.0	0	-	0.0	1	0	
Niger	800	800	800	-	38	72	0	0.0	0	-	0.0	38	0	
Nigeria	1,820	1,500	3,100	-	147	278	-	0.0	0	-	0.0	147	0	
Senegal	370	100	50	-	2	4	-	0.0	0	-	0.0	2	0	
Sierra Leone	500	500	250	-	12	22	-	0.0	0	-	0.0	12	0	
Togo	150	100	100	-	5	9	-	0.0	0	-	0.0	5	0	
Burkina Faso	3,500	3,500	3,900	-	184	350	-	0.0	0	-	0.0	184	0	
Subtotal	17,780	16,900	16,290	-1.7	770	1,463	0	0.0	0	-	0.0	770	0	0
CENTRAL AFRICA														
Burundi	1	1	1	-	0	0	-	-	(22,989)	No quota	-	-	-	
C A R	31,000	19,500	19,000	-	1,138	2,161	0	0.0	0	-	0.0	1,138	800	
Cameroon	5,000	12,400	21,200	-	1,269	2,412	300	12.4	100	33.3	4.1	1,217	300	
Chad	-	2,500	3,100	-	186	353	0	0.0	0	-	0.0	186	320	0
Congo	10,800	59,000	61,000	-	3,652	6,939	1,200	17.3	610	50.8	8.8	3,331	3,784	4,547
Equat. Guinea	-	1,800	500	-	30	57	-	0.0	0	-	0.0	30	0	
Gabon (NP)	13,400	48,000	76,000	-	4,550	8,646	0	0.0	0	-	0.0	4,550	2,600	12,153
Zaire	376,000	523,000	195,000	-	11,675	22,183	10,000	85.1	1,425	14.3	6.4	10,925	15,000	
Subtotal	436,200	666,200	375,800	-2.8	22,500	42,750	11,500	26.9	2,135	18.6	5.0	21,376	22,804	16,700
EAST AFRICA														
Ethiopia (NP)	9,000	9,000	6,650	-	400	760	700	92.1	640	91.4	84.2	63	530	172
Kenya	65,056	28,000	35,000	-13.3	6,600	12,540	2,000	15.9	0	0.0	0.0	6,600	2,000	800
Rwanda	150	100	70	-	2	4	-	0.0	0	-	0.0	2	0	
Somalia	24,323	8,600	6,000	-33.4	3,500	6,650	17,002	255.7	16,986	99.9	255.4	-5,440	0	
Sudan	133,772	32,300	40,000	-29.5	18,500	35,150	12,971	36.9	13,009	100.3	37.0	11,653	21,500	21,500
Tanzania	203,900	216,000	100,000	-15.7	22,200	42,180	16,400	38.9	2,001	12.2	4.7	21,147	18,150	2,000
Uganda (NP)	2,320	2,000	3,000	-	200	380	0	0.0	0	-	0.0	200	302	156
Subtotal	438,521	296,000	190,720	-18.9	51,402	97,664	49,073	50.2	32,636	66.5	33.4	34,225	42,482	24,628
SOUTHERN AFRICA														
Angola	12,400	12,400	12,400	-	2001	3,801	-	0.0	0	-	0.0	2,001	0	
Botswana	20,000	45,300	51,000	6.0	300	570	520	91.2	14	2.7	2.5	293	520	
Malawi	4,500	2,400	2,400	-	150	285	20	7.0	20	100.0	7.0	139	150	70
Mozambique	54,800	27,400	18,600	-25.5	7,200	13,680	120	0.9	96	80.0	0.7	7,149	200	
Namibia	2,300	2,000	5,000	N	500	950	1376	144.8	50	3.6	5.3	474	1,033	279
South Africa	8,000	8,300	8,200	N	500	950	12,100	1273.7	4,197	34.7	441.8	-1,709	14,000	
Zambia	160,000	58,000	41,000	-34.2	11,600	22,040	5,800	26.3	2,961	51.1	13.4	10,042	8,500	6,100
Zimbabwe	49,000	47,000	43,000	N	5,000	13,000	14,000	107.7	507	3.6	3.9	4,575	9,000	4,572
Subtotal	311,000	202,800	181,600	-11.3	27251	51,776	33,936	65.5	7,845	23.1	15.2	23,122	33,403	11,021
GRAND TOTALS	1,203,501	1,181,900	764,410	-8.8	101,923	193,653	94,509	48.8	42,616	45.1	22.0	79,493	98,689	52,349

ble 2 CONSTANT HARVEST MODELS

	WEST	CENTRAL	EAST	SOUTH	KENYA	TANZANIA	MOZAMB.	ZAMBIA	SOMALIA	SUDAN	AFRICA
ual Offtake ..	770	22,500	51,500	29,300	6,600	22,200	7,200	23,200	3,500	18,500	104,000
*******1981	17,780	436,200	438,521	311,000	65,056	203,900	54,800	160,000	24,323	133,772	1,203,501
1982	17,543	426,786	400,177	291,030	60,408	187,817	49,244	141,600	21,553	119,285	1,135,606
1983	17,300	417,090	360,682	270,461	55,620	171,252	43,521	122,648	18,699	104,364	1,065,674
1984	17,049	407,102	320,002	249,275	50,689	154,189	37,627	103,127	15,760	88,995	993,644
1985	16,790	396,815	278,102	227,453	45,609	136,615	31,556	83,021	12,733	73,164	919,454
1986	16,524	386,220	234,946	204,977	40,377	118,513	25,302	62,312	9,615	56,859	843,037
*******1987	16,250	375,306	190,494	181,826	34,989	99,869	18,862	40,981	6,403	40,065	764,329
1988	15,967	364,066	144,709	157,981	29,438	80,665	12,227	19,011	3,096	22,767	683,258
1989	15,676	352,488	97,550	133,420	23,722	60,885	5,394	-3,619	-312	4,950	599,756
1990	15,376	340,562	48,976	108,123	17,833	40,511	-1,644	-26,928	-3,821	-13,401	513,749
decline 1987 ..	-1.7	-2.8	-18.9	-11.3	-13.3	-15.7	-25.5	-34.2	-33.4	-29.5	-9.3

ADDENDUM TO DOC. 6.21 ANNEX 2

A more extensive analysis of elephant numbers, trends and distribution and an attempt to derive elephant numbers in uncensused parts of their range followed the May 1987 AERSG meeting held in Nyeri in Kenya. The title page and continental estimates from this work by Anne Burrill and Iain Douglas-Hamilton are appended to this report. Except for the East African region their totals are considerably higher than the AERSG figures. The authors emphasize that their figures are maximum estimates as the methods used may lead to overestimates and they do no accept the figure of 584,551 derived from their model for Central Africa. The following table highlights the major differences.

	AERSG 1987 Estimate	Burrill & Hamilton 1987 Estimates	Percent Difference
West Africa	16,290	24,388	+50%
Central Africa	375,800	584,551	+56%
East Africa	190,000	175,777	- 8%
Southern Africa	181,600	235,840	+30%

In West and Central Africa a constant harvest model for trend and elephant deaths would no longer fit the data since the new estimates imply that the elephant populations in these regions have increased. However in East and Southern Africa such a model may still apply. In the case of East Africa the new data indicate an even greater decline whilst in Southern Africa the new data do not alter the conclusions.

The title page, abstract and Appendix VIII of Burrill & Douglas-Hamilton's report are appended.

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GLOBAL RESOURCE INFORMATION DATABASE

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African Elephant Database Project

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GEMS
GLOBAL ENVIRONMENT MONITORING SYSTEM
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African Elephant Database Project

ABSTRACT

The objective of this report is to provide information on elephant numbers, distribution and trends, and factors affecting these, which will be helpful to countries in reviewing and setting quotas under the CITES Ivory Export Quota agreement.

The data on elephants have been acquired from published scientific literature, reports of serial or ground surveys, and from a series of questionnaires distributed up to December 1986. They have been exhaustively reviewed by the African Elephant and Rhino Specialist Group (AERSG) of IUCN. The total range of the elephant is estimated at 5,921,000 km^2 46% in Central Africa, 25% in East Africa, 25% in Southern Africa and 5% in West Africa. Of the total range nearly 30% is rainforest and largely uncensused to this day.

On the basis of these data, and computer modelling, the factors correlated to elephant density have been determined. The most significant positive correlation was with effective protection.

Elephant numbers were then projected for each country, by computer modelling. The regional totals were West Africa 24,000; East Africa 176,000; Southern Africa 236,000. For Central Africa the only data input came from areas of abundance in Gabon and CAR. When extrapolated to other forested areas they gave a regional total of 585,000; thought to be unrealistically high.

Trends were also calculated from successive estimates. The East African weighted trends were -6.8% per annum for protected areas, and -14.2% per annum for unprotected areas, with an overall weighted annual trend of -8.1%. In Southern Africa the weighted trend for countries with little poaching was 0.7% per annum, and in the heavily poached countries -8.2% per annum. Trend data for the rest of Africa were fragmentary, but in the northern savannahs elephants were mainly decreasing in a band across the continent from Somalia to Senegal, with a weighted mean of -17.8% per annum. No quantitative data were available for trends in the forest, but informants suggest variations from stability or increase in Gabon, to rapid decrease in Eastern Zaire.

Through this project, a central data base of elephant populations has been established at UNEP within the Global Environment Monitoring System (GEMS) as part of its Global Resource Information Database (GRID). As further data concerning elephants are obtained, they can also be incorporated into the database for the purposes of updating the results reported herein.

Appendix VIII

Comparison of Continental Estimates

		PREVIOUS STUDIES				THIS STUDY		
		1979 (1)	1981 (2)	1985 (3)	AERSG 1987	GIS 1987	% PROJECTED	% PROTECTED.
CENTRAL AFRICA	CAMEROON	16200	5000	12400	21200	58328	98%	16%
	CAR	63000	31000	19500	19000	37186	81%	25%
	CHAD	15000	-	2500	3100	6267	67%	37%
	CONGO	10800	10800	59000	61000	79278	100%	2%
	EQUATORIAL GUINEA	1300	-	1800	500	5445	100%	0%
	GABON	13400	13400	48000	76000	74396	79%	8%
	ZAIRE	377700	376000	523000	195000	329651	98%	9%
EAST AFRICA	ETHIOPIA	900	-	9000	6650	9288	100%	42%
	KENYA	65000	65056	28000	23000	20809	0%	67%
	RWANDA	150	150	100	50	48	23%	77%
	SOMALIA	24300	24323	8600	6000	4482	0%	12%
	SUDAN	134000	133722	32300	40000	29760	71%	50%
	TANZANIA	316300	203900	216000	85000	108779	14%	69%
	UGANDA	6000	2320	2000	2300	2611	5%	80%
SOUTHERN AFRICA	ANGOLA	12400	12400	12400	12400	40426	100%	21%
	BOTSWANA	20000	20000	45300	51000	58096	12%	36%
	MALAWI	4500	4500	2400	2400	2794	16%	80%
	MOZAMBIQUE	54800	54800	24700	18600	20013	1%	20%
	NAMIBIA	2700	2300	2000	5000	4963	1%	61%
	SOUTH AFRICA	7800	8000	8300	8200	9075	11%	91%
	ZAMBIA	150000	160000	58000	41000	54699	30%	90%
	ZIMBABWE	30000	47000	47000	43000	45774	3%	80%
WEST AFRICA	BENIN	900	1250	2300	2100	2267	34%	66%
	BURKINA FASA	1700	3500	3500	3900	4756	54%	81%
	GHANA	3500	970	1000	1100	2964	88%	74%
	GUI BISSAU	-	-	-	20	56	29%	0%
	GUINEA	300	800	800	300	757	100%	11%
	IVORY C	4000	4800	4800	3300	3785	2%	44%
	LIBERIA	900	2000	800	650	3901	100%	11%
	MALI	1000	780	700	600	896	45%	19%
	MAURITANIA	160	40	0	20	105	100%	0%
	NIGER	1500	800	800	800	609	19%	91%
	NIGERIA	2300	1820	1500	3100	3345	45%	79%
	SENEGAL	450	200	100	50	142	71%	29%
	SIERRA LEONE	300	500	500	250	405	73%	67%
	TOGO	80	150	100	100	400	0%	24%

SOURCES: (1) DOUGLAS-HAMILTON (1979), (2) CUMMING AND JACKSON (1984), (3) MARTIN (1985), AERSG 1987, THIS STUDY

Some changes reflect real trends (Sudan, Kenya) others are corrections of wrong information (Malawi, Gabon) or a combination of both factors (Botswana) and some are affected by inflated projections (Central African countries, Angola). GIS projections can be used as maximum estimates. The percentage of the current GIS estimate which is projected is given. The percentage of elephants living in protected areas, nominal or otherwise, is also given.