The Elephant Trade Information System (ETIS) and the Illicit Trade in Ivory: A report to the 13th meeting of the Conference of the Parties to CITES

T. Milliken, R.W. Burn, F.M. Underwood and L. Sangalakula

TRAFFIC East/Southern Africa
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Introduction

In 1997, through Resolution Conf. 10.10, the CITES Parties mandated the creation of a comprehensive international monitoring system under the auspices of TRAFFIC to track the illegal trade in elephant products. The Elephant Trade Information System (ETIS) has been developed to serve that purpose. The current objectives of ETIS, as noted in Resolution Conf. 10.10 (Rev. CoP12), are as follows:

i) measuring and recording levels and trends, and changes in levels and trends, of illegal hunting and trade in ivory in elephant range States, and in trade entrepots;

ii) assessing whether and to what extent observed trends are related to changes in the listing of elephant populations in the CITES appendices and/or the resumption of legal international trade in ivory;

iii) establishing an information base to support the making of decisions on appropriate management, protection and enforcement needs; and

iv) building capacity in range States.

The Resolution calls for TRAFFIC to produce "*a comprehensive report to each meeting of the Conference of the Parties*".

The first analytical results from ETIS were presented at the twelfth meeting of the Conference of the Parties (CoP12) in Santiago, Chile in November 2002 (Milliken *et al.*, 2002a, b, c). The major findings of that effort demonstrated that illicit trade in ivory is most directly correlated to the existence of large-scale domestic ivory markets in Asia and Africa which exhibit poor law enforcement effort. Key countries, and the characteristics of their trade, were identified in this regard. The analysis also concluded that there has been an increasing trend in ivory seizures since 1989 and that a new emerging consumer market in China was the principal driving force behind the upward trend. Drawing upon these results, the Parties adopted Decisions 12.36-12.39, all addressing '*Elephants – control of internal ivory trade*'. These decisions established a formal mechanism to assess control measures in a number of countries highlighted in the ETIS analysis. Those specifically named were: Cameroon, China, Democratic Republic of the Congo, Djibouti, Ethiopia, Japan, Nigeria, Thailand, Uganda and the United States.

This report, which is divided into three parts, fulfills the reporting obligation for the thirteenth meeting of the Conference of the Parties (CoP13). Part I describes the general development and operation of ETIS since CoP12, and primarily relates to the third and fourth objectives above. This section also presents a summary of the elephant product seizure data in ETIS as of 06 July 2004. In Part II, the spatial aspects of the seizure data are analysed to identify the most important countries and their roles in the illicit trade in ivory. This analysis directly fulfills the third objective for ETIS above. Part III, which addresses the first and second objectives above, presents an analysis of the seizure data to establish trends in the illicit trade in ivory, and changes in trends over time. The probable reasons for these changes and their relationship with events under CITES are discussed. This report is designed to fulfill all of the objectives for ETIS which the Parties have specified in Resolution Conf. 10.10 (Rev. CoP12).

A detailed description of the ETIS structure and database components was outlined in the report contained in CoP12 Doc. 34.1, Annex 1. Readers are advised to review that document for a description of the basic conceptual framework of the monitoring system and its constituent parts. This report to CoP13 is designed

to update developments over the last two years, but not to repeat in detail background information previously given.

Part I: The Development, Management and Current Status of ETIS

Operational developments:

Since November 2002, TRAFFIC, in collaboration with statisticians from the Statistical Services Centre of the University of Reading, has made a number of refinements to the database structure. TRAFFIC has upgraded the ETIS computer system, acquiring a Dell 4600 Dimension with 2.66 GHz processing speed, 512 MB-memory size and 80 Gb of memory drive. The basic software programme has been enhanced, separating the seizures database files from the ETIS programme files in order to create an installable version of ETIS. In another development, a new version of ETIS was compiled using Excel on an MS Access-based platform, replacing Crystal Reports, the programme previously used for outputs of the seizures database. These modifications have served to address compatibility issues and reduce the number of software conflicts.

ETIS database components:

Currently, ETIS comprises the following components:

a) *Seizures Database*: The seizures database forms the core component of ETIS and continues to record information on elephant product seizures from all over the world since 1989 in a standardized manner. Records of elephant product seizures are stored in a database with a 'front end' interface structure written in MS Visual Basic with DAO 3.6 (data access objects), comprising 11 component tables featuring 88 fields. The main table, containing 55 fields, is the principal component where the seizure information is stored. As will be described in more detail, at 06 July 2004, there were 9,426 records in ETIS, representing 75 countries or territories around the world.

b) *Law Enforcement Effort Database: CITES Legislation Project Score*: It is believed that law enforcement effort greatly determines whether or not illegal elephant product transactions are detected and subsequently seized. The ability of a country's legislation to properly enforce the provisions of CITES is regarded as a reflection of law enforcement effort. Using the results of the CITES National Legislation Project, an ongoing initiative under CITES that comparatively ranks the legislation of most Parties, a subsidiary database has been developed to track the rankings of individual countries through time using the following three categories:

   Category 1 – legislation that is believed generally to meet the requirements for implementation of CITES;

   Category 2 – legislation that is believed generally not to meet all of the requirements for implementation of CITES; and

   Category 3 – legislation that is believed generally not to meet the requirements for the implementation of CITES.

   This database, which serves as a proxy measure for law enforcement effort, was updated and any changes in rankings since CoP12 were captured. In this database, scores have been projected backwards from the point of first assessment, and scores for 2003 were used to represent 2004, in order to cover the entire period from 1989 to the present.

c) *Law Enforcement Effort Database: Law Enforcement Effort Ratio*: As a second proxy measure of law enforcement effort, ETIS uses the ratio between the number of elephant product seizures that a country itself makes versus the total number of seizures in which the country is involved, including those made by other countries that identify the country in question as either a country of origin, export, re-export or destination. As the ratio for individual countries is ever-changing with the continual acquisition of new seizure data, it is not tracked in a formal database structure. Instead, it is calculated at the time the seizures database is closed for analytical purposes and used accordingly.

d) *Law Enforcement Efficiency Database*: *CPI Score:* Along with law enforcement effort, law enforcement efficiency is another factor that needs to be assessed in analyzing elephant product seizure information. ETIS uses the Corruption Perception Index (CPI) of Transparency International

as an independent proxy measure of law enforcement efficiency; this variable is also believed to influence rates of reporting. Using a methodology described on their website (see http://www.transparency.org/ cpi/index), the CPI is an annual ranking of a range of countries on a scale of 10.0 (highly clean) to 1.0 (highly corrupt). While Transparency International cautions about making year-to-year comparisons using the CPI, within ETIS, these data are primarily used as proxy covariate measures for law enforcement efficiency.

For several countries, CPI rankings are not available for every year since 1989. In such cases, missing values have been estimated using standard linear interpolation. For other countries, CPI rankings were not available at all and it was necessary to establish CPI rankings on the basis of a predictive statistical model that related CPI to key economic variables. The variables found to be significantly correlated to CPI were gross national income per capita (GNI) and total aid. A multiple regression model was fitted to log(CPI) with log(GNI) with log(aid) as explanatory variables for the years 1996 and 2003 (for 1996: R^2 = 51%, P<0.0001; for 2003: R^2 = 53%, P<0.0001). In some cases, CPI values for other years were estimated by linear interpolation from these values.

e) *Rates of Reporting Database*: *CITES Annual Report Ratio:* It is further recognised that there are any number of elephant product seizures which are made, but subsequently not reported to ETIS. Thus, it is important to establish proxy measures that are country-specific and time-based for assessing rates of reporting. To achieve this, a subsidiary database has been established to track the submission of CITES annual reports by the Parties, which is one of the primary obligations for each country under the Convention. This database records the ratio of the number of times a country has submitted an annual report against the number of years the country has been a Party to CITES. This simple ratio is then transformed using an empirical logit transformation (Collett, 1991); log((r + 0.5)/(n – r +0.5)), where 'r' is the number of annual reports and 'n' is the number of years. The empirical logit score has been adopted as a measure of reporting rates.

f) *Rates of Reporting Database*: *Data Record Score*: Another factor that must be assessed to understand the rate of reporting concerns the means by which data have been collected. Since the adoption of Resolution Conf. 10.10 in 1997, the CITES Parties are obliged to submit information on elephant product seizures to ETIS either through the CITES Secretariat or directly to TRAFFIC. However, the data collection process has not always been formalized under CITES and, at various times, TRAFFIC has engaged in active data collection exercises to compile seizure records from specified countries. The various means of data collection introduce bias into any future analysis of the data. To help track such bias, ETIS scores each individual seizure record using a scoring system of 1 (completely passive), 2 (some level of intervention) and 3 targeted (active data collection). (Please note in the previous report to CoP12, this database was referred to as the '*Data Collection Score Database*', however, it has now been changed to the name above so as not to be confused with the new database described in g) below).

g) *Rates of Reporting Database*: *Data Collection Score*: In conjunction with the data record score noted above, it is also necessary to track the background processes of intervention that may result in seizure information being communicated to ETIS. This is very similar to tracking the catch (i.e. the number of seizure cases reported to ETIS) per unit effort (i.e. the degree of intervention it took to acquire the seizure cases in ETIS). In this regard, scores for various activities have been established and computed for each country for each year since 1989. The final score for each country is the cumulative sum of the number of component activities that have occurred within a given year. These scores are based on the following:

0	Acquisition of data through no intervention or canvassing.
0.5	Acquisition of data through minimal canvassing (including routine prompting using CITES Notifications to the Parties and other ongoing CITES processes).
0.5	Acquisition of data through direct implementation of MIKE in range states.
1	Acquisition of data through ETIS canvassing (including direct letters, calls, and other contacts with government authorities) and provision of ETIS country reports.
1 – 2	Acquisition of data through direct and active non-ETIS interventions (including special studies and comprehensive reports derived from other sources or

processes). This score is prorated in terms of coverage over time and data sources.

1 - 2 Acquisition of data through persistent follow-up letters and calls on incomplete information. This score is prorated in terms of coverage over time and data sources.

1 - 5 Acquisition of data through ETIS interventions involving active, direct primary data collection exercises in a country. The highest score of 5 involves coverage of all record sources for the entire year, while partial coverage over time or data sources results in a lesser pro rata score.

The Data Collection Score is a new component in ETIS since CoP12 and is believed to provide a better means for adjusting for bias in the subsequent analyses. Current scores range from 0 to 5, but a higher score is conceivable.

h) Domestic Ivory Markets Score: To understand the role individual countries play in the trade in ivory, it is necessary to track domestic ivory markets around the world in a comparative manner. Based upon a cumulative scoring system ranging from –3 to 18, the relative scale of the retail-level trade, the degree of control over such trade, and the status of ivory carving is tracked for 66 key countries through this database. These scores are based on the following:

Score for scale of number of ivory products on domestic ivory market:

+9	> 40,001 pcs or 5,921 kg
+8	20,001 – 40,000 pcs or 2,961-5,920 kg
+7	10,001 – 20,000 pcs or 1,481-2,960 kg
+6	5,001 – 10,000 pcs or 741-1,480 kg
+5	1,001 – 5,000 pcs or 151-740 kg
+4	501 - 1,000 pcs or 74-151 kg
+3	51 – 500 pcs or 7.4-74 kg
+2	< 50 pcs or < 7.4 kg
+1	None

Score for number of carvers and carving industry score (based on Hunter et al., 2004):

+2.5	> 201 carvers	+2.5	> 31 carving industry score
+2	101 – 200 carvers	+2	26 – 30 carving industry score
+1.5	41 – 100 carvers	+1.5	21 – 25 carving industry score
+1	15 – 40 carvers	+1	16 – 20 carving industry score
+0.5	1 – 14 carvers	+0.5	8 – 15 carving industry score
0	No carvers	0	No carving industry score

Score for degree of regulation:

Registration of all dealers:	Yes = -1	No = +1
Trade controls for raw ivory:	Yes = -1	No = +1
Effective reporting:	Yes = -1	No = +1
Effective enforcement:	Yes = -1	No = +1

Since CoP12, a point system for the status of ivory carving has been added to this database in recognition of the fact that a number of countries may feature few ivory products within their borders, but function as ivory carving centres for products that are primarily sold in other parts of the world. This component has expanded the range of the scoring system by five points from the previous scale of –3 to 13. This database was updated for many countries based upon recently published information (Anon, 2003; Courable *et al.*, 2003; Hunter *et al.*, 2004; Martin and Stiles, 2004; Milledge, in prep.; Williamson, in prep.; or informed estimates from TRAFFIC sources).

i) Background Economic Variables Database: It may also be important to assess the background economic situation in each country in order to understand contemporary ivory trade dynamics more fully. Within ETIS, comparative socio-economic data are held for each country over time for this purpose. Key variables include population, gross national product (GDP), per capita gross national

income (GNI), levels of inflation, and aid per capita. These data have been obtained from the CIA World Fact Book (http://www.cia.gov/cia/publications/factbook/).

Data Collection:

In Resolution Conf. 10.10 (CoP12 Rev.), CITES Parties are obligated to report elephant product seizure information to the Secretariat "*within 90 days of the occurrence*". This is not always the case, however, and, in late 2003, TRAFFIC directly wrote to all CITES Parties and their territories requesting the submission of elephant product seizure information. The Secretariat followed up this initiative by circulating Notification to the Parties No. 2004/030, of 30 April 2004, calling for all Parties to submit elephant product seizure data to ETIS in a timely manner in order to ensure its inclusion in the analysis for CoP13.

Since 28 August 2002, when ETIS was closed for the last analysis to CoP12, TRAFFIC has received 1,913 records of elephant product seizures from 50 countries, of which 1,609 were input into ETIS and one rejected before the database was closed on 06 July 2004 for the current analysis. The remaining 303 cases are pending further clarification before data entry can be undertaken and are included together with 17 other cases that have been pending since CoP12 (Table 1). Another 144 cases were received after the database was closed for this analysis, but are indicated in Table 1 as 'just received'.

At CoP12 the Born Free Foundation circulated a report, *A Global Problem, Elephant Poaching and Ivory Seizure Data 2000 – 2002*, that contained data on elephant poaching and illegal trade in ivory from January 2000 through October 2002 (Anon., 2002). The data appeared to represent a total of 881 seizure cases, of which 593 were subsequently verified as already being in ETIS. Concerning the remaining 288 cases, TRAFFIC has contacted and verified the validity of 21 cases with the governments of Botswana, Cyprus, Denmark, Hungary, Hong Kong SAR, Macau SAR, Norway and the United Kingdom. In this regard, the United Kingdom corrected values for the weight of certain seizures in question, and circumstances surrounding one case in Norway resulted in it being rejected as a seizure. Two other countries, the Central African Republic and Jordan, also responded, but were unable to verify the seizures attributed to them and requested further information. As TRAFFIC does not possess anything more than what was presented in the Born Free Foundation report which is in the public domain, these cases are still pending, but will be rejected unless further substantiating information is made available in the near future. Ten other countries, including Cameroon, Chile, Congo, Egypt, Ghana, Italy, Swaziland, Uganda and Zambia did not respond to letters seeking verification of 34 cases and these are also pending (Table 1). Another 189 cases, representing data from China and France, were noted in the Born Free Foundation report, but similar data have also been received by TRAFFIC through other channels and are still being addressed as part of another data verification process (Table 1). The principal issue with the French data are that the total volume of ivory has been aggregated into larger time units and, as such, are not understandable on a case-by-case basis, a prerequisite for data entry into ETIS. As a result, these data also remain pending at this time. Another 41 cases are still pending verification from India, Kenya, South Africa, United Republic of Tanzania, Zimbabwe, Belgium, the Netherlands, Slovakia and Ukraine (Table 1). Between January and May 2004, TRAFFIC contacted the Born Free Foundation to acquire source documentation for pending cases, but nothing has been received at this time. The Born Free Foundation should be acknowledged and commended for assisting TRAFFIC with the collection of data for ETIS. In order to ensure the timely inclusion of such data in ETIS, however, it is important to remember that quality control measures require access to source documentation so that verification standards are maintained.

Table 1: Seizure cases pending verification prior to entry into ETIS (20 August 2004)

Date Received	Country of Discovery	No. of Cases	Source	Pending	Comments
Year of Seizure Not Provided					
21/04/2004	United Republic of Tanzania	3	Wildlife Division (TZ)	3	CITES process, incomplete data
18/06/2004	Ethiopia	23	EWCO	23	Targeted data collection; incomplete data (date of seizure unknown)
	1991				
19/08/2002	Belgium	1	Belgian CITES Management Authority	1	Targeted data collection; pending since CoP12
	1993				
02/08/2002	Denmark	1	Min. of Environment – Division for Wildlife Management	1	Targeted data collection; confiscation status unknown; pending since CoP12

Date Received	Country of Discovery	No. of Cases	Source	Pending	Comments
	1994				
02/08/2002	Denmark	1	Min. of Environment – Division for Wildlife Management	1	Targeted data collection; incomplete data; pending since CoP12
	1996				
19/08/2002	Belgium	1	Belgian CITES Management Authority	1	Targeted data collection, incomplete data; pending since CoP12
	1997				
19/08/2002	Belgium	9	Belgian CITES Management Authority	9	Targeted data collection, incomplete data; pending since CoP12
	1999				
02/08/2002	Denmark	1	Min. of Environment – Division for Wildlife Management	1	Targeted data collection; incomplete data; pending since CoP12
16/08/2002	India	1	TRAFFIC India	1	Pending clarification; pending since CoP12
14/07/2004	Malawi	1	Department of National Parks and Wildlife	1	Just received
	2000				
22/08/2002	United Kingdom	2	HM Customs & Excise	2	Targeted data collection; incomplete data; pending since CoP12
23/11/2002	Kenya	11	Born Free Foundation	11	Data not case specific, but amalgamated; Kenya previously provided data for this year; likely duplication
23/11/2002	Netherlands	12	Born Free Foundation	12	Pending clarification
23/11/2002	Jordan	1	Born Free Foundation	1	Data provided insufficient for Jordan government to verify; pending further clarification
23/11/2002	Swaziland	1	Born Free Foundation	1	Pending clarification
23/11/2002	Cameroon	3	Born Free Foundation	3	Pending clarification
23/11/2002	Congo	1	Born Free Foundation	1	Pending clarification
23/11/2002	Ghana	1	Born Free Foundation	1	Pending clarification
23/11/2002	Chile	1	Born Free Foundation	1	Pending clarification
23/11/2002	Egypt	2	Born Free Foundation	2	Pending clarification
23/11/2002	South Africa	1	Born Free Foundation	1	Pending clarification
23/11/2002	Zambia	3	Born Free Foundation	3	Pending clarification
23/11/2002	France	139	Born Free Foundation	139	Data not case specific, but amalgamated; also received through other channels; pending clarification
14/07/2004	Malawi	1	Department of National Parks and Wildlife	1	Just received
	2001				
23/11/2002	Italy	3	Born Free Foundation	3	Pending clarification
23/11/2002	France	29	Born Free Foundation	29	Data not case specific, but amalgamated; also received through other channels; pending clarification
23/11/2002	India	4	Born Free Foundation	4	Pending clarification
23/11/2002	China	12	Born Free Foundation	12	Data received from China for period in question but did not include large seizures in BFF report; other data not case specific; possible duplication.
23/11/2002	Congo	1	Born Free Foundation	1	Pending clarification
23/11/2002	Chile	1	Born Free Foundation	1	Pending clarification
23/11/2002	South Africa	1	Born Free Foundation	1	Pending clarification
23/11/2002	United Republic of Tanzania	2	Born Free Foundation	2	Pending clarification
23/11/2002	Uganda	1	Born Free Foundation	1	Pending clarification
23/11/2002	Ukraine	1	Born Free Foundation	1	Pending clarification
23/11/2002	Zambia	1	Born Free Foundation	1	Pending clarification
23/11/2002	United Kingdom	8	Born Free Foundation	8	Pending clarification
14/07/2004	Malawi	4	Department of National Parks and Wildlife	4	Just received
	2002				

Date Received	Country of Discovery	No. of Cases	Source	Pending	Comments
11/09/2002	Uganda	1	New Vision (Kampala)	1	Pending clarification
26/09/2002	Switzerland	1	TRAFFIC Europe	1	Pending clarification
23/11/2002	India	4	Born Free Foundation	4	Pending clarification
23/11/2002	China	9	Born Free Foundation	9	Pending clarification
23/11/2002	Belgium	2	Born Free Foundation	2	Pending clarification
23/11/2002	Slovakia	1	Born Free Foundation	1	Pending clarification
23/11/2002	Italy	3	Born Free Foundation	3	Pending clarification
23/11/2002	Uganda	1	Born Free Foundation	1	Pending clarification
23/11/2002	Cameroon	1	Born Free Foundation	1	Pending clarification
23/11/2002	Congo	1	Born Free Foundation	1	Pending clarification
23/11/2002	Ghana	1	Born Free Foundation	1	Pending clarification
23/11/2002	South Africa	1	Born Free Foundation	1	Pending clarification
23/11/2002	Zimbabwe	1	Born Free Foundation	1	Pending clarification
23/11/2002	Central African Republic	1	Born Free Foundation	1	Data provided insufficient for CAR government to verify; pending further clarification
10/02/2003	Uganda	1	New Vision (Kampala)	1	Pending clarification
30/06/2004	Zambia	1	ZAWA	1	Just received
14/07/2004	Malawi	2	Department of National Parks and Wildlife	2	Just received
05/08/2004	Zambia	1	ZAWA	1	Just received
20/08/2004	Slovakia	2	Department of Nature and Landscape Protection	2	Just received
	2003				
06/05/2003	Uganda	1	New Vision (Kampala)	1	Pending clarification
26/08/2003	South Africa	1	Mpumalanga Parks Board	1	Targeted data collection, incomplete data
19/09/2003	South Africa	1	SANPARKS Corporate Investigation Services – Pietersburg	1	CITES process, incomplete data
23/03/2004	Denmark	2	Min. of Environment – Danish Forest and Nature Agency	2	CITES process, incomplete data
06/04/2004	Australia	1	Department of the Environment and Heritage	1	CITES process, incomplete data
30/06/2004	Zambia	2	ZAWA	2	Just received
14/07/2004	Malawi	5	Department of National Parks and Wildlife	5	Just received
05/08/2004	Zambia	3	ZAWA	3	Just received
11/08/2004	Australia	52	Australian Customs Service	52	Just received
	2004				
10/03/2004	China	1	Xinhua News Agency	1	Pending clarification
13/03/2004	United Arab Emirates	1	Dubiainteract.com	1	Pending clarification
06/06/2004	Mozambique	1	Mozambique CITES Management Authority	1	Just received
30/06/2004	Zambia	1	ZAWA	1	Just received
06/07/2004	Spain	1	NZ Herald	1	Just received
14/07/2004	Malawi	1	Department of National Parks and Wildlife	1	Just received
16/07/2004	Japan	1	Permanent Mission of Japan in Geneva	1	CITES process, just received
22/07/2004	Zambia	1	The Times of Zambia (Ndola)	1	Just received
23/07/2004	Belgium	1	Belgian Customs Airport News	1	Just received
03/08/2004	China	3	People's Daily Online	3	Just received
05/08/2004	Hong Kong	1	Hong Kong Police Force	1	CITES process, just received
05/08/2004	Hong Kong	1	Agriculture, Fisheries & Conservation Department	1	CITES process, just received
05/08/2004	South Africa	1	Independent Online	1	Just received
11/08/2004	Australia	48	Australian Customs Service	48	Just received

Date Received	Country of Discovery	No. of Cases	Source	Pending	Comments
05/08/2004	Zambia	5	ZAWA	5	Just received
20/08/2004	United Kingdom	4	HM Customs & Excise	4	Just received
	Grand Total	**464**		**464**	

Outputs to the Parties:

Covering the time period 01 January 1989 to 29 September 2002, TRAFFIC produced the third series of ETIS Country Reports for 182 countries or territories, including 160 CITES Parties, which were distributed to the Parties in April 2003 via the CITES Secretariat. These reports are summary tabulations of all seizures that relate to an individual country or territory. They include both in-country seizures, as well as seizures which take place elsewhere but reportedly involve the country in question as a source, transit or destination country, or a national of the country in question was identified as involved in the seizure. The ETIS Country Reports are an integral part of the ETIS feedback loop, allowing countries an opportunity to verify information, as well as gain a better understanding of their particular role in the global ivory trade. TRAFFIC would like to express particular appreciation to the Governments of Argentina, Austria, Malta, Mauritius, Pakistan, Poland and Sweden for their thoughtful reviews and encouragement. It is also worth mentioning that, following receipt of its most recent ETIS Country Report, India requested further details of all seizure cases in which Indians nationals were involved in the illegal trade of ivory outside of India; commendably, the Indian Government has indicated its intention to investigate such infractions.

Capacity building and training:

The ETIS Action Toolkit, an interactive PowerPoint training programme assisting Parties to meet their CITES obligations for participation in ETIS, has been developed by TRAFFIC and used in a number of training exercises to date. Translated into Chinese, since CoP12, the ETIS Action Toolkit has been used in two workshops in China to support the implementation of ETIS, while a third workshop is scheduled for October 2004. Other training workshops have been held in the United Republic of Tanzania in 2002 and Ethiopia, Nepal (for CITES Parties in South Asia) and Taiwan, province of China, in 2004. Workshop events are useful to support the development of national structures and procedures within specified agencies for better ETIS implementation.

Links with MIKE and the ETIS TAG:

Along with ETIS, Resolution Conf. 10.10 (Rev. CoP12) also mandates the creation of a monitoring system to track illegal killing of elephants. To meet this requirement, a site-based initiative known as Monitoring Illegal Killing of Elephants (MIKE) has been established (see CoP13 Doc. 29.3). It is important that MIKE and ETIS are linked to the best extent possible and considerable progress has been made since CoP12 in this regard.

The most fundamental linkage is at the data collection level. A formalised approach has been developed to ensure that all instances of elephant product seizures that occur at MIKE sites in Africa and Asia are reported to ETIS and are included in the seizures database in a timely manner. This procedure resulted in 22 seizure cases for Botswana, Mali, Namibia, Zambia and Zimbabwe being reported to ETIS by the MIKE Sub-regional Support Officers.

On another level, ETIS and MIKE have agreed to share resources where appropriate. In this regard, ETIS has already developed a series of subsidiary databases that hold background information on economic variables and domestic ivory markets. It has been established that these database components will be viewed as a shared resource and made available to MIKE as appropriate.

Once MIKE becomes fully operative, like ETIS, it will produce analytical reports to each meeting of the CITES Conference of the Parties. At such time, every attempt will be made to integrate and interpret the results from the MIKE and ETIS analyses together. It will be important to assess the results together to draw overarching conclusions on the status of elephants on the ground and the global trade in elephant products, especially ivory. As MIKE will only be producing a descriptive report for CoP13 and not a full analysis, the analytical linkages will be addressed in the future as appropriate.

Finally, in Resolution Conf. 10.10 (Rev. CoP12), the Parties mandated that ETIS be subjected to "*technical oversight…through an independent technical advisory group to be established by the Secretariat*". This marked a new and welcomed development for ETIS. As MIKE already benefited from a technical advisory group (TAG), it was decided, in the interest of administrative and financial efficiency, that an ETIS sub-group,

with a designated membership, would be appended to the MIKE TAG. As a result, the ETIS Sub-group consists of Dr. Holly Dublin, Dr. Hugo Jachmann, Prof. Anil Gore, Dr. Elizabeth Bennett and Dr. Esmond Martin. The terms of reference for the MIKE TAG, communicated to the Parties in Notification to the Parties No. 2000/025, of 23 March 2000, would also apply to the ETIS Sub-group. (This group has reviewed the ETIS reports submitted to CoP13).

Funding:

Since CoP12, the operation of ETIS has been supported almost entirely by the United Kingdom's Department of Environment, Food and Rural Affairs (DEFRA). A generous grant of GBP60,000 was received in early 2003, followed by another substantial grant of GBP20,000 in 2004. To support the production of an analysis of the ETIS data for CoP13, the CITES Secretariat has also supported TRAFFIC with a grant of USD10,000. TRAFFIC extends its warm thanks in appreciation for this support. To support capacity building efforts for ETIS in various countries, TRAFFIC would also like to thank the Rufford Foundation, the World Wide Fund for Nature (WWF) and U.S. Department of State.

Number of Records:

In order to produce an analysis of the spatial aspects of the ivory seizure records in ETIS, it was necessary to close the database temporarily on 06 July 2004. As of that date, ETIS comprised 9,426 elephant product seizure records, representing law enforcement actions in 75 countries around the world. The number of elephant product seizures by country by year is presented in Table 2.

Table 2: Number of elephant product seizure cases by country by year (06 July 2004)

Region/country/territory	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Africa																	
Algeria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Benin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Botswana	1	-	-	-	-	-	3	1	-	1	4	5	9	3	11	-	38
Burkina Faso	-	-	-	-	-	1	0	0	0	-	-	-	-	-	-	-	1
Burundi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cameroon	-	-	3	-	3	2	-	-	-	-	-	9	1	-	-	-	18
Central African Republic	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Chad	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	3
Comoros	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Congo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Cote d'Ivoire	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	6
Democratic Republic of the Congo	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	3
Djibouti	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	2
Egypt	-	-	-	-	-	-	-	-	-	-	3	11	6	15	-	1	36
Equatorial Guinea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Eritrea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Ethiopia	-	1	1	3	5	12	2	4	3	3	3	2	-	1	4	5	49
Gabon	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	2
Gambia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Ghana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Guinea	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
Guinea Bissau	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Kenya	-	1	1	17	20	7	24	8	6	2	10	32	31	27	36	-	222
Lesotho	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Liberia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Libyan Arab Jamahiriya	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Madagascar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Malawi	22	12	27	26	25	4	9	2	1	1	3	-	-	-	1	-	133
Mali	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Mauritania	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Mauritius	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-	-	0

Region/country/territory	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Morocco	-	-	-	-	-	1	3	1	-	-	-	-	1	-	-	-	6
Mozambique	-	-	-	-	-	-	-	-	-	-	1	1	-	1	1	-	4
Namibia	24	31	44	40	69	69	71	50	58	22	24	20	18	14	12	4	570
Niger	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
Nigeria	8	2	2	-	-	-	-	-	-	-	-	-	-	0	0	-	12
Rwanda	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Sao Tome and Principe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Senegal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Seychelles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Sierra Leone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Somalia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
South Africa	3	7	47	40	47	22	16	26	49	62	62	12	8	24	4	-	429
Sudan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Swaziland	0	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
United Republic of Tanzania	34	19	41	25	29	21	11	19	17	10	4	3	1	26	8	1	269
Togo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Tunisia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Uganda	-	3	-	1	-	1	1	-	1	-	-	-	1	-	-	-	8
Zambia	17	16	21	17	9	10	6	3	4	1	-	1	-	1	4	-	110
Zimbabwe	3	11	11	4	10	1	13	1	26	34	35	12	7	-	5	-	173
Subtotal	112	103	198	175	217	151	160	116	166	141	149	112	84	118	88	12	2,102
Asia																	
Afghanistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Bangladesh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Brunei Darussalam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Bhutan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0
Cambodia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
China	-	-	-	-	2	3	1	3	-	3	11	26	54	58	39	-	200
Hong Kong SAR	-	19	14	18	11	8	11	14	8	5	4	9	4	4	1	2	132
India	-	-	8	4	0	1	2	11	11	11	10	27	25	6	2	-	118
Indonesia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Iran	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Israel	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2
Japan	3	7	2	1	1	6	46	39	23	18	18	8	14	8	8	-	202
Jordan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Kuwait	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Lao People's Democratic Republic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Macau SAR	2	1	0	7	3	3	3	2	-	-	-	-	1	2	1	-	25
Malaysia	0	0	0	11	2	0	0	-	-	1	-	-	2	-	1	1	18
Mongolia	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	0
Myanmar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Nepal	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Pakistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Philippines	-	-	-	-	-	-	-	1	3	1	-	0	0	-	-	-	5
Qatar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Republic of Korea	0	0	0	0	2	0	1	-	1	-	-	-	-	-	-	-	4
Saudi Arabia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Singapore	0	1	1	1	3	2	1	-	-	-	-	-	-	1	-	-	10
Sri Lanka	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Syrian Arab Republic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Taiwan, province of China	-	-	1	1	6	13	10	10	11	15	13	7	-	-	-	-	87
Thailand	-	-	-	2	3	8	4	3	-	1	-	1	2	6	1	4	35
United Arab Emirates	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	2
Uzbekistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0

Region/country/territory	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Viet Nam	-	-	-	-	-	-	-	-	-	1	-	1	2	-	-	-	4
Yemen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Subtotal	6	28	26	45	33	44	79	83	58	56	59	79	104	85	54	7	846
Europe																	
Albania	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Austria	0	0	0	0	0	0	0	0	6	8	2	1	5	0	-	2	24
Azerbaijan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Belarus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Belgium	21	9	23	32	43	55	36	57	25	12	8	14	10	29	1	-	375
Bulgaria	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
Croatia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cyprus	-	-	-	-	-	-	-	1	2	-	-	1	-	-	-	-	4
Czech Republic	-	-	-	-	-	-	-	-	-	4	1	-	-	-	-	-	5
Denmark	1	5	3	6	7	5	5	1	1	10	3	2	1	2	2	-	54
Estonia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Finland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
France	2	85	79	116	91	-	1	-	1	1	25	-	82	51	27	-	561
Georgia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Germany	0	0	98	115	47	1	-	41	51	47	45	43	22	31	31	-	572
Greece	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Hungary	-	-	-	-	-	-	4	3	1	3	0	2	5	4	-	1	23
Iceland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Ireland	-	-	-	-	-	-	-	-	1	0	0	0	0	0	0	-	1
Italy	0	1	2	2	49	2	2	-	4	1	-	-	-	-	-	-	63
Kazakhstan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Latvia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
Liechtenstein	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Lithuania	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Luxembourg	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Macedonia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Malta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Monaco	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	0
Netherlands	-	-	-	1	-	1	-	4	1	1	2	27	18	-	-	1	56
Norway	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	2
Poland	-	-	-	-	-	-	-	-	-	-	9	3	4	2	-	-	18
Portugal	3	17	8	15	16	0	-	-	-	-	1	1	-	-	-	-	61
Republic of Moldova	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	0
Romania	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Russian Federation	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
Serbia and Montenegro	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Slovakia	0	0	0	0	0	0	0	0	0	0	1	0	0	-	-	-	1
Slovenia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Spain	9	54	6	2	7	1	12	36	5	21	14	23	21	15	17	-	243
Sweden	-	-	-	-	-	-	-	-	1	2	4	-	1	1	-	-	9
Switzerland	133	64	26	6	4	5	7	5	49	37	55	34	45	28	26	-	524
Turkey	-	-	-	-	-	-	-	-	-	-	0	0	0	-	-	-	0
Ukraine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
United Kingdom		170	118	44	26	1	4	5	1	1	-	10	32	26	32	7	477
Subtotal	169	405	363	339	290	71	71	154	149	149	171	161	247	189	137	11	3,076
North America																	
Canada	0	0	0	0	0	1	-	1	-	21	19	9	22	-	-	-	73
Mexico					-	-	-	1	1	-	-	-	-	-	-	-	2
United States	-	452	264	234	172	112	199	218	194	221	182	227	185	157	1	1	2,819
Subtotal	0	452	264	234	172	113	199	220	195	242	201	236	207	157	1	1	2,894

Region/country/territory	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Oceania																	
Australia	-	-	-	-	-	-	-	45	89	69	47	39	34	-	52	-	375
Fiji	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
New Zealand	10	31	18	16	-	-	-	8	-	-	-	7	30	10	-	-	130
Papua New Guinea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Palau	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Vanuatu	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Subtotal	10	31	18	16	0	0	0	53	89	69	47	47	64	10	52	0	506
Central and South America and the Caribbean																	
Antigua and Barbuda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Argentina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Bahamas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Barbados	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Belize	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Bolivia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Colombia	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
Costa Rica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cuba	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Dominica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Dominican Republic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Ecuador	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
El Salvador	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Grenada	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Guatemala	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Guyana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Honduras	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Jamaica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Nicaragua	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Panama	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Paraguay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Peru	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Saint Kitts and Nevis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Saint Lucia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Saint Vincent and the Grenadines	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Suriname	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trinidad and Tobago	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Uruguay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Venezuela	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Subtotal	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2
Grand Total	297	1,019	869	809	712	379	509	626	657	658	627	635	707	559	332	31	9,426

When viewed from a regional perspective, countries in Europe and North America have each contributed about one-third of the seizure records in ETIS. Slightly less than a quarter of the seizure records derive from African countries, while another 9% represent seizures reported by Asian countries. Just over 5% of the data comprise seizures made in the Oceania region, while there are only two records of elephant product seizures from South and Central America and the Caribbean region, although a number of countries have reported that no seizures have been made for various years in question.

In terms of annual totals, there are only 297 seizure records for 1989, the baseline year in ETIS. Thereafter, the period 1990 through 1992 has the greatest number of seizure records, ranging from 809 to 1,019 cases each year. From 1993 through 2003, between 332 and 712 records are found for each year, but the data for 2003 are the weakest data set in this period. Finally, ETIS contains only 31 records for 2004. As in previous years, there is always a considerable delay between the occurrence of elephant product seizures and their

reporting to ETIS on the part of the Parties. It is not surprising that 2003 and 2004 represent relatively weak data sets.

Rates of reporting and the completeness of country-specific data sets:

Assessed from a regional perspective, the following comments can be made about the data in ETIS:

a) *Africa*: Namibia and South Africa have provided the most complete data sets in ETIS for the African region. Botswana, Kenya, United Republic of Tanzania, and Zimbabwe have also provided data on a fairly regular basis, but there are gaps in the early years within the Botswana and Kenya data sets, and the latter years for the United Republic of Tanzania and Zimbabwe data. Targeted data collection exercises in Malawi and Zambia yielded rather complete data sets for early years, but there has been a notable lack of data submissions to ETIS after 1996. Egypt and Ethiopia should be commended for recent efforts to submit a range of elephant product seizure data; while gaps certainly remain, a better picture of law enforcement against the illicit trade in ivory has emerged for these two important countries. Although the overall record is very incomplete, Congo, Cote d'Ivoire, Mozambique, and Sierra Leone, all important range states for African elephants, and Morocco, have submitted data to ETIS for the first time. The first ivory seizure record for Mali was also received from the CITES MIKE West African regional coordinator. Within ETIS, there are elephant product seizure records for a number of other African countries, but none have been submitted and accepted for data entry into ETIS since CoP12. In this regard, it is worth noting that Cameroon, the Democratic Republic of the Congo and Uganda, all countries identified in Decision 12.39 as major players in the illicit trade in ivory, have not submitted any information to ETIS on elephant product seizures in their countries over the last two years. It is also noteworthy that eight other African Elephant range States, including Benin, Equatorial Guinea, Eritrea, Ghana, Liberia, Senegal, Sudan and Togo, have never submitted any seizure data.

b) *Asia*: The most complete data sets for the Asian region are from Japan and Hong Kong SAR, which report elephant product seizures in virtually every year tracked by ETIS. The data set for China has improved immensely, though there remains a lack of data for years prior to 1997. Regardless, the government of China should be commended for the provision of 182 seizure cases since CoP12, increasing the total number of cases for China by nearly twelve times. India continues to provide data on a regular basis and overall the data set is rather complete for most years except for the earliest two years, 1989 and 1990. For the period 1993 through 2000, the data set for Taiwan, province of China, is fairly good, but data for earlier or more recent years have not been received. Macau SAR has also supplied seizure data for the last few years, but a gap exists for the period 1997 through 2000. Although there have been a number of submissions from Thailand since CoP12, overall the data are incomplete for most years. Thailand is a very important country in the illicit trade in ivory and the probability that many seizures have gone unreported to ETIS is great. In the same vein, as an important transit country, one would expect far more records of elephant product seizures from Singapore, but no data have been received from that country since CoP12. The data set for Singapore is believed to contain a major gap from 1996 to the present, a nine-year period in which only a single seizure has been reported. Since CoP12, a small number of seizure cases have been reported from Malaysia and the United Arab Emirates, while records of elephant product seizures in Nepal, Philippines, Republic of Korea, Sri Lanka, and Vietnam have been received sporadically from various sources in the past. Bhutan, an Asian Elephant range State, has reported that no ivory seizures have occurred throughout the entire period of 1989 to 2003. Finally, it is worth noting that a number of Asian Elephant range States, including Cambodia, Indonesia, Lao People's Democratic Republic and Myanmar, have never reported any elephant product seizures to ETIS.

c) *Europe*: The best data sets in Europe belong to Belgium, Denmark, Germany, Spain and Switzerland. In these countries, the data are believed to be complete for most years. France and the United Kingdom have also provided good data sets, but there are gaps in a number of years, particularly the period 1994 through 2000. There is some data on elephant product seizures in Italy and Portugal for the early period when TRAFFIC Europe undertook a targeted data collection exercise, but it is disappointing to note that neither country has submitted any data to ETIS since CoP12 and the record from 1994 onwards is very incomplete. Portugal, in particular, is an important trade route for ivory from former Portuguese colonies in Africa, so it is disappointing that requests for elephant product seizure data have gone unanswered. Austria, Hungary, the Netherlands, Poland, and Sweden have continued to submit data to ETIS from time to time, but with the exception of Austria there remain major gaps in each of these data sets, particularly for earlier years. Various other European countries have reported seizure cases to ETIS, but the overall record is rather

sporadic. However, Monaco, the Republic of Moldova and Slovakia have reported no elephant product seizures for most years back to 1989, while Turkey has similarly done so for the period 1999 through 2001. One of the biggest gaps in Europe probably concerns the Russian Federation, where only a single ivory seizure has been reported to ETIS for the entire 16-year period.

d) *North America*: Apart for the years 1989, 2003 and 2004, the data set for the United States is deemed to be complete, with nearly 200 cases added since CoP12. In fact, the data set for United States, based on records from the U.S. Fish and Wildlife Service's Law Enforcement Information System (LEMIS), is the largest of any country in ETIS. In contrast, neither Canada nor Mexico have submitted any elephant product seizure records since CoP12 and these data sets are regarded as rather incomplete.

e) *Oceania*: The Government of Australia should be commended for the provision of a backlog of data, representing 375 seizure cases and covering the period 1996 through 2003. Previously, Australia had never reported any elephant product seizures to ETIS. With the exception of 2002, for which data are still outstanding, the Australian data set is deemed to be complete from 1996 onwards, but there is no data for earlier years. New Zealand has not provided any new seizure data since CoP12, and the data set remains incomplete from 1993 through 1999, and since 2003. Only one other elephant product seizure from Vanuatu has been reported from Oceania.

f) *Central and South America*: With only two reported seizures of elephant products, there has been no change to the data from this region since CoP12. Brazil and Suriname, however, have reported that no elephant product seizures have occurred over a 15-year period from 1989 through 2003.

Data Quality:

Each elephant product seizure record is ascribed a score for the *reliability of source* and for the *completeness of the data*. Only records that meet a certain minimal standard for reliability and completeness are eligible for data entry into ETIS. The scoring system for data quality was elaborated in CoP12 Doc. 34.1. Table 3 presents a summary of the ETIS data quality as of 06 July 2004. The reliability of data sources remains very good with nearly four out of five records holding the highest reliability score of 'A'. In terms of data completeness, slightly more than two-thirds of the records hold the minimum score of '3'. As in the past, the most common issue resulting in a '3' as opposed to a score of '2' is the failure to report both the number of specimens seized *and* their weight.

Table 3: ETIS data quality summary (06 July 2004)

Source Grade	**Completeness Score**				
	1	2	3	**Total**	**Percentage**
A	222	2,243	5,018	7,483	79
B	3	500	1,335	1,838	19
C	5	24	76	105	1
Total	230	2,767	6,429	9,426	100
Percentage	2	29	68	100	

Trade in non-ivory elephant products:

Table 4 presents the data in ETIS relating to non-ivory elephant product seizures. In the ETIS analysis for CoP12, non-ivory seizures accounted for 440 seizure cases from 17 countries. Currently, non-ivory elephant product seizures are represented by 721 records from 26 countries. Of these records, 48 cases also involved the seizure of ivory. As noted in Table 4, these seizures comprised elephant bones, feet, hair, hide, meat, teeth and other products. The most common non-ivory elephant product seizures involve elephant hair and small leather or hide items. Once again, there appears to be a notable under-reporting of elephant meat seizures. While the United Republic of Tanzania and the United States have reported some fairly modest seizures in this regard, there are no reported meat seizures from Central Africa whatsoever, although this region is regarded as the greatest consumer of elephant meat and many elephants are killed primarily for this purpose (Martin and Stiles, 2000). In general, the ETIS data indicate that non-ivory elephant product seizures are far less common than ivory seizures, and, with the exception of meat, probably represent a trade in by-products.

Table 4: Volume or number of non-ivory product seizures in ETIS (06 July 2004)

Country	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Country Total
Bones (pcs)																	
Australia	0	0	0	0	0	0	0	0	0	0	20	2	0	0	0	0	22
Canada	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
New Zealand	4	2	1	0	0	0	0	0	0	1	0	2	0	0	0	0	10
Spain	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
United States	0	0	0	0	0	0	1	3	0	16	1	2	5	2	0	0	30
Grand Total	4	2	1	0	0	0	1	3	0	18	21	6	7	2	1	0	66
Bones (kg)																	
Nepal	1040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,040
United States	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Grand Total	1040	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1,042
Feet (pcs)																	
Australia	0	0	0	0	0	0	0	0	3	1	3	2	0	2	0	0	11
Belgium	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
New Zealand	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0	3
Poland	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Slovakia	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4
South Africa	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Spain	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	6
United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	12
United States	0	0	0	0	0	0	4	1	0	3	2	0	0	1	0	0	11
Grand Total	0	0	0	1	0	0	4	1	3	4	10	4	8	3	12	0	50
Hair (pcs)																	
Australia	0	0	0	0	0	0	0	277	42	1	1	6	2	0	9	0	338
Belgium	0	0	0	0	0	0	0	1	0	0	0	0	0	180	0	0	181
Denmark	0	0	0	0	0	0	0	0	0	0	73	0	0	0	0	0	73
Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	24	6	0	30
Japan	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
New Zealand	1	18	0	0	0	0	0	0	0	0	0	0	13	1	0	0	33
Slovakia	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Spain	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4	8
United States	0	0	0	0	3	0	118	440	104	120	89	103	218	59	0	0	1,254
Zimbabwe	0	0	0	0	0	0	0	0	0	110	0	0	0	0	0	0	110
Grand Total	1	18	0	0	3	0	118	719	146	231	164	111	234	265	17	4	2,031
Hair (kg)																	
Austria	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Spain	0	0	0	0	0	0	0	0	0	0	0	0	0	0	110	0	110
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	1	0	110	0	111
Hide (pcs)																	
Australia	0	0	0	0	0	0	0	73	12	290	22	58	9	0	21	0	485
Austria	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2
Canada	0	0	0	0	0	0	0	0	0	0	0	2	9	0	0	0	11
Denmark	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	3
France	0	0	0	0	0	0	0	0	0	0	127	0	0	0	0	0	127
Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	1	20	0	21
Hong Kong SAR	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Japan	0	0	0	0	0	0	1	6	3	0	3	5	0	1	2	0	21

Country	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Country Total
Kenya	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2
Macau SAR	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
Namibia	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4
New Zealand	4	25	7	5	0	0	0	0	0	0	0	0	2	0	0	0	43
Slovakia	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	12
South Africa	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
Spain	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	6
Sweden	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
United Republic of Tanzania	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	3	6	1	1	11
United States	0	0	0	0	0	0	81	76	81	65	122	132	190	24	0	0	771
Grand Total	4	25	7	5	0	1	82	158	98	355	292	202	216	39	44	1	1,529
Hide (kg)																	
China	0	0	0	0	0	0	0	0	0	0	0	0	67	93	0	0	160
Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Kenya	0	0	0	0	0	0	0	0	0	0	3	0	0	10	0	0	13
Macau SAR	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
Spain	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	12
United States	0	0	0	0	0	0	0	0	0	0	0	4	13	13	0	0	30
Zimbabwe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	219	0	219
Grand Total	0	0	0	0	0	0	0	2	0	12	3	4	80	116	220	0	437
Meat (pcs)																	
United Republic of Tanzania	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
United States	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6
Meat (kg)																	
United Republic of Tanzania	0	0	0	0	0	0	0	0	70	0	0	0	0	129	0	0	199
United States	0	0	0	0	0	0	0	0	0	0	0	0	1	10	0	0	11
Grand Total	0	0	0	0	0	0	0	0	70	0	0	0	1	139	0	0	210
Teeth (pcs)																	
Australia	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Belgium	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0	5
Peru	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Slovakia	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Spain	0	0	0	0	0	0	0	0	0	0	0	8	8	4	0	0	20
United States	0	0	0	0	0	0	0	14	22	5	5	5	6	23	0	0	80
Grand Total	0	0	0	0	2	0	0	14	25	6	7	13	15	27	0	0	109
Teeth (kg)																	
Kenya	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4
United States	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	3
Grand Total	0	0	0	0	0	0	0	0	0	0	4	0	2	1	0	0	7
Other (pcs)																	
Australia	0	0	0	0	0	0	0	14	41	1	0	0	0	0	0	0	56
Cameroon	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3
Japan	0	0	0	0	0	0	0	0	0	10	4	621	0	0	0	0	635
Slovakia	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Spain	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	20
United States	0	0	0	0	0	0	0	2	0	0	0	17	0	1	0	0	20
Grand Total	0	0	0	0	0	0	0	16	41	11	5	643	0	1	20	0	737

Country	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Country Total
Other (kg)																	
Japan	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
United States	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
Grand Total	0	0	0	0	0	0	0	0	0	0	3	1	0	0	1	1	6

Volume of ivory represented in the seizures database:

There are many records in ETIS where the volume of ivory by ivory type is specified only by 'number of pieces' or 'weight in kg'. In such cases, it is necessary to impute missing values. For raw ivory, based on an analysis of all ETIS seizure data for which both the weight and the number of pieces are known, a simple regression model was used to estimate the weight or the number of pieces. For imputing missing values for semi-worked ivory and worked ivory, a regression model was found to be less reliable because of the wide variability in the data. In searching for the best predicative model for these ivory types, it was found that the mean weight per piece, following the removal of a small number of outlier data points, provided the best method for imputing missing values. This represents a modification of the method used in the previous ETIS analysis where missing values for all ivory types were imputed on the basis of regression models. In the present analysis, the following calculations were used:

i) for raw ivory — estimated weight = $3.5701 \times pcs^{0.9988}$; estimated pieces = $0.2797 \times wt^{1.0012}$

ii) for semi-worked ivory — estimated weight = $0.039 \times pcs$; estimated pieces = $25.63 \times wt$

iii) for worked ivory — estimated weight = $0.1492 \times pcs$; estimated pieces = $6.7024 \times wt$

Although ivory is distinguished as raw, semi-worked and worked ivory within ETIS, the aggregated weight is computed to reflect 'raw ivory equivalent' values in order to account for scrap and wastage that occurs during the manufacturing process. Thus, for semi-worked and worked ivory products, weights have been increased by 30% based upon various assessments of the loss of ivory through carving and mechanized manufacturing processes (Milliken, 1989; Anon., 2000). By making this adjustment, it is possible to relate trade volumes to the overall impact on elephant populations.

Table 5 provides a summary of the volume of ivory represented by the ETIS data in raw ivory equivalent terms as of 06 July 2004. Collectively, it is estimated that a total of over 226 tonnes of ivory have reportedly been seized throughout the world between 01 January 1989 and 06 July 2004. These seizures are believed to represent some 45,400 tusks or pieces of raw ivory, over 227,000 pieces of semi-worked ivory, and more than 180,000 worked ivory products. As a proportion of the total volume of ivory seized in 'raw ivory equivalent' terms, nearly 80% reflects raw ivory seizures, while worked ivory represents 15% and semi-worked ivory accounts for 5% of the total volume.

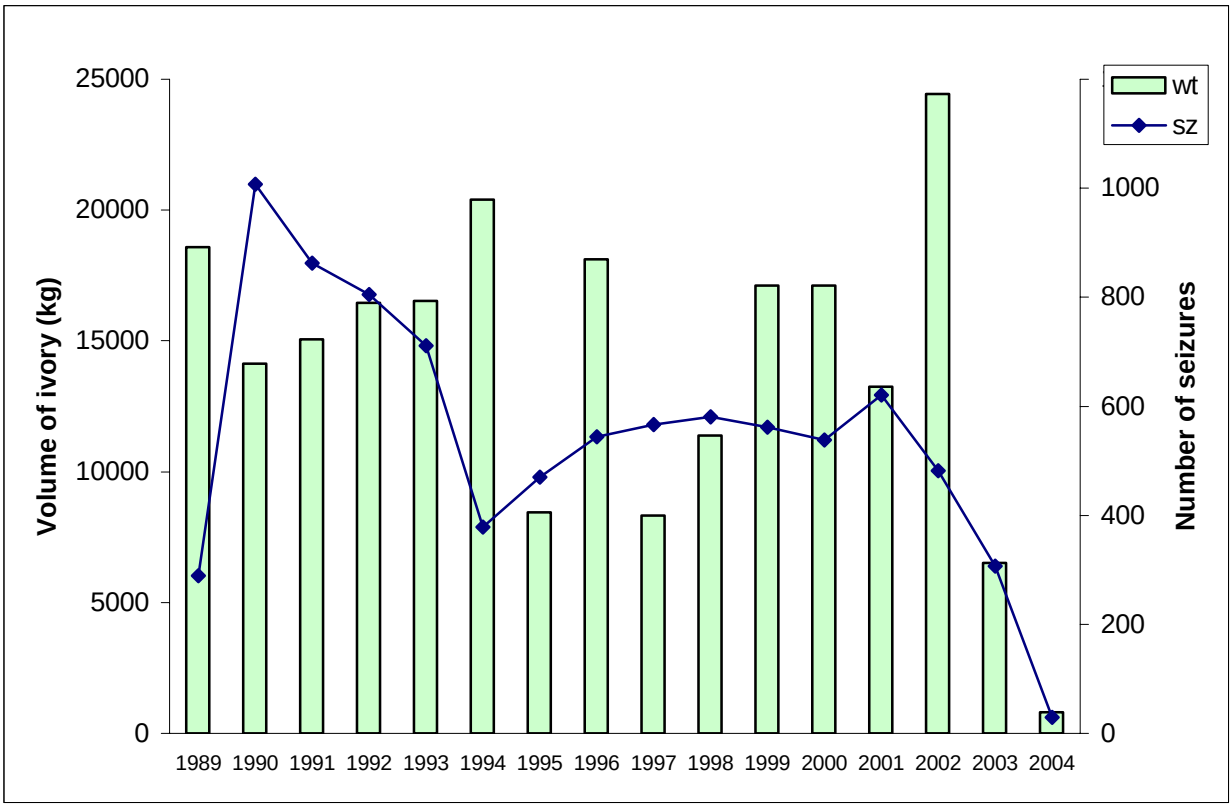
Table 5: Estimated volume of ivory in 'raw ivory equivalent' represented by ETIS seizure data, 1989-2004 (06 July 2004)

Year	Raw Ivory		Semi-worked Ivory		Worked Ivory		Total
	Pieces	Weight (kg)	Pieces	Weight (kg)	Pieces	Weight (kg)	Weight
1989	3,049	17,403	15,062	764	5,095	424	18,591
1990	1,573	7,226	53,308	2,403	21,151	4,490	14,119
1991	2,814	11,459	6,286	609	13,018	2,984	15,052
1992	2,560	12,773	2,815	205	9,622	3,477	16,455
1993	2,982	13,058	22,651	1,310	7,883	2,161	16,529
1994	3,071	13,058	12,420	640	33,739	6,691	20,389
1995	1,647	6,655	12,072	594	10,839	1,204	8,453
1996	6,012	15,598	36,709	1,662	4,358	863	18,123
1997	1,603	7,084	7,703	443	5,229	799	8,326
1998	2,767	9,363	561	86	21,863	1,926	11,375

Year	Raw Ivory		Semi-worked Ivory		Worked Ivory		Total
	Pieces	Weight (kg)	Pieces	Weight (kg)	Pieces	Weight (kg)	Weight
1999	4,121	14,778	2,482	141	9,197	2,207	17,126
2000	4,555	14,897	13,464	687	6,857	1,533	17,117
2001	2,422	10,462	351	60	12,830	2,734	13,256
2002	5,054	18,886	40,978	2,131	14,449	3,427	24,444
2003	1,008	6,008	48	9	1,917	490	6,507
2004	168	675	222	8	4,368	129	812
Total Wt.		**179,383**		**11,752**		**35,539**	**226,674**
Total Pcs.	45,407		227,132		182,415		434,757

It needs to be appreciated that, as more data become available to ETIS, the formulas used to estimate the missing values for weight or number of pieces will change over time. Parties should appreciate that understanding weight is the critical element for assessing the impact of ivory trade on elephant populations, thus, reporting the total weight of a seizure, as opposed to only reporting the number of pieces, is preferable in instances where only one variable is given. Because data are being added over time, there is perhaps an intuitive expectation that the addition of more seizure records will inevitably lead to an ever-increasing volume of ivory seized. In fact, this may not always be the case as the formulas used to impute missing values will change in the process. If average weights per unit of ivory by type fall as a result, the overall volume of ivory will reflect this and may show reductions in the volume for specific years when compared to earlier presentations of the data.

Figure 1: Estimated volume of ivory and number of seizure cases by year, 1989-2004 (06 July 2004)



As such, in this report, it is worth noting that the total estimated volume of ivory seized in 1992, 1993, 1996, 1998 and 2001 has actually decreased by approximately 1-5% from the totals presented in the previous ETIS analysis due to changes in the conversion formulas for this report. On the other hand, the total volume of seizures in all other years has increased, especially 1990 and 1994, where the estimated weight of semi-worked and worked ivory show substantial increases. In these years, for these ivory types, the conversion of a large number of pieces into an undeclared value for weight stands behind the increase. One case in particular, a seizure of 28,128 pieces of worked ivory in Thailand in 1994, is useful to illustrate this point and single-handedly accounts for the large increase in the total volume of ivory in that year. Using the current formula, this number of worked ivory pieces converts to 4,197 kg of ivory (before calculating raw ivory equivalent), while the formula used in the 2002 report resulted in only some 68 kg of ivory. This case is

exceptional in that it is one of the only cases within the ETIS data for which such a large number of pieces has been reported in the absence of any variable for weight. This example clearly amplifies the importance of providing data on both number of pieces and weight whenever possible to ensure greater precision in future analyses. (It should be noted that whether or not the results for this particular data point represent an overestimate or an underestimate is essentially moot, as it will be seen that Thailand emerged in a prominent role in both the CoP12 and the CoP13 analyses, and the projected trend during this period is essentially the same.)

Figure 1 graphically depicts the volume of ivory seized and the number of cases upon which the data are based for each year since 1989. Readers are cautioned not to interpret Table 5 or Figure 1 as representing absolute trade volumes or as suggestive of trends over time. The issue of trends is addressed in Part III of this report.

Discussion on the development and management of ETIS:

As with all database systems, ETIS will only be as good as the data provided to it. It is encouraging to note that the number of elephant product seizure records in ETIS continues to grow, and more and more countries are participating through the submission of seizure data in a more timely manner. Compared to the spatial analysis prepared from the ETIS data as of 06 June 2002 (see CoP12 Doc. 34.1 Annex 2), and the trends analysis based on the data as of 28 August 2002 (see CoP12 Doc. 34.1 Annex 3), there are currently 2,302 and 1,609 more seizure cases respectively in the database.

TRAFFIC would particularly like to commend the Governments of Belgium, Denmark, France, Germany, Hungary, Hong Kong SAR, India, Kenya, Namibia, Spain, South Africa, Switzerland, United Kingdom and the United States for continuing to diligently supply elephant product seizure data to ETIS in a timely manner. The data sets for these countries remain amongst the most complete, and these countries provide the best examples of compliance with the Resolution Conf. 10.10 (Rev. CoP12) mandate for the timely submission of elephant product seizure data to ETIS.

At the same time, a number of other countries, which previously did not submit data to ETIS on a regular basis, are now fully participating and should also be commended for their commitment. In this regard, Australia and China have made great strides in providing a backlog of seizure data, and the data sets for these two nations have grown tremendously as a result. Equally, there are encouraging signs that Egypt and Ethiopia have increased their commitment to ETIS and are supplying seizure information with far greater detail and regularity than previously was the case. These countries also deserve recognition for their efforts.

By the same token, a number of countries in which elephant product seizures are believed to be occurring continue to experience difficulty in participating in ETIS. It is unfortunate to note that many African and Asian Elephant range States are either never experiencing any elephant product seizures, or are totally failing to report them to ETIS. Equally, certain transit or destination countries for the illicit trade in ivory are in the same category. Many of these same countries were identified in the spatial analysis submitted to CoP12 as playing prominent, but often problematic, contemporary roles in the ivory trade. In this regard, Burundi, Cameroon, Cote d'Ivoire, the Democratic Republic of the Congo, Djibouti, Italy, Malawi, Nigeria, Portugal, Singapore, Sudan, Taiwan, province of China, and Uganda are all encouraged, where appropriate, to compile and submit elephant product seizure records to ETIS. Since 2001, submissions from Zimbabwe have also been very few in number and sporadic in terms of timing. Other elephant range states in both Africa and Asia are rarely, if ever, submitting data to ETIS, including Angola, Bangladesh, Benin, Burkina Faso, Cambodia, Central African Republic, Chad, Congo (Brazzaville), Equatorial Guinea, Eritrea, Gabon, Ghana, Guinea, Guinea Bissau, Indonesia, Lao People's Democratic Republic, Liberia, Mozambique, Myanmar, Nepal, Niger, Rwanda, Senegal, Sierra Leone, Somalia, Sri Lanka, Swaziland, Togo, Viet Nam and Zambia.

It needs to be recognized that capacity building to enhance awareness for and participation in ETIS remains a considerable challenge in parts of the world, particularly in Africa and Asia. Targeted workshop events that assist government authorities with the development of formalized structures and procedures, and designated roles and responsibilities within specified agencies at the national level to ensure that elephant product seizure data are 'captured' and communicated to ETIS in a timely manner are still a requirement.

In terms of data quality, the reliability of source ratings have again improved marginally. Data quality scores have remained largely unchanged, but could improve if Parties would submit both the number of pieces and weight by type of elephant product seized. If only one variable is submitted, Parties are reminded that 'weight' is more important than the 'number of pieces'. Overall, however, data quality is sufficient to allow for competent analysis of the spatial and temporal aspects of the data to meet the objectives of CITES for ETIS.

With respect to ETIS funding, TRAFFIC would like to acknowledge and thank the government of the United Kingdom for almost single-handedly supporting the development and operation of ETIS since CoP12. Without this support, it would not be possible to maintain and further develop ETIS to serve the needs of the Parties. It needs to be acknowledged, however, that the future core management and operational functions of ETIS are not covered by a secure funding arrangement at this time. The Parties are encouraged to support efforts to place ETIS on a sounder financial basis in the future.

Part II: An Analysis of the Spatial Aspects of the ETIS Data

Background:

Resolution Conf. 10.10 (Rev. CoP12) calls for ETIS to establish "*an information base to support the making of decisions on appropriate management, protection and enforcement needs*". As was the case at CoP12, a spatial analysis of the ETIS data is recognised as a competent means to identify those countries or territories where management, protection and enforcement needs in terms of illegal trade in ivory are likely to be the greatest. The overall aim of such an analysis is to answer the following questions:

- *Which countries or territories are playing leading roles in the illicit trade in ivory?,* and
- *What are the characteristics of this involvement in illegal trade in ivory?*

In the ETIS submission to CoP12, consideration of the spatial aspects of the data included a heuristic exploratory analysis to assist in the establishment of an analytical framework. In this exercise, it was possible to 'test' the data through a progressive assessment of variables relating to frequency, scale, period of activity, law enforcement effort, and size and degree of regulation of domestic ivory markets. These initial efforts led directly to a confirmatory analysis of greater statistical rigour. Having developed the analytical framework through such a process, and being generally satisfied with the results of the spatial analysis that subsequently occurred using statistical methods, an exploratory analysis is not deemed to be a necessary requirement for the current effort.

Using agglomerative hierarchical cluster analysis (Everitt *et al.*, 2001), it is possible to establish well-defined groups of countries or territories that exhibit similar patterns of seizure records, and to describe the main characteristics of these groupings in terms of numbers of seizures, volumes of ivory seized and other key covariate factors. This method of analysis is useful in isolating those countries that, according to the ETIS data, account for the largest proportion of the illegal trade in ivory since 1989, while countries and territories of lesser importance are screened out of the analysis. In this manner, cluster analysis eliminates a considerable portion of the 'background noise' and allows the primary focus to remain on those players who are most important.

The Statistical Analysis:

Since trade in ivory poses the primary illegal trade threat to elephants from a global point of view, trade in other elephant products identified in ETIS is not considered in this analysis. Of the 9,426 records currently in ETIS, 8,753 relate to trade in ivory or ivory products and were used in the following analysis. The data for each country and for each year from 1989-2004 included the number of seizures reported by the country itself (i.e. "s*z in*"), plus the number of seizures in which the same country was implicated as the country of origin, re-export, export or destination of seizures which occurred elsewhere (i.e. "*sz out*"). These data were treated separately, and the corresponding weights of the volume of ivory (in raw ivory equivalent terms) were summed (i.e. "*wt in*" and "*wt out*"). In addition, data collection and CPI scores were also available for each country in every year.

Preliminary data screening:

An initial subjective screening of the data transpired in order to eliminate those countries implicated in fewer than 20 seizures overall and with a total weight of less than 100 kg over the entire 15-year period. This reduced the number of countries under consideration from 154 to 78, while continuing to include those countries that accounted for the bulk of the ivory trade represented by the ETIS data.

To further reduce the data and highlight the most important countries, another data reduction exercise was carried out using cluster analysis. Of the 78 remaining countries, those that have contributed the greatest proportion of trade in the period 1997-2004 are of principal interest because this period most directly reflects

contemporary trade dynamics that are operative today. The cluster analysis used the following variables to identify groups of countries or territories with similar characteristics:

wt.in.1	total weight 'in-country' seizures, 1989-1996
wt.in.2	total weight 'in-country' seizures, 1997-2004
wt.out.1	total weight from elsewhere implicating the country, 1989-1996
wt.out.2	total weight from elsewhere implicating the country, 1997-2004
wt.ratio	ratio of total weight in the period 1997-2004 to total weight over the whole period from 1989-2004

The last variable was included to help distinguish countries that have been most active in the illicit ivory trade during the most recent period of time. It should also be appreciated that the difference between the first and second steps in the data reduction exercise is that the groupings resulting from the cluster analysis are statistically determined by the data itself and do not entail any subject intervention.

One of the clusters identified by this analysis was a group of 43 countries with a mean weight of 709 kg and mean number of seizures equal to 59 (averaged over both periods). The mean weight of the remaining 35 countries was 9,856 kg and the mean number of seizures was 338, so the cluster of 43 was taken to represent a residual group of countries with comparatively low values concerning the scale and frequency of their involvement in illicit trade in ivory. In contrast, the 35 countries that remain are heavily implicated in the illicit trade in ivory.

Adjusting to remove bias in the data:

As previously noted, there are a number sources of bias in the ETIS data. In this regard, uneven data collection effort between countries and between years, variation in law enforcement effort and efficiency, and variation in the rate of reporting are likely to be the main sources of bias in ETIS. To be able to make comparisons between countries and through time, it is necessary to adjust the number of seizures and weight of seizures made in-country to account for differing degrees of effort in terms of data collection, law enforcement and reporting.

In this regard, the Data Collection Score, or *DCS*, and the Corruption Perception Index or *CPI,* (see Part I, ETIS database components) were used in the following manner. The annual data from 1989-2002 for the 78 countries remaining after the first data reduction exercise were used to regress the number of seizures made in-country against *DCS* and *CPI.* In doing this, the data for 2003 and 2004 were excluded as these years are incomplete. Further, the US data were also excluded as, with 30% of the total number of seizures (almost all of very low volume), it represented an outlier that distorted the precision of the model. The standardised number of seizures made in-country in any year was calculated as the difference between the reported number of seizures made in-country and the predicted number of seizures made in-country from the linear regression. The standardised number of seizures made in-country for the period 1989-2002 is then the sum of the standardised number of seizures made in-country over all years. The same method of standardisation was carried out for the total weight of seizures made in-country, although no correction for *CPI* was made as it was not a significant predictor of the weight seized in country. Using this method, the data were adjusted to reduce bias.

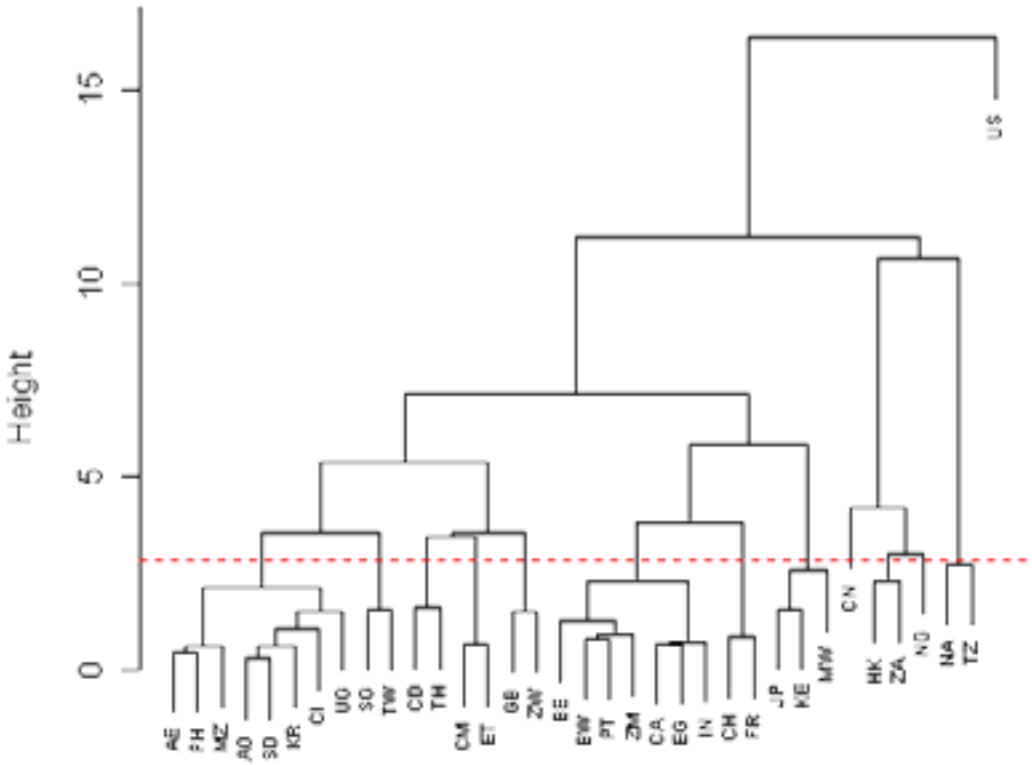
The cluster analysis:

Having adjusted the data to account for bias as described above, it was possible to commence a cluster analysis to identify the most important players in the illicit trade in ivory. Variables used in this analysis of 35 countries for the period 1997-2002 were:

sz.in.adj	adjusted number of total seizures made in-country
sz.out	total number of seizures made implicating the country
sz.ratio	the ratio of seizures reported 'in country' to total number of seizures involving that country: *sz.in.2/(sz.in.2+sz.out.2)*
wt.in.adj	adjusted total weight of seizures made in-country
wt.out	total weight (raw ivory equivalent) of seizures implicating the country

The variable *sz.ratio* was included because preliminary data analysis indicated that it would be useful in discriminating between high and low law enforcement effort (although probably confounded with reporting rate).

Figure 2: The cluster analysis



The results of the cluster analysis are presented in a hierarchical configuration in Figure 2. In this figure, the 'height' axis, that is plotted from 0 to 15, represents a relative measure of dissimilarity between clusters. The degree of vertical separation between various clusters along this axis is indicative of their differences. For example, the path from the cluster (AE, PH) (on the far left hand side of the figure) to cluster (CD, TH) (to the left of the middle) reaches a height of about 5 units, while the path between (AE, PH) to (NA, TZ) (on the far right hand side of the figure) is nearly 11 units of height. Simply put, the differences between (AE, PH) and (NA, TZ) are far greater than the difference between (AE, PH) and (CD, TH) in terms of the underlying statistics.

It is useful to visualise the configuration in Figure 2 as a 'mobile' with all end points hanging to 0 on the height axis (even those such as the US which appears at the top of the configuration). To obtain cluster groupings with a particular measurement of refinement, a horizontal line can be drawn at any point perpendicular to the height axis to 'cut' across the figure. The points where the vertical lines intersect with the horizontal line essentially 'cut' the 'mobile' into parts, giving rise to various cluster groupings of countries which fall below the 'cut'. Generally speaking, drawing the horizontal line at higher points along the height axis results in fewer but coarser clusters of countries, while drawing the line at the lowest point just above '0' point would result in the total separation of all countries in the configuration. While various groupings are possible in this hierarchical representation, for the purposes of this analysis, a 'cut' (represented by the dashed line in Figure 2) was made at approximately 2.5 units, resulting in the formation of 13 clusters. These groupings include three single country clusters, seven pairs of countries or territories, one cluster of three countries, one cluster of seven countries and one cluster of eight countries. The ETIS analysis at CoP12 also presented 13 clusters.

Table 6: Summary statistics for the 13 groups of the cluster analysis, 1997-2002

		Measure of Frequency	***Measure of Scale***	***Measure of Period of Activity***	***Measures of Law Enforcement Effort Efficiency and Rates of Reporting***		***Measure of Internal Ivory Trade***
Group	**Countries**	**Mean no. of seizures[1]**	**Mean weight (kg)[2]**	**Change in weight (kg)[3]**	**Mean CPI[4]**	**Mean LE/reporting ratio[5]**	**Mean market score[6]**
1	CD, TH	309	12,128	-471	2.1	0.07	15.0
2	NG	509	10,796	4,727	1.1	0.02	14.5
3	CM, ET	212	8,337	-1,564	2.4	0.15	12.8
4	CN	662	30,232	23,812	3.6	0.30	12.0
5	US	2,515	8,334	1,388	7.7	0.95	8.0
6	GB, ZW	584	4,025	-77	6.1	0.51	8.0
7	HK, ZA	610	20,759	-84	6.5	0.42	7.5
8	AE, AO, CI, KR, MZ, PH, SD, UG	57	3,135	257	3.1	0.09	6.8
9	SG, TW	114	13,545	-77	7.2	0.35	5.8
10	BE, BW, CA, EG, IN, PT, ZM	167	4,385	-98	5.2	0.64	4.5
11	JP, KE, MW	243	14,766	4,574	4.2	0.76	4.3
12	CH, FR	621	5,251	-1,167	7.9	0.88	3.5
13	NA, TZ	457	33,724	-19,756	3.7	0.91	-1.0

(1) *Frequency* is measured by the 'mean number of seizures' (i.e. the total number of all seizures for each country/territory divided by the number of entities in the cluster); high numbers indicate greater involvement; low numbers indicate lesser involvement.
(2) *Scale* is measured by the 'mean weight' (i.e. the total volume of ivory represented by all seizures for each country/territory divided by the number of entities in the cluster); high numbers indicate greater volumes of ivory; low numbers indicate lesser volumes of ivory.
(3) *Period of activity* is measured by the 'change in weight' (i.e. the difference between the total weight in the early period, 1989-1996, subtracted from the total weight from the most recent period, 1997-2004); positive values indicate greater activity in the recent period; negative values indicate greater activity in the earlier period.
(4) *Law enforcement effort, effectiveness, and rates of reporting* is measured, firstly, by the 'mean CPI' (i.e. the total Corruption Perception Index score for each country from 1989-2003 divided by the number of entities in the cluster); scores range from 1.0 to 10.0; low numbers indicate higher perceptions of corruption; high numbers indicate lesser perceptions of corruption.
(5) *Law enforcement effort, effectiveness, and rates of reporting* is measured, secondly, by the 'mean LE/reporting ratio' (i.e. the total number of in-country seizures divided by the total number of seizures divided by the number of entities in the cluster); ratios range from 0.00 to 1.00; low numbers indicate poor law enforcement effort; high numbers indicate good law enforcement effort.
(6) *Internal ivory trade* is measured by the 'mean market score'; scores range from –3 to 18; high numbers indicate large-scale, unregulated domestic ivory markets and carving industries; low numbers indicate smaller, highly-regulated domestic ivory markets and carving industries.

Table 6 presents summary statistics for the 13 groups. These statistics are an aggregate of all components forming a particular cluster. Thus, for single country clusters, the statistics definitively reflect the data for that particular country, but for clusters comprised of two or more countries, the statistics represent the mean of all of the constituent components. In Table 6, the clusters have been arranged according to their 'mean market score' that derives from the *Domestic Ivory Market Database* in ETIS (see Part I, ETIS database components). It needs to be further noted that the 'mean market score' was not used in the statistical analysis described above, but was subsequently added to help interpret the results of the cluster analysis.

Discussion: assessing the results:

The summary statistics in Table 6 are useful as they allow each cluster to be assessed from a number of standpoints. The following can be said about the 13 groups of countries and territories that derive from the cluster analysis:

Group 1 – Democratic Republic of the Congo (CD) and Thailand (TH): These two countries, both of which are elephant range States, were also in the same cluster in the ETIS analysis presented to CoP12. In terms of frequency and scale, this cluster ranks in the middle range, indicating fairly regular involvement in the illicit trade in ivory. In terms of particular roles in the ivory trade, further examination of the data suggest that the Democratic Republic of the Congo is a major supplier of illegal consignments of ivory within and from Africa. This view is supported by other evidence that indicates that the Democratic Republic of the Congo is the most important source of ivory found on the West African market (Courouble *et al.*, 2003), and that large consignments of ivory often move out of areas of conflict in northern and eastern parts of the country (Anon., 2001; Hunter *et al.*, 2004). Thailand remains one of Asia's largest net importers of African ivory and reportedly has more ivory products on display than possibly any country in the world (Martin and Stiles, 2003). Ivory trade in the earlier period, 1989-1996, was slightly more active than the more recent period, 1997-2004, as noted by the negative value in the 'change in weight' column. However, as noted in Part I of this report, the government of the Democratic Republic of the Congo has consistently failed to submit any seizure data to ETIS, and the data set for Thailand is also regarded as incomplete. Poor participation in ETIS serves to obscure the degree of recent illegal trade developments to some extent. Law enforcement continues to be a serious issue in both countries as noted by the exceptionally low CPI and law enforcement effort scores. These scores indicate a very high perception of corruption and points to extremely lax law enforcement effort in these countries. Equally, the domestic ivory market score is the greatest of any cluster. Studies have documented that both countries harbour internal ivory carving industries and large-scale domestic ivory markets, which remain poorly regulated (Martin and Stiles, 2000; Martin and Stiles, 2002; Hunter *et al*., 2004). Civil conflict in the Democratic Republic of the Congo certainly exacerbates problems in that country, but there is little evidence of effective law enforcement of illegal trade in ivory in the capital city, Kinshasha, an important ivory centre which is far removed from the major conflict zones. These findings remain consistent with those presented in the ETIS analysis at CoP12. Thailand has reportedly made some attempt to curtail ivory carving in the country, but ivory is still widely available at the retail level and legal 'loopholes' apparently make stricter regulation problematic (Stiles, 2004). Overall, Thailand's efforts are regarded as largely insufficient, according to a report from the CITES Secretariat in March 2004 which reported that Thailand ''does not have adequate measures to control the trade in ivory" (Anon., 2004). An action plan from Thailand is now awaited, while the Democratic Republic of the Congo failed to respond altogether to the Secretariat's for information on internal trade in ivory (Anon., 2004).

Group 2 – Nigeria (NG): Once again Nigeria, an African Elephant range State, forms a single country cluster. Like the cluster for the Democratic Republic of the Congo and Thailand, Nigeria ranks in the middle range in terms of frequency and scale of involvement in illicit trade in ivory. Further examination of the data indicates that Nigeria functions as a major supplier of all ivory types to international markets around the world. With respect to period of activity, Nigeria's involvement in illicit trade in ivory has been far more active since 1997, as demonstrated by the very high positive value in the 'change in weight' column. As Nigeria has supplied very little seizure data to ETIS, and there are no records of any in-country ivory seizures over a 13-year period from 1992 through 2004, Nigeria's involvement in the trade is almost entirely revealed through seizure data presented by other countries. As was the case in the ETIS analysis at CoP12, Nigeria demonstrates the highest perceptions of corruption and the lowest level of law enforcement effort of any country assessed in the analysis. Nigeria also holds the second highest score for its domestic ivory market. Recent studies have shown that Nigeria's ivory market continues to grow and that there is an internal ivory carving industry within the country (Courouble *et al.*, 2003; Hunter *et al.*, 2004). These findings mirror the result of the ETIS report to CoP12 but, according to the CITES Secretariat, there has been almost no effort to improve the situation since that time (Anon., 2004).

Group 3 – Cameroon (CM) and Ethiopia (ET): Both Cameroon and Ethiopia are African Elephant range States, and both countries were part of the same cluster (along with two other countries) in the ETIS analysis to CoP12. Collectively, these two countries demonstrate lower values for frequency and scale in comparison to the two preceeding clusters, and such trade has decreased considerably in the most recent period, judging by the negative value in the 'change in weight' column. This result should be interpreted with some caution, however, as it is certainly influenced by the fact that Cameroon has not submitted any data on ivory seizures to ETIS over the last three years and the data set for Ethiopia demonstrates certain weaknesses in terms of recent years. Further examination of the data in ETIS suggests that both countries continue to be major conduits for ivory shipments moving to destinations both within Africa and further abroad. In both countries the perception of corruption is an important concern, given the low CPI score which suggests high

levels of corruption, and law enforcement effort remains very poor. This is worrying as both countries have significant domestic ivory markets that are poorly regulated (Martin and Stiles, 2000; Milledge, in prep.), but little has been done to address outstanding issues since CoP12, according to the CITES Secretariat in March 2004 (Anon., 2004). Since that time, however, Ethiopia has conducted a law enforcement training event in collaboration with the CITES Secretariat and TRAFFIC, and has commenced an effort to supply seizure data to ETIS.

Group 4 – China (CN): As judged by the scores for the 'mean number of seizures' and 'mean weight', China continues to demonstrate exceptionally high, indeed the second highest, values for involvement in the illicit trade in ivory. Further, China has the highest positive value of any cluster for 'change in weight', indicating that almost all of China's illicit trade in ivory has occurred since 1997. These findings continue to support conclusions reached in the ETIS analysis to CoP12. However, China's CPI and law enforcement effort scores have improved, the latter markedly, rising from 6% to 30% since 2002. This clearly indicates that the Chinese authorities have made a concerted effort to curtail illicit trade in ivory to and within the country, and that they are reporting these efforts to ETIS through the regular submission of seizure data. At the same time, China's domestic ivory market score has also dropped (given the current scale of the domestic ivory market score), but still remains comparatively high to most other clusters in this analysis. While noting improvements and positive actions by the government, China still remains perhaps the most important country globally as a destination for illicit consignments of ivory. One recent study indicated that China has now eclipsed Japan as Asia's largest manufacturer of ivory products (Martin and Stiles, 2003), so further diligence in terms of law enforcement is required.

Group 5 – United States of America (US): Reporting nearly five times as many seizures as any other country in ETIS, the United States continues to rank highest in terms of 'mean number of seizures', but only ninth in terms of the measure for scale. This indicates that the United States continues to make a lot of very small ivory seizures, indicative of a country predominantly dealing with the illegal import of ivory products as 'personal effects' rather than larger commercial shipments. The positive value in the 'change in weight' column, however, suggests that the United States has been more active in the latter eight years than was the case in the eight-year period following the ivory trade ban agreed in 1989. The high value for CPI indicates that there is a very low perception of corruption in the country and, at 95%, the United States has the best law enforcement effort ratio of any cluster in the analysis. The domestic ivory market score has increased to some extent as a result of recent information regarding the existence of a very limited local ivory carving industry and lax regulation of ivory products believed to have been on local retail markets prior to the ivory trade ban (Williamson, in prep.). The CITES Secretariat has indicated that the United States is not fully implementing the requirements of Resolution Conf. 10.10 (Rev. Cop12), but regards the country as a low priority in the initiative to control internal trade in ivory (Anon., 2004).

Group 6 – United Kingdom (GB) and Zimbabwe (ZW): At first glance, the two countries in this cluster make somewhat odd companions. Zimbabwe is an African Elephant range State whose population is in Appendix II of the Convention and is a significant, but generally legal, producer of ivory in various forms. To some extent, the United Kingdom functions as a transit route linked to both Asia and Africa, and has a domestic ivory market of some concern. In this analysis, these countries fall in the middle range in terms of frequency as shown by the 'mean number of seizures', but overall have a very low value for 'mean weight' for how much ivory is represented by these seizures. This suggests frequent, small-scale seizures involving these countries. In fact, under CITES, since 1997, Zimbabwe has been allowed to export 'ivory carvings for non-commercial purposes'. Regardless, worked ivory legally exported from Zimbabwe as 'personal effects' is often ineligible for import in other countries with stricter domestic measures and is consequently seized. Such data comprise most of the seizure information concerning Zimbabwe that is reported by other countries. Likewise, detailed examination of the ETIS data for the United Kingdom indicates that small-scale seizures of worked ivory products are the most common ivory trade infraction in that country. This unifying fact is an important consideration in understanding the composition of this cluster. The low negative value in the 'change in weight' column indicates that the scale of the illegal trade has been nearly equal over both periods. The CPI score is in the upper range, indicating generally low perceptions of corruption, while the law enforcement effort ratio is at the mid-point, indicating an average performance. In fact, the seizure of worked ivory products that were legally exported from Zimbabwe confounds this variable and results in a lower value than would normally be expected if stricter domestic measures were not at play. The domestic ivory market score is also in the mid-range, but as an aggregated score it is worth noting that the market in Zimbabwe is at least twice as large as the market in the United Kingdom.

Group 7 – Hong Kong SAR (HK) and South Africa (ZA): Hong Kong SAR and South Africa were also paired together in the cluster analysis presented to CoP12. Since then, the ranking of this cluster against the frequency measure has increased slightly, but the scale measure as shown in the 'mean weight' column has increased considerably to the third highest position. Of equal importance, the 'mean change in weight'

variable, that was strongly negative in 2002, has been reduced to a value that suggests that involvement in illicit ivory trade is now nearly equal in both of the eight-year periods of time. This development, as well as the increase in the scale measurement, is a direct consequence of the fact that an illegal consignment of over 6.2 tonnes of raw ivory and over 40,000 pieces of semi-worked ivory moved from Malawi through South Africa prior to its seizure in Singapore in 2002. The CPI and law enforcement effort scores have remained largely unchanged in this cluster since the ETIS analysis for CoP12. In this regard, there is a very low perception of corruption, but the law enforcement effort ratio remains below the mid-point in this analysis. The domestic ivory market score continues to be in the mid-range when aggregated, but this is largely due to the influence of Hong Kong, where one recent survey identified over 35,000 ivory products for sale (Martin and Stiles, 2003).

Group 8 – United Arab Emirates (AE), Angola (AO), Cote d'Ivoire (CI), Republic of Korea (KR), Mozambique (MZ), Philippines (PH), Sudan (SD) and Uganda (UG): This cluster of eight countries is the largest grouping in Figure 2 and consequently is a bit of a 'catch-all' group. It includes two countries, the United Arab Emirates and Mozambique, which did not feature in the cluster analysis in the ETIS report to CoP12, and Angola has not yet joined the Convention. As demonstrated by the 'mean number of seizures' and 'mean weight' variables, the frequency and scale measures for this group are the lowest of any cluster in the analysis. This indicates that, when viewed as an aggregate, these countries are infrequently implicated in ivory seizures which have fairly modest weight values. In fact, none of these countries contribute ivory seizure data to ETIS on a regular basis and trade dynamics come into focus almost entirely through the seizure information supplied by others. The positive value in the 'mean change in weight' column is something to watch as it suggests that at least some of these countries have become more active in the illicit trade in ivory since 1997. In this regard, Sudan, Uganda and Mozambique in Africa, and the Philippines as transit country in Asia, are of particular concern. Another worrying factor is that this cluster has very low values for CPI and law enforcement effort, a generally poor combination for the successful interdiction of illegal trade in ivory. The mid-range score for domestic ivory markets suggests that some countries have active markets while in others markets are comparatively small. In this regard, Cote d'Ivoire, Mozambique, Sudan and possibly Angola are believed to have the largest internal ivory markets within this group, and carving industries of considerable importance have already been identified in the first three countries (Hunter *et al*., 2004). Uganda, for which there is almost no evidence of a domestic ivory market, remains a country of concern due to alleged linkages with the trade for the Democratic Republic of the Congo through military channels (Anon., 2001).

Group 9 – Singapore (SG) and Taiwan, province of China (TW): Although both Singapore and Taiwan, province of China, featured in the cluster analysis presented to CoP12, they were in separate clusters. In this analysis, they are paired together and collectively demonstrate a low value for 'mean number of seizures', but a mid-range value for 'mean weight'. The 'change in weight' variable also indicates that involvement in illicit trade has been fairly equal in both time periods. In fact, both Singapore and Taiwan, province of China, were in clusters that had much stronger negative values for the period of activity measure in the ETIS analysis for CoP12. This indicates that illicit trade in ivory is perhaps becoming more active in both places, especially as it is recognised that the data for Taiwan, province of China, are poor from 2001 onwards and Singapore has failed to submit elephant product seizure records since 1996. The only seizure record for Singapore in the period 1997-2004 concerns the largest seizure in ETIS (described in Group 7 above). These considerations serve to explain the poor law enforcement effort ratio of only 35%, but the CPI score is one of the highest in the analysis, indicating a very low perception of corruption. The domestic ivory market score for Singapore and Taiwan, province of China, is also low, and recent studies have underscored a significant decline in both places (Martin and Stiles, 2003; Martin and Stiles, 2002). Consequently, both places are believed to now represent transit points rather than end-use markets.

Group 10 – Belgium (BE), Botswana (BW), Canada (CA), Egypt (EG), India (IN), Portugal (PT) and Zambia (ZM): This cluster of seven countries is the second largest group and, again, is a 'catch-all' containing a mix of elephant range States (Botswana, India and Zambia) and transit or consumer countries (Belgium, Canada, Egypt and Portugal). Botswana and Canada appear in the cluster analysis for the first time, while all other countries featured in the cluster analysis presented to CoP12. In terms of frequency and scale, this cluster mirrors Group 8, a slightly larger cluster described above, but with somewhat greater values. The 'change in weight' variable suggests that trade in the earlier period, 1989-1996, was only marginally greater than the trade in latter period, 1997-2004. The CPI score indicates that the perception of corruption could be an issue in some of these countries on occasion, however, the law enforcement effort ratio is far better than average. Both of these scores are far more favourable than those found for the eight countries in Group 8. As an aggregate, the domestic ivory market score is low, but there is considerable variance amongst individual countries. In particular, the scale of the internal ivory market in Egypt, which also has a carving industry, is very large in comparison to the other countries in this cluster (Martin and Stiles, 2000; Hunter *et al*., 2004).

Group 11 – Japan (JP), Kenya (KE) and Malawi (MW): This cluster includes two African Elephant range States and a major consumer of ivory in Asia. All three countries were in the cluster analysis presented at CoP12 but, at that time, Japan was in a group separate to the one that featured Kenya and Malawi (along with two other countries). In this analysis, these three countries have a fairly low value for 'mean number of seizures', the frequency measure, but have a large value for 'mean weight', indicating that many reported seizures entail fairly substantial volumes of ivory. This group has a very high positive value for 'change in weight' which demonstrates a high level of illegal trade activity in the most recent period, 1997-2004. In fact, both Malawi, as the exporter, and Japan, as the designated destination, featured in the huge raw and semi-worked ivory seizure that occurred in Singapore in 2002 (described in Group 7 above). As would be expected, the influence of this single high-volume seizure on the 'mean weight' and 'change in weight' values is great within this cluster. The low CPI score suggests that there is a high perception of corruption, but the aggregated value more strongly reflects the individual CPI values for Kenya (below 2) and Malawi (below 3) rather than Japan (above 7). At 76%, the aggregated law enforcement effort ratio, however, is much better, indicating a fairly strong performance overall. As an aggregate, the domestic ivory market score is low, but the individual variance between these countries is exceptionally great, making this variable difficult to interpret in a meaningful way. As individual country values, Kenya has the lowest possible score for the scale of its domestic ivory market, while Japan features towards the other end of the scale with a large domestic ivory market, and Malawi falls somewhere in the middle.

Group 12 – Switzerland (CH) and France (FR): This cluster features two European countries that fall along transit routes and have fairly minor internal ivory markets. While France was a part of the cluster analysis presented to CoP12, this is the first time for Switzerland to emerge in a cluster. The high value for 'mean number of seizures', but the low value for 'mean weight' suggests many very small ivory seizures. In fact, detailed examination of the data shows that most seizures involve 'personal effects. The rather strong negative value for 'change in weight' means that the earlier period, 1989-1996, has been more active than the recent period. With the highest CPI score in this analysis, the perception of corruption is not an important factor of concern in either of these countries, and this is complemented by a very high law enforcement effort ratio. The low domestic ivory market score also indicates that the internal ivory trade in these countries is comparatively small, but most European ivory markets have not been assessed with any degree of detail for some time.

Group 13 – Namibia (NA) and Tanzania (TZ): Both of these countries are important African Elephant range States and featured in the cluster analysis presented to CoP12, but in separate groups. In this analysis, Namibia and Tanzania are considered together, featuring a mid-point value for 'mean number of seizures', but the highest value of all for 'mean weight'. This indicates that there have been a relatively large number of high-volume ivory seizures in these countries. This is perhaps of concern, but the negative value for 'change in weight' is the largest in the analysis and indicates that the period 1989-1996 was far more active than the period 1997-2004. While the CPI value is low, suggesting a fairly high perception of corruption, this is largely due to the influence of Tanzania's low CPI score. Any concern about corruption, however, seems to be largely mitigated by the law enforcement effort ratio which, as the second highest in the analysis, is extremely good. The very low domestic ivory market score is indicative of countries that have almost no internal ivory markets. As such, both of these countries function as trade routes more than any other role in the ivory trade. In this regard, Tanzania's port of Dar es Salaam has provided global access for ivory flows originating in Central Africa, while Namibia once served as an ivory trade route linked to Angola. Both of these routes, however, appear to be far less active today than previously was the case.

The case of Burundi and Djibouti: In the ETIS analysis to CoP12, both Burundi and Djibouti were amongst the 31 countries identified in the 13 clusters. Djibouti, in particular, was part of a rather important cluster together with Cameroon, Ethiopia and Uganda, and was specifically named with these other countries in Decision 12.39. As such, Djibouti has been part of the intersessional process under the direction of the Standing Committee reviewing compliance with the requirements of Resolution Conf. 10.10 (Rev. CoP12) for internal trade in ivory. In this analysis, neither country features in the clusters noted above and both were eliminated in the data reduction exercises described in the methodology. This seems to have resulted from the fact that, since CoP12, neither country has reported any ivory seizures themselves, and both were only otherwise implicated in four very small seizures. As such, both countries appear to be rather dormant in the illicit trade in ivory at this time and have been eclipsed by other important players.

<u>Correlated relationships which drive illicit trade in ivory:</u>

The description of the individual clusters above amplifies the salient characteristics and key relationships of the individual or groups of countries or territories that featured in the cluster analysis. Table 7 presents a statistical correlation of the variables given in the summary statistics in Table 6. As was the case in the ETIS

analysis at CoP12, there is a highly significant negative correlation between the domestic ivory market score and the law enforcement effort reporting ratio. In other words, countries which have large, unregulated domestic ivory markets (i.e. high scores) generally exhibit the poorest law enforcement effort (i.e. low ratios), and these variables stand as key governing factors behind the illicit trade in ivory. Although this correlation has dropped marginally from a -0.86 in the earlier analysis to –0.76 in this report, the P value still remains highly significant at < 0.001.

The second strongest correlation is found between the degree of corruption as measured by the CPI and the law enforcement effort ratio. In this regard, countries with a low CPI score, that is where there is a high perception of corruption, such countries most often (but not always) exhibit a low law enforcement effort ratio. These factors, though somewhat less significant than the variables discussed above, also contrive to support illicit trade in ivory. And finally, there is a positive correlation, albeit of far less significance than the other variables, found between the mean change in weight and the domestic ivory market score. This indicates that some countries with large, unregulated ivory markets have become more active since 1997, which is in contrast to countries with low domestic ivory market scores.

Table 7: Correlation between variables in Table 6

	Mean no. of seizures	**Mean weight**	**Change in weight**	**Mean CPI**	**LE/report ratio**
Mean weight	0.00 (ns)				
Change in weight	0.09 (ns)	0.01 (ns)			
Mean CPI	0.44 (ns)	-0.17 (ns)	-0.09 (ns)		
LE/report ratio	0.48 (ns)	0.14 (ns)	-0.35 (ns)	0.67 (**)	
Market score	0.04 (ns)	-0.17 (ns)	0.55 (*)	-0.53 (ns)	-0.77 (***)

Key:
ns = not significant ** = significant at P<0.01
* = significant at P < 0.05 *** = significant at P<0.001

Assessing the results of the spatial analysis:

The four clusters which hold the Democratic Republic of the Congo, Thailand, Nigeria, Cameroon, Ethiopia and China most directly exhibit the correlated relationships described above. As such, collectively, these six countries appear to play the most problematic contemporary roles in the illicit trade in ivory. Although all are elephant range States, only the Democratic Republic of the Congo and, to a lesser extent, Cameroon appear to be important producers of ivory today. All of these countries, however, continue to serve as entrepot, transit countries, manufacturers and end-use markets to varying degrees. Indeed, probably the most salient unifying characteristic is that all of these countries have highly visible domestic ivory markets and support local ivory carving industries that appear to be in need of stricter regulation and enforcement. Further, Nigeria, Cameroon and Ethiopia are regular conduits for consignments of raw ivory moving off of the African Continent, and both China and Thailand are important end-use destinations in this regard.

To a far lesser extent, the cluster comprising the United Arab Emirates, Angola, Cote d'Ivoire, the Republic of Korea, Mozambique, Philippines, Sudan and Uganda also exhibits similar problematic characteristics to those described above, but with even greater variance in terms of individual roles and attributes. Some countries, particularly those in Africa, including Angola, Cote d'Ivoire, Mozambique, Sudan and Uganda, are pivotal countries that may take on greater significance in terms of the illicit trade in ivory in the future. All of these countries need to be encouraged to assess their domestic ivory markets carefully, improve their law enforcement effort ratios and report seizure information to ETIS in a timely manner.

As a secondary level of concern, the five clusters which comprise the United States, United Kingdom, Zimbabwe, Hong Kong SAR, South Africa, Singapore, Taiwan, province of China, Japan, Kenya and Malawi also need to be encouraged to assess current responses to illicit ivory trade issues. Without any question, the United States exhibits extremely effective law enforcement in terms of interdicting ivory coming into the

country. However, the fact that the ivory trade is becoming progressively more active in the face of a comparably high domestic ivory market score is cause for some concern, and the domestic market probably requires some attention. The same is true of the cluster comprising Japan, Kenya and Malawi. The latter two countries fall along active contemporary trade routes within Africa, as is also the case for South Africa. Likewise, Singapore functions as an important gateway to traditional end-use markets in Asia, including Japan, Hong Kong SAR and Taiwan, province of China, while the United Kingdom is a transit country of lesser importance. Domestic trade in ivory in Taiwan, province of China, has reportedly declined markedly in recent years (Martin and Stiles, 2003), but it could play a possible role as an entrepot or transit country with respect to the ivory market on the Chinese mainland or possibly Japan. Similarly, Hong Kong SAR still has a substantial domestic ivory market, although dealers there claim to be only interested in liquidating pre-existing ivory stock (Martin and Stiles, 2003). On the other hand, Hong Kong SAR has been implicated as a transit country for ivory moving in and out of China, and better monitoring of the retail market is probably required. Zimbabwe also needs to improve law enforcement of its own domestic ivory market and, in particular, attempt to curtail sales of worked ivory to citizens of countries with stricter domestic measures in view of Resolution Conf. 10.10 (Rev. CoP12) which calls for the establishment of "*a nationwide procedure, particularly in retail outlets, informing tourists and other non-nationals that they should not purchase ivory in cases where it is illegal for them to import it into their own home countries*".

It is rather difficult to assess the cluster that includes Belgium, Botswana, Canada, Egypt, India, Portugal and Zambia. The aggregated statistics in Table 6 give rise to a fairly benign picture, however, the situation in individual countries is somewhat variable and, to some extent, data deficient due to poor reporting from Canada, Portugal and Zambia. In this group, Egypt and India have traditional ivory carving industries, but a concerted law enforcement effort has led to a serious state of decline in India (Hunter *et al.*, 2004), while the market in Egypt would benefit from an updated assessment. There is some concern that Portugal could be a conduit linking former African colonies with certain Asian markets, but direct evidence for this development is lacking at the present time. Belgium may also be a transit country for former colonies, but good law enforcement effort and regular reporting of seizure data to ETIS stands in contrast to the situation for Portugal. There is also concern that some of the ivory seized by Singapore in 2002 was of Zambian origin, indicating that this country deserves some attention. There are no obvious concerns about the situation in Botswana, although it might be useful to supply further information on ivory seizures that may have occurred in the period 1989 through 1998.

Finally, France, Switzerland, Namibia and Tanzania fall within the two clusters that appear to have the best aggregated statistics. There are few obvious issues with respect to these countries although Tanzania needs to ensure regular reporting of its elephant product seizures to ETIS and continue to carefully monitor the port and airport of Dar es Salaam where most large-scale ivory seizures have occurred in the past. France could also address the lack of seizure information for the period 1994 through 1998 and the year 2000.

In response to the ETIS analysis at CoP12, the Parties agreed Decision 12.39 which initiated an intersessional CITES process, under the direction of the Standing Committee, to deal with the issue of domestic ivory markets that fail to comply with the requirements specified in Resolution 10.10 (Rev. CoP12). While some limited progress has been made in this regard, this initiative is still under development and will be considered again as a formal agenda item at CoP13 in Bangkok, Thailand (see CoP13 Doc. 29.1).

It is significant to note that all six of the countries designated as playing the most problematic contemporary roles in the illicit trade in ivory in this analysis were also specifically identified in Decision 12.39 for review by the CITES Secretariat two years ago. It is, therefore, important to continue to subject these countries to the oversight mechanism outlined in Decision 12.39 as a means to effectively inhibit the negative impact poorly regulated domestic ivory markets have on elephant populations around the world.

In this regard, recent measures approved by the Standing Committee to expand the purview of Decision 12.39 beyond the ten countries initially targeted (i.e. Cameroon, China, the Democratic Republic of the Congo, Djibouti, Ethiopia, Japan, Nigeria, Thailand, Uganda and the United States of America) seem appropriate in view of the number of other countries or territories that have emerged in this analysis as ivory trade players of some concern.

Conclusions of the spatial analysis:

With respect to the spatial analysis, the following conclusions can be made:

- Illicit trade in ivory continues to be most directly related to the presence of large-scale, poorly regulated, domestic ivory markets in Asia and Africa. In such places, if there is a high perception of corruption, as

indicated by the Corruption Perception Index of Transparency International, there is also likely to be poor law enforcement effort. And, to some extent, such markets have been more active in the recent period 1997-2004 than the earlier period, 1989-1996.

- On the basis of agglomerative hierarchical cluster analysis, the six countries most highly implicated in the illicit trade in ivory are Cameroon, China, the Democratic Republic of the Congo, Ethiopia, Nigeria and Thailand. All of these countries featured in the ETIS analysis to CoP12. Of these countries, only China has demonstrated significant improvement in its law enforcement effort and appears to be making commendable progress in dealing with a serious illegal ivory trade problem. Ethiopia and Thailand have also made some effort to deal with outstanding issues, but further progress may be inhibited by an inadequate legal framework from which to act. It should also be noted that there appears to have been little change in the situation in the Democratic Republic of the Congo, Cameroon and Nigeria where serious illegal ivory trade problems remain to be tackled.

- Another group of countries, including Angola, Cote d'Ivoire, Hong Kong SAR, Japan, Kenya, the Republic of Korea, Malawi, Mozambique, Philippines, Singapore, South Africa, Sudan, Taiwan, province of China, Uganda, United Arab Emirates, United States, United Kingdom and Zimbabwe, were also identified as playing important roles in the trade. At the very least, if they are not already doing so, these countries should make an effort to report ivory and other elephant product seizures to ETIS and promote awareness of the prospect of illegal trade in ivory amongst law enforcement agencies in their countries. Those countries in this group with active domestic ivory markets should ensure compliance with CITES requirements.

- The issue of unregulated domestic ivory markets continues to require special attention. In this regard, Decision 12.39 should be reaffirmed and the intersessional process under the direction of the Standing Committee should continue to be developed. In the absence of progress, remedial action should be taken against those countries that do not ensure compliance with the provisions outlined for control of internal ivory trade in Resolution Conf. 10.10 (Rev. CoP12). In view of the number of countries identified in the illicit trade in ivory, the decision at the 50th meeting of the Standing Committee to expand the scope of Decision 12.39 within Africa is a welcomed course of action and should be supported.

- Certain countries which have never or only rarely report ivory and other elephant product seizure information to ETIS should be encouraged to do so. In this regard, a special emphasis needs to be made to encourage all African and Asian Elephant range States, key transit and end-use market countries to comply with their obligations under the Convention to report such information. TRAFFIC should be encouraged to produce lists of such countries as appropriate for circulation through the CITES Secretariat.

Part III: An Analysis of Trends in Ivory Seizures in the ETIS Data

Background:

Resolution Conf. 10.10 (Rev. CoP12) calls for ETIS to measure "*levels and trends, and changes in levels and trends*" of illegal trade in ivory. It also calls for an assessment of "*whether and to what extent observed trends are related to changes in the listing of elephant populations in the CITES appendices and/or the resumption of legal trade in ivory*". This analysis aims to achieve that requirement by addressing the following questions:

- *What is the trend in the illicit trade in ivory since 1989 to the present and how has it changed over the years?,* and

- *What are the probable causes of any changes in the trend during this period of time and how do they relate to CITES?*

Before proceeding, it is worth recalling the basic conceptual framework of ETIS. It must be appreciated that it is not possible to observe the actual level of illegal trade in ivory that occurs globally each year. Consequently, ETIS will never be able to express absolute values for the illegal trade in ivory. But, as illicit trade in ivory unfolds, a certain number of transactions are detected and seized and, of these, a certain number are reported to ETIS. Again, it is not possible to know the exact number of ivory seizures that occur throughout the world each year. Over time, however, as the data build up, an information base is established which affords a 'window' through which it is possible to view illegal trade in ivory in a credible manner. Although this view is inherently imperfect because of bias in the data, it can be substantially improved if independent covariate proxy measures are found to assess such things as law enforcement

effort, efficiency and rates of reporting. These variables are key factors that introduce bias into the data, determining both its quality and quantity. By using these proxy measures in statistical analysis, it is possible to adjust the data to reduce the various forms of bias contained within it. By making such adjustments, it then becomes possible to produce trends that are believed to reflect, in a general manner, relative trends in illicit trade in ivory over the period of time under consideration.

The methodological framework:

At the outset, it should be stated that data for the year 2004 are not included in this analysis as, with only 31 records, it is very incomplete. To undertake the analysis, the total volume of ivory in raw ivory equivalent terms for the period 1989-2003 was isolated, resulting in a data set representing 72 countries. It is worth recalling again that the conversion formulas for estimating the volume of ivory represented by numbers of pieces were updated to reflect new data received since the ETIS analysis at CoP12. As a result, there is some degree of difference between the estimated volume of ivory seized for various years in the early analysis when compared to the current analysis (see Part I, Volume of ivory represented in the Seizures Database for discussion of this issue). At the same time, the current analysis also benefits from the inclusion of nearly 1,400 new records of ivory seizures.

As a measure of illegal ivory trade activity, the volume of ivory derived from the seizures data demonstrates some degree of bias. Direct measurement of the causes of this bias are not available, but a number of proxy variables are used as substitutes. The main sources of bias and the proxy variables used as corrective measures are:

- *Variation in law enforcement effort and efficiency*: Bias arising from varying degrees of law enforcement effort and efficiency is believed to exist between and within countries, and over time. Two variables have been used to address this issue, the Corruption Perceptions Index (CPI) and the Law Enforcement Effort Ratio (*sz.ratio*) for each country in each year (see Part I, ETIS database components).
- *Variation in reporting rate*: An unknown proportion of ivory seizures are never reported to ETIS and it is assumed that this uncertainty varies between countries and years. To compensate for different rates of reporting, the proportion of years that a country submits a CITES Annual Report was assumed to reflect a similar rate of reporting. In this regard, the CITES Annual Report Ratio (*rep.ratio*) was used to adjust for bias in the rates of reporting (see Part I, ETIS database components).
- *Uneven data collection*: At various times during the period of operation of ETIS, different levels of effort have been used in the collection of seizures data. To adjust for this bias, the Data Collection Score (DCS) was devised as a measure of data collection effort for each country in each year (see Part I, ETIS database components). This analysis represents the first time the DCS has been tested in an analysis.

To adjust for these biases, a regression model was fitted to the annual volume of ivory in raw ivory equivalent terms for each country with the proxy measures noted above used as explanatory variables. Each measure was tested for the significance of its contribution to the prediction of the volume of ivory represented in the seizures data. This model was a linear mixed-effects model (Pinheiro and Bates, 2000), with random coefficients for each of the explanatory variables. Only DCS and *sz.ratio* were found to be significant ($P < 0.0001$ for each). Accordingly, CPI and *rep.ratio* were not used in the subsequent trends analysis. The total volume of ivory for each country in each year was then adjusted by removing the contributions from DCS and *sz.ratio*. These adjusted weights were then summed over countries to provide a total adjusted estimate of the volume of ivory in raw ivory equivalent terms for each year.

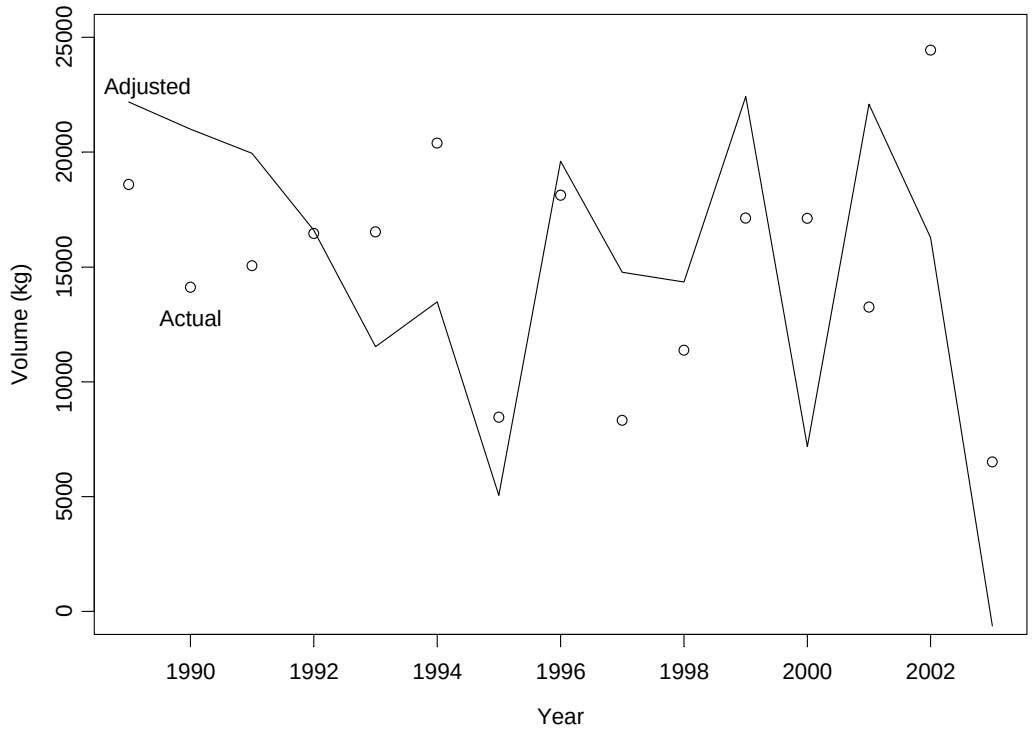
The unsmoothed trend:

With the bias reduced as described above, it is possible to estimate a trend. The solid line in Figure 3 shows the adjusted total volume of ivory seized, as represented by the ETIS data over the period under examination. This trend line is shown in relation to the unadjusted data points (rendered as small circles), which correspond to the annual totals of ivory seized as presented in Table 5 and Figure 1 of this report. In years where data collection has been most passive, 1989 through 1991, for example, the trend line is adjusted upwards, while in years where data collection has been more actively pursued, as in 1993 and 1994, it is adjusted downwards.

The trend line in Figure 3 shows a general decline in the volume of ivory seized between 1989 through 1995. This decline is followed by an exceptionally sharp increase in 1996, but this upward thrust is not sustained and falls somewhat over the next two years. From 1998 through 2002, there is a period of fairly wide

fluctuation in the volume of ivory seized from year to year, until finally dropping off rather dramatically in 2003.

Figure 3: Adjusted trend 1989-2003 with actual volume of ivory in 'raw ivory equivalent' terms (06 July 2004)

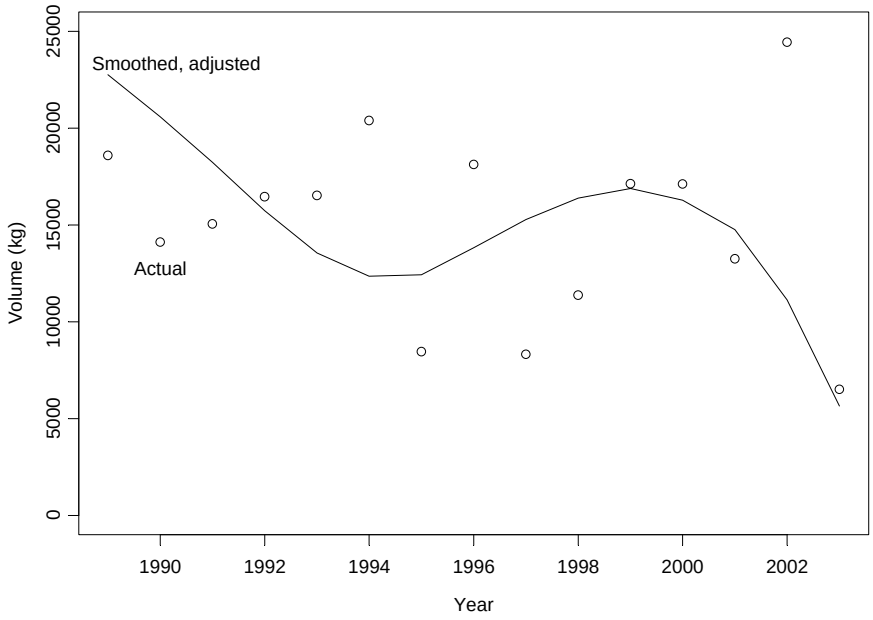


Smoothing the trend:

The adjusted trend in Figure 3 is somewhat difficult to visualise given the rather severe fluctuations that have occurred from 1995 onwards. To provide a better indication of the underlying trend, it is possible to estimate a smoothed trend by fitting a generalized additive model (Hastie and Tibshirani, 1990) with a cubic spline smoother. Figure 4 provides a smoothed adjusted trend line against the actual annual volume of ivory represented by the seizure data in the ETIS.

The smooth adjusted trend line presents a more generalised picture of the volume of ivory seized over this period. As such, it indicates that there was a fairly steady decline in the seizure of illicit ivory through 1995, followed by a steady increase from 1996 through 1999. Thereafter, the trend demonstrates a gradual, then sharp, decline in ivory seizures to 2003.

Figure 4: Smoothed adjusted trend 1989-2003 with actual volume of ivory in 'raw ivory equivalent' terms (06 July 2003)



The relative accuracy of this trend is addressed in Figure 5, where the same smoothed trend line is presented together with approximate 95% confidence limits. This means, from a statistical point of view, that the true underlying trend lies somewhere between the limiting curves represented by the dotted lines.

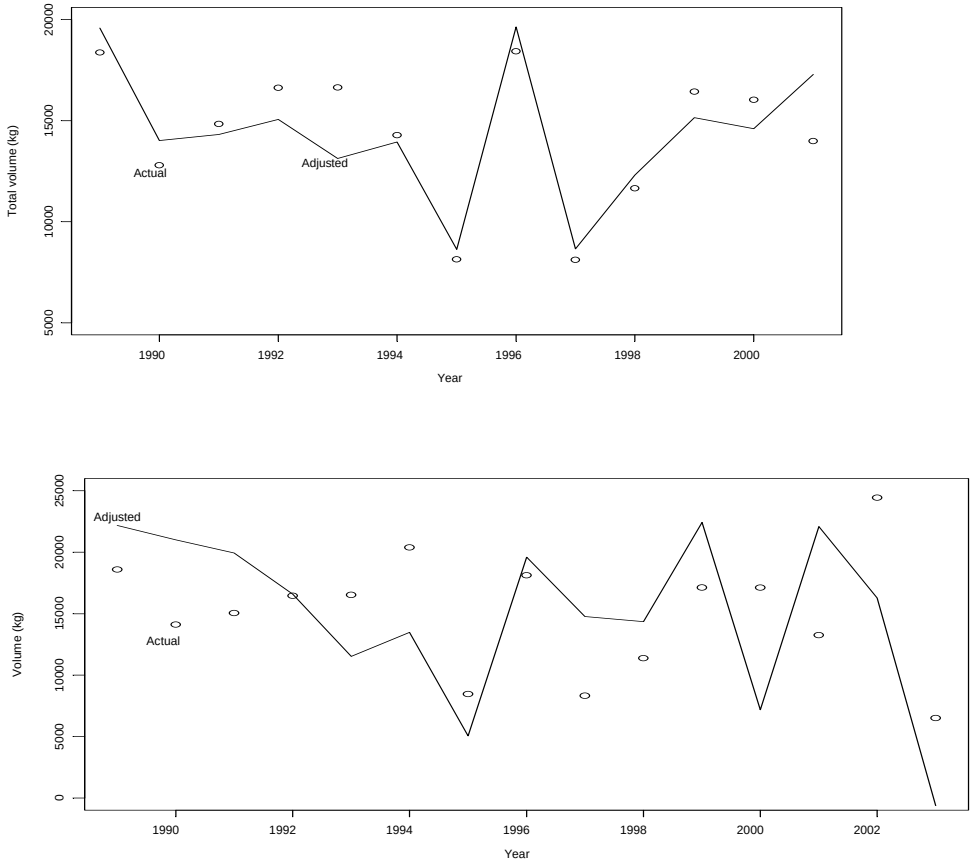
Figure 5: Smoothed adjusted trend line for 1989-2003 (scaled) ± 2 standard errors (95% confidence interval) (06 July 2004)

Comparing the trend (1989-2003) with the result in the ETIS analysis to CoP12:

The ETIS analysis to CoP12 presented a trend for seizures of illicit trade in ivory for the period 1989-2001. As an initial consideration, it is useful to compare the result from two years ago (Figure 6, upper) with the

adjusted but unsmoothed trend in this report (Figure 6, lower). Presenting the two results together allows for comparisons to be readily made. It can be seen that, in both cases, there is a general decline in the volume of ivory seized globally between 1989 through 1995, followed by a rather sharp increase in the trend in 1996. The trend line in the earlier analysis to CoP12 shows that after the major increase in 1996, there is an equally sharply decrease in 1997. The trend stemming from the current analysis also shows a decline in 1997 and, again, in 1998, but the net effect is rather modest in comparison to that observed in the earlier report. In the adjusted unsmoothed trend presented to CoP12, the volume of ivory seized steadily increased from 1997 onwards, while in the current analysis, a period of fairly wide fluctuation occurs from 1997 through 2001, giving way to a persistent and steep downward movement thereafter.

Figure 6: Comparing the adjusted trend line 1989-2001 in ETIS analysis to CoP12 (upper; ETIS Data at 06 July 2004) with current analysis 1989-2003 (lower; ETIS data at 28 August 2002)



Contrary to the analysis presented at CoP12, there is now an apparent downward trend in the volume of ivory seized around the world, as represented by the ETIS data. In this regard, the trend line in the current analysis appears to be heavily influenced by the data for 2003. If so, it needs to be noted again that, within ETIS, the 2003 data is regarded as less complete than that for the preceding period of time. Apart from 2004, which was not considered in the current analysis at all, the data for 2003 represent the lowest number of ivory seizures and the lowest volume of ivory seized within the 15-year period under examination (Table 5).

Thus, an argument can be made that 2003 is 'data deficient'. In fact, certain key countries or territories that otherwise represent fairly complete data sets in ETIS, such as Hong Kong SAR, South Africa, Taiwan, province of China, and the United States, have not yet provided data for elephant product seizures that occurred that year. Further, data for other important countries, such as Egypt and India, are weak for 2003. As an underlying consideration, it should also be appreciated that the general data collection pattern within ETIS suggests that it takes about two years before any given year reaches a kind of 'critical mass' in terms of the number of seizure cases at hand. For example, the data set for the year 2001 had only 432 seizure cases in August 2002 (when the trends analysis for CoP12 was prepared), but had increased to 707 cases by July 2004 (the time of the current analysis), indicating a rate of increase of 63% over the two-year period

of time. There is every reason to believe that the number of seizure cases for the year 2003 will quantitatively increase in a similar manner by 2005.

For these reasons, and in the interest of caution, it is worth taking another look at the trend without using the data for 2003. Interestingly, when this is done, the smoothed adjusted trend actually reverses that shown in Figure 4 and represents a gradual increase from 1995 to the present (Figure 7). In this figure, the smoothed adjusted trend line is shown against the actual data (circles) and the adjusted trend before smoothing (the dashed line).

Figure 7: Smoothed adjusted trend 1989-2002 with actual and adjusted volume of ivory in 'raw ivory equivalent' terms (06 July 2004)

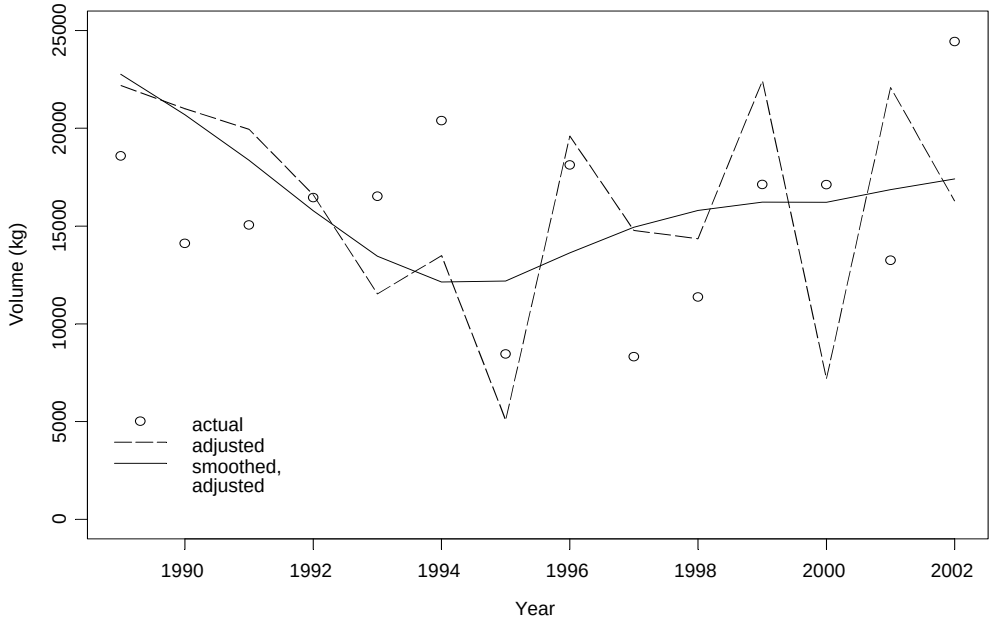


Figure 8 shows the same smoothed adjusted trend line fitted with approximate 95% confidence limits. As noted previously, the true underlying trend is confidently expected to lie within the dotted lines that mark the confidence limits.

Figure 8: Smoothed adjusted trend line 1989-2002 (scaled) ± 2 standard errors (95% confidence interval) (06 July 2004)

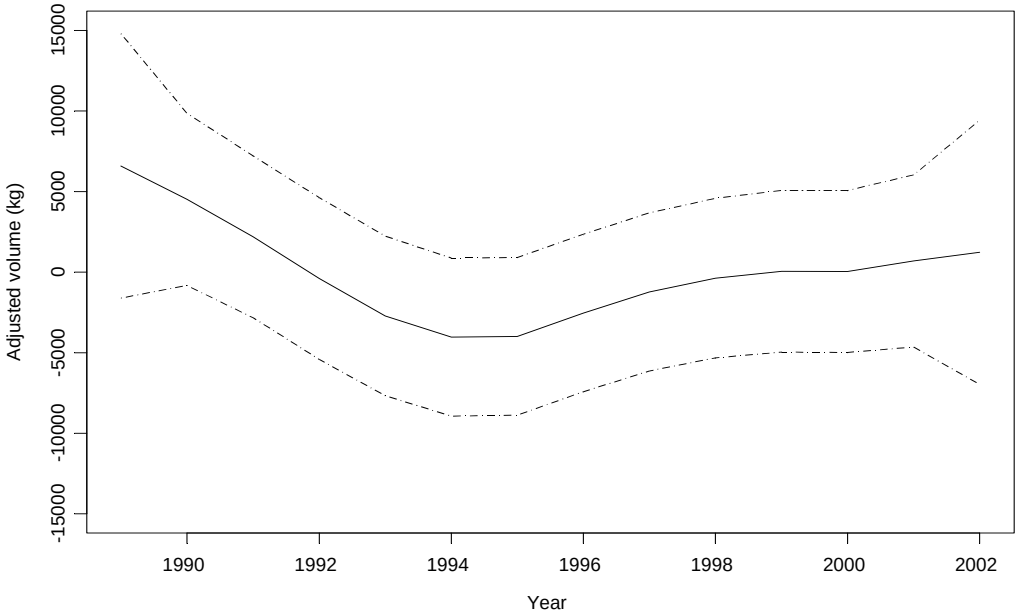


Figure 9: CoP12 smoothed adjusted trend line 1989-2001 (scaled), +/- 2 standard errors (95% confidence interval) (28 August 2002)

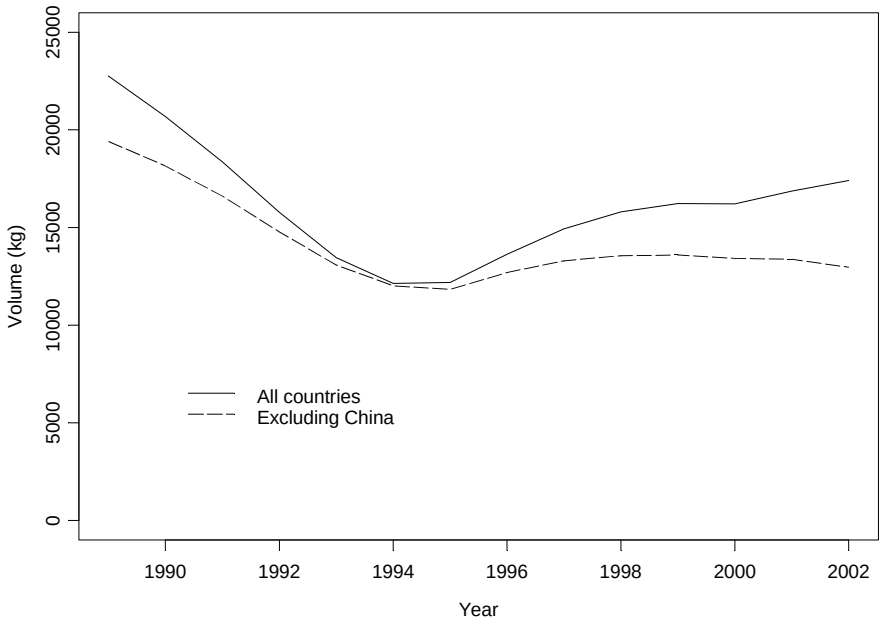
In many respects, the smoothed adjusted trend that emerges once the data for 2003 are removed closely mirrors the smoothed adjusted trend which was presented in the ETIS analysis to CoP12 (Figure 9). The principal difference between the two results is that the current smoothed adjusted trend shows an earlier, but far more gradual, increase from 1995 onwards (Figure 8). This 'nuance' stands in contrast to the result from two years ago which indicated a flat period of relative stability in global ivory seizures between 1993 to 1998, before giving rise to a sharp increase in subsequent years (Figure 9). Overall, however, the two figures demonstrate remarkably similar patterns, although the current analysis in Figure 8 covers an additional year (2002) and is based on 1,088 more records of ivory seizures than the trend depicted in Figure 9.

While illicit ivory trade dynamics may be changing globally, as suggested by the trend depicted in Figures 4 and 5 above (which include another 307 ivory seizure records from the year 2003), for reasons already outlined, there is some degree of uncertainty concerning this result. Consequently, it is judged to be a premature reflection of the current level of illegal ivory trade volumes at this time. Far more confidence is held with respect to the trend indicated in Figures 7 and 8 as a formal output of ETIS at this time. For the purposes of meeting the CITES requirement to measure trends for each Conference of the Parties, the trend representing the years 1989-2002 (as depicted in Figure 7 and 8) is believed to best reflect contemporary illegal trade dynamics for ivory during this period. As such, it will be discussed in the following section of this analysis.

Assessing the trend - the role of China:

Accepting the trend in Figure 7 as reflective of the volume of ivory seized over the 14-year period 1989-2002, there remains some concern that the amount of ivory seized each year is continuing to increase. That said, the rate of increase is much less now than was previously reported two years ago, and the trend line no longer shows exponential growth in successive years. Although too early to accept in a definitive manner, current data for 2003 are suggestive that such volumes may in fact experience decline in the near future and reverse the upward trend, however, this remains to be seen in future assessments of the ETIS data.

Figure 10: Smooth adjusted trend 1989-2002 with all data and with China data removed



In the ETIS analysis for CoP12, the role of China in the illicit trade in ivory was identified as the single most important influencing factor in the upward trend from 1999 through 2001. It is worth assessing and updating this finding once again. In Figure 10, the smoothed adjusted trend for the period 1989-2002 is shown both with and without the data for China. In this regard, the dashed line shows the trend once all cases where China is identified as the 'country of discovery' or the 'country of destination' have been removed. These data primarily represent shipments of raw and semi-worked ivory to China and are regarded as a measure of Chinese demand over this period. By removing these data, China's demand for ivory, and its influence on the observed trend involving all countries, can be demonstrated. It can be seen in Figure 10 that China's impact is considerable and changes the trend markedly once removed. Without the influence of Chinese demand (as depicted by the dashed line), the volume of ivory seized globally experiences very modest increases in 1996 and 1997, and then essentially becomes flat thereafter, showing very little change whatsoever other than a very slight hint of downward movement in 2002.

This result continues to confirm the finding of the ETIS analysis to CoP12 that identified China as the single most important country in the ivory trade today. While that finding provoked some controversy at the time and clearly challenged the paradigm that held Japan to be the leading driver of global ivory trade dynamics, since then other observers have reached similar conclusions. A major study of ivory markets in East Asia in

2002 concluded that "China has emerged as the main ivory manufacturing centre for all Asia, surpassing Hong Kong and Japan" (Martin and Stiles, 2003). It was also observed that "China is probably also the only country in East Asia that has more worked ivory retail outlets [in 2002] than in 1990" (Martin and Stiles, 2003). On an encouraging note, the study also asserted that China had "introduced new laws and …increased efforts to stop illegal ivory imports and to prosecute smugglers" (Martin and Stiles, 2003).

There can be little doubt that if illicit trade in ivory is to be reduced in the future, China will need to play a significant role in bringing this reduction about. In this regard, it should be acknowledged again that China has already reacted in a proactive and positive manner to the results of the ETIS analysis presented at CoP12. There is ample evidence to demonstrate that China has made a concerted attempt to curtail illegal ivory trade into and within the country over the last two years. In contrast to the situation prior to CoP12, many elephant product seizures are now occurring and being reported to ETIS by the Chinese authorities. In this analysis, since 2002, China's law enforcement effort ratio has improved from 6% to 30%, a far greater margin of improvement than any other country represented within ETIS. The structure and scale of China's ivory trade is such that it can not be effectively controlled over night. While allowing room for further improvement, China should be commended for the rapid strides it has made in addressing ivory trade issues. The impact of a continuing Chinese commitment to suppress illicit trade in ivory will be an important factor in any future decline in illegal ivory trade volumes globally.

Assessing the trend - the issue of 'signals':

In order to address the relationship of observed trends in the illegal trade in ivory to events under CITES, it is necessary to revisit the perennial question of 'signals'. The basic logic of this hypothesis holds that intentions to transfer elephant populations to Appendix II, or to change annotations to allow even limited trade in ivory, produce 'signals' that a re-opening of trade in ivory is imminent. This, in turn, stimulates the illegal killing of elephants and illicit trade in ivory. Proposals to transfer specified populations of elephants from Appendix I to Appendix II of the Convention were considered at each and every meeting of the Conference of the Parties since 1989. These meetings were held in March 1992 (Kyoto, Japan), November 1994 (Ft. Lauderdale, Florida), June 1997 (Harare, Zimbabwe), April 2000 (Nairobi, Kenya) and November 2002 (Santiago, Chile), but the proposals to amend the appendices were in the public domain at least six months prior to these meetings. Not until June 1997 were any downlisting proposals for African Elephants actually accepted by the Parties, and then only for three southern African countries, but trade in raw ivory was not immediately allowed. The agreed one-off sale of pre-determined stocks of raw ivory was made conditional and did not transpire until 1999 under an arrangement involving Botswana, Namibia and Zimbabwe, as the exporters, and Japan, as the sole importer. In 2000, the elephant population of South Africa was downlisted, but trade in raw ivory was not allowed. Finally, in 2002, another one-off conditional sale of raw ivory was approved for three countries, but this transaction has yet to occur. All of these events generated media coverage and consequently produced 'signals'.

Against this backdrop, the adjusted but unsmoothed trend presented in Figure 3 can be assessed to see if increases in ivory seizures follow a pattern commensurate with the CITES cycle for Conferences of the Parties. In fact, it can be seen that in the years 1992, 1997, 2000 and 2002, the volume of ivory seized actually declines from previous years, in one case, 2000, quite markedly. Only in 1994 is there an apparent increase during a year holding a Conference of the Parties. In 1999, however, the year raw ivory is auctioned in three African countries and legally exported to Japan under a CITES-approved arrangement, the volume of ivory seized globally increased fairly substantially, but was not sustained and fell sharply the next year (Figure 3).

Overall, the pattern described above does not support the 'signals' hypothesis. It is possible that the impact of key events under CITES may be felt in a subsequent year. That said, others have argued that the so-called negative 'signals' effect of downlistings under CITES could actually lead to greater awareness and vigilance on the part of law enforcement authorities in certain parts of the world. By the same token, high-profile ivory seizures and the publicity they engender may have a deterrent effect on criminal elements, particularly middleman operatives, potentially involved in illegal ivory transactions. In sum, there are many different kinds of 'signals', both positive and negative, and there have essentially been signals of one sort or another throughout the entire period. Consequently, it is very difficult to isolate the effect and impact of the various signals under CITES and identify any clear pattern or relationship with the seizures data in ETIS.

Perhaps some of the best work on the 'signals' argument comes from qualitative assessments that have been conducted in key ivory manufacturing and consuming markets in Asia. In this regard, it should be recalled that, in 2002, the Chinese government expressed the view that the ivory auctions in Africa and the subsequent import of ivory to Japan in 1999 caused ''many Chinese people to misunderstand the decision and believe that the international trade in ivory [had] resumed" (Chinese Management Authority, in litt. 14

October 2002). Ivory trade researchers working in Asia the same year, however, on the basis of interviews, concluded that "ivory vendors in China, Hong Kong and Taiwan do not believe that CITES will ever approve a renewed international trade in ivory for their industries. Most ivory personnel seemed resigned to a collapse of the elephant ivory industry, and were already taking steps to carve and/or sell substitutes, or to change business completely" (Martin and Stiles, 2003). These observers further stated that "the CITES-approved raw ivory sales to Japan from southern Africa in 1999 were not seen as important by ivory dealers outside of Japan" and that "ivory industry business personnel in China, Hong Kong and Taiwan did not believe that the ivory auctions had a significant effect on either internal or external ivory demand" (Martin and Stiles, 2003).

In contrast to the 'signals' argument, which essentially relies on understanding perceptions and other motivational factors that are unobservable, many other observers believe that 'real life' economics exert a much stronger influence over the illicit trade in ivory, with unregulated domestic ivory markets being the paramount force in this regard. It is worth remembering that the results of the ETIS analysis to CoP12, and again in the current study, demonstrate that illegal trade in ivory is most significantly correlated with the presence of large-scale domestic ivory markets and poor law enforcement.

In contrast to 'signals', most domestic ivory markets are generally highly observable and largely exist independently of any events or decisions under CITES. In this regard, virtually all major domestic ivory markets pre-date the transfer of any elephant populations to Appendix II under CITES and, indeed, the earlier ivory trade ban under the Convention. One recently-published study examines the relationship between unregulated domestic ivory markets and the illicit trade in ivory by attempting to quantify demand amongst ivory carvers around the world. It was concluded that between 33-83 tonnes of ivory are required to support the annual requirements of ivory carvers in the 22 most problematic markets in Africa and Asia (Hunter *et al.*, 2004). The study further suggested that this volume of ivory represents between approximately 4,800 and 12,200 elephants annually, most of which derive from illicit sources, particularly in Central Africa (Hunter *et al.*, 2004).

In one way or another, the domestic ivory markets of Africa and Asia have represented a tangible demand for ivory throughout this entire period. In most cases, these markets are highly visible and, more often than not, poorly regulated when viewed against the criteria outlined in Resolution Conf. 10.10 (Rev. CoP12). The very presence of these markets must be recognized as a potent 'signal' in and of itself. It is believed that the observed changes in the trend of ivory seized throughout the world is more directly correlated to the absence or presence of unregulated domestic ivory markets than any other factor.

Conclusions of the trends analysis:

This analysis has produced a trend representing the illegal trade in ivory for the period 1989-2002. Although an attempt was made, it has not been possible to project the trend through 2003 with certainty in the face of concerns about the quantity of data available for that particular year. This analysis has further assessed changes in the trend over the period in question. In this regard, the first two objectives for the ivory trade monitoring system under CITES have been satisfied.

With respect to the trend analysis for the period 1989-2002, the following conclusions can be made:

- When adjusted to reduce bias and smoothed to indicate the underlying trend more clearly, the seizure data in ETIS indicate a declining trend in the volume of ivory seized globally from 1989 through 1994. This is then followed by a gradual increasing trend from 1995 to the present, though never to the levels of prior to 1992. This trend closely reflects the smoothed and adjusted trend presented in the ETIS analysis to CoP12, but the upward slope in recent years is somewhat more gradual than was previously reported.

- The ivory market in China continues to be the most important influence on the increasing trend. If the influence of China is removed, the trend line is essentially flat from 1994 onwards. This demonstrates that, as a single market, Chinese demand alone accounts for the increasing trend in illegal trade in ivory. China's continuing commitment to effective law enforcement, however, could actually induce a reversal in the next iteration of this trend analysis.

- It is not possible to demonstrate any relationship between the volume of ivory seized between 1989-2002 with key events under CITES. In most, but not all, years in which a Conference of the Parties was held, there was an apparent decline in the volume of ivory seized. On the basis of other qualitative information, it is also not possible to relate the emergence of Chinese demand for ivory to events under CITES.

- The prospect of a downward trend in illegal seizures of ivory is strong, but will only occur if serious attention is placed on the regulation of domestic ivory markets, particularly those in Asia and Africa. The ivory seizure data in ETIS continues to demonstrate a strong correlation between illegal trade in ivory, domestic ivory markets and poor regulation. In this regard, China and Thailand in Asia, and Cameroon, Democratic Republic of the Congo, Ethiopia and Nigeria in Africa, are the most important countries. Of these countries, only China has acted decisively to curtail the illicit movement of ivory into local markets and destinations abroad.

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