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

Twelfth meeting of the Conference of the Parties
Santiago (Chile), 3-15 November 2002

Interpretation and implementation of the Convention

Species trade and conservation issues

Conservation of elephants and trade in elephant specimens

ILLEGAL TRADE IN IVORY AND OTHER ELEPHANT SPECIMENS

Summary report on the Elephant Trade Information System (ETIS)

Managed by TRAFFIC, the Elephant Trade Information System (ETIS) is a comprehensive international monitoring system operating under the auspices of CITES to track illegal trade in elephant products. Mandated in Resolution Conf. 10.10 (Rev.) Trade in elephant specimens, the objectives of the system are:

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.

This resolution calls for the production of "*a comprehensive report to each meeting of the Conference of the Parties*". In fulfillment of this requirement, for the twelfth meeting of the Conference of the Parties, TRAFFIC has produced the following three reports:

– The status of the Elephant Trade Information System (ETIS) CoP12 Doc 34.1 Annex 1;

– An analysis of the spatial aspects of the elephant product seizures data in ETIS CoP12 Doc 34.1, Annex 2; and

– An analysis of trends of elephant product seizure data in ETIS CoP12 Doc 34.1, Annex 3.

The following is a summary of these reports, including the analytical findings and recommendations.

The Status and Development of ETIS

As reported in CoP12 Doc. 34.1 Annex 1, ETIS is fully operational and has become a complex, knowledge-based tool for monitoring illegal trade in elephant products. The central database, holding information on ivory seizures throughout the world since 1989, is now supported by six subsidiary databases which track law enforcement effort and efficiency, rates of reporting, domestic ivory markets and a range of background

economic variables. These databases are integral to the basic ETIS structure, and allow for detailed and comprehensive analysis of the seizures data so that the objectives of ETIS noted above can be met. Continued refinements and updating of data will necessarily continue, but all of the fundamental components are now in place.

In terms of the number of seizure records, since CoP11, more Parties are participating in ETIS then at any time in the past. As at 06 June 2002, the Seizures Database comprised 7,124 records; on the basis of these data, the first two reports were completed. As at 28 August 2002, a total of 7,817 seizure records were in ETIS, and the third report was completed. While the more passive data collection process through the CITES Secretariat yields a progressive in-flow of data, direct engagement between TRAFFIC and the CITES Management Authorities of the Parties seems to result in far more cases being reported to ETIS. It is concluded that direct engagement should continue to augment the process through the CITES Secretariat.

In terms of rates of reporting, overall, TRAFFIC is encouraged by the data sets which are emerging for various countries in Europe, North America and, to a lesser extent, Africa and Asia. There are, however, a number of very important countries, particularly certain elephant range states in Africa and Asia, and a number of consuming countries in Asia, which are not contributing seizure data at all or only very rarely. Issues surrounding the lack of participation in ETIS should be assessed and appropriate actions should be taken to assist these countries to fulfill their seizure data submission obligations under CITES in a consistent and timely manner. To support capacity building, TRAFFIC has developed a series of training modules that lend themselves to anything from a 30-minute presentation to a two-day workshop.

In terms of data quality, it is encouraging to note that the reliability of source ratings is very good. Data quality scores, however, could be improved through the submission of more complete seizure records. Again, capacity and understanding at the national level could be fundamental in this regard, and appropriate capacity building initiatives could be the solution.

In terms of outputs to the Parties, to date, TRAFFIC has produced an annual ETIS Country Report for each Party on two occasions, and a third report will be issued shortly. These reports are increasingly generating positive comment from a greater number of Parties, and TRAFFIC believes they are now recognized as an important contribution to the understanding of national linkages of individual countries to global ivory trade dynamics.

With respect to funding for ETIS, it is noted that the 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.

The Analysis of the Spatial Aspects of ETIS

As reported in CoP12 Doc 34.1, Annex 2, an analysis was undertaken focusing on the questions:

– 'Which countries are playing leading roles in the illicit trade in ivory?' and

– 'What are the characteristics of this involvement?'

With 150 countries implicated in the illegal ivory trade covered by ETIS, two approaches were employed to identify those with leading roles. In the first instance, an exploratory process of data filtration progressively examined the conceptual issues of frequency, scale, period of activity, law enforcement effort and efficiency, rates of reporting, and the size and degree of regulation of domestic ivory markets to identify countries or territories of primary and secondary importance. This effort was supported by a cluster analysis employing more rigorous statistical methods and procedures, which was used as a confirmatory piece of work to complement the exploratory analysis. In the exploratory analysis 17 countries/territories were highlighted in the final analysis, while the cluster analysis addressed 31 countries/territories in 13 separate clusters. Although the cluster analysis was broader in scope, both approaches produced remarkably similar results.

The cluster analysis clearly demonstrates that illicit trade in ivory is most directly correlated to the presence of large-scale, unregulated domestic ivory markets which exhibit a poor degree of law enforcement effort. These markets are found in Africa and Asia, and those of primary importance have characteristically become increasingly more active since 1996. Collectively, these markets stand behind the greatest volume of ivory being seized throughout the world. They repeatedly demonstrate a pattern of illegal trade characterized by an inward flow of semi-worked and raw ivory and an outward flow of worked ivory products and, often in African range states, raw ivory.

The country-specific results of the cluster analysis indicate the following:

– With some degree of variability in terms of scale, the most problematic characteristics described above apply to the situations found in **China** and **Nigeria**, followed by the **Democratic Republic of the Congo** and **Thailand**. These four countries have some of the largest unregulated ivory markets in the world, demonstrate very poor law enforcement effort and efficiency, and consequently exert the greatest contemporary influence on illegal trade in ivory today.

– **Cameroon**, **Djibouti**, **Ethiopia** and **Uganda** emerge as a group of African countries of major concern. These countries also play problematic roles as frequent sources of raw ivory leaving the African continent. In addition, Cameroon and Ethiopia also have the largest unregulated domestic ivory markets in Central and East Africa, respectively. Uganda's trade in ivory appears to be directly linked to the ongoing conflict in the Democratic Republic of Congo.

– Similarly, but on a smaller scale and with a greater range of variability, the same characteristics as noted above are generally present for **Angola**, **Burundi**, **Côte d'Ivoire**, **Egypt**, **India, the Republic of Korea, the Philippines**, **Sudan** and **Taiwan**, province of China. These are all pivotal countries or territories, which have the potential for rapid movement into the above mentioned groups if illicit ivory trade variables increase over time. Egypt, Côte d'Ivoire, Sudan, India and Taiwan, province of China, all have domestic ivory markets, though some are illegal, while Angola, Burundi and Philippines appear to function as trade routes. Nationals of the Republic of Korea have frequently been associated with illegal shipments of ivory within Africa and Asia.

– Another group of countries, which is notable for a decline in illicit trade activity in the most recent period, 1996-2002, when compared to the period immediately following the trade ban under CITES, includes **Hong Kong SAR**, **Japan**, **Singapore** and **South Africa**, and to a lesser extent **Belgium**, **France**, **Kenya**, **Malawi**, **Portugal**, **the United Kingdom**, **Zimbabwe** and **Zambia**. These countries generally exhibit better law enforcement effort than the groups noted above, but for historical or contemporary reasons, continue to play important roles primarily as transit countries or, in the case of Japan and Hong Kong SAR, as end-use markets. While trade through or to these countries is generally waning, failure to maintain good law enforcement could change the future position of these countries and put them into a more problematic grouping.

– **the United Republic of Tanzania**, as an important transit country, and the **United States of America**, as an end-use market, share characteristics with the group immediately above except that trade appears to be more active in the recent period, 1996-2002. However, with extremely high law enforcement effort ratios, both countries presently appear to be meeting the challenge at hand adequately.

– Finally, of all of the countries assessed in detail, **Namibia** is highlighted by virtue of its good record, especially its rate of reporting seizure data which is the best in Africa. There, recent seizures represent a small fraction of what occurred in the earlier period, 1989-1995, law enforcement effort has been consistently high and the domestic ivory market remains very small.

In terms of improving the situation, through interventions directly linked to CITES, implementation of the domestic ivory trade controls noted in Resolution Conf. 10.10 (Rev.) stands as the foremost challenge. The operative clauses of the section Regarding control of internal ivory trade:

> *RECOMMENDS to those Parties in whose jurisdiction there is an ivory carving industry that is not yet structured, organized or controlled and to those Parties designated as ivory importing countries, that comprehensive internal legislative, regulatory and enforcement measures be adopted to:*
>
> *a) register or license all importers, manufacturers, wholesalers and retailers dealing in raw, semi-worked or worked ivory products; and*
>
> *b) introduce recording and inspection procedures to enable the Management Authority and other appropriate government agencies to monitor the flow of ivory within the State, particularly by means of:*
>
> *i) compulsory trade controls over raw ivory; and*
>
> *ii) a comprehensive and demonstrably effective reporting and enforcement system for worked ivory.*

There is a need to review these requirements with respect to many of the countries identified above.

The Analysis of the Temporal Aspects of ETIS

As reported in CoP12 Doc 34.1, Annex 2, an analysis of the temporal and dynamic aspects of the ETIS data has served to address the first two objectives for ETIS mandated by the CITES Parties in Resolution Conf. 10.10 (Rev.) noted above. In this regard, the following conclusions can be made:

– There are two fundamental views concerning the impact of the CITES ban on international commercial trade in ivory since 1989. On the basis of econometric modeling, economists predicated that an immediate decline in trade volumes would be followed by a gradual increasing upward trend if demand for ivory remained. An alternative, but unmodeled, explanation views the Appendix I listing of all elephant populations as the key to conservation, and holds that any change, or attempt to change, this status sends 'signals' which lead to increased trade in ivory.

– The seizures data in ETIS, when adjusted to remove bias and smoothed to indicated more clearly the underlying trend, indicate a declining trend in the volume of ivory seized worldwide during the period 1989 to 1994, a period of stability between 1994 through 1998, and an increasing trend from 1998 to the present. The observed trend appears to support the econometric model noted above, but the general upward trend since 1989 is noteworthy and needs to be carefully examined in the context of demand and supply dynamics.

– The change in the observed trend, specifically the upward trend since 1998, is most directly related to the emergence of demand for ivory in China. The influence of the Chinese market is the single most important reason for upward trend from 1998 onwards. This result mirrors similar developments for other aspects of China's trade in natural resources and retail sales of luxury products, particularly tropical timber and jewelry. In this regard, upward trends are directly linked to sustained economic growth and the expansion of disposable income. The influence of China on illicit trade in ivory is likely to grow in the face of a continuing strong economic performance.

– Because the change in the observed trend is explicitly explained by the China factor, it is an implicit finding that other factors have exerted a minimal influence in comparison. This study has not been able to detect that change in the listing of elephant populations in the CITES appendices and the one-off legal trade in ivory under CITES are important explanatory variables for the trend. It is believed that further analysis of the ETIS data in conjunction with economic variables and other factors will support this conclusion.

– While not directly observable through this analysis of the ETIS data, circumstantial evidence indicates that the conflict in the Democratic Republic of Congo, including the engagement of surrounding countries, stands behind the increasing supply of ivory for international consumption.

Recommendations

The analyses above clearly demonstrate a strong linkage between the ivory seizure data in ETIS and large-scale, unregulated domestic ivory markets around the world. There is a clear pattern of raw ivory illegally moving into these markets, and worked ivory products regularly moving out of them. These markets almost universally fail to implement the regulatory requirements recommended in Resolution Conf. 10.10 (Rev.). This is an issue that needs to be tackled by individual countries at the national level, and one which CITES should maintain appropriate oversight review and guidance through the intercessional period between Conferences of the Parties.

In view of the above analyses, TRAFFIC recommends the following:

– For countries which allow domestic trade in ivory, and have not been reviewed through the Panel of Experts process, a formal mechanism under the direction of the CITES Standing Committee should be initiated to evaluate compliance with the provisions outlined in Regarding control of internal ivory trade of Resolution Conf. 10.10 (Rev.), especially for countries of major concern as identified in this report.

– Where the regulatory requirements of Resolution Conf. 10.10 (Rev.) are not being met, Parties should be supported, through appropriate capacity-building initiatives, to improve their legal and administrative controls and law enforcement capabilities. Where countries fail to address these concerns, appropriate punitive measures should be considered.

– While better reporting of ivory seizures to ETIS remains a general concern, countries which have never or only rarely reported an elephant product seizure to ETIS, but are frequently associated with seizures reported elsewhere, should make a special effort to review their national law enforcement data and send data to ETIS as appropriate.

– The Parties need to ensure that the future operation and implementation of ETIS proceeds on a sound financial basis.

A report on the status of the Elephant Trade Information System (ETIS) to the 12th meeting of the Conference of the Parties

15 July 2002
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Introduction

The Elephant Trade Information System (ETIS) was mandated by the Parties in Resolution Conf. 10.10 (Rev.) (*Trade in Elephant Specimens*) to be a comprehensive international monitoring system to track the illegal trade in elephant products, particularly ivory. The objectives of the system are:

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.

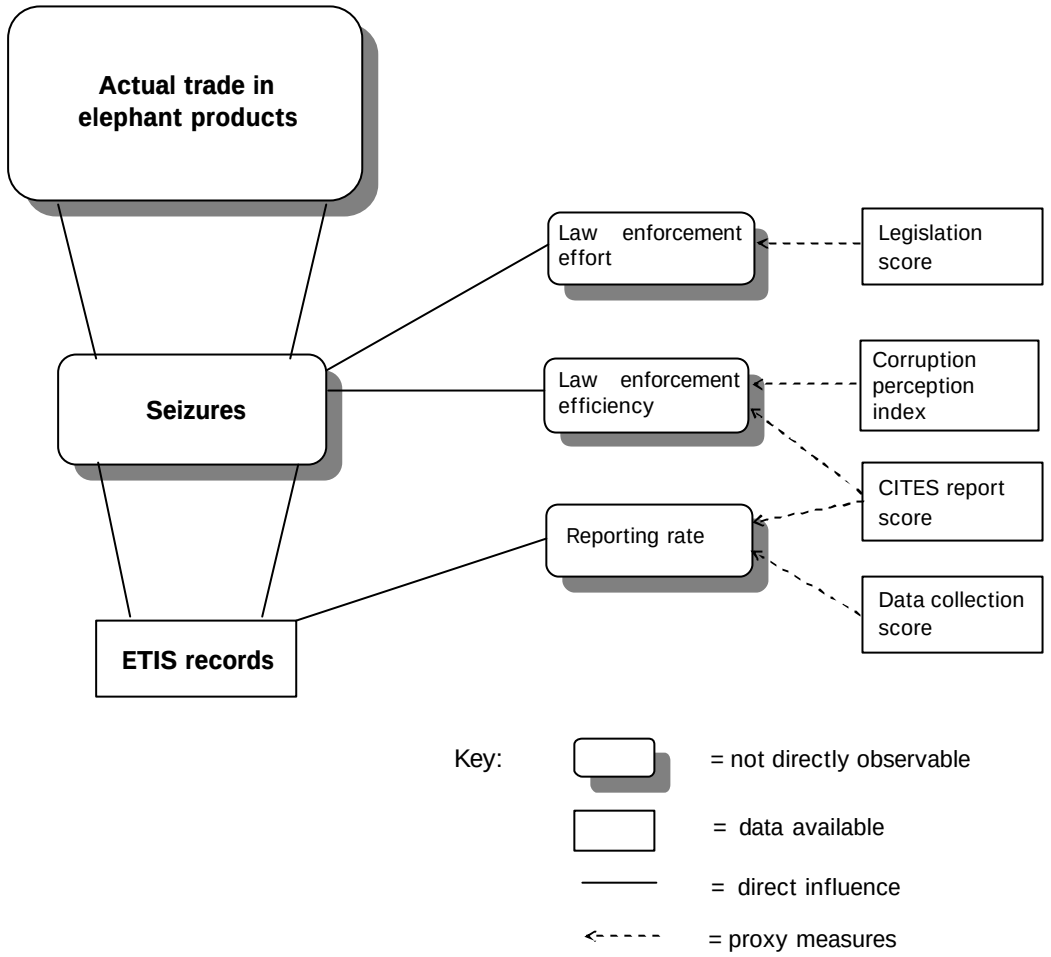
The eleventh meeting of the Conference of the Parties to CITES (CoP11) reaffirmed the role of TRAFFIC as the co-ordinator and manager of ETIS, with particular responsibilities to "*assist the relevant Parties with the collection of data, ensure data quality and consistency, and provide training in data collection and information management techniques to designated officials around the world as appropriate*".

Resolution Conf. 10.10 (Rev.) calls upon TRAFFIC to produce "*a comprehensive report to each meeting of the Conference of the Parties*". For CoP12, this is the first of three reports to be produced by TRAFFIC in fulfillment of that requirement. This report outlines general development and operation issues of ETIS since CoP11, and presents a summary of the seizure data in ETIS as of 06 June 2002. Using a progressive data filtration process, the second report will offer an exploratory analysis of the ETIS data, with a focus on identifying the most important players and their roles in the illicit trade in ivory. Finally, employing more rigorous statistical procedures, a third analytical report will be produced prior to CoP12. This report will attempt to address the issue of trends and the possible reasons behind such trends, as well as examine the results obtained in the second report through more confirmatory statistical procedures.

The development of the etis database structure and components

The origin of ETIS lies in the Bad Ivory Database System (BIDS) that TRAFFIC independently developed in 1992 to track ivory trade dynamics in the post-CITES ban period when traditional sources of ivory trade information all but disappeared. While BIDS was a fully-developed database system in its own right, it was recognised that further refinements would be necessary in order to serve the requirements of the CITES Parties. In this regard, BIDS evolved into ETIS. The design of ETIS was initially outlined in Doc. SC. 40.5.2.6, which was approved at the 40th meeting of the Standing Committee to CITES. To function as an integrated information system on trade in ivory and other elephant products, it was agreed that ETIS would comprise a number of interlinked database components that would not only track elephant product seizures around the world, but also monitor a variety of other related issues such as the status of domestic ivory markets, measures of law enforcement effort and effectiveness, rates of reporting and background economic variables. Figure 1 illustrates the basic conceptual framework of ETIS.

Figure 1: Basic conceptual framework of ETIS



The idea behind the graphical description in Figure 1 is that the absolute volume of trade in elephant products is not directly observable. This trade leads to a certain number of seizures, which is also not directly measurable as only some of them are reported to ETIS. The seizures that are reported to ETIS constitute the core of the monitoring system and create a window through which we get an imperfect view of the actual trade. Data on law enforcement effort and effectiveness, rates of reporting and background economic variables, are included in ETIS because they are likely to be important factors affecting the number of seizures reported to ETIS, and will serve as aids in improving the precision of this imperfect view. Other subsidiary components of ETIS, notably data on domestic ivory markets, will be valuable in seeking explanations of any trends that are detected. For reasons explained in the next subsection, direct measurement of variables on law enforcement effort and effectiveness and on reporting rates is not practicable, but proxy measures, as indicated in Figure 1, have been derived from available data.

It is not anticipated that ETIS will ever be able to produce unbiased estimates of the absolute volume of trade in elephant products, but it will be possible to assess *trends* in this trade over time based on seizures data, when analysed in conjunction with the subsidiary data as indicated in Figure 1. By the same token, identifying countries that are globally important in international trade in ivory and other elephant products, will also be possible without the need for estimates of absolute volumes. ETIS will also be able to produce a range of secondary outputs that address various aspects of trade dynamics, such as trade routes.

Developmental status of the ETIS database components:

Since CoP11, TRAFFIC, in consultation with the Statistical Services Centre of the University of Reading, has actively engaged in the development of ETIS. This has entailed further enhancement of the programming of the Seizures Database, as well as substantive development of the subsidiary databases. For a number of these database components, it has not been possible to meet all data requirements using measurable, time-based, country-specific quantitative variables. For example, measuring law enforcement effort and efficiency on an annual basis for all countries, based upon data such as budgets, number of staff, training standards, equipment and other similar factors is largely impossible given the often confidential nature of this information, the large number of countries and territories involved, and the resources currently available for the development of ETIS. Thus, it is necessary to look to other readily-obtainable data as proxy measures of these variables.

Currently ETIS comprises the following components:

a) *Seizures Database*: The seizures database, which forms the core component of ETIS, has been fully operational since prior to CoP11. Covering the period 1989 onwards, records of elephant product seizures, especially ivory, are stored in an *MS Access* database with a Visual Basic 'front end' interface structure. The Seizures Database is comprised of 11 components or tables containing 88 fields. The Main table is the principal component and is where all reported seizure information is stored; it contains 55 fields. At the time of the last Conference of the Parties, a total of 4,361 elephant product seizure cases were held in the database. Currently, the seizure record has grown to include 7,124 cases of ivory and elephant product seizures which have occurred in 64 countries or territories around the world since 1989 (Table 2). Collectively, these records implicate the involvement of 150 countries or territories in the illicit trade in elephant products globally.

b) *Law Enforcement Effort Database*: Law enforcement effort greatly influences whether or not elephant product seizures occur. An independent measure of law enforcement effort is necessary to interpret the data in ETIS. The status of a country's legislation in terms of its ability to properly enforce the provisions of CITES is regarded as a proxy measure for law enforcement effort. A subsidiary database has been created using the results of the CITES National Legislation Project. Pursuant to Resolution Conf. 8.4 (*National laws for implementation of the Convention*), since 1992, the CITES Parties have mandated an ongoing process to examine the national legislation of individual Party States and to assess the ability of these domestic measures to implement the basic requirements of the Convention. Relying upon an established set of criteria, the CITES National Legislation Project ranks the legislation of Parties into one of the three following categories:

   – Category 1 legislation that is believed generally to meet the requirements for implementation of CITES;
   – Category 2 legislation which is believed generally not to meet all requirements for implementation of the CITES; and
   – category 3 legislation that is believed generally not to meet the requirements for the implementation of CITES.

Since November 1994, selected countries have been assessed at various points in time, and the assigned rankings provide a measure of the ability of individual countries to fulfil their obligations under the Convention. In the context of ETIS, these comparative rankings serve as a proxy measure of law enforcement effort. Parties whose legislation is ranked in category 2 or 3 are encouraged to take decisive steps to improve the legal basis for implementing CITES within their jurisdiction. Thus, over time, the ranking of a number of countries has changed and these changes are noted in the database as occurring in the year in which they are reported in CITES documentation in conjunction with a Conference of the Parties or a Standing Committee meeting. Currently, the CITES Legislation Database in ETIS contains comparative rankings for 143 Parties. To cover the period 1989 to the present, scores have been projected backwards from the point of first assessment.

c) *Law Enforcement Efficiency Database*: In addition to law enforcement effort, elephant product seizures are greatly influenced by the efficiency in which law enforcement actions unfold. For the analysis of the seizures data, it is necessary to establish an independent measure of law enforcement efficiency. Given the constraints noted above, as a proxy measure of law enforcement efficiency, a subsidiary database has been developed based upon the Corruption Perceptions Index (CPI) of Transparency International. The CPI is a composite country-specific annual index that relates to perceptions of the degree of corruption as seen by business people, risk analysts and the general public. The CPI affords a reasonable independent measure as it has, on numerous occasions, been documented that the illicit movement of ivory is often facilitated by corruption on the part of law enforcement authorities around the world (for most recent observations in this regard see Martin and Stiles, 2000; Martin and Stiles, 2002). CPI has been used by Transparency International to rank countries between 10 (highly clean) to 0 (highly corrupt) annually since 1995. During the period 1995 through 2001, Transparency International comparatively assessed between 41 and 99 countries each year. In addition, historical comparative CPI rankings have also been issued for 54 nations covering the period 1988-1992. Altogether, since 1989, a CPI ranking is available for at least one year for 106 countries. While Transparency International cautions about year-to-year comparisons using the CPI (see http://www.transparency.org/cpi/index), within ETIS, these data will be used only as a covariate to serve as proxy measures for law enforcement efficiency.

   For the 106 countries for which at least one CPI ranking is available, missing values have been estimated using standard linear interpolation. For a further 25 countries, which are important countries from an ivory and elephant product trade perspective, CPI rankings from Transparency International were not available. For these countries, which are all elephant range states, transit countries or end-use consumers, an estimated CPI ranking was obtained as predictions from a statistical model relating CPI to economic variables. Economic data were obtained from the CIA World Fact Book (stored in the ETIS Background Economic Variables Database – see g) below). The variables found to be significantly related to CPI were gross national income per capita (GNI) and total aid. For countries for which CPI was available, a multiple regression model was fitted to log(CPI) with log(GNI) with log(aid) as explanatory variables for the years 1996 and 2000 (for 1996: R^2 = 53%, $P < 0.0001$; for 2000: R^2 = 52%, $P < 0.0001$). CPI values for other years were estimated by linear interpolation from these predicted values.

d) *Rates of Reporting: CITES Annual Reports Database*: It is also recognised that the number of cases in the Seizures Database in ETIS will be greatly influenced by the rates of reporting by individual Parties and that, for analytical purposes, it is necessary to establish a proxy measure for rates of reporting. In this regard, a subsidiary database on the submission of CITES annual reports has been developed. This database records, for each country, the ratio of the number of years the country has submitted an annual report to the number of years the country has been a Party to the Convention. The submission of a CITES annual report is a reporting obligation noted in the text of the Convention and a country's performance in fulfilling this obligation over time is a reflection of efficiency. However, this simple ratio is misleading since a country which has submitted, say, nine reports over 12 years and a country which has submitted three reports over four years, would both score a ratio of 0.75. In fact, it would seem reasonable to award a greater score to the former country for greater consistency in reporting. At the other end of the scale, three out of 12 ought to score lower than one out of four, although the ratio is 0.25 in both cases. A simple transformation which 'stretches' the ratio to reflect these differences is the 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. It is also possible that these data might serve as another means for assessing law enforcement efficiency.

e) *Rates of Reporting: Data Collection Score Database*: Another factor which needs to be accounted for when considering rates of reporting by the Parties concerns whether or not the collection of data has resulted from active or passive means. Prior to 1997, when TRAFFIC's Bad Ivory Database System, the precursor to ETIS, was adopted by the CITES Parties as *"the appropriate instrument for monitoring the pattern and measuring the scale of illegal trade in ivory and other elephant specimens"*, various countries had been subjected to targeted data collection exercises. These often involved the use of TRAFFIC staff or consultants to examine field documentation, particularly 'occurrence books' and other official records, to gather information on elephant product seizures. In analyzing the data in ETIS, it is important to remain

cognizant of what data in which countries has been derived from active forms of data collection as opposed to the more passive flow of data through the CITES reporting system. The Data Collection Score Database tracks this issue using a scoring system of 1 (completely passive), 2 (some level of intervention), and 3 (targetted data collection exercise). These scores will be used in the analytical modelling of the seizure data.

f) *Domestic Ivory Markets Database*: While commercial international trade in ivory is strictly regulated under CITES, there are many legal domestic ivory markets around the world. Whether found in elephant range States or in other parts of the world, the presence of these ivory markets is recognised as being a significant factor in the illegal killing of elephants and the illicit movement of ivory. The Domestic Ivory Markets Database has been developed as a component of ETIS to track the relative scale of major domestic ivory markets globally. Various recent studies have been undertaken on selected ivory markets in Africa and Asia, producing comparative data on the relative scale of these markets (Martin and Stiles, 2000; Martin and Stiles, 2002; Anon., in press; Kiyono, in press; Milliken, in press; Parry-Jones and O'Connell-Rodwell, in press; Shepherd, in press; and Wu and Phipps, in press). Using data on the number of ivory products observed or the estimated weight of these products, and an assessment of compliance with the three requirements outlined in paragraph 3 of Resolution Conf. 10.10 (Rev.), 55 countries have been comparatively ranked on a point scale, ranging from 13 (large-scale, unregulated) to -3 (inactive, highly-regulated). This database will be used to help interpret the seizure data.

g) *Background Economic Variables Database*: The background economic climate of a country is also recognised as a contributing factor in the presence or absence of many illegal activities. Within ETIS, a database holding comparative socio-economic data that is time-based and country-specific has been established. Key variables include population, area, gross national product (GDP), gross national income (GNI) per capita, inflation – GDP deflator, and aid per capita. These data have been obtained from the CIA World Fact Book (http://www.cia.gov/cia/publications/factbook/).

The Management of ETIS

Data Collection:

As outlined in Annex 1 of Resolution Conf. 10.10 (Rev.), the Parties are mandated to submit records of elephant product seizures to the CITES Secretariat "*within 90 days of their occurrence*". The Secretariat removes any confidential information and then passes the seizure records on to TRAFFIC for inclusion into ETIS after a process of verification. To standardize data collection, the Parties have been encouraged to use the '*Ivory and Elephant Product Seizure Data Collection Form*' which was first circulated in Notification to the Parties No. 1998/10, of 31 March 1998, and again in Notification to the Parties No. 1999/36, of 30 November 1999. To assist this effort, a document entitled *"Explanatory Notes for the 'Ivory and Elephant Product Seizure Data Collection Form'"* was also circulated through Notification to the Parties No. 1999/36, of 30 April 1999. It should be noted that electronic versions of the ETIS data collection form can also be accessed from the CITES website (http://www.cites/org/eng/notifs.1999/092a1.pdf).

While the data collection form serves a very useful purpose, TRAFFIC also recognises that many Party States have their own standardized documents or databases for tracking elephant and other wildlife product seizures. As long as the minimum essential data set for entry into ETIS is addressed (i.e. the source of data, the date of seizure, agency responsible for the seizure, the location of the seizure, and the ivory type and quantity in either number of pieces or by total weight, and/or the type of non-ivory elephant product and quantity in either number of pieces or by total weight), the system can accept information in any format, including electronic or printouts of pre-existing records. Data from a number of countries, including Germany, Switzerland and the United States of America, have been obtained in this manner.

Table 1 presents a record of data collection since 01 March 2001, when TRAFFIC last provided a report to the CITES Standing Committee (see Notification to the Parties No. 2001/030). Since March 2001, data collection through the CITES process has yielded 461 new cases from Botswana, Cameroon, China, Egypt, Japan, Kenya, Namibia and Switzerland, including five case that were rejected and one which is pending further clarification.

Following their review of the second series of ETIS Country Reports, Austria, Hungary, the Netherlands, Peru, Slovakia and Sweden also submitted data on 65 new seizure cases directly to TRAFFIC, including one which requires further clarification; another 135 cases have just been received from Japan, but have not yet been entered into ETIS.

At CoP11, it was noted in Doc. 11.31.1 Annex 5 that most Parties were failing to meet their obligation to ETIS by the timely submission of elephant product seizure information. In the ensuing discussion, TRAFFIC was encouraged by the Parties to become more proactive in the collection of data for ETIS. To this end, TRAFFIC embarked on a data collection exercise by writing to 41 CITES Management Authorities namely, Angola, Cameroon, the Central African Republic, Chad, China, the Congo, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Ethiopia, France, Gabon, Germany, Guinea, Hong Kong SAR, India, Indonesia, Japan, Kenya, Liberia, Macau SAR, Mali, Malawi, Malaysia, Mozambique, Niger, Nigeria, the Philippines, Portugal, Rwanda, the Republic of Korea, Senegal, Sierra Leone, Somalia, Sudan, Thailand, Togo, Uganda, Viet Nam, Zambia and Zimbabwe. With the assistance of certain offices of the TRAFFIC network, Canada, the United States of America, the Russian Federation and South Africa were also contacted. As a result of this exercise, 1,341 new seizure cases were received from Canada, China, Germany, Hong Kong SAR, India, Kenya, the Philippines, Russian Federation, South Africa, Taiwan, province of China, the United Republic of Tanzania, United States of America and Zimbabwe, including 12 cases which are pending further clarification and ten cases which were rejected (Table 1). Another 64 cases have just been received from the Governments of Malaysia, South Africa, Thailand and Viet Nam, but have not yet been entered into ETIS (Table 1). Another data set of 527 cases has been submitted by South Africa's Endangered Species Protection Unit, but pending a review, it is difficult to know how many seizure cases represent duplications of data already in ETIS and how many are new cases. Finally, a review of data previously submitted by the Government of New Zealand to TRAFFIC during the operation of BIDS also yielded 30 new seizure cases involving non-ivory elephant products and these were entered into ETIS (Table 1).

Another 73 seizure cases were obtained from a review of published secondary sources. These cases involved elephant product seizures which occurred in Belgium, China, the Democratic Republic of the Congo, Djibouti, Egypt, France, India, Macau SAR, Malaysia, Nepal, New Zealand, South Africa, Switzerland, Thailand, Uganda, the United Kingdom, United States of America and Zambia (Table 1). Another two cases for China and South Africa have just been received, but not entered into the database (Table 1).

To summarise outstanding issues noted in Table 1, for 14 cases, entry into ETIS is pending further clarification, and another 201 cases were received just after the closing of the database for this report. In addition, 527 cases from South Africa are pending further review before entry into ETIS. Finally, during the period under consideration, another 15 cases have been rejected as they either did not relate to elephant products, or the items in question were not seized in the final analysis but rather returned to their owners.

Table 1: Number and status of seizure cases received between 01 March 2001 – 30 June 2002

Country discovered	No. of cases	Source	Entered	Pending	Rejected	Comments
1989						
Japan	1	Japanese Customs Authorities		1		Just received
Nepal	1	Report: Wildlife Trade in Nepal	1			
New Zealand	7	Department of Conservation (NZ)	7			
Switzerland	133	Swiss Management Authority	133			Data received through the CITES process
United Republic of Tanzania	1	Daily News (TZ)	1			
United Republic of Tanzania	1	Daily News (TZ)	1			
Zimbabwe	3	Dept. of National Parks & Wildlife Management	3			

Country discovered	No. of cases	Source	Enter-ed	Pend-ing	Reject-ed	Comments
1990						
New Zealand	12	Department of Conservation (NZ)	12			
South Africa	1	Natal Parks Board	1			
Switzerland	63	Swiss Management Authority	63			Data received through the CITES process
1991						
New Zealand	7	Department of Conservation (NZ)	7			
Switzerland	26	Swiss Management Authority	26			Data received through the CITES process
United Republic of Tanzania	1	Daily News (TZ)	1			
Zimbabwe	5	Dept. of National Parks & Wildlife Management	5			
1992						
New Zealand	4	Department of Conservation (NZ)	4			
South Africa	1	Natal Parks Board	1			
Switzerland	6	Swiss Management Authority	6			Data received through the CITES process
United Republic of Tanzania	1	Local Newspaper	1			
Zimbabwe	2	Dept. of National Parks & Wildlife Management	2			
1993						
Japan	1	Japanese Customs Authorities		1		Just received
South Africa	1	Natal Parks Board	1			
South Africa	2	DEAT - South African CITES Management Authority	2			
Switzerland	4	Swiss Management Authority	4			Data received through the CITES process
United Republic of Tanzania	1	Sunday News (TZ)	1			
1994						
South Africa	1	DEAT - South African CITES Management Authority	1			
South Africa	1	Mpumalanga Parks Board	1			
South Africa	2	Natal Parks Board	2			
Switzerland	5	Swiss Management Authority	5			Data received through the CITES process
Taiwan, province of China	7	Wildlife Protection Unit, Council of Agriculture	7			
Thailand	6	Report: The South and SE Asian Ivory Markets	6			
United Republic of Tanzania	1	Daily News (TZ)	1			
Zimbabwe	1	Dept. of National Parks & Wildlife Management	1			
1995						
Hungary	3	Hungary Management Authority	3			
India	1	Report: Wildlife trade in Nepal	1			
Japan	42	Japanese Customs Authorities		42		Just received
South Africa	1	DEAT - South African CITES Management Authority	1			

Country discovered	No. of cases	Source	Entered	Pending	Rejected	Comments
South Africa	2	Natal Parks Board	2			
South Africa	3	Gauteng Nature Conservation		3		Just received
Switzerland	2	Swiss Management Authority	2			Data received through the CITES process
Thailand	3	Report: The South and SE Asian Ivory Markets	3			
United Republic of Tanzania	1	Nipashe (TZ)	1			
United Republic of Tanzania	2	Daily News (TZ)	2			
United Republic of Tanzania	1	Guardian News (TZ)	1			
Zimbabwe	10	Dept. of National Parks & Wildlife Management	10			
1996						
Germany	41	German Management Authority	41			
Hong Kong SAR	16	HK Management Authority	13		3	Specimens returned to owner and one case already in ETIS
Hungary	2	Hungary Management Authority	2			
Japan	36	Japanese Customs Authorities		36		Just received
Philippines	1	Protected Areas & Wildlife Bureau – PHMA	1			
South Africa	3	Natal Parks Board	3			
South Africa	11	Gauteng Nature Conservation		11		Just received
Switzerland	4	Swiss Management Authority	4			Data received through the CITES process
Taiwan, province of China	2	Wildlife Protection Unit, Council of Agriculture	2			
Thailand	3	Report: The South and SE Asian Ivory Markets	3			
United Republic of Tanzania	2	Magira & Nipashe (TZ)	2			
United Republic of Tanzania	3	Daily News (TZ)	3			
Zimbabwe	1	Dept. of National Parks & Wildlife Management	1			
1997						
Austria	1	Austria Management Authority - Customs Authority	1			
France	1	TRAFFIC Bulletin	1			
Germany	51	German Management Authority	51			
Hong Kong SAR	9	HK Management Authority	8		1	Specimen returned to owner
Hungary	1	Hungary Management Authority	1			
Japan	22	Japanese Customs Authorities		22		Just received
Philippines	2	Protected Areas & Wildlife Bureau – PHMA	2			
South Africa	33	DEAT - South African CITES Management Authority	32	1		Data incomplete
South Africa	1	Mpumalanga Parks Board	1			
South Africa	6	Gauteng Nature Conservation		6		Just received

Country discovered	No. of cases	Source	Enter-ed	Pend-ing	Reject-ed	Comments
Switzerland	47	Swiss Management Authority	47			Data received through the CITES process
Taiwan, province of China	8	Wildlife Protection Unit, Council of Agriculture	8			
United Republic of Tanzania	2	Uhuru & Nipashe (TZ)	2			
Zimbabwe	22	Dept. of National Parks & Wildlife Management	22			
1998						
Austria	8	Austria Management Authority - Customs Authority	8			
Belgium	2	TRAFFIC Bulletin	2			
Canada	20	Environment Canada	20			
China	1	TRAFFIC East Asia	1			
Germany	47	German Management Authority	47			
Hong Kong SAR	5	HK Management Authority	5			
Hungary	3	Hungary Management Authority	2	1		Apparent duplication
Japan	15	Japanese Customs Authorities		15		Just received
Malaysia	1	Dept. Wildlife & National Parks (MY)		1		Just received
Namibia	1	Protection Resources Unit	1			Data received through the CITES process
Philippines	1	Protected Areas & Wildlife Bureau – PHMA	1			
South Africa	33	DEAT - South African CITES Management Authority	33			
South Africa	4	Mpumalanga Parks Board	3		1	Case already in ETIS
South Africa	18	Gauteng Nature Conservation		18		Just received
Sweden	2	Swedish CITES Management Authority	2			
Switzerland	36	Swiss Management Authority	36			Data received through the CITES process
Taiwan, province of China	7	Wildlife Protection Unit, Council of Agriculture	7			
Taiwan, province of China	7	Taipei Customs Bureau, Min. Finance	7			
Thailand	1	Report: The South and SE Asian Ivory Markets	1			
United Kingdom	1	Government of India COP11 Document	1			
United States of America	3	TNA – LEMIS	3			
Viet Nam	1	CITES Management Authority of Viet Nam		1		Just received
Zimbabwe	24	Dept. of National Parks & Wildlife Management	24			
1999						
Austria	2	Austria Management Authority - Customs Authority	2			
Canada	19	Environment Canada	19			
China	5	TRAFFIC East Asia	5			
Germany	45	German Management Authority	45			

Country discovered	No. of cases	Source	Enter-ed	Pend-ing	Reject-ed	Comments
Hong Kong SAR	4	HK Management Authority	4			
India	7	Assistant CITES Management Authority India	7			
Japan	18	Japanese Customs Authorities		18		Just received
Kenya	1	Kenya Wildlife Service	1			Data received through the CITES process
Namibia	2	Protection Resources Unit	2			Data received through the CITES process
Namibia	1	Protecion Resources Unit	1			Data received through the CITES process
Netherlands	2	The Netherlands CITES Management Authority	2			
Russian Federation	1	TRAFFIC Europe - Russia	1			
Slovakia	1	Ministry of the Environment of the Slovak Republic	1			
South Africa	43	DEAT - South African CITES Management Authority	41	2		Data incomplete
South Africa	2	Mpumalanga Parks Board	2			
South Africa	5	Gauteng Nature Conservation		5		Just received
Sweden	4	Swedish CITES Management Authority	4			
Switzerland	48	Swiss Management Authority	48			Data received through the CITES process
Taiwan, province of China	5	Wildlife Protection Unit, Council of Agriculture	5			
Taiwan, province of China	7	Customs	7			
United Republic of Tanzania	2	Uhuru (TZ)	2			
United States of America	180	TNA - LEMIS	180			
Zimbabwe	27	Dept. of National Parks & Wildlife Management	27			
2000						
Belgium	2	TRAFFIC Bulletin	2			
Cameroon	10	CM Government	9	1		Data incomplete/ data received through the CITES process
Canada	8	Environment Canada	8			
China	1	Shanghai Customs	1			Data received through the CITES process
China	2	TRAFFIC East Asia	2			
DRC	3	Report: UN Security council Report	3			
Egypt	2	Report: Pachyderm	2			
Germany	43	German Management Authority	43			
Hong Kong SAR	11	HK Management Authority	9		2	Specimens returned to owner
Hungary	2	Hungary Management Authority	2			
India	17	Assistant CITES Management Authority India	17			
Japan	1	Japanese Customs	1			Data received through the CITES process

Country discovered	No. of cases	Source	Entered	Pending	Rejected	Comments
Kenya	31	Kenya Wildlife Service	30	1		Data incomplete
Kenya	2	Kenya Wildlife Service	2			Data received through the CITES process
Namibia	20	Protection Resources Unit	19		1	Invalid, not a seizure/ data received through the CITES process
Netherlands	27	The Netherlands CITES Management Authority	27			
South Africa	3	DEAT - South African CITES Management Authority	3			
South Africa	5	Gauteng Nature Conservation		5		Just received
Taiwan, province of China	5	Kaohsiung Customs Bureau, Min. Finance	5			
Thailand	1	CITES Management Authority of Thailand		1		Just received
United Republic of Tanzania	2	Uhuru Newspaper, Daily News	2			
United States of America	1	Environmental News Service	1			
United States of America	225	TNA - LEMIS	225			
Viet Nam	1	CITES Management Authority of Viet Nam		1		Just received
Zambia	1	Save the Elephant Website	1			
Zimbabwe	12	Dept. of National Parks & Wildlife Management	12			
2001						
Belgium	1	TRAFFIC Bulletin/Belgian Customs	1			
Botswana	10	Wildlife Department (BW)	7		3	Invalid, non-elephant products/data received through the CITES process
Cameroon	1	CM Government	1			Data received through the CITES process
Canada	22	Environment Canada	22			
China	1	Jinan Branch, CITES Management Authority	1			Data received through the CITES process
China	1	TRAFFIC East Asia	1			
China	4	TRAFFIC East Asia	3	1		Pending clarification
Djibouti	1	TRAFFIC Bulletin	1			
Egypt	1	Egyptian Management Authority	1			Data received through the CITES process
Germany	22	German Management Authority	22			
Hong Kong SAR	7	HK Management Authority	4		3	Specimens returned to owner
Hungary	1	Hungary Management Authority	1			
India	2	TRAFFIC India	2			
India	8	Assistant CITES Management Authority India	8			
India	1	Assistant CITES Management Authority India	1			

Country discovered	No. of cases	Source	Enter-ed	Pend-ing	Reject-ed	Comments
Japan	4	Japanese Customs	4			Data received through the CITES process
Kenya	22	Kenya Wildlife Service	22			
Kenya	1	Kenya Customs - JKIA	1			Data received through the CITES process
Kenya	9	Kenya Wildlife Service	8		1	Case already in ETIS/ data received through the CITES process
Macau SAR	1	South China Morning Post	1			
Malaysia	2	TRAFFIC Bulletin	2			
Malaysia	2	Dept. of Wildlife & National Parks (MY)		2		Just received
Namibia	19	Ministry of Environment and Tourism	19			Data received through the CITES process
Netherlands	3	The Netherlands CITES Management Authority	3			
Peru	1	Peru CITES Management Authority	1			
South Africa	1	Directorate: Environment & Conservation, Kalahari Regional Office (ZA)		1		Just received
South Africa	1	Africa Eye News Service (ZA)	1			
South Africa	3	DEAT - South African CITES Management Authority	2	1		Data incomplete
South Africa	1	Local Newspaper		1		Just received
South Africa	2	Gauteng Nature Conservation		2		Just received
Sweden	1	Swedish CITES Management Authority	1			
Switzerland	1	TRAFFIC Europe Regional Office	1			
Thailand	2	CITES Management Authority of Thailand		2		Just received
Uganda	1	New Vision (UG)	1			
United Kingdom	1	TRAFFIC Bulletin	1			
United Republic of Tanzania	1	Daily News (TZ)	1			
United States of America	1	International Fund for Animal Welfare	1			
United States of America	152	TNA – LEMIS	152			
Viet Nam	2	CITES Management Authority of Viet Nam		2		Just received
Zimbabwe	6	Dept. of National Parks & Wildlife Management	6			
2002						
Egypt	2	Egyptian Management Authority	2			Data received through the CITES process
Hungary	1	Hungary Management Authority	1			
South Africa	1	Directorate: Environment & Conservation, Kalahari Regional Office (ZA)		1		Just received
India	1	WSPI	1			
Kenya	3	Kenya Wildlife Service	3			

Country discovered	No. of cases	Source	Enter-ed	Pend-ing	Reject-ed	Comments
Namibia	5	Ministry of Environment and Tourism	5			
South Africa	1	TRAFFIC East/Southern Africa - South Africa	1			
South Africa	1	24News.com (ZA)	1			
Thailand	2	CITES Management Authority of Thailand		2		Just received
United Republic of Tanzania	1	TRAFFIC East/Southern Africa - the United Republic of Tanzania	1			
United Republic of Tanzania	2	Daily News (TZ)	2			
Year of seizure unknown						
South Africa	7	DEAT - South African CITES Management Authority		7		Data incomplete
Total	**2,171**		**1,941**	**215**	**15**	

* In addition, a summary of all confiscation of ivory between 1989 to November 2001 in South Africa by the Endangered Species Protection Unit has been received.

This data set involves 527 cases and is currently being reviewed before input into ETIS.

Outputs to the Parties

To keep the Parties informed about the role of their country in the illicit trade in ivory and other elephant products and to establish a valuable feedback loop, TRAFFIC periodically produces an ETIS Country Report for each of the Parties to CITES and selected non-Party States. These reports are tabular summaries of the data in ETIS. They include not only those seizures which have occurred within the country in question, but also those which have taken place elsewhere but reportedly involve the country in question as either the country of origin, export, re-export or destination for the elephant products that were seized, or where nationals of the country in question were involved with or arrested in conjunction with an ivory seizure. It needs to be appreciated that where countries are reportedly involved in a particular ivory seizure which takes place elsewhere, it is not, in all cases, proof of involvement. There are instances where, for example, the origin of the product or the trade route used, is falsely identified to deliberately mislead investigating authorities. Regardless, these reports offer valuable insight into the nature and scale of illicit trade relating to individual countries, as well as the state of current law enforcement efforts and rates of reporting seizure cases to ETIS.

To date, TRAFFIC has produced an annual ETIS Country Report on two occasions. Prior to CoP11, the first ETIS Country Reports, covering the period between 01 January 1989 to 31 October 1999, were produced and circulated to 135 CITES Parties or territories and a number of non-Party States in January 2000. Disappointingly, comment on the reports was only received from Switzerland and the Czech Republic.

The second series of ETIS Country Reports, covering the time period from 01 January 1989 to 28 February 2001, were produced in September 2001 and circulated to the Parties in February 2002. These reports included all new data received and in put into ETIS through 28 February 2001. Altogether, 179 individual country reports were produced by TRAFFIC and circulated by the CITES Secretariat. This time response from the Parties significantly improved, with a number of Parties expressing appreciation for the reports, sending new data and updating information for specific cases as appropriate. In this regard, TRAFFIC would like to express appreciation to the Governments of Austria, Bolivia, Ghana, Hungary, India, Republic of Moldova, Monaco, the Netherlands, Peru, Slovakia and Sweden for their support and encouragement.

Operational protocol

In terms of access to the data in ETIS, the ETIS Country Report (see Outputs to the Parties above) provides each Party a summary of all seizure cases which relate to an individual country on an annual basis. In addition to the ETIS Country Reports, Parties may request an interim report through the CITES Secretariat at any time. Thus, any Party can access the data relevant to its role in the illicit ivory trade at any time. Parties who wish to receive the data pertaining to another Party State are encouraged to contact the CITES Management Authority of the Party in question and request a copy of the latest ETIS Country Report or an interim ETIS Country Report. In this manner, the Parties remain in control over the ETIS data which pertains directly to them. A more formalized protocol on this policy is under development.

Capacity building and training

"*Building capacity in range States*" is one of the objectives of Resolution Conf. 10.10 (Rev.). Annex 1 of that resolution also calls upon TRAFFIC to "*assist the Parties with the collection of data*" and to "*provide training in data collection and information management techniques to designated officials around the world as appropriate*". To achieve this objective, TRAFFIC has developed the "ETIS Action Toolkit" to foster awareness and build capacity for ETIS implementation within the CITES Parties. Centered upon seven detailed but highly adaptive PowerPoint and/or overhead modular presentations on CITES, elephant conservation and ETIS, the 'toolkit' has been designed to support a comprehensive, two-day, interactive training event, or it can be abbreviated to provide for an ETIS awareness briefing of 30 minutes duration, or anywhere in between. Thus, the 'toolkit' is a dynamic, but flexible, training package which can be modified to accommodate specific audiences or circumstances as appropriate. TRAFFIC has secured funding to undertake ETIS training workshops in China and the United Republic of Tanzania, and a larger proposal to support up to 25 training events with various Parties has been prepared and submitted to selected donors for funding.

Funding

Since CoP11, the development and operation of ETIS has been supported by funding provided by the United Kingdom's Department of Environment, Transport and the Regions (DEFRA), WWF-International, and the CITES Secretariat. In addition, TRAFFIC East/Southern Africa has committed substantial core resources to the operation and management of ETIS. For the future, a more stable funding basis is essential for the effective implementation of ETIS. Currently, no funding has been secured to support the core operation of ETIS in the future.

A summary of the seizures data

In order to produce status and analytical reports for the Parties, it is necessary to curtail the data entry functions of ETIS temporarily and examine the data at a defined moment in time. In this regard, the Seizures Database was 'closed' on 06 June 2002. The following discussion will present a general summary of the seizure data in ETIS at that time.

Interpretation of results

It is important for readers to bear in mind that the presentation which follows on the number of elephant product seizures or ivory trade volumes represented by the data currently held in ETIS should not be interpreted as absolute volumes or as suggestive of trends over time. To reiterate, what is presented below represents a general summary of the ETIS data as at 06 June 2002 and has not been adjusted to account for law enforcement effort and efficiency, rates of reporting or other factors that must be part of a serious analysis. As stated earlier, TRAFFIC will produce two more reports which will attempt to interpret these data more rigorously using exploratory and statistical modelling procedures.

Number of Records

By CoP11 (see Doc. 11.31.1 Annex 5), a total of 4,361 elephant product seizure cases were held in the database. A summary report on ETIS, submitted to the CITES Secretariat and circulated to the Parties on 18 May 2001 through Notification to the Parties No. 2001/030, indicated that the database had, by January 2001, grown to include 5,183 seizure cases from 59 countries or territories. Since then, further data have been received and, as of 06 June 2002, the seizure database comprised 7,124 records of ivory and elephant product seizures which have occurred in 64 countries or territories around the world since 1989 (Table 2), while another 215 cases are pending clarification or have just been received and have not yet been entered into the database (Table 1).

When viewed from a regional perspective, three regions -- North America, Europe and Africa – are responsible for the bulk of the seizures records in ETIS. North America accounts for 37.9% of the seizures, while 31.3% occurred in Europe, and another 24% represent African seizures. Only 5.5% of the ETIS records represent seizures in Asian countries, although many countries in that region play significant roles in the global ivory trade and/or are Asian Elephant Ranges states. Oceania and Central and South American countries account for less than 2% of the elephant product seizure records in ETIS.

In terms of annual totals, the greatest number of seizure records relate to 1990, for which 1,014 seizure records are in ETIS, while in the preceding year, 1989, only 277 ivory seizure cases have been reported (Table 2). From 1991 through 1993, the number of seizure records ranges between 680 and 867 annually, and then drops to between 343 to 491 over the next seven years, from 1994 through 2000 (Table 2). Currently, 304 elephant product seizures have been reported to ETIS for 2001, and only 17 seizures comprise the data set for 2002 (Table 2). The lack of data for the most recent years is, however, not surprising as, in the past, there is usually a considerable delay between the occurrence of seizures and the reporting of the event to ETIS. To illustrate, at the time of the ETIS report to CoP11 in April 2000, ETIS contained only 30 seizure records for the preceding year, 1999; currently, there are 491 seizure records for that year.

Table 2: Number of ivory seizures by country by year (06 June 2002)

Region/country/territory	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Africa															
Algeria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Benin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Botswana	-	-	-	-	-	-	-	-	-	1	4	4	7	-	16
Burkina Faso	-	-	-	-	-	1	0	0	0	-	-	-	-	-	1
Burundi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cameroon	-	-	3	-	3	2	-	-	-	-	-	9	1	-	18
Central African Rep.	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
Chad	-	-	-	-	-	-	-	-	-	3	-	-	-	-	3
Comoros	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Congo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Côte d'Ivoire	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Democratic Republic of the Congo	-	-	-	-	-	-	-	-	-	-	-	3	-	-	3
Djibouti	-	-	-	1	-	-	-	-	-	-	-	-	1	-	2
Egypt	-	-	-	-	-	-	-	-	-	-	2	8	1	2	13
Equatorial Guinea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Eritrea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Ethiopia	-	-	1	-	-	-	-	-	-	1	2	-	-	-	4
Gabon	-	-	-	1	-	-	-	1	-	-	-	-	-	-	2

Region/country/territory	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Gambia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Ghana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Guinea	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Guinea Bissau	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Kenya	-	1	1	17	20	7	24	8	6	2	10	32	31	3	162
Liberia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Madagascar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Malawi	22	12	27	26	25	4	9	2	1	1	3	-	-	-	132
Mali	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Mauritania	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Mauritius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Morocco	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Mozambique	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Namibia	24	31	44	40	69	69	71	50	58	22	24	19	19	5	545
Niger	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Nigeria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Rwanda	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Sao Tome and Principe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Senegal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Seychelles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Sierra Leone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Somalia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
South Africa	3	7	47	39	30	19	9	13	35	37	43	3	3	2	290
Sudan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Swaziland	0	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Togo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Tunisia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Uganda	-	3	-	1	-	1	1	-	1	-	-	-	1	-	8
United Republic of Tanzania	34	19	41	25	29	21	11	19	17	10	4	2	1	3	236
Zambia	17	16	21	17	9	10	6	3	4	1	-	1	-	-	105
Zimbabwe	3	11	11	4	10	1	13	1	26	34	35	12	6	-	167
Subtotal	103	100	196	171	195	135	145	97	149	114	127	94	71	15	1,712
Asia															
Afghanistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Bangladesh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Brunei Darussalam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cambodia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
China	-	-	-	-	-	-	-	1	-	1	7	3	5	-	17
Hong Kong SAR	-	19	14	18	11	8	11	14	8	5	4	9	4	-	125
India	-	-	8	3	0	1	2	5	-	-	8	17	11	1	56
Indonesia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Iran	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Israel	-	-	-	-	-	-	-	-	-	-	2	-	-	-	2
Japan	2	7	2	1	0	0	5	2	1	-	-	6	4	-	30
Jordan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Macau SAR	2	1	0	7	3	3	3	-	-	-	-	-	1	-	20

Region/country/territory	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Malaysia	0	0	0	11	2	0	0	-	-	-	-	-	2	-	15
Mongolia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	-	9
Sri Lanka	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
Taiwan, province of China	-	-	1	1	6	13	10	10	12	15	12	7	-	-	87
Thailand	-	-	-	2	3	8	4	3	-	1	-	1	-	-	22
United Arab Emirates	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Uzbekistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Viet Nam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Yemen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Subtotal	5	28	26	44	30	35	37	36	26	23	34	43	27	1	395
Europe															
Austria	0	0	0	0	0	0	0	0	6	8	2	0	-	-	16
Azerbaijan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Belarus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Belgium	11	8	23	26	36	49	33	48	3	2	-	2	1		242
Bulgaria	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Croatia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cyprus	-	-	-	-	-	-	-	1	2	-	-	-	-	-	3
Czech Republic	-	-	-	-	-	-	-	-	-	3	-	-	-	-	3
Denmark	1	5	3	6	7	-	-	-	-	-	-	-	-	-	22
Estonia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Finland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
France	2	85	79	116	91	-	1	-	1	1	25	-	-	-	401
Georgia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Germany	0	0	98	115	47	1	-	41	51	47	45	43	22	-	510
Greece	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Hungary	-	-	-	-	-	-	4	3	1	2	0	2	1	1	14
Iceland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Ireland	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
Italy	0	1	2	2	49	2	2	-	4	1	-	-	-	-	63
Kazakhstan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Latvia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	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

Region/country/territory	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Netherlands	-	-	-	1	-	1	-	4	1	1	2	27	3		40
Norway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Poland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
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
Slovakia	0	0	0	0	0	0	0	0	0	0	1	0	0	-	1
Slovenia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Spain	9	54	6	2	7	1	1	2	-	6	-	-	-	-	88
Sweden	-	-	-	-	-	-	-	-	1	2	4	-	1	-	8
Switzerland	133	63	26	6	4	5	6	5	47	36	48	-	1	-	380
Turkey	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Ukraine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
United Kingdom	0	170	118	44	26	1	4	5	1	1	-	1	1	-	372
Yugoslavia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Subtotal	159	403	363	333	283	60	51	110	119	111	129	76	30	1	2,228
North America															
Canada	0	0	0	0	0	1	-	1	-	21	19	9	22	-	73
Mexico					-	-	-	1	1	-	-	-	-	-	2
United States of America	-	452	264	234	172	112	199	218	194	221	182	227	153	-	2,628
Subtotal	0	452	264	234	172	113	199	220	195	242	201	236	175	0	2,703
Oceania															
Australia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Fiji	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
New Zealand	10	31	18	16	-	-	-	8	-	-	-		-	-	83
Papua New Guinea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Vanuatu	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Subtotal	10	31	18	16	0	0	0	8	0	0	0	1	0	0	84
Central and South America and the Caribbean															
Antigua and Barbuda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Argentina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Bahamas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Barbados	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Belize	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Bolivia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Brazil	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Chile	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Colombia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Costa Rica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Cuba	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Dominica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Dominican Republic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Ecuador	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
El Salvador	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Grenada	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0

Region/country/territory	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
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
Trinidad and Tobago	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Uruguay	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Venezuela	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Subtotal	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2
Grand Total	277	1,014	867	798	680	343	432	471	489	491	491	450	304	17	7,124

Data quality

Each seizure entry in ETIS is assessed for data quality through a two-step process that scores the *reliability of source* and the *completeness of data*. Reliability of source assesses the credibility of the data and is graded as follows:

A Highest degree of reliability involving an official source (e.g. government agency responsible for the seizure, CITES authority, INTERPOL or Customs);
B Reliable but unofficial source (e.g. a reputable NGO, a known government official in an individual capacity); and
C Least degree of reliability (e.g. secondary account from a newspaper, magazine or website).

It is recognised that there are occasions where misinformation may inadvertently become part of the ETIS record, even when it comes from reliable government authorities which receive a grade of 'A'. In this regard, criminals may deliberately falsify information, particularly the source of the products seized or the trade routes used, to mislead authorities, and the authorities may accept such information as 'fact' and include it in their submissions to ETIS. In most cases, it is not possible to validate such instances and the details of each seizure case are accepted from official authorities in good faith. With this acknowledgement, however, it is believed that such concerns only affect a very small number of records and the overall 'picture' created by the ETIS data is not distorted in a serious manner.

The completeness of data is a measure of how thoroughly the numbered items on the *Ivory and Elephant Product Seizure Data Collection Form* have been addressed. Completeness is graded as follows:

1 Complete information (excluding confidential enforcement data and with or without the judicial data);
2 All important case information, including information on both the number of pieces and weight by ivory type or other product; and
3 Minimum essential information, including data on source of data, date of seizure, location of seizure and either number of pieces or weight by ivory type or other non-ivory elephant product.

On this scale, a grade of A1 represents the highest grade in terms of reliability and completeness of data, while a score of C3 represents the minimum grade for entering a seizure case into ETIS. These scores will be used to facilitate analysis and interpretation of the seizure data.

Table 3 presents a summary of data quality as of 06 June 2002. Overall, the reliability of source continues to improve and, since CoP11, the percentage of data holding the highest reliability score of 'A' has increased from 62% to 76%. Currently, only 1% of the data is derived from secondary sources. This is a very encouraging development.

At the same time, two-thirds of the seizures database continues to hold the minimum score of '3' in terms of data completeness (Table 3). However, completeness scores of '1' have increased from less than 1% in 2000, to nearly 3% at the present time. As noted in previous reports, the absence of both the number of specimens seized and their weight is the single most common problem resulting in a completeness score of '3' as opposed to '2'.

Table 3: ETIS data quality summary (06 June 2002)

Source	Completeness score				
Grade	**1**	**2**	**3**	**Total**	**Percentage**
A	182	1,707	3,545	5,434	76
B	3	465	1,134	1,602	23
C	5	23	60	88	1
Total	190	2,195	4,739	7,124	100
Pertcentage	3	31	66	100	

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*: Having reported some 545 elephant product seizures since 1989, there is little doubt that Namibia ranks first in terms of presenting a complete set of seizure records to ETIS. In this regard, the Government of Namibia should be highly commended. The Governments of Kenya, South Africa and Zimbabwe should also be acknowledged as diligently providing data on elephant product seizures in their countries and, in general, these data sets are regarded as also being relatively complete throughout the period under examination. In addition, Botswana, Cameroon and Egypt have also, since CoP11, contributed important seizure information to ETIS, however, the completeness of the data sets for these countries, particularly the backlog of seizure data covering the period 1989 to 1998, remains an issue to address. The data set for The United Republic of Tanzania is deemed to be relatively complete for the period 1989 through 1998, but only large-scale seizures have been reported to ETIS since 1999. Finally, the data sets for Malawi and Zambia are relatively complete for the period 1989 through 1995, but thereafter are viewed as being largely incomplete, and there have been no formal submissions from these countries to ETIS since prior to CoP11. Rwanda should also be acknowledged for submitting a single seizure case through the ETIS process. For elsewhere in Africa, including another 28 African Elephant range States, ETIS contains few seizure records and it appears that little attempt is being made by the relevant government authorities to communicate elephant product seizure information to the CITES Secretariat for inclusion into ETIS.

b) *Asia*: Within Asia, the data sets for Hong Kong SAR, Japan, Taiwan, province of China, and Macau SAR are regarded as being the most complete, however, in each case there are gaps. For Hong Kong SAR, there is no data for 1989; for Japan, the years 1998 and 1999 need to be addressed, but the recently received data should fill this gap once it is entered into ETIS; for Taiwan, province of China,, there is no data for 1989, 1990 and 2001; and for Macau SAR, there is a large gap covering the years 1996 through 2000. There is information on elephant product seizures in Malaysia, the Republic of Korea and Singapore for the period 1989 through 1995, but thereafter there is a lack of data from these countries, although Malaysia has just sent data that have not been entered into ETIS yet. India has recently provided information on a number of elephant product seizures between 1999 and 2001, but overall the data set is regarded as being generally incomplete. There are some records of ivory seizures in Thailand for the period 1992 through 1996 but, again, the data set is largely incomplete. Thailand has sent data on a few more cases, however, but it has not been input into ETIS yet. And finally, since CoP11, China has officially reported only two elephant product seizure cases to ETIS, but these are believed to only represent a small part of the total number of seizures which have occurred in China in recent years. Moreover, the historical record for China is completely lacking, with no data at all for the period 1989 through 1995, and 1997. Elsewhere in Asia, there are few seizure records for most countries, and none at all for many important Asian Elephant range States, including Cambodia, Indonesia and Myanmar; Viet Nam, however, has just made its first submissions to ETIS, although not in time for entry into the database for this report. Finally, there is only one record for the United Arab Emirates, which traditionally functioned as a major entrepot in the ivory trade between Africa and various Asian end-use markets prior to the international commercial trade ban under CITES.

c) *Europe*: Within Europe, the Governments of Germany and Switzerland should be commended for contributing the most complete data sets to ETIS. With the greatest number of seizures overall for this region, only the years 1994 and 1995 remain incomplete in the German data set, while Switzerland's seizure record remains outstanding from 2000 onwards. Equally, although few seizures have actually occurred, the Governments of Austria, Monaco, the Republic of Moldova and Slovakia should be acknowledged for also providing relatively complete sets of data by confirming '0' for years in which no elephant product seizures were made. Hungary has also diligently provided data to ETIS covering seizures from 1995 onwards, but data for the period 1989 through 1994 are lacking. Similarly, the Netherlands and Sweden have also provided regular submissions to ETIS from 1998 onwards, but data for the period 1989 through 1997 are mostly lacking. Belgium has supplied a relatively complete set of data for the period 1989 through 1996, but thereafter the data are far less complete. For France and the United Kingdom, data are reasonably complete for the years 1990 through 1993, but are largely incomplete thereafter and for 1989. However, just prior to CoP11, France should be commended for contributing a complete set of elephant product seizure data for 1999, but it also needs to be noted that there have been no submissions since. Finally, the data sets for Denmark, Italy, Portugal and Spain are reasonably complete for the years 1989 through 1993, but thereafter the record is far from complete. For all other European countries, there a just a few records or no records at all concerning elephant product seizures, although the Czech Republic and Bulgaria deserve mention for contributing data through the CITES data collection process.

d) *North America*: With the exception of 1989, for which there is no data, the ETIS record for the United States of America is believed to be complete. Based on printouts of elephant product seizures from the U.S. Fish and Wildlife Service's Law Enforcement Management Information System (LEMIS), with 2,628 records, the United States of America data set reflects the greatest number of elephant product seizures in ETIS. Canada has supplied reasonably complete data from 1998 onwards, but the seizure record prior to 1998 is incomplete. Prior to CoP11, the Government of Mexico should be acknowledged for providing some data for 1996 and 1997, but there have been no subsequent submissions.

e) *Oceania*: The record for Oceania is very incomplete and rates of reporting appear to be disappointing. Only one record of an elephant product seizure in Vanuatu has been entered into ETIS since CoP11. Since the inception of ETIS, there has been no response from Australia and it is difficult to assess whether this reflects a poor rate of reporting or simply no elephant product seizures. In reviewing data previously obtained from the Government of New Zealand, TRAFFIC has extracted information on 30 additional cases

involving the seizure of non-ivory elephant products and added them to ETIS. With these additions the record for New Zealand for the years 1989 to 1992 is believed to be complete, but thereafter there is very little information.

f) *Central and South America*: Chile and Peru have each submitted a single record of an elephant product seizure to ETIS. Otherwise, there are no other records concerning illicit elephant product trade in this entire region.

Trade in Non-Ivory Elephant Products

At the time of CoP11, only a single record of a non-ivory elephant product seizure was contained in ETIS. Since then, 440 records involving seizures of non-ivory elephant products, from 17 countries, have been received. Forty of these records also involved the seizure of ivory. As Table 4 illustrates, these seizures comprised elephant bones, feet, hair, hide, teeth and meat. Overall, however, most recent seizures have either involved hair products, primarily bracelets created from the stiff hairs found on the tail of elephants, or small hide or leather items. Interestingly, while six records in ETIS mention elephant meat, only two records quantify the volume of the elephant meat seized. The general lack of data on elephant meat seizures is remarkable in that some observers believe that the illegal trade in elephant meat is by far the most serious issue behind elephant poaching in parts of Africa, especially Central Africa, and that trade in ivory is largely a by-product (K. Ammann, in litt. to cites-l@phoenix.wcmc.org.uk, 23 April 2002). For the most part, seizures of non-ivory elephant products appear to be far less frequent in comparison to the record of ivory seizures in ETIS.

Table 4: Volume or number of non-ivory elephant product seizures in ETIS (06 June 2002)

Country	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Country Total	Grand Total
Bone (pcs)																
Canada	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	
New Zealand	4	2	1	0	0	0	0	0	0	0	0	0	0	0	7	
United States of America	0	0	0	0	0	0	1	3	0	16	1	2	4	0	27	35
Bone (kg)																
United States of America	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
Nepal	1040	0	0	0	0	0	0	0	0	0	0	0	0	0	1,040	1,041
Feet (pcs)																
New Zealand	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	
South Africa	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	4	
United States of America	0	0	0	0	0	0	4	1	0	3	2	0	0	0	10	16
Hair (pcs)																
Belgium	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	
Japan	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	
Slovakia	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
New Zealand	1	18	0	0	0	0	0	0	0	0	0	0	0	0	19	
Zimbabwe	0	0	0	0	0	0	0	0	0	110	0	0	0	0	110	
United States of America	0	0	0	0	0	0	118	440	100	120	71	103	216	0	1,168	1,300

Country	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Country Total	Grand Total
Hide (pcs)																
Austria	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	
Hong Kong SAR	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	
Kenya	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
Sweden	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
South Africa	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	
Namibia	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	
Japan	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	
Canada	0	0	0	0	0	0	0	0	0	0	0	2	9	0	11	
Slovakia	0	0	0	0	0	0	0	0	0	0	12	0	0	0	12	
New Zealand	4	25	7	5	0	0	0	0	0	0	0	0	0	0	41	
France	0	0	0	0	0	0	0	0	0	0	127	0	0	0	127	
United States of America	0	0	0	0	0	0	81	92	83	65	122	134	192	0	769	976
Hide (kg)																
Kenya	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	
United States of America	0	0	0	0	0	0	0	5	0	0	0	3.0	9.4	0	17.4	20.4
Meat (kg)																
United Republic of Tanzania	0	0	0	0	0	0	0	0	70	0	0	0	0	0	70	70
Tooth (pcs)																
Peru	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
Slovakia	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	
Kenya	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	
United States of America	0	0	0	0	0	0	0	9	22	5	5	2	4	0	47	54
Tooth (kg)																
United States of America	0	0	0	0	0	0	0	0	0	0	0	0	1.1	0.0	1.1	1.1
Other (pcs)																
Slovakia	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
Cameroon	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	
United States of America	0	0	0	0	0	0	0	1	2	0	0	17	3	0	23	27
Other (kg)																
United States of America	0	0	0	0	0	0	0	0	0	0	3.5	0.7	0.9	0.0	5.0	5.0

Volume of ivory represented in the seizures database

The Seizures Database in ETIS distinguishes three types of ivory: raw, semi-worked and worked ivory, but not all seizure records contain data on both the weight and the number of pieces by ivory type. In order to derive the volume of ivory represented by the ETIS records, it is first necessary to impute missing values in the seizures data, and then to adjust the weights of semi-worked and worked ivory products to represent 'raw ivory equivalent' values. Using a simple regression model, the following calculations were derived from the ETIS data for which both the weight and the number of pieces of the seized items was known; these calculations have been used to impute missing values for either weight or number of pieces in the data:

i) for raw ivory: estimated weight = $3.65 \times pcs^{1.01}$
estimated pieces. = $0.75 \times wt^{0.6}$

ii) for semi-worked ivory: estimated weight = $0.41 \times pcs^{0.67}$
estimated pieces = $6.85 \times wt^{0.98}$

iii) for worked ivory: estimated weight = $0.45 \times pcs^{0.49}$
estimated pieces = $7.24 \times wt^{0.36}$

Further, in order to present trade volumes in raw ivory equivalent terms, all semi-worked and worked ivory weights have been increased by 30% to account for scrap and wastage during the manufacturing process. This calculation is based upon various assessments of the loss of ivory as scrap and wastage during the manufacturing process (Milliken, 1989; Anon., 2000). Representing the data in ETIS as raw ivory equivalent allows for the discussion of trade volumes to be understood in terms of overall impact on elephant populations. In this regard, all references to ivory trade volumes will be stated in raw ivory equivalent terms.

Collectively, the records in ETIS indicate that the equivalent of nearly 185 tonnes of raw ivory have been reported as seized throughout the world since January 1989 (Table 5). These seizures are estimated to represent 32,692 tusks or pieces of raw ivory, 129,793 semi-worked ivory blocks, and 131,251 worked ivory products (Table 5).

Table 5: Volume of ivory in 'raw ivory equivalent' values represented by the ETIS data (06 June 2002)

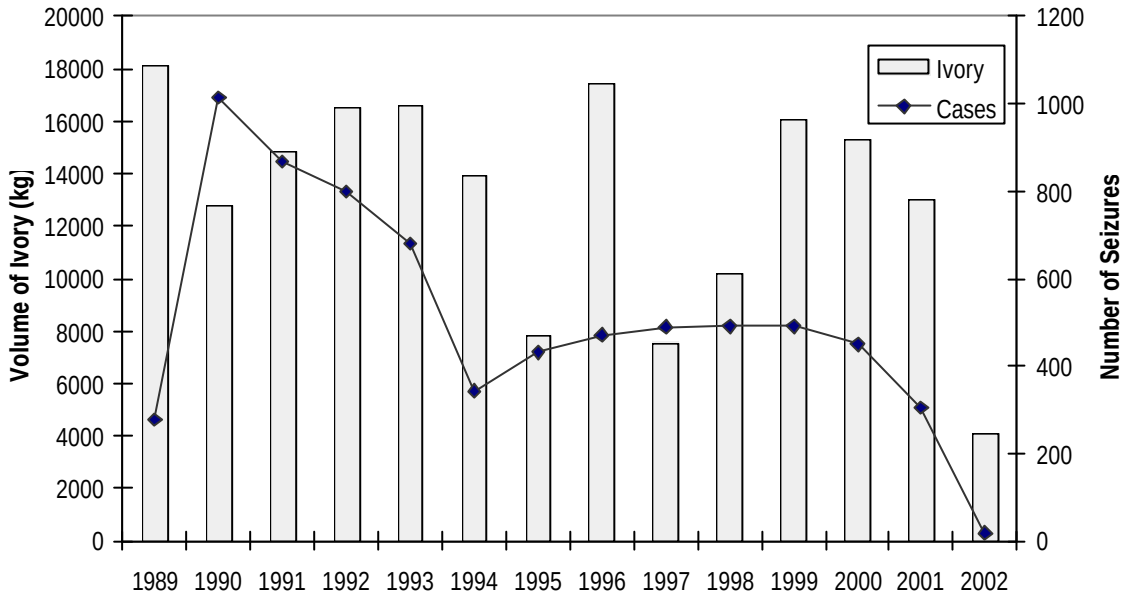
Year of Seizure	Raw Ivory Pcs	Raw Ivory kg	Semi Worked Pcs	Semi Worked kg*	Worked Ivory Pcs	Worked Ivory kg*	Total Weight kg*
1989	2,993	17,119	4,128	857	4,995	171	18,147
1990	1,203	7,141	53,040	2,137	19,022	3,504	12,783
1991	2,418	11,648	6,286	695	12,228	2,495	14,838
1992	2,357	12,803	2,815	264	9,484	3,463	16,530
1993	2,939	13,057	17,195	1,404	5,822	2,145	16,606
1994	2,823	12,573	7,430	694	32,474	675	13,941
1995	1,281	6,446	11,160	464	7,826	905	7,815
1996	4,677	15,415	6,495	1,362	3,066	693	17,470
1997	1,297	6,092	16,955	944	3,667	516	7,552
1998	2,075	9,377	67	74	16,060	746	10,197
1999	3,251	13,984	497	101	8,183	2,001	16,086
2000	1,422	14,042	3,467	742	5,789	494	15,278
2001	2,515	12,481	257	48	2,583	455	12,983
2002	1,440	3,922	1	1	53	149	4,072
Grand total	**32,692**	**156,099**	**129,793**	**9,787**	**131,251**	**18,411**	**184,298**

* adjusted to raw ivory equivalent

Figure 2 depicts the volume of raw ivory equivalent represented by the seizure data held in ETIS as of 06 June 2002, together with the number of seizure cases for each year. From 1989 through 1994, the volume of ivory seized averaged nearly 15.5 tonnes annually, ranging from a low of 12,783 kg in 1990 to a high of 18,147 kg in 1989. While the volume of ivory seized in 1989 is the greatest, it needs to be appreciated that it stems from the fewest number of seizure cases in ETIS. In 1995 and 1997, the volume of seized ivory dropped to below eight tonnes in both years, but in 1996, the intervening year, over 17 tonnes of ivory was seized, the second

largest volume of ivory in the period under examination. From 1998 through 2001, the volume of ivory seized ranged from just over ten tonnes in 1998 to 16 tonnes in 1999. These volumes of ivory generally fall within the seizure levels seen between 1990 through 1994. The data for 2002 are very few, and accordingly the volume of ivory seized during that year has dropped off markedly.

Figure 2: Volume of ivory in 'raw ivory equivalent' values seized and number of seizure *cases* by year



Conclusions

With the development of the subsidiary databases, the basic ETIS structure is essentially complete, although continued refinements and updating of data will necessarily be an operational aspect of ETIS in the future. With all of its components, ETIS has rapidly become a very complex, knowledge-based tool for monitoring illegal trade in elephant products. The stage has been set for analysis and interpretation of the ETIS seizure data, and two such reports will follow this status report.

The number of seizure records in ETIS has grown considerably since CoP11 and there is little doubt that more Parties are participating in ETIS then at any time in the past. This is a very encouraging development. While the more passive data collection process through the CITES Secretariat yields a progressive in-flow of data, direct engagement between TRAFFIC and the CITES Management Authorities of the Parties seems to result in far more cases being reported to ETIS. It is concluded that direct engagement should continue to augment the process through the CITES Secretariat.

In terms of rates of reporting, overall, TRAFFIC is encouraged by the data sets which are emerging for various countries in Europe, North America and, to a lesser extent, Africa and Asia. There are, however, a number of very important countries, particularly certain elephant range states in Africa and Asia and a number of consuming countries in Asia, which are not contributing seizure data at all or only very rarely. Issues surrounding the lack of participation in ETIS should be assessed and, if capacity building and awareness issues

are identified as a problem, appropriate actions should be taken to assist these countries to fulfill their seizure data submission obligations under Resolution Conf. 10.10 (Rev.) in a consistent and timely manner.

In terms of data quality, it is also encouraging to note that the reliability of source ratings remain very good. Data quality scores, however, could be improved through the submission of more complete seizure records. Again, capacity and understanding at the national level could be fundamental in this regard, and the necessity of engaging in appropriate capacity building initiatives should not be overlooked.

The ETIS Country Reports are increasingly generating positive comment from a greater number of Parties, and TRAFFIC believes these reports are beginning to be recognized as making a welcomed contribution to the understanding of national linkages to global ivory trade dynamics.

With respect to funding for ETIS, it is noted that the 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.

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An analysis of the spatial aspects of the elephant product seizure data in ETIS; a report to the 12th meeting of the Conference of the Parties

30 July 2002
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Introduction

The Elephant Trade Information System (ETIS) is a comprehensive international monitoring system to track illegal trade in elephant products. The principal means for doing so is through an examination of data on elephant product seizures around the world, in conjunction with a range of covariate information, all of which is contained in an elaborate information system under the management of TRAFFIC. A report on the structure and status of ETIS, and a general summary of the seizure data, has been submitted to the Parties as Annex 1 to this document. That report provides essential background information that is pertinent to this spatial analysis of the ETIS data; readers are advised to view this report in the conjunction with the earlier submission.

ETIS was mandated by the Parties in Resolution Conf. 10.10 (Rev.) (*Trade in Elephant Specimens*) to, among other things, establish *'an information base to support the making of decisions on appropriate management, protection and enforcement needs*'. This report, the first major analytical output from the system, is an attempt to identify where the management, protection and enforcement needs are most likely to be the greatest. Thus, this effort addresses key spatial issues associated with the data in ETIS by focusing on the questions:

– 'Which countries are playing leading roles in the illicit trade in ivory?', and

– 'What are the characteristics of this involvement?'.

This study commences with a presentation of the key conceptual elements of the seizure data and covariate information contained in the ETIS databases. This discussion will address issues pertaining to the concepts of frequency, scale and periods of activity concerning ivory seizures, law enforcement effort, efficiency and corruption, rates of reporting and data collection, and the scale and regulation of domestic ivory markets. The conceptual discussion will set the stage for presenting the two analytical components that follow. The first entails an exploratory analysis of the seizure data using a progressive filtering of the data to identify countries or territories of primary or secondary importance in terms of trade in ivory. The second analysis will employ more rigorous statistical methods and procedures, specifically a technique called 'cluster analysis', to assess the same issue. Consequently, in broad terms, the second analysis is used as a confirmatory piece of work to validate, or otherwise, the results of the exploratory analysis. To interpret the results more fully, a discussion section will follow the presentation of these analyses, drawing upon a range of other qualitative and descriptive information. This report will conclude with a brief section on conclusions and recommendations.

Finally, readers need to bear in mind that in the analyses that follow, the presentation of the number of elephant product seizures or ivory trade volumes represent the most basic parameters of the data currently held in ETIS. These data do not represent absolute volumes of trade and are not suggestive of trends over time. It needs to be appreciated that this examination of the spatial and static aspects of the ETIS data will be augmented by another analytical report to be issued prior to CoP12. The third report will attempt to assess trends in the data, and to correlate any such results with other factors that impact upon the trade, using appropriate statistical methods and procedures. Collectively, these three reports will complete the reporting requirements for ETIS to the twelfth meeting of the Conference of the Parties to CITES (CoP12).

The Conceptual Framework

Frequency, scale and period of activity: defining key players in the illicit trade in ivory

While the illicit trade in ivory is certainly global, it is characterized by often diffuse and ever-changing trade patterns. Currently, over 150 countries have been identified worldwide as playing one role or another in this trade, according to the data that has been reported to ETIS. The large number of countries and the relatively long time period addressed necessarily produces considerable 'noise in the system' and makes it difficult to identify and focus upon the most important players in terms of where current management and enforcement needs are the greatest. One-off ivory seizures, even when they are sensational large-scale events, may not necessarily be indicative of the most important trade patterns over time. Equally, persistent small-scale seizures may be regarded as relatively inconsequential by the authorities but, with the passage of time, they may actually point to serious illegal trade problems. In order to understand trade dynamics, it is important to consider the ETIS data from a number of related perspectives. In this regard, the issues of 'frequency', 'scale' and 'period of most activity' emerge as very important considerations.

The total number of seizure cases in ETIS which pertain to a specific country can be used to measure comparatively the frequency certain countries are reportedly involved in illicit trade in ivory. This requires that the number of seizures that have been made by a particular country within its national jurisdiction be combined with the number of seizures that have been made elsewhere, but which also implicate the country in question in some trade capacity. In doing so, it is appreciated that implication in some kind of a role in a seizure which takes place elsewhere may not always be proof of involvement. However, in the context of thousands of seizure records from all over the world, it is unlikely that false information would repeatedly be given and become a part of ETIS to such an extent that the record would be seriously distorted. Bearing this consideration in mind, it is believed that the total number of cases provides a relative 'frequency measure' of how often particular countries are reported to be involved in illicit ivory trade transactions. It follows that countries which are frequently associated with ivory seizures are likely to play important roles as producers, consumers or facilitators (entrepot or transit countries) in the trade.

In conjunction with assessing frequency, another useful measure for identifying the major players in the illicit trade in ivory is to examine the issue of scale. In this regard, looking at the total raw ivory equivalent volume of the various types of ivory seized allows countries to be ranked comparatively according to the scale of ivory represented by the illegal transactions with which they are associated. As with the issue of frequency, it is important to assess scale from the standpoint of both in-country ivory seizures, as well as seizures which take place elsewhere but reportedly involve the country in question as either the country of origin, export, re-export, or destination. This 'scale measure' serves to put the focus on those countries where illicit ivory trade volumes are most significant.

Finally, it is important to assess the period of most activity in order to evaluate shifts in the trade. ETIS currently covers a period of 14 years, and countries that might have been active in the trade in early years, may have become relatively dormant or completely inactive in more recent years. Equally, new countries may be entering the trade as producers, end-use markets or transit links with a burst of activity in recent times. Finally, it is recognised that there have been some profound changes in CITES policy with respect to the status of certain populations of African Elephants and the allowance of conditional trade options in recent years. These policy changes could have produced new trade dynamics. Thus, assessing the data from the perspective of period of activity helps to ensure that the focus remains contemporary and relevant in an ever-changing environment.

Law enforcement effort and rates of reporting: compensating for bias

It is recognised that the frequency and scale measures described above are greatly influenced by a number of factors. In the first instance, law enforcement effort is a key consideration. Countries which place a serious emphasis on curtailing illegal and unsustainable trade in wildlife products, especially ivory, and devote human and financial resources towards such a goal, are more likely to make seizures than countries who do not. A secondary, but equally important, consideration is the rate at which individual countries report elephant

product seizures to ETIS. It is logical to assume that countries with good law enforcement and high rates of reporting to ETIS are all countries that are likely to score relatively high on the frequency and scale indexes simply because they are making seizures and reporting them to ETIS. In the larger scheme of things, however, such countries may not be as problematic as others with far lower scores. Thus, it is important to introduce a means to eliminate this bias to some extent, and to separate those countries with relatively good law enforcement effort and rates of reporting from those with poor law enforcement and reporting.

One way to assess law enforcement effort and rates of reporting is to examine the ratio between the number of seizures made and reported by a particular country, as opposed to the number of seizures made elsewhere but which reportedly involve the same country. It is reasoned that a relatively large volume of ivory in various forms moving into, through, and out of, a county at frequent intervals provides numerous opportunities for seizures to be made. When faced with such a challenge, countries with a well-developed law enforcement capacity are likely to demonstrate a fairly consistent record of in-country seizures. Conversely, the lack of in-country seizures is very likely to be a reflection of poor law enforcement effort and efficiency (A. Standing, in litt. to TRAFFIC, 16 February 2000), including (sometimes) high levels of corruption. (The *Law Enforcement Efficiency Database* in ETIS addresses this last issue by incorporating the Corruption Perceptions Index (CPI) of Transparency International as a covariate in ETIS; see discussion in Annex 1 to this document). It is also recognised that few records of in-country seizures also, in some cases, reflects poor reporting to ETIS. Nonetheless, the percentage of seizures which takes place inside a given country as opposed to the total number of seizures is regarded as a useful measure of 'law enforcement effort/rates of reporting'. This measure can serve to put the focus on those countries that have serious illegal ivory trade problems and are in need of better law enforcement or a commitment to the implementation of ETIS.

Figure 1: Number of cases seized in country (> 42%) compared to number of cases seized elsewhere but involving the same country

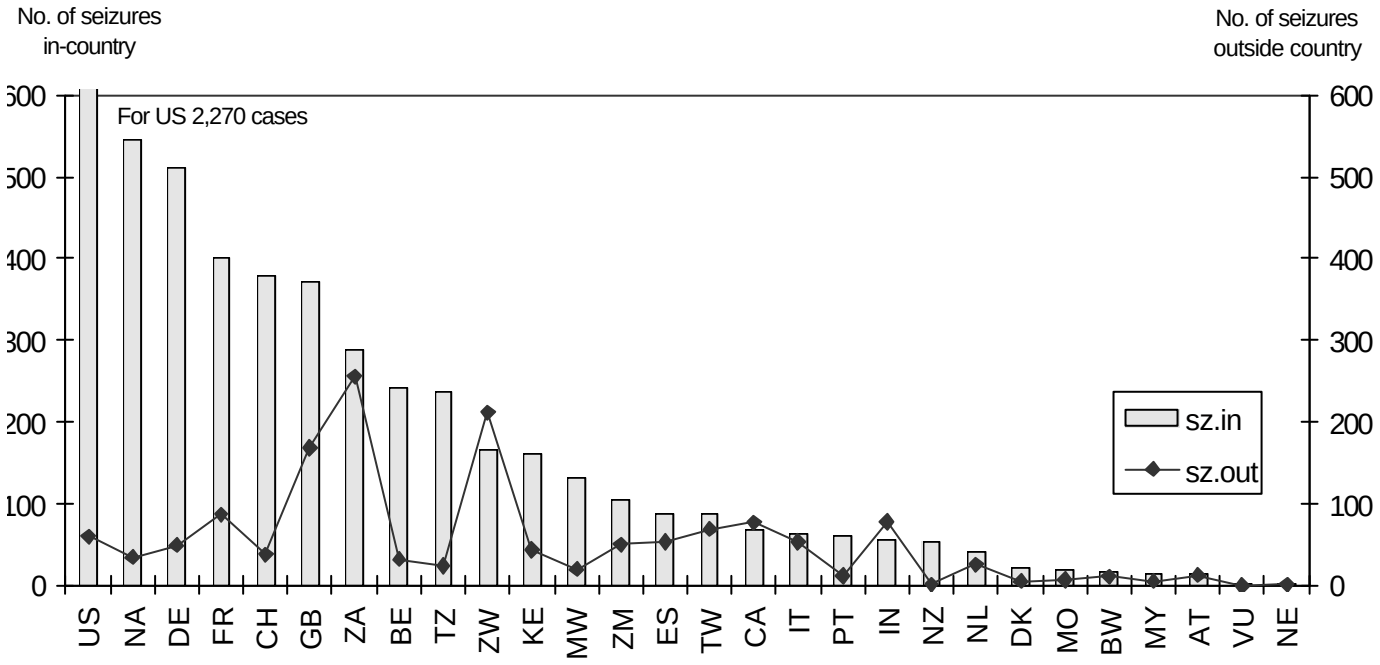
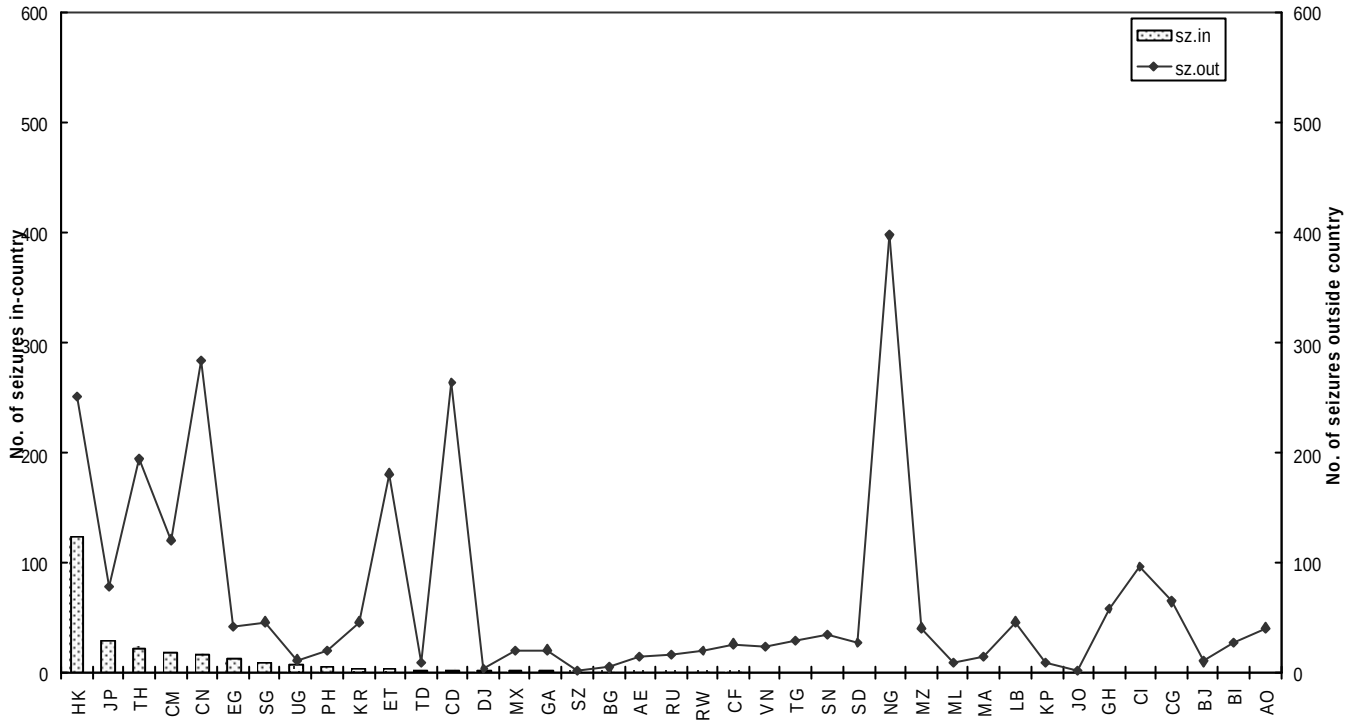


Figure 2: Number of cases seized in country (< 40%) compared to number of cases seized elsewhere but involving the same country



To illustrate this point further, Figures 1 and 2 graphically depict the number of in-country seizures against those which implicate the country in question but occur elsewhere for a selection of 67 countries and territories. In Figure 1, with the exception of Canada, India and Zimbabwe, in all cases the data show that more seizures are taking place in-country than elsewhere. Countries such as the United States of America, Namibia and Germany clearly demonstrate very good in-country law enforcement as well as rates of reporting to ETIS.

In Figure 2, the opposite is true, with external seizures representing far more seizures than what is taking place, and reported to ETIS, at the national level. In this regard, countries featuring prominent disparities include Nigeria (0/398), China (17/284), the Democratic Republic of the Congo (3/263), Thailand (22/194), Ethiopia (4/181), Cameroon (18/121) and Côte d'Ivoire (0/97). These countries all stand out for their frequent linkages to ivory seizures that are taking place elsewhere in the world, but none, or very few seizures, are being reported as occurring at the national level. There are a number of other countries which have not made (or have failed to report) any seizures within their countries, but which are often associated with seizures that occur elsewhere. In this regard, the Congo (0/65), Ghana (0/59), Lebanon (0/46), Angola (0/41) and Mozambique (0/41) are noteworthy examples.

Finally, in terms of rates of reporting, it is important to know where data collection at the national level has resulted from passive or active data collection methods. In particular, during the time of the Bad Ivory Database System (BIDS), the precursor to ETIS, TRAFFIC undertook several targetted data collection exercises in a number of African and European countries. These systematic efforts to compile data at the national level yielded a relatively large number of cases of elephant product seizures that possibly otherwise would not have become part of the database through the more passive data collection process under CITES. However, targetting introduces bias into the system and needs to be accounted for when analyzing the data. To do this, TRAFFIC has developed the *Data Collection Score Database* as a component of ETIS (see discussion in Annex 1 of this document).

<u>The Relationship Between Domestic Ivory Markets and Illicit Trade: Understanding Motivation</u>

The relationship between the presence or absence of domestic ivory markets and the illegal killing of elephants and movement of elephants has long been established (Cobb, 1989). In the context of ivory seizures, this relationship needs to be examined carefully. Various recent studies have made detailed assessments of a number of these markets in Africa and Asia, and more work in this regard is currently in progress (Martin and Stiles, 2000; Martin and Stiles, 2002; Anon., in press; Kiyono, in press; Milliken, in press; Parry-Jones and O'Connell-Rodwell, in press; Shepherd, in press; Wu and Phipps, in press). This body of work indicates that there is considerable variability in the scale and dynamics of these markets. Using data from these studies on the number or the weight of ivory products that have been openly observed for sale at the retail level, the *Domestic Ivory Markets Database* of ETIS attempts to assess the markets of various countries in Africa, Asia and elsewhere in the world on a comparative basis. It follows that ivory markets which are diverse and large-scale are generally more problematic than markets in which only a few ivory products are openly offered for sale.

Market scale, however, is not the only consideration. The regulatory and law enforcement framework in which each of these markets exists must also be examined. This issue often makes the critical difference between what can be considered to be an unregulated and (perhaps) largely illegal market, from those which are highly-regulated and supplied by legal and sustainable sources of ivory. The issue of regulation and law enforcement necessarily leads to an examination of what CITES requires in terms of the control of domestic trade in ivory. In paragraph 3 (<u>*Regarding control of internal ivory trade*</u>) of Resolution Conf. 10.10 (Rev.), it:

> *Recommends to those Parties in whose jurisdiction there is an ivory carving industry that is not yet structured, organized or controlled and to those Parties designated as ivory importing countries, that comprehensive internal legislative, regulatory and enforcement measures be adopted to:*
>
> *a) register or license all importers, manufacturers, wholesalers and retailers dealing in raw, semi-worked or worked ivory products; and*

b) introduce recording and inspection procedures to enable the Management Authority and other appropriate government agencies to monitor the flow of ivory within the State, particularly by means of:

i) compulsory trade controls over raw ivory; and

ii) a comprehensive and demonstrably effective reporting and enforcement system for worked ivory

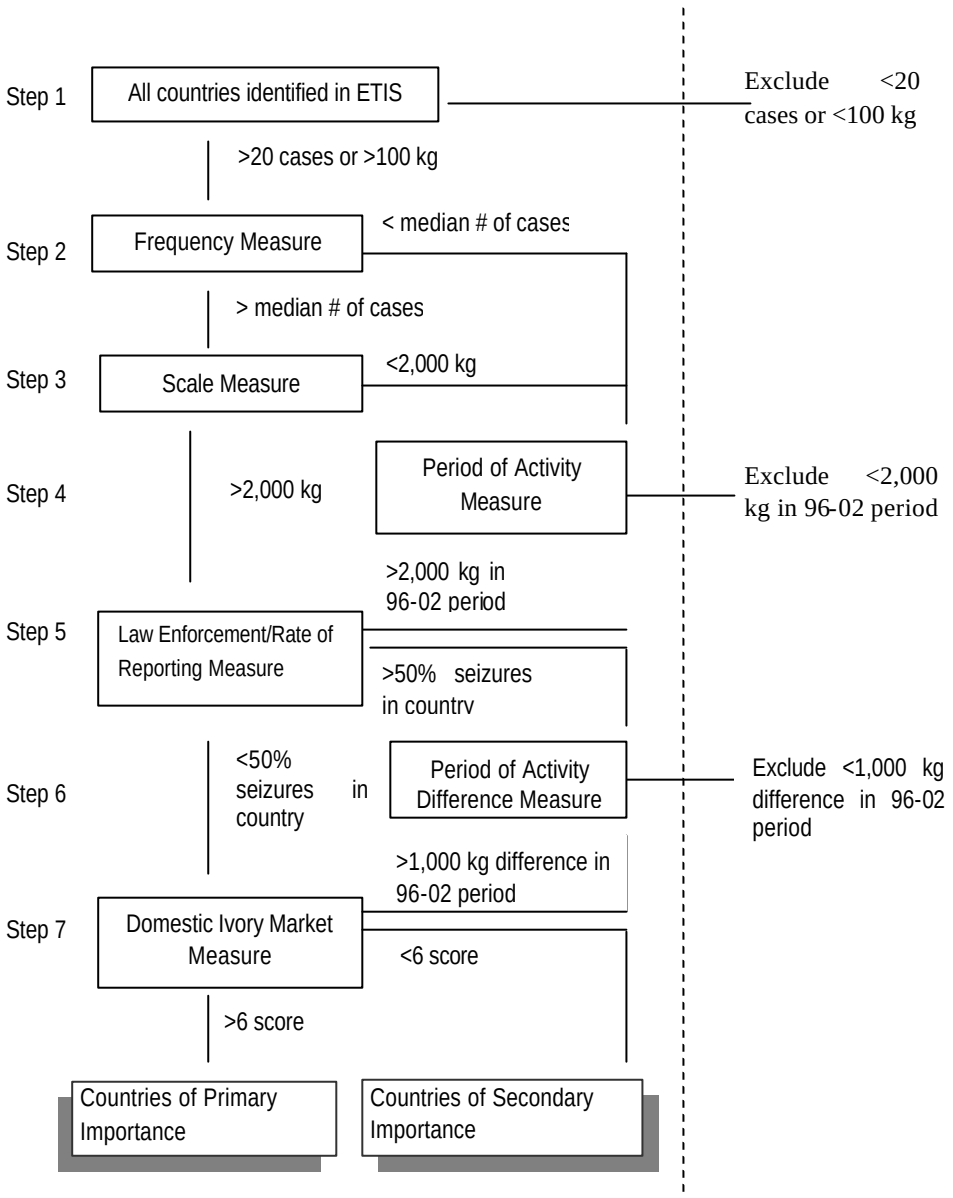
The legal sanction, or not, of domestic trade in ivory is an issue of national sovereignty on the one hand, but the presence, or absence, of regulation and law enforcement can produce impacts that extend far beyond national borders on the other. The recommendations of the Convention do not directly impinge upon the national sovereignty of individual countries in this regard, but they are designed to ensure that negative impacts and consequences are minimised to a reasonable extent. Documenting through licensing and registration schemes those directly involved in domestic trade in ivory as individuals or businesses, and monitoring their activities through appropriate regulatory and law enforcement activities, helps to ensure that illegally derived ivory or ivory products are prevented from dominating these markets. It follows that countries which implement the CITES requirements noted above are more likely to be in control of their domestic ivory markets than countries who do not. This needs to be factored into an analysis of the relationship between illegal trade in ivory and domestic ivory markets around the world. An assessment of compliance with Resolution Conf. 10.10 Rev.) is factored into the comparative scores that rank countries in the *Domestic Ivory Market Database*.

Similarly, it also needs to be appreciated that many importing countries around the world restrict the introduction of ivory products into their national borders irrespective of the legality and levels of control over these products in source countries. Through stricter domestic measures, many countries disallow the importation of ivory products as personal effects, even where such trade is sanctioned under CITES, such as the case of Zimbabwe since September 1997. These seizures become bona fide records in ETIS, as ETIS accepts the definition of what legally constitutes a seizure from the standpoint of the country in which the seizure occurs. However, it is recognised that there is, in fact, a qualitative distinction between the seizure of elephant products that are demonstrably legal and coming out of a highly-regulated system at their source, and those which are not. This consideration also has to be factored into an analysis of the relationship between illegal trade in ivory and domestic ivory markets.

The Exploratory Analysis

To attempt to identify the major players in the illicit ivory trade, an exploratory model has been devised to test and analyze data based upon a progressive assessment of frequency, scale, period of most activity, law enforcement effort, rates of reporting, and the scale and degree of regulation of domestic ivory markets. While critical thresholds are largely determined through a subjective and arbitrary process, the objective of this exploratory analysis is to identify key players and to understand their respective roles. Figure 3 illustrates the seven-step methodology that has been developed for this purpose:

Figure 3: The exploratory model for assessing countries of primary and secondary importance



Beginning with step one, the ETIS data was reduced to include all countries/territories where 20 or more ivory seizures have taken place either within the country or elsewhere. Added to this were all countries/territories where, regardless of the number of seizures, a total of 100 kg of ivory (raw ivory equivalent weight) or more has been seized either within the country or elsewhere. This has reduced the data set from over 150 countries/territories to 67, (the 67 countries presented in Figures 1 and 2 above). This data set was the starting point for identifying the most important players in the illicit ivory trade (Table 1).

In step two, all countries/territories were ranked in terms of a frequency measure. Looking at the total number of seizures involving each country, the data range from a high of 2,330 cases for the United States of America to a low of one case for Vanuatu (Table 1). Taking the median point in the scale, which is 55, all countries with less than 55 seizure cases in total were eliminated. Thus, the original data set was reduced by 33 countries/territories. Of the 34 countries/territories that remain, it is not surprising that the United States of America, Namibia, Germany, South Africa, the United Kingdom, France and Switzerland are at the top of the list. As described in Annex 1 of this document, all of these countries represent the best examples of complete data sets in ETIS. What is far more interesting, and is not influenced by good rates of reporting, is the

presence of countries such as Nigeria, China, the Democratic Republic of the Congo, Thailand and Ethiopia on the list. These countries have either not reported any seizures to ETIS themselves, or have only reported a very few number of cases, yet they are frequently reported in conjunction with seizures which are taking place elsewhere in the world.

Table 1: Frequency Measure

Code	Country	No. of cases in country	No. of cases out country	No. of cases total
US	USA	2,270	60	2,330
NA	Namibia	545	35	580
DE	Germany	510	49	559
ZA	South Africa	289	256	545
GB	United Kingdom	372	169	541
FR	France	400	87	487
CH	Switzerland	380	38	418
NG	Nigeria	0	398	398
ZW	Zimbabwe	166	212	378
HK	Hong Kong SAR	124	251	375
CN	China	17	284	301
BE	Belgium	242	32	274
CD	DRC	3	263	266
TZ	United Republic of Tanzania	236	24	260
TH	Thailand	22	194	216
KE	Kenya	162	44	206
ET	Ethiopia	4	181	185
TW	Taiwan, province of China	87	69	156
ZM	Zambia	105	50	155
MW	Malawi	132	20	152
CA	Canada	69	77	146
ES	Spain	88	54	142
CM	Cameroon	18	121	139
IN	India	56	78	134
IT	Italy	63	54	117
JP	Japan	29	79	108
CI	Côte d'Ivoire	0	97	97
PT	Portugal	61	12	73
NL	Netherlands	40	26	66
CG	Congo	0	65	65
GH	Ghana	0	59	59
SG	Singapore	9	46	55
EG	Egypt	13	42	55
NZ	New Zealand	54	1	55

Eliminate < 55 (median)				
KR	Korea, Republic of	4	47	51
LB	Lebanon	0	46	46
AO	Angola	0	41	41
MZ	Mozambique	0	41	41
SN	Senegal	0	34	34
TG	Togo	0	29	29
SD	Sudan	0	28	28
CF	Central African Rep.	1	27	28
BI	Burundi	0	28	28
AT	Austria	15	13	28
BW	Botswana	16	11	27
DK	Denmark	22	5	27
MO	Macau SAR	20	7	27
PH	Philippines	5	20	25
VN	Vietnam	0	24	24
GA	Gabon	2	21	23
MX	Mexico	2	20	22
RW	Rwanda	1	20	21
UG	Uganda	8	12	20
MY	Malaysia	15	5	20
RU	Russian Federation	1	17	18
UA	United Arab Emirates	1	14	15
MA	Morocco	0	14	14
TD	Chad	3	9	12
BJ	Benin	0	10	10
KP	Korea, DPR	0	9	9
ML	Mali	0	9	9
DJ	Djibouti	2	4	6
BG	Bulgaria	1	5	6
SZ	Swaziland	1	3	4
JO	Jordan	0	3	3
NE	Niger	1	1	2
VU	Vanuatu	1	0	1

Moving on to step three, the remaining countries/territories were examined against a scale measure, which assessed the total volume of ivory represented by the seizures that have taken place both in and outside each country in question (Table 2). The data range from a high of 32,565 kg for The United Republic of Tanzania to a low of 87 kg for New Zealand. Although the median point was over 5,000 kg, it was reasoned that this threshold was too high, and the model was adapted to eliminate only those countries where less than 2,000 kg of ivory in total had been seized. (If the average tusk weight were 3.65 kg -- as currently indicated by the data in ETIS -- 2,000 kg represents the ivory of approximately 300 elephants). Accordingly, seven more countries were eliminated, leaving 27 countries/territories (Table 2). In terms of total volume seized, it is interesting to note that the top ten positions are all held by African Elephant range States or ivory consuming countries in Asia.

Table 2: Scale measure

Code	Country	Total Wt (kg) in	Total Wt (kg) out	Total Wt (kg)
TZ	United Republic of Tanzania	31,043	1,522	32,565
NA	Namibia	30,642	471	31,113
CN	China	14,671	6,499	21,170
TW	Taiwan, province of China	12,938	2,446	15,384
HK	Hong Kong SAR	4,007	9,567	13,574
ZA	South Africa	8,782	3,164	11,946
NE	Nigeria	0	10,347	10,347
CD	DRC	5,800	3,598	9,398
ZM	Zambia	6,743	1,577	8,320
KE	Kenya	6,449	1,601	8,050
FR	France	7,647	216	7,863
JP	Japan	5,026	2,742	7,768
US	USA	6,864	470	7,334
CM	Cameroon	522	6,557	7,079
ET	Ethiopia	1,196	5,861	7,057
TH	Thailand	4,230	2,000	6,230
BE	Belgium	4,702	530	5,232
IN	India	4,099	518	4,617
GB	United Kingdom	2,153	2,062	4,215
MW	Malawi	2,320	1,659	3,979
SG	Singapore	286	3,448	3,734
PT	Portugal	1,953	1,603	3,556
EG	Egypt	2,789	121	2,910
ZW	Zimbabwe	2,154	554	2,708
CI	Côte d'Ivoire	0	2,601	2,601
ES	Spain	1,811	530	2,341
IT	Italy	1,410	624	2,034
Eliminate < 2,000				
NL	Netherlands	1,846	51	1,897
DE	Germany	1,421	158	1,579
CH	Switzerland	1,108	110	1,218
CG	Congo	0	940	940
CA	Canada	196	184	380
GH	Ghana	0	230	230
NZ	New Zealand	84	3	87

In step four, the period of activity measure was used to reassess those countries/territories which were eliminated using the frequency and scale measures. For the period of activity measure, the total weight of ivory seized that related to a particular country was divided into two equal parts, covering the periods 1989-1995 and 1996-2002. In employing this measure, if any country demonstrated a trade pattern whereby the volume of ivory seized in the most recent period was greater than 2,000 kg, which was the threshold used in assessing the scale measure, it was added to the list of countries still under consideration (Table 3). In this regard, Uganda, which was linked to 3,273 kg of ivory seized over the last seven years, was placed back on the list of major players. It was reasoned that this method served as a useful check on the results of the frequency and scale measures.

Table 3: Period of Activity Measure

Code	Country	Total Wt (kg) 1989 - 1995	Total Wt (kg) 1996 - 2002	Total Wt (kg)
UG	Uganda	408	3,273	3,681
Add > 2,000 kg in 1996-2002 period				
UA	United Arab Emirates	800	1,879	2,679
PH	Philippines	102	1,776	1,878
DJ	Djibouti	470	1,601	2,071
SD	Sudan	303	1,555	1,858
GA	Gabon	1,439	930	2,369
CH	Switzerland	319	899	1,218
AO	Angola	2,311	831	3,142
RW	Rwanda	175	803	978
KP	Korea, DPR	177	663	840
KR	Korea, Republic of	4,892	604	5,496
DE	Germany	985	594	1,579
RU	Russian Federation	50	568	618
NL	Netherlands	671	1,226	1,897
BW	Botswana	100	517	617
MY	Malaysia	67	372	439
AT	Austria	7	277	284
TD	Chad	57	260	317
CA	Canada	127	253	380

Code	Country	Total Wt (kg) 1989 - 1995	Total Wt (kg) 1996 - 2002	Total Wt (kg)
VU	Vanuatu	0	240	240
CF	Central African Republic	576	189	765
ML	Mali	20	180	200
BG	Bulgaria	16	150	166
BJ	Benin	18	126	144
GH	Ghana	116	114	230
MO	Macau SAR	160	103	263
MZ	Mozambique	187	49	236
TG	Togo	72	36	108
VN	Vietnam	20	21	41
MA	Morocco	98	20	118
CG	Congo	921	19	940
NZ	New Zealand	68	19	87
MX	Mexico	30	16	45
BI	Burundi	1,556	10	1,566
SN	Senegal	120	9	129
LB	Lebanon	968	7	975
SZ	Swaziland	201	5	206
JO	Jordan	267	2	269
DK	Denmark	79	1	80
NE	Niger	236	0	236

In step five, an attempt was made to remove bias that is associated with law enforcement effort and rates of reporting. In this regard, the 28 remaining countries were examined according to the percentage of seizures which have occurred in-country, as opposed to the total number of seizures for which the country in question was associated (Table 4). These data indicate a range of 0% for Nigeria and Côte d'Ivoire and under 10% for the Democratic Republic of the Congo, Ethiopia, China and Thailand on the one hand, to over 90% for The United Republic of Tanzania, Namibia and the United States of America on the other. Countries where more than 50% of the seizures are occurring in-country as opposed to elsewhere were regarded as having relatively good law enforcement and rates of reporting to ETIS. As a result, 14 countries/territories were seen to demonstrate relatively good law enforcement effort and rates of reporting and they were eliminated from the short list (Table 4).

Table 4: Law Enforcement Effort/Rates of Reporting Measure

Code	Country	No. of Cases in	No. of Cases out	Total No. of Cases	% of Cases in to Cases out
NG	Nigeria	0	398	398	0.00
CI	Côte d'Ivoire	0	97	97	0.00
CD	DRC	3	263	266	1.13
ET	Ethiopia	4	181	185	2.16
CN	China	17	284	301	5.65
TH	Thailand	22	194	216	10.19
CM	Cameroon	18	121	139	12.95
SG	Singapore	9	46	55	16.36
EG	Egypt	13	42	55	23.64
JP	Japan	29	79	108	26.85
HK	Hong Kong SAR	124	251	375	33.07
UG	Uganda	8	12	20	40.00
IN	India	56	78	134	41.79
ZW	Zimbabwe	166	212	378	43.92

Code	Country	No. of Cases in	No. of Cases out	Total No. of Cases	% of Cases in to Cases out
Eliminate < 50%					
ZA	South Africa	289	256	545	53.03
IT	Italy	63	54	117	53.85
TW	Taiwan, province of China	87	69	156	55.77
ES	Spain	88	54	142	61.97
ZM	Zambia	105	50	155	67.74
GB	United Kingdom	372	169	541	68.76
KE	Kenya	162	44	206	78.64
FR	France	400	87	487	82.14
PT	Portugal	61	12	73	83.56
MW	Malawi	132	20	152	86.84
BE	Belgium	242	32	274	88.32
TZ	Tanzania	236	24	260	90.77
NA	Namibia	545	35	580	93.97
US	USA	2,270	60	2,330	97.42

In step six, all countries excluded during the step five process were again reconsidered. In this regard, seizure volumes were examined by assessing the difference between the volume of ivory seized through in-country seizures during the periods 1989-1995 and 1996-2002. If the total volume in the most recent period exceeded the total volume in the earlier period by more than 1,000 kg, it was reasoned that the scale of illegal trade was increasing. As this may present an ongoing challenge, even in the face of relatively good levels of law enforcement, it was felt that such countries should be closely tracked. Consequently, Taiwan, province of China, the United Republic of Tanzania and the United States of America were added to the short list of countries (Table 5).

Table 5: Period of Activity Difference Measure

Code	Country	Total Wt (kg) in 1989-1995	Total Wt (kg) in 1996-2002	Difference
TW	Taiwan, province of China	5,693	7,246	1,553
TZ	United Republic of Tanzania	14,935	16,107	1,172
US	United States of America	2,858	4,006	1,148
Eliminate < 1,000 kg difference				
PT	Portugal	531	1,422	891
ZA	South Africa	754	1,400	646
GB	United Kingdom	1,145	1,008	-137
KE	Kenya	3,493	2,956	-537
IT	Italy	1,401	9	-1,392

Code	Country	Total Wt (kg) in 1989-1995	Total Wt (kg) in 1996-2002	Difference
ES	Spain	1,700	110	-1,590
MW	Malawi	2,193	127	-2,066
BE	Belgium	4,008	694	-3,314
FR	France	6,382	1,265	-5,117
ZM	Zambia	6,047	696	-5,351
NA	Namibia	27,004	3,638	-23,366

Applying step seven to the 17 countries/territories that derived from steps five and six helps to understand the roles these countries play in the ivory trade. All of these countries/territories have domestic ivory markets and have been ranked in the Domestic Ivory Market Database of ETIS. Table 6 presents a comparative ranking of the scale of these ivory markets and, in this regard, Thailand and Japan top the list, followed by Hong Kong SAR, Egypt, Zimbabwe and Côte d'Ivoire. Further, each country was assessed in terms of its implementation of the four requirements listed in paragraph 3 of Resolution Conf 10.10 (Rev.). Where the requirements have been met, points were subtracted from the score based on the scale of the market. Conversely, the lack of implementation led to points being added to the score for scale. Thus, a country implementing three of the four requirements would have two points subtracted from the score, and a country implementing only one requirement would have two points added to its score.

Table 6: Domestic Ivory Market Measure

			Scale of the Market Ranking				Compliance with Resolution Conf. 10.10 (Rev)				
Code	Country	FINAL SCORE	Scale: No. of items	Scale: Weight of items	Score	Ref.	3 a) Registration of dealers Yes -1/No + 1	3 b) I Trade controls raw ivory Yes -1/No + 1	3 b) ii part 1 Effective reporting Yes -1/No + 1	3 b) ii part 2 Effective enforcement Yes -1/No + 1	Score
Primary Importance											
TH	Thailand	**13**	88,179	n/a	**9**	2	1	1	1	1	**4**
EG	Egypt	**12**	21,460	n/a	**8**	1	1	1	1	1	**4**
CI	Côte d'Ivoire	**12**	20,114	2,748	**8**	1	1	1	1	1	**4**
CN	China	**11**	20,000	n/a	**7**	3	1	1	1	1	**4**
NG	Nigeria	**11**	5,966	1,742	**7**	1	1	1	1	1	**4**
HK	Hong Kong SAR	**10**	30,000	n/a	**8**	3	1	-1	1	1	**2**
ET	Ethiopia	**10**	9,996	n/a	**6**	1	1	1	1	1	**4**
CM	Cameroon	**10**	6,015	654	**6**	1	1	1	1	1	**4**
CD	DR Congo	**9**	4,324	485	**5**	1	1	1	1	1	**4**
IN	India	**7**	5,000	n/a	**5**	3	1	-1	1	1	**2**
TW	Taiwan, province of China	**6**	10,000	n/a	**6**	3	-1	-1	1	1	**0**
Secondary Importance											
JP	Japan	**5**	40,100	n/a	**9**	3	-1	-1	-1	-1	**-4**
SG	Singapore	**5**	2,700	n/a	**5**	2	-1	-1	1	1	**0**
UG	Uganda	**5**	200	n/a	**3**	3	1	1	1	-1	**2**
ZW	Zimbabwe	**4**	20,475	n/a	**8**	1	-1	-1	-1	-1	**-4**
US	United States of America	**4**	1,000	n/a	**4**	3	-1	-1	1	1	**0**
TZ	United Republic of Tanzania	**-1**	0	n/a	**1**	3	-1	-1	1	-1	**-2**

			Score for scale of domestic ivory market			
			9 - > 40,001 pcs or > 5,921 kg	Key:		
			8 - 20,001 - 40,000 pcs or 2,961-5,920 kg	pcs = pieces		
			7 - 10,001 - 20,000 pcs or 1,481-2,960 kg	kg = kilogrammes		
			6 - 5,001 - 10,000 pcs or 741-1,480 kg	n/a = not available		
			5 - 1,001 - 5,000 pcs or 151-740 kg			
			4 - 501 - 1,000 pcs or 74-150 kg	Ref:		
			3 - 51 - 500 pcs or 7.4-74 kg	1 - Martin & Stiles, 2000		
			2 - < 50 pcs or < 7.4 kg	2 - Martin & Stiles, 2002		
			1 - None	3 - TRAFFIC estimate		

In the final analysis, the scores for the countries under consideration ranged from minus one to thirteen, with scores of six or more identifying countries of greatest concern. Six was selected as the defining threshold for countries of primary importance. In this regard, it was reasoned that a country with a nine on the scale of market ranking, but fully implementing the requirements of Resolution Conf. 10.10 (Rev.), would necessarily be in a different classification from countries which were not implementing any, or only a few, of the domestic trade controls specified in the resolution. It should be noted that in the case of Japan and Zimbabwe, the paragraph 3 provisions of Resolution Conf. 10.10 (Rev.) were formerly evaluated by Panels of Experts and,

with improvements to their control systems, found to have satisfied all of these requirements. In all other countries/territories, there has been no formal review, however, based upon national legislation and other available information, it was possible to make informed assumptions about the situation.

Using the above model, in the final analysis, Thailand, Egypt, Côte d'Ivoire, China, Nigeria, Hong Kong SAR, Ethiopia, Cameroon, the Democratic Republic of the Congo, India and Taiwan, province of China, emerge as the eleven countries or territories of primary importance, while Japan, Singapore, Uganda, Zimbabwe and the United Republic of Tanzania follow as countries of secondary importance.

The Statistical Analysis

The 7,124 seizure records currently in ETIS, covering the period 1989 through 2002, clearly show a lot of variation between countries, in terms of both numbers of seizures reported and the volumes of ivory these seizures represent. This analysis aims to search for well-defined groups of countries or territories with similar patterns of seizure records and, if such groups are found, to identify their main characteristics. The main focus of interest are those countries that, according to ETIS records, account for most of the illegal ivory trade, with the less important ones being screened out before the analysis process. The objective is to complement the heuristic exploratory analysis of the previous section with a confirmatory analysis of somewhat greater statistical rigour. The idea was to use cluster analysis (Everitt *et al.*, 2001) to identify groupings based on numbers of seizures, volumes of ivory seized, and key covariates. The results will then be compared with the tentative findings of the previous exploratory approach.

A Word on Statistical Methods

In the analysis that follows, agglomerative hierarchical cluster analysis was used (Everitt *et al.*, 2001). The starting point of this method is a measure of 'distance' or dissimilarity between two 'individuals', in this case, countries. The measure utilised was the Euclidean metric

$$d_{ij} = \sqrt{\sum_{k=1}^{p} \left(x_{ik} - x_{jk} \right)^2}$$

where d_{ij} is the dissimilarity between countries i and j, and x_{ik} is the value of variable k for individual i, and p is the number of variables. Since the scales of measurement of the variables are quite different, they were first standardised (by subtracting the mean and then dividing by the standard deviation). The clustering process first finds the two individuals that are 'closest', that is, have the smallest distance, and makes them a group of two. (This group of two is an embryonic 'cluster'; individuals not yet assigned to a cluster are considered clusters on their own.) Next, individuals are assigned to existing clusters in such a way that the 'within cluster error sum of squares' is minimised (see Everitt *et al.,* 2001 for details). This method of combining clusters, known as Ward's method, generally results in homogeneous groups of individuals, while the groups themselves are as different as possible. The process continues until all individuals are in a single cluster. The result of this process is a series of groupings of the individuals with the property that each grouping is a refinement of the one above it, i.e. a hierarchical series of groupings. The diagram in Figure 4 should make this explanation clear.

Preliminary Data Screening

Having first removed seizure records consisting only of non-ivory elephant products, total numbers of seizures and weight (raw ivory equivalent) were calculated for each country or territory over the entire period, 1989-2002. For each country, seizures reported by the country itself, as well as seizures in which the country was implicated as country of origin, re-export, export or destination, were counted separately and the corresponding weights were summed. Countries implicated in fewer than 20 seizures (reported from the country itself or elsewhere), and with total weight less than 100kg were eliminated for the purposes of this analysis. The resulting dataset, consisting of 67 countries, was the starting point of this analysis, and was the same as that used in the exploratory analysis above. The purpose of this initial screening was to remove relatively insignificant countries in terms of ivory trade, as represented in the database, so as to focus on countries that, taken together, are responsible for the bulk of the trade.

For the main analysis, the two periods, 1989-1995 and 1996-2002, were treated separately. There are three principal reasons for this:

a) The earlier period corresponds roughly to the period when seizure records were collected on a more or less *ad hoc* basis by TRAFFIC, before the instigation of ETIS.

b) Patterns of activity in ivory trade have clearly changed in comparison with the earlier years covered by ETIS. That is to say that the countries that are, according to ETIS records, currently implicated the most are not entirely the same as those which were most active in the earlier period.

c) The earlier period broadly corresponds to the international commercial trade ban on ivory under CITES when all elephant populations were listed in Appendix I, while the later period roughly addresses the time when CITES policy resulted in some African Elephant populations being placed in Appendix II and allowing strictly regulated conditional trade in certain elephant products.

The 67 countries resulting from the initial screening were still too numerous for an effective analysis to isolate the countries with most ivory trade activity, so a preliminary cluster analysis was used to further reduce the number of countries under consideration. The variables used for this initial clustering were:

wt.in.1 = total weight from 'in country' seizures 1989-1995
wt.out.1 = total weight from elsewhere, implicating the country, 1989-1995
wt.in.2 = total weight from 'in country' seizures 1996-2002
wt.out.2 = total weight from elsewhere, implicating the country, 1996-2002
wt.dif = change in total weight from the 1989-1995 period to 1996-2002

The reason for including the last variable was to help identify countries that have changed significantly since the earlier period.

This cluster analysis produced a group of 36 countries with a mean weight (total over both periods) equal to 744 kg, and a mean number of seizures equal to 70. The corresponding mean weight for the other countries was 8,249 kg and mean number of seizures was 267. Thus, in comparison, the group of 36 countries represents places where low volume ivory seizures infrequently occur. These countries were therefore removed for the next stage of the analysis, leaving a data set of 31 countries. The difference between this approach to data reduction and that used in the exploratory analysis above is that in the latter, there was a degree of subjectivity in the choice of thresholds for filtering, whereas in cluster analysis the grouping is statistically determined by the data itself without any subjective intervention.

Results of the Analysis

Variables used in the analysis: As the objective of the analysis was to isolate countries from the list of 31 that are currently important, the data was restricted to the period 1996-2002.

The variables used for the analysis are, for each of the 31 countries in the dataset:

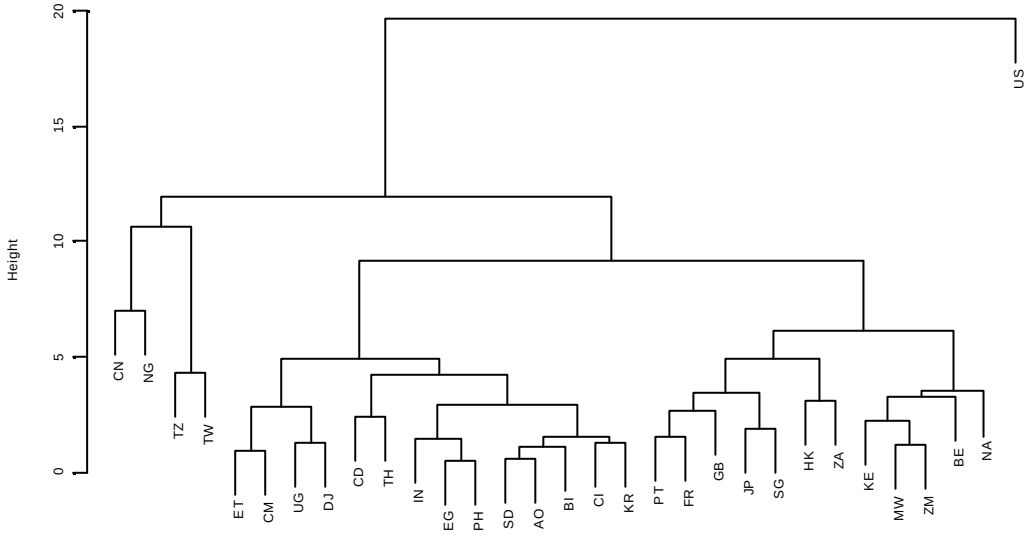
sz.in = total number of seizures reported from the country itself
sz.out = total number of seizures reported from elsewhere that implicate the country
sz.ratio = ratio of seizures reported 'in country' to total number of seizures
= *sz.in / (sz.in + sz.out)*
wt.in = total weight (raw ivory equivalent) from 'in country' seizures
wt.out = total weight (raw ivory equivalent) from other seizures implicating the country

The *sz.ratio* variable was included because the exploratory analysis suggested that it was important in identifying countries with high law enforcement effort (possibly combined with reporting rates).

Explanatory variables: As previously mentioned, over the years, data collection effort has varied considerably and is a likely source of bias in the seizure records. Some seizure records are the result of deliberately targetted data collection activities, whereas others have been submitted on a voluntary basis. To account for this bias, a data collection score (DCS) was used from data contained in the *Data Collection Score Databases* of ETIS. For a given country in a given year, the DCS is the proportion of seizure records that resulted from targetted data collection. The feasibility of a more refined scoring method, based on the type and extent of targetting, will be investigated for future analysis. Another variable that has been found to account for substantial variation between countries is the Corruption Perceptions Index (CPI) of Transparency International, as found in the *Law Enforcement Efficiency Database* of ETIS. This variable can be regarded as a partial proxy measure of law enforcement efficiency. The mean DCS and mean CPI were calculated for the period 1996-2002 for each country and these two variables were incorporated into the analysis.

The results of the cluster analysis are shown in Figure 4. The 'height' axis represents a relative measure of dissimilarity between clusters. To assess the difference between two clusters, it is necessary to trace the path from one to the other and note the greatest vertical separation along the 'height' axis. Thus, for example, the path from the cluster (ET, CM) to (EG, PH) reaches a height of five units, while the path from (ET, CM) to the cluster (JP, SG) goes to a height of about nine units. To obtain a grouping from the hierarchy, imagine drawing a horizontal line across the diagram at a given height, and note the vertical lines that this line intersects. The clusters determined by these vertical lines represent a clustering of a given degree of refinement. By drawing the horizontal line higher, a coarser grouping is obtained, while at the lowest level all countries become isolated. In this regard, it should be noted that the vertical positions of the end points are arbitrary and it is best to imagine them as all dropping down to the same level.

Figure 4: The cluster analysis



While various groupings are possible, given the hierarchical nature of the analysis, for the purposes of this presentation, a cut has been made just below the five unit measure on the height axis to group the 31 countries into 13 clusters. In this grouping, six countries or territories (China, Nigeria, the United Republic of Tanzania, Taiwan, province of China,, Namibia and the United States of America) form single-entity clusters, while the Democratic Republic of the Congo and Thailand, Hong Kong SAR and South Africa, and Japan and Singapore are paired together. The other 19 counties fall into four other clusters ranging from three to eight countries.

Table 7: Summary statistics for the 13 clusters

Group	Countries	Mean no. of seizures	Mean weight (kg)	Mean change in weight (kg)	Mean CPI	Mean LE/ reporting ratio	Mean market score
1	CN	117	18831	16493	3.1	0.06	11.0
2	NG	141	8676	7004	1.4	0.00	11.0
3	CD, TH	68	5030	2247	2.3	0.06	11.0
4	AO, BI, CI, EG, IN, KR, PH, SD	22	1494	-20	2.8	0.12	8.4
5	CM, DJ, ET, UG	23	3506	2039	2.6	0.22	8.0
6	HK, ZA	169	3822	-5115	6.3	0.43	8.0
7	TW	91	7624	-136	5.4	0.56	6.0
8	US	899	4211	1088	7.6	0.97	5.0
9	JP, SG	34	2135	-1481	7.8	0.22	5.0
10	FR, GB, PT	51	1313	-2585	7.3	0.78	4.7
11	BE, KE, MW, ZM	53	1645	-3104	3.8	0.80	3.5
12	TZ	68	17336	2108	2.1	0.91	-1.0
13	NA	216	3689	-23736	5.3	0.94	-1.0

Table 7 presents summary statistics for these groups, which have been arranged according to their 'mean market score' that derives from the *Domestic Ivory Market Database* in ETIS. These scores were not used as explanatory variables in the statistical analysis resulting in the clusters presented in Figure 1, but they are given in this table to help interpret the relationships that have emerged from the cluster analysis. Further, using the mean market score, helps to relate these findings to those from the earlier exploratory analysis, where countries with a score of six or more were considered to be countries of primary importance, while scores of five or less were countries of secondary importance. Thus, higher scores are indicative of larger, unregulated markets, while lower scores reflect smaller and more regulated markets.

The table also presents other mean statistical characteristics of the clusters. The frequency measure is the 'mean number of seizures' within the group, while the scale measure is the 'mean weight' represented by the total volume of ivory seized both in-country and elsewhere relating to the countries in the group, in the period 1996-2002. The 'mean change in weight' refers to the difference between the total weight of ivory seized in the period 1989-1995 from the total weight seized in the most recent period, 1996-2002; this statistic provides a period of activity measure for the group. The law enforcement/rates of reporting measure is the mean ratio between the number of seizures within the group of countries as opposed to the total number of seizures implicating the same group of countries for the period 1996-2002; low scores are indicative of poor law enforcement and/or reporting effort. This is augmented by the mean CPI score for the group for the same period, where again low scores are indicative of higher perceptions of corruption.

Discussion: assessing the results

With 150 countries identified in the ETIS data, both the exploratory assessment and the cluster analysis effectively reduce the data to a core group of countries or territories that account for the bulk of the seizures taking place. Although arbitrary in terms of setting key thresholds, the progressive filtration of data in the exploratory analysis results in a short list of 17 countries or territories. By the same token, but relying on strict

statistical means, the 13 discrete clusters which emerge from the cluster analysis process are referenced to 31 countries or territories. In both cases, based upon certain characteristics, these countries can be divided into countries of primary and secondary importance.

In broad terms, both the exploratory and cluster analysis present remarkably similar findings in terms of the most important countries or territories, and their attributes, in the illicit trade in ivory. It is interesting to note that only one country in the exploratory analysis, Zimbabwe, is absent from those countries identified in the cluster analysis. On the other hand, the cluster analysis introduces 15 other countries, including Angola, Belgium, Burundi, Djibouti, France, Kenya, Malawi, Namibia, the Philippines, Portugal, the Republic of Korea, South Africa, Sudan, the United Kingdom and Zambia. Half of these countries are part of discrete clusters which exclude any of the countries or territories that were identified in the exploratory analysis.

Using the country groups as indicated in the cluster analysis, and ranking them in order according to the mean market score, the following can be said about these countries/territories:

Group 1 – China: In the cluster analysis, China is a single-country 'group', with Nigeria forming the closest 'neighbouring' cluster. In terms of the volume of ivory seized, China ranks first among all countries assessed, both from the standpoint of the period, 1996-2002, and the difference between the volume of ivory seized in the earlier period, 1989-1995, and the most recent period, 1996-2002. China's law enforcement effort score is among the lowest of the countries assessed, with most seizures taking place externally, and the CPI score is also relatively low. Certainly within Asia, China's current trade in ivory appears to be one of the largest and the most active. This trade is believed to be driven by a considerable domestic ivory market, which was also ranked very high. On the basis of recent field studies, however, the scale of China's domestic ivory trade remains to be adequately quantified. There is little doubt that the traditional State-run ivory processing centres, which underpinned China's ivory trade in the pre-CITES ban period, are undergoing profound change and appear to be scaling down their ivory operations (Lee and Parry-Jones, 1997). At the same time, there is qualitative evidence that trade in ivory is increasing in the face of the rapid expansion of private enterprise opportunities and the introduction of market-economy forces (Lee and Parry-Jones, 1997; Dublin *et al.*, 1995; Parry-Jones and O'Connell-Rodwell, in press; D. Stiles, *in litt.* to T. Milliken, 2002).

Group 2 – Nigeria: Nigeria also becomes a 'group' unto itself in the cluster analysis, and was in the third highest ranking of the exploratory analysis. In this regard, Nigeria has a very high frequency in terms of association with ivory seizures taking place throughout the world, and this involvement translates into a large volume of ivory. A further consideration is that there is increasing activity in the most recent period, 1996-2002, as opposed to the earlier period of 1989-1995. Further, Nigeria's law enforcement effort and CPI scores are the lowest of all countries surveyed. In contrast, in both analyses, Nigeria receives very high scores in terms of the scale and lack of regulation for its domestic ivory market. These findings are corroborated by field studies which have found the domestic ivory trade in Nigeria in 2000 to be comparatively one of the largest within West Africa, and a market that has continued to grow since the mid-1990s (Martin and Stiles, 2000). The data also indicate that Nigeria is a major supplier of raw ivory to Asian markets.

Group 3 – the Democratic Republic of the Congo and Thailand: The Democratic Republic of the Congo and Thailand fall within the same group in the cluster analysis, and both ranked highly as countries of primary importance in the exploratory analysis. In many respects, the characteristics of these two countries are similar to Nigeria and China, except that the frequency and scale variables are less. The law enforcement effort and CPI scores are also very low, while the domestic ivory market score in both countries is high. Indeed, Thailand has recently been described as "by far the largest market for worked ivory in South and Southeast Asia", with observable quantities of ivory products exceeding anything seen in similar surveys in Africa two years earlier (Martin and Stiles, 2002). Within Central Africa, the Democratic Republic of the Congo also harbours a significant domestic ivory market in its capital city of Kinshasa (Martin and Stiles, 2000). Both countries are frequently involved in the trade in raw ivory. The situation in the Democratic Republic of the Congo is complicated by the protracted state of civil war in eastern and northern parts of the country; this state of affairs has contributed to serious elephant poaching since the mid-1990s, and leads to illegal trade in ivory, both within the country and beyond its borders (Anon., 2001).

Group 4 – Angola, Burundi, Côte d'Ivoire, Egypt, India, the Republic of Korea, the Philippines and Sudan: The largest group in the cluster analysis, only three of these countries, Côte d'Ivoire, Egypt and India, were identified as countries of primary importance in the exploratory analysis. In the cluster analysis, this appears to be the 'catch-all' group with the various countries exhibiting a wider range of roles and variables in the ivory trade than those found in other clusters. Half of the countries are range states (Angola, Côte d'Ivoire, India and Sudan), and half are most frequently involved as transit countries or have nationals often involved in ivory seizures occurring elsewhere (Angola, Burundi, the Republic of Korea, and the Philippines). Collectively, these countries exhibit relatively low law enforcement ratios and CPI scores. The mean domestic ivory market score is also high, but this results largely from the influence of Egypt, Côte d'Ivoire and India; these countries currently have, or have had in the very recent past, some of largest domestic ivory markets in Africa and Asia and therefore carry comparatively high domestic ivory market scores. There is also considerable variability in the period of activity measure. Angola, Burundi, Côte d'Ivoire and the Republic of Korea were most active in the period 1989-1995, while Egypt, India, the Philippines and Sudan were most active between 1996-2002. All and all, this is a pivotal group of countries where any increase in frequency or scale is likely to cause movement into other groups, particularly Group 5.

Group 5 – Cameroon, Djibouti, Ethiopia and Uganda: This group of four countries have all been involved with a small number of large ivory seizures in the most recent period, 1996-2002. This is demonstrated by the fact that the mean number of seizure cases is relatively small, while the volume of ivory these seizures represent is comparatively large. The law enforcement effort ratio is relatively low with less than a quarter of the seizures occurring nationally, and the CPI value is also low. At the same time, the mean domestic ivory market score is high. In this regard, it should be noted that Cameroon and Ethiopia harbour the largest domestic ivory markets in Central Africa and East Africa, respectively (Martin and Stiles, 2000), while Djibouti and Uganda have much smaller domestic ivory trades in comparison. All of these countries, but particularly Cameroon and Ethiopia, are implicated as significant sources of raw ivory, and sometimes worked ivory products, that are traded to other parts of Africa or exported to consuming countries in Asia. To a large extent, Uganda's ivory trade appears to be linked to the protracted state of civil unrest in the eastern part of the Democratic Republic of the Congo (Anon., 2001).

Group 6 – Hong Kong SAR and South Africa: Hong Kong SAR and South Africa are paired in a group characterised by a large number of seizures that represents a large volume of ivory. However, in comparison with the situation in the period 1989-1995, this trade has significantly diminished as shown by the negative value in the 'mean change in weight'. Further, Hong Kong SAR and South Africa have a law enforcement effort score that is twice as good as Group 5, and a much higher CPI score reflecting lower perceptions of corruption. (Readers should note that new data received from South Africa but not yet entered into ETIS will no doubt change the law enforcement effort ratio considerably; see Annex 1 of this document). Both Hong Kong SAR and South Africa rank highly in terms of their domestic ivory markets. This is not surprising as, in 1990, Hong Kong SAR held the largest documented stockpile of ivory in the world and, prior to the trade ban, had the largest ivory industry and consistently consumed the greatest volume of ivory globally (Milliken and Melville, 1989). South Africa also allows internal trade in ivory, a trade that is primarily centred on stock from the pre-CITES ban period. In both places, the domestic trade in ivory is in a state of decline (Lee *et al.*, 1997; Martin and Stiles, 2000).

Group 7 – Taiwan, province of China,: Taiwan, province of China, is also a group on its own. Although less frequent in number than the previous group, seizures relating to Taiwan, province of China, represent very high volumes of ivory. In fact, six of the 30 largest seizures in ETIS have occurred in Taiwan, province of China. The difference between the two periods is marginal, suggesting a fairly stable illegal trade threat. However, there appears to be a commitment to interdict contraband ivory as Taiwan, province of China, demonstrates a relatively high law enforcement effort ratio and has a mid-point CPI score. Taiwan's (province of China) market score is precisely at the cut-off point for countries of primary importance in the exploratory analysis, but recent surveys of the domestic ivory market in Taiwan, province of China, indicates a decline in availability and sales (Wu and Phipps, in press). The possibility remains that Taiwan, province of China may play some role as an entrepot destination for ivory for later transhipment to other locations. Further investigation is clearly warranted, but China would seemingly loom as the most likely recipient, with the ivory probably being

transferred at sea across the Taiwan Straits as has been documented for other wildlife products in the past (Low, 1991).

Group 8 – United States of America: With nearly five times as many seizures as any other country in ETIS, it is not surprising that the United States of America represents a single-country cluster. Although individual seizures are small in terms of the weight of ivory they represent, collectively these seizures account for a substantial volume of ivory. The data indicate that the more recent period, 1996-2002, has been more active than the early period. On the other hand, the United States of America has the best law enforcement effort ratio of any country in ETIS, and has a very high CPI score. The domestic ivory market score is relatively low, indicating a country of secondary importance in the exploratory analysis. In fact, the primary challenge to the United States of America seems to be centred upon the introduction of ivory curios as personal effects by U.S. citizens returning from overseas.

Group 9 – Japan and Singapore: Japan and Singapore are paired together in the cluster analysis, as they were in the exploratory analysis as countries of secondary importance. As such, summary statistics indicate a mixed prognosis. For Japan and Singapore, a relatively small number of seizures has yielded a moderate volume of ivory. However, this trade was more active in the period 1989-1995 as demonstrated by the negative variable in the 'mean change in weight'. While this appears to be a positive development, the low law enforcement effort ratio is not favourable. (Readers should note that new data received from Japan, but not yet entered into ETIS, will no doubt change the law enforcement effort ratio considerably; see Annex 1 of this document). On the other hand, the CPI score is the highest of all countries indicating very low perceptions of corruption. In terms of domestic ivory markets, there is little doubt that Japan is one of the largest, but it also has one of the highest degrees of regulation in the world (Kiyono, in press). As the only formally-designated country eligible for the one-off CITES-approved shipment of ivory in 1999, Japan is obviously a very important country in the legal ivory trade equation. In this regard, it (perhaps) represents the 'ultimate' ivory market. Singapore's market is considerably smaller, but not as thoroughly regulated, with recent surveys indicating a major decline in the local industry (Martin and Stiles, 2002). Because of well-developed air and shipping links, Singapore is one of the world's most important transit countries, including for illicit commodities such as ivory moving between Africa and other parts of Asia.

Group 10 – France, the United Kingdom and Portugal: More than anything else, these three European countries become a cluster together by virtue of their roles as trade routes connecting Africa with Asia. The summary statistics indicate both a modest number of seizures and volume of ivory, and that this trade has declined to some extent in the most recent period, 1996-2002, when compared to the earlier period of activity. However, rates of reporting could be a significant influence on this last observation. Overall, these countries have a good law enforcement effort ratio and CPI score, and none represent important domestic ivory markets. Reflecting both favourable transportation routes and colonial linkages, the primary challenge to France, the United Kingdom and Portugal remains the movement of illegal consignments of ivory from producer countries in Africa through these countries to destinations in Asia. A secondary challenge concerns the introduction of ivory curios as personal effects from tourists of these countries returning home from other parts of the world.

Group 11 – Belgium, Kenya, Malawi and Zambia: This group of one European and three African countries largely follows the variables observed for Group 10, except that ivory trade volumes are slightly larger and the rate of decline in the most recent period, 1996-2002, is slightly more pronounced. The law enforcement effort ration is marginally higher that that for Group 10, but the CPI score is considerably lower. Overall the low domestic market scores indicates that these countries are not end-users themselves, but play other roles in the illicit ivory trade. In fact, Kenya, and Zambia do not allow domestic trade in worked ivory, and generally enforce this policy, while Malawi allows a small, regulated trade. All three African countries, as well as Belgium, play important roles in terms of trade routes as transit countries. Kenya's international airport in Nairobi has become the major airline hub for East Africa, while Mombasa remains a major shipping port on the Indian Ocean. Landlocked Zambia and Malawi also function (sometimes together) as staging grounds within Southern Africa for the movement of ivory to destinations further afield. Belgium has also been a favoured trade route for ivory moving out of Africa to Asia from former Belgium colonies.

Group 12 – the United Republic of Tanzania: the United Republic of Tanzania forms a cluster on its own, which is characterised by fairly frequent seizures of extremely large volumes of ivory. This trade shows signs of having increased somewhat in the most recent period, 1995-2002. the United Republic of Tanzania has one of the best law enforcement effort ratios in the data, but equally has one of the lowest CPI scores. This apparent anomaly could possibly be explained by the fact that the United Republic of Tanzania, among all African countries, made an extreme effort to curtail elephant poaching and illegal trade in ivory in the late 1980's and early 1990s by launching a nationwide law enforcement campaign code-named Operation Uhai (Dublin *et al*., 1995). The residual effects of this effort probably continues to sensitize law enforcement bodies with respect to ivory trade and accounts for the United Republic of Tanzania's high law enforcement ratio. As reflected by the very low domestic market score, the United Republic of Tanzania also prohibits local trade in ivory and enforces such provisions effectively. Thus, the United Republic of Tanzania's role in the ivory trade continues to be as an important trade route and transit country, especially through its principal Indian Ocean port of Dar es Salaam. In this regard, six of the 30 largest ivory seizures in ETIS have occurred in the United Republic of Tanzania.

Group 13 – Namibia: Like the United States of America, the high number of seizures that have occurred in Namibia pretty much guarantee that this country will assume a group of its own in the cluster analysis. With the second highest law enforcement effort ratio and a mid-point CPI score, Namibia appears to be very much in control of the situation nationally. This is further demonstrated by the fact that the decline in illegal trade activity, as measured by the 'mean change in weight' variable, shows an overwhelming decline between the periods 1989-1995 and 1996-2002. Another consideration for Namibia is the fact that it harbours a very negligible domestic trade in ivory which is highly regulated. Collectively, this profile indicates that Namibia is not currently a country of relative importance in terms contemporary illicit ivory trade dynamics.

The case of Zimbabwe: Zimbabwe was the only country shortlisted in the exploratory analysis as a country of secondary importance, which was entirely excluded in the statistical analysis when the data set was reduced from 67 countries or territories to 31. If Zimbabwe were treated as a single-country cluster the following attributes would arise. Zimbabwe is implicated in a large number (mean no. of seizures = 219) of very low volume seizures (mean weight = 1,700kg), which is characteristic of a country that allows the export of worked ivory products. In the case of Zimbabwe, provisions for such trade were sanctioned under CITES at the time the country's elephant population was transferred to Appendix II in 1997. In the more recent period, 1995-2002, the volume of ivory represented by seizures in which Zimbabwe is implicated has marginally increased (mean change in weight = 692kg). Part of this increase is believed to reflect stricter domestic measures in importing countries which disallow legal purchases of worked ivory products from Zimbabwe. Zimbabwe's law enforcement effort ratio is roughly mid-point on the scale and is equal to the ratio of the Group 6 countries, Hong Kong SAR and South Africa. The CPI score is low and equal to the Group 11 countries of Belgium, Kenya, Malawi and Zambia. Zimbabwe has a considerable domestic ivory market, but its control system was assessed by the Panel of Experts and, with further improvements, was deemed to comply with the requirements of Resolution Conf. 10.10. Other external assessments have indicated that Zimbabwe's regulatory system "for ivory craftsmen and vendors are the most comprehensive in Africa and are enforced by the authorities" (Martin and Stiles, 2000).

Conclusions and Recommendations

Using different methods, the results of both the exploratory and statistical analysis do provide comparative insight into determining the most important countries, and their characteristics, with respect to illicit trade in ivory, as represented by the seizures data in ETIS. While the statistical method yields a larger group of countries or territories, the degree of overlap with the smaller group highlighted in the exploratory analysis is fairly remarkable. In both analyses, there is a considerable degree of variation in terms of characteristics and, in this regard, some countries or territories clearly represent greater problems than others.

Table 8: Correlations between variables in Table 7

	Mean # sz	Mean wt	Change in wt	Mean CPI	LE/report ratio
Mean wt	-0.04 (ns)				
Change in wt	-0.05 (ns)	0.56 (*)			
Mean CPI	0.42 (ns)	-0.45 (ns)	-0.39 (ns)		
LE/report ratio	0.44 (ns)	-0.1 (ns)	-0.56 (*)	0.46 (ns)	
Market score	-0.11 (ns)	0.04 (ns)	0.66 (**)	-0.31 (ns)	-0.86 (***)

Note

ns = not significant
* = signif. at P < 0.05
** = signif. at P < 0.01
*** = signif. at P < 0.001
wt = weight
sz = seizures

In terms of the most problematic variables, Table 8 presents a comparative correlation of the variables presented in Table 7. The most significant correlation is the relationship between the score of the domestic ivory market and the law enforcement effort ratio. Countries with large, unregulated ivory markets generally exhibit the lowest degree of law enforcement effort. The second strongest correlation is between the change in weight between the two periods examined and the domestic ivory market score. Here again, larger and unregulated ivory markets are generally very active with more ivory flowing into them in the more recent period, 1996-2002.

Of lesser significance is the correlation between the change in weight between the two periods and the law enforcement effort ratio. In this regard, countries that are most active in the more recent period, 1996-2002, are likely to exhibit a poorer law enforcement effort ratio. By the same token, change in weight between the two periods and the mean weight of the ivory seized also showed the same degree of correlation. This indicates that countries where the mean weight was at the higher end of the spectrum were far more likely to show more active ivory trade in the more recent period, 1996-2002.

With some degree of variability in terms of scale, the more problematic characteristics described above apply to the situations found in China, Nigeria, the Democratic Republic of the Congo and Thailand, and to a somewhat lesser extent in Cameroon, Djibouti, Ethiopia and Uganda. In the cluster analysis, these eight countries appear to play the most problematic contemporary roles in the illicit trade in ivory. In the exploratory analysis, all were identified as countries of primary importance, except for Uganda, which held secondary importance, and Djibouti, which did not feature at all.

Similarly, but again on a smaller scale and with a far greater range of variability, the same characteristics as noted above are generally present for Angola, Burundi, Côte d'Ivoire, Egypt, India, the Republic of Korea, the Philippines, Sudan and Taiwan, province of China. In the cluster analysis, these are all pivotal countries or territories, which have the potential for fairly rapid movement into the above mentioned groups if illicit ivory trade variables increase over time. In the exploratory analysis, Côte d'Ivoire, India, and Taiwan, province of China all rated as countries of primary importance.

Another group, which is notable for a decline in illicit trade activity in the most recent period, 1996-2002, and generally better law enforcement effort and higher CPI scores, is represented by Hong Kong SAR, Japan, Singapore and South Africa, and to a lesser extent Belgium, France, Kenya, Malawi, Portugal, the United Kingdom, Zimbabwe and Zambia. These are also pivotal countries in the sense that, for historical and contemporary reasons, they will continue to play important roles primarily as transit countries or, in the case of Japan, as the 'ultimate' end-use market. Failure to maintain good law enforcement could change the future position of these countries and put them into a more problematic grouping. In the exploratory analysis, Hong Kong SAR rated primary importance, while Japan, Singapore and Zimbabwe were countries of secondary importance.

the United Republic of Tanzania and the United States of America share characteristics with the group immediately above except that the challenge to law enforcement appears to already be occurring in that the most recent period, 1996-2002, represents the time of greatest activity. However, with extremely high law enforcement effort ratios, both countries presently appear to be coping well with the challenge at hand. Both countries were identified as countries of secondary importance in the exploratory analysis.

Finally, of all of the countries analysed in detail, Namibia overwhelmingly represents the best composite set characteristics. There, recent seizures represent a small fraction of what was the case in the earlier period, 1989-1995, while law enforcement effort has remained consistently high, with the CPI score in the mid-range and a very low domestic ivory market score. In this regard, Namibia enters the analysis by virtue of its good record and not for any other reason.

In terms of improving the situation where problems have been noted above, through interventions directly linked to CITES, implementation of the domestic ivory trade controls noted in Resolution Conf. 10.10 (Rev.) stands as the foremost challenge. The analyses above clearly demonstrate a strong linkage between the ivory seizure data in ETIS and large-scale, unregulated domestic ivory markets around the world. There is a clear pattern of raw ivory illegally moving into these markets, and worked ivory products regularly moving out of them. These markets almost universally fail to implement the regulatory requirements recommended in Resolution Conf. 10.10 (Rev.). This is an issue that needs to be tackled by individual countries at the national level, and one which CITES should maintain appropriate oversight review and guidance through the intercessional period between Conferences of the Parties.

In view of the above analyses, TRAFFIC recommends the following:

a) For countries which allow domestic trade in ivory, and have not been reviewed through the Panel of Experts process, a formal mechanism under the direction of the CITES Standing Committee should be initiated to evaluate compliance with the provisions outlined in '*Regarding control of internal ivory trade*' of Resolution Conf. 10.10 (Rev.), especially for countries of major concern as identified in this report.

b) Where the regulatory requirements of Resolution Conf. 10.10 (Rev.) are not being met, Parties should be supported, through appropriate capacity-building initiatives, to improve their legal and administrative controls and law enforcement capabilities.

c) While better reporting of ivory seizures to ETIS remains a general concern, countries which have never or only rarely reported an elephant product seizure to ETIS, but are frequently associated with seizures reported elsewhere, should make a special effort to review their national law enforcement data and send data to ETIS as appropriate.

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An analysis of trends of elephant product seizure data in ETIS; a report to the 12th meeting of the Conference of the Parties

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Introduction

This is the third and final report to the 12th meeting of the Conference of the Parties to CITES (CoP12) on the Elephant Trade Information System (ETIS), the international monitoring system managed by TRAFFIC to track illegal trade in elephant products. The first report addressed the structure and status of ETIS and presented a general summary of the seizure data as of 06 June 2002 (see CoP12 Doc. 34.1 Annex 1). The second report presented an analysis of the spatial and static aspects of the seizures data to identify which countries or territories are playing leading roles in the illicit trade in ivory and the fundamental characteristics of this involvement (see CoP12 Doc. 34.1 Annex 2). These reports provide pertinent information and context for the analysis that follows; readers are encouraged to refer to these documents in conjunction with the findings of this analysis.

In Resolution Conf. 10.10 (Rev.) (*Trade in Elephant Specimens*), the Parties outline four objectives to guide the operation of ETIS. For this report, the following two objectives are specifically addressed:

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

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.

This report achieves this goal by undertaking an analysis of trends in the seizures data and assessing possible reasons for such trends. As will be explained, it is believed that the adjusted trends in the seizures data reflect, in a general manner, actual levels of illicit trade in ivory over the period under consideration. Collectively, this report, together with the other two reports on ETIS that have been submitted to CoP12, fulfil the reporting requirements called for in Resolution Conf. 10.10 (Rev.).

A Summary of the Seizures Data as of 28 August 2002

Number of Records

In order to produce analytical reports based on the ETIS data, it is necessary to curtail the data entry functions temporarily and examine the data at a defined moment in time. In this regard, the Seizures Database was 'closed' on 06 June 2002 for the production of the first two reports submitted to CoP12. Following the completion of those reports, data entry once again commenced, and 693 new records of elephant product seizures were entered into the database before its temporary closure on 28 August 2002 for the production of the current analysis. Table 1 presents the record of data collection and entry during this period and should be viewed as an update of Table 1 in CoP12 Doc. 34.1 Annex 1. As of 28 August 2002, the Seizures Database comprised 7,817 records of elephant product seizures which have occurred in 67 countries or territories around the world since 1989 (Table 2), while another 19 cases are pending clarification or have just been received and have not yet been entered into the database (Table 1).

Table 1: Number and status of seizure cases received between 06 June – 28 August 2002

Date recv'd	Country Discovered	No. of Cases	Source	Entered	Pending	Rejected	Comments
1989							
04/07/2002	Japan	1	Japanese Customs Authorities	1			Response to 2nd ETIS Report
16/07/2002	Nigeria	8	Kano State Ministry of Agriculture's Wildlife Unit (NG)	8			Targeted data collection
19/08/2002	Belgium	10	Belgian CITES Management Authority	10			Targeted data collection
1990							
Jul-02	Nigeria	2	Head of CITES Enforcement Lagos (NG)	2			Targeted data collection
19/08/2002	Belgium	1	Belgian CITES Management Authority	1			Targeted data collection
1991							
Jul-02	Nigeria	2	Head of CITES Enforcement Lagos (NG)	2			Targeted data collection
19/08/2002	Belgium	1	Belgian CITES Management Authority		1		Targeted data collection; incomplete data
1992							
19/08/2002	Belgium	6	Belgian CITES Management Authority	6			Targeted data collection
1993							
04/07/2002	Japan	1	Japanese Customs Authorities	1			Response to 2nd ETIS Report
02/08/2002	Denmark	1	Min. of Environment - Division for Wildlife Management		1		Waiting clarification/ targeted data collection/ confiscation status unknown
19/08/2002	Belgium	7	Belgian CITES Management Authority	7			Targeted data collection
1994							
02/08/2002	Denmark	6	Min. of Environment - Division for Wildlife Management	5	1		Waiting clarification/ targeted data collection/ data incomplete
19/08/2002	Belgium	6	Belgian CITES Management Authority	6			Targeted data collection
1995							
04/07/2002	Japan	42	Japanese Customs Authorities	41		1	Already in ETIS
08/07/2002	South Africa	3	Gauteng Nature Conservation	3			Targeted data collection
25/07/2002	South Africa	1	Free State Province - Dept. of Tourism, Environment & Economic Affairs	1			Targeted data collection
02/08/2002	Denmark	5	Min. of Environment - Division for Wildlife Management	5			Targeted data collection
16/08/2002	Spain	11	Ministerio de Economia y Haciendo	11			Targeted data collection
19/08/2002	Belgium	3	Belgian CITES Management Authority	2	1		Targeted data collection, pending clarification
1996							
04/07/2002	Japan	36	Japanese Customs Authorities	34		2	Response to 2nd ETIS Report, already in ETIS
08/07/2002	South Africa	11	Gauteng Nature Conservation	11			Targeted data collection
25/07/2002	South Africa	2	Free State Province - Dept. of Tourism, Environment & Economic Affairs	2			Targeted data collection
02/08/2002	Denmark	1	Min. of Environment - Division for Wildlife Management	1			Targeted data collection
16/08/2002	Spain	34	Ministerio de Economia y Haciendo	34			Targeted data collection
16/08/2002	India	8	TRAFFIC India	6		2	Already in ETIS
19/08/2002	Belgium	10	Belgian CITES Management Authority	9	1		Targeted data collection, incomplete data

Date recv'd	Country Discovered	No. of Cases	Source	Entered	Pending	Rejected	Comments
1997							
04/07/2002	Japan	22	Japanese Customs Authorities	22			Response to 2nd ETIS Report
08/07/2002	South Africa	6	Gauteng Nature Conservation	6			Targeted data collection
25/07/2002	South Africa	3	Free State Province - Dept. of Tourism, Environment & Economic Affairs	3			Targeted data collection
02/08/2002	Denmark	1	Min. of Environment - Division for Wildlife Management	1			Targeted data collection
16/08/2002	Spain	5	Ministerio de Economia y Haciendo	5			Targeted data collection
16/08/2002	India	11	TRAFFIC India	11			Other
19/08/2002	Belgium	31	Belgian CITES Management Authority	22	9		Targeted data collection, incomplete data
1998							
04/07/2002	Japan	15	Japanese Customs Authorities	15			Response to 2nd ETIS Report
03/07/2002	Malaysia	1	Dept. Wildlife & National Parks (MY)	1			Targeted data collection
08/07/2002	South Africa	18	Gauteng Nature Conservation	18			Targeted data collection
02/07/2002	Viet Nam	1	CITES Management Authority of Vietnam	1			Targeted data collection
25/07/2002	South Africa	3	Free State Province - Dept. of Tourism, Environment & Economic Affairs	3			Targeted data collection
02/08/2002	Denmark	10	Min. of Environment - Division for Wildlife Management	10			Targeted data collection
16/08/2002	Spain	15	Ministerio de Economia y Haciendo	15			Targeted data collection
16/08/2002	India*	10	TRAFFIC India	10			
20/08/2002	Switzerland	1	Swiss CITES Management Authority	1			Targeted data collection
19/08/2002	Belgium	10	Belgian CITES Management Authority	10			Targeted data collection
1999							
04/07/2002	Japan	18	Japanese Customs Authorities	18			Response to 2nd ETIS Report
08/07/2002	South Africa	5	Gauteng Nature Conservation	5			Targeted data collection
25/07/2002	South Africa	2	Free State Province - Dept. of Tourism, Environment & Economic Affairs	2			Targeted data collection
02/08/2002	Denmark	4	Min. of Environment - Division for Wildlife Management	3	1		Waiting clarification/targeted data collection/ data incomplete
05/08/2002	Poland	9	Min. of the Environment - Dept. of Nature Conservation	9			Response to 2nd ETIS Report
16/08/2002	Spain	14	Ministerio de Economia y Haciendo	14			Targeted data collection
16/08/2002	India**	3	TRAFFIC India	2	1		Pending clarification
20/08/2002	Switzerland	5	Swiss CITES Management Authority	5			Targeted data collection
19/08/2002	Belgium	8	Belgian CITES Management Authority	7	1		Targeted data collection, pending clarification
2000							
02/07/2002	Viet Nam	1	CITES Management Authority of Vietnam	1			Targeted data collection
08/07/2002	South Africa	5	Gauteng Nature Conservation	5			Targeted data collection
24/06/2002	Thailand	1	CITES Management Authority of Thailand			1	Already in ETIS
25/07/2002	South Africa	1	Free State Province - Dept. of Tourism, Environment & Economic Affairs	1			Targeted data collection
02/08/2002	Denmark	2	Min. of Environment - Division for Wildlife Management	2			Targeted data collection
05/08/2002	Poland	3	Min. of the Environment - Dept. of Nature Conservation	3			Response to 2nd ETIS Report

Date recv'd	Country Discovered	No. of Cases	Source	Entered	Pending	Rejected	Comments
16/08/2002	New Zealand	7	Department of Conservation	7			Targeted data collection
16/08/2002	Spain	23	Ministerio de Economia y Haciendo	23			Targeted data collection
16/08/2002	India	21	TRAFFIC India	10		11	Already in ETIS
20/08/2002	Switzerland	33	Swiss CITES Management Authority	33			Targeted data collection
22/08/2002	United Kingdom	12	HM Customs & Excise	9	2	1	Targeted data collection, one already in ETIS, two incomplete data
19/08/2002	Belgium	12	Belgian CITES Management Authority	12			Targeted data collection
	2001						
03/07/2002	Malaysia	2	Dept. of Wildlife & National Parks (MY)			2	Already in ETIS
20/06/2002	South Africa	2	Directorate: Environment & Conservation, Kalahari Regional Office (ZA)	2			Targeted data collection
08/07/2002	South Africa	2	Gauteng Nature Conservation	2			Targeted data collection
24/06/2002	Thailand	2	CITES Management Authority of Thailand	2			Targeted data collection
02/07/2002	Viet Nam	2	CITES Management Authority of Vietnam	2			Targeted data collection
05/08/2002	Poland	3	Min. of the Environment - Dept. of Nature Conservation	3			Response to 2nd ETIS Report
16/08/2002	New Zealand	30	Department of Conservation	30			Targeted data collection
16/08/2002	Spain	21	Ministerio de Economia y Haciendo	21			Targeted data collection
16/08/2002	India	18	TRAFFIC India	14		4	Already in ETIS
20/08/2002	Switzerland	43	Swiss CITES Management Authority	43			Targeted data collection
22/08/2002	United Kingdom	2	HM Customs & Excise	2			Targeted data collection
19/08/2002	Belgium	8	Belgian CITES Management Authority	8			Targeted data collection
			2002				
19/06/2002	South Africa	1	The Citizen	1			
24/06/2002	Thailand	2	CITES Management Authority of Thailand	2			Targeted data collection
07/08/2002	Singapore	1	Agri-good and Veterinary Authority (SG)	1			CITES process
15/01/2002	Belgium	1	TRAFFIC Europe	1			
16/08/2002	Hong Kong	1	TRAFFIC East Asia	1			
16/08/2002	New Zealand	10	Department of Conservation	10			Targeted data collection
16/08/2002	India	5	TRAFFIC India	4		1	Already in ETIS
20/08/2002	Switzerland	11	Swiss CITES Management Authority	11			Targeted data collection
Total		**738**		**694**	**19**	**25**	

Notes

- Shaded data represents data received during the production of the report to CITES in July 2002.
- * 14 cases involving 193.75 of of ivory carving occurred between 1998 -99, this information was not included to ETIS, pending clarification
- ** 5 cases involving 22.55 kg of raw ivory occurred between 1999-2000, this information was not included to ETIS, pending clarification
- For the Belgium and Swiss data, the M.A. submitted hundreds of cases, most of which were already in ETIS. Only new cases are indicated above.
- France submitted summarized seize for which a request has been put in to get the data on a case-by-case basis.

Table 2 in this report updates a similar table in CoP12 Doc. 34.1 Annex 1, by indicating those countries for which new data have been entered into ETIS. It also provides the updated regional subtotals and overall total as of 28 August 2002. In terms of new data, the Governments of three countries -- Nigeria, Poland and Vietnam -- have submitted records of ivory seizures to ETIS for the first time and should be commended. The Governments of Belgium, Denmark, Japan, Malaysia, New Zealand, Spain, South Africa, Switzerland and Thailand have also submitted new data. In addition, TRAFFIC has procured new elephant product seizure records for Hong Kong, India, Singapore and the United Kingdom. It should also be noted that new data were received from France, but requires further verification before data entry can be completed. With these entries, the data sets for Belgium, Denmark, India, Japan, Spain, South Africa and Switzerland have significantly improved and are considered to be among the most complete within the ETIS seizures database.

Table 2: Number of ivory seizures by country by year (28 August 2002)

Region/country/territory	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Africa															
Nigeria	8	2	2	-	-	-	-	-	-	-	-		-	-	12
South Africa							4	13	9	21	7	6	4	1	65
Subtotal	8	2	2	0	0	0	4	13	9	21	7	6	4	1	77
Previous regional subtotal	*103*	*100*	*196*	*171*	*195*	*135*	*145*	*97*	*149*	*114*	*127*	*95*	*69*	*15*	*1,711*
Regional total	**111**	**102**	**198**	**171**	**195**	**135**	**149**	**110**	**158**	**135**	**134**	**101**	**73**	**16**	**1,788**
Asia															
Hong Kong														1	1
India								6	11	10	2	10	14	4	57
Japan	1				1		41	34	22	15	18				132
Malaysia										1					1
Singapore														1	1
Thailand													2	2	4
Viet Nam										1		1	2		4
Subtotal	1	0	0	0	1	0	41	40	33	27	20	11	18	8	200
Previous regional subtotal	*5*	*28*	*26*	*44*	*30*	*35*	*37*	*37*	*25*	*23*	*34*	*43*	*27*	*1*	*395*
Regional total	**6**	**28**	**26**	**44**	**31**	**35**	**78**	**77**	**58**	**50**	**54**	**54**	**45**	**9**	**595**
Europe															
Belgium	10	1		6	7	6	2	9	22	10	7	12	9		101
Denmark						5	5	1	1	10	3	2			27
Poland											9	3	3		15
Spain							11	34	5	15	14	23	21		123
Switzerland										1	5	33	43	11	93
United Kingdom												9	2		11
Subtotal	10	1	0	6	7	11	18	44	28	36	38	82	78	11	370
Previous regional subtotal	*159*	*403*	*363*	*333*	*283*	*60*	*51*	*110*	*119*	*111*	*129*	*76*	*30*	*1*	*2,228*
Regional total	**169**	**404**	**363**	**339**	**290**	**71**	**69**	**154**	**147**	**147**	**167**	**158**	**108**	**12**	**2,598**
North America															
Regional subtotal	**0**	**452**	**264**	**234**	**172**	**113**	**199**	**220**	**195**	**242**	**201**	**236**	**175**	**0**	**2,703**
Oceania															
New Zealand												7	30	10	47
Subtotal	0	0	0	0	0	0	0	0	0	0	0	7	30	10	47
Previous regional subtotal	*10*	*31*	*18*	*16*	*0*	*0*	*0*	*8*	*0*	*0*	*0*	*1*	*0*	*0*	*84*
Regional total	**10**	**31**	**18**	**16**	**0**	**0**	**0**	**8**	**0**	**0**	**0**	**8**	**30**	**10**	**131**

Region/country/territory	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Total
Central and South America and the Caribbean															
Regional subtotal	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*1*	*0*	*2*
Grand Total	**296**	**1,017**	**869**	**804**	**688**	**354**	**495**	**569**	**558**	**575**	**556**	**557**	**432**	**47**	**7,817**

Data Quality:

As described in CoP12 Doc. 34.1 Annex 1, each seizure entry in ETIS is assessed for data quality through a two-step process that scores the *reliability of source* and the *completeness of data*. Table 3 presents a summary of data quality as of 28 August 2002. The addition of new data has changed the percentage of the overall scores described in the first report only marginally.

Table 3: ETIS data quality summary (28 August 2002)

Source	Completeness score				
Grade	1	2	3	Total	Percentage
A	187	1,811	4,074	6,072	78
B	4	478	1,175	1,657	21
C	5	23	60	88	1
Total	196	2,312	5,309	7,817	100
Percentage	3	30	67	100	

Volume of Ivory Represented in the Seizures Database:

In this report, data concerning the volume of the three types of ivory differentiated in the Seizures Database -- raw, semi-worked and worked -- are presented in 'raw ivory equivalent' values. Missing values in terms of the weight or the number of pieces by ivory type for each seizure have been imputed using the following variables:

i) for raw ivory
estimated weight = $3.65 \times pcs^{1.01}$
estimated pieces. = $0.75 \times wt^{0.6}$

ii) for semi-worked ivory:
estimated weight = $0.41 \times pcs^{0.67}$
estimated pieces = $6.85 \times wt^{0.98}$

iii) for worked ivory:
estimated weight = $0.45 \times pcs^{0.49}$
estimated pieces = $7.24 \times wt^{0.36}$

Further, in order to present trade volumes in raw ivory equivalent terms, all semi-worked and worked ivory weights have been increased by 30% to account for scrap and wastage during the manufacturing process. (These calculations have been used throughout the ETIS reports submitted by TRAFFIC to CoP12).

Table 4: Volume of ivory in 'raw ivory equivalent' values represented by the ETIS data (28 August 2002)

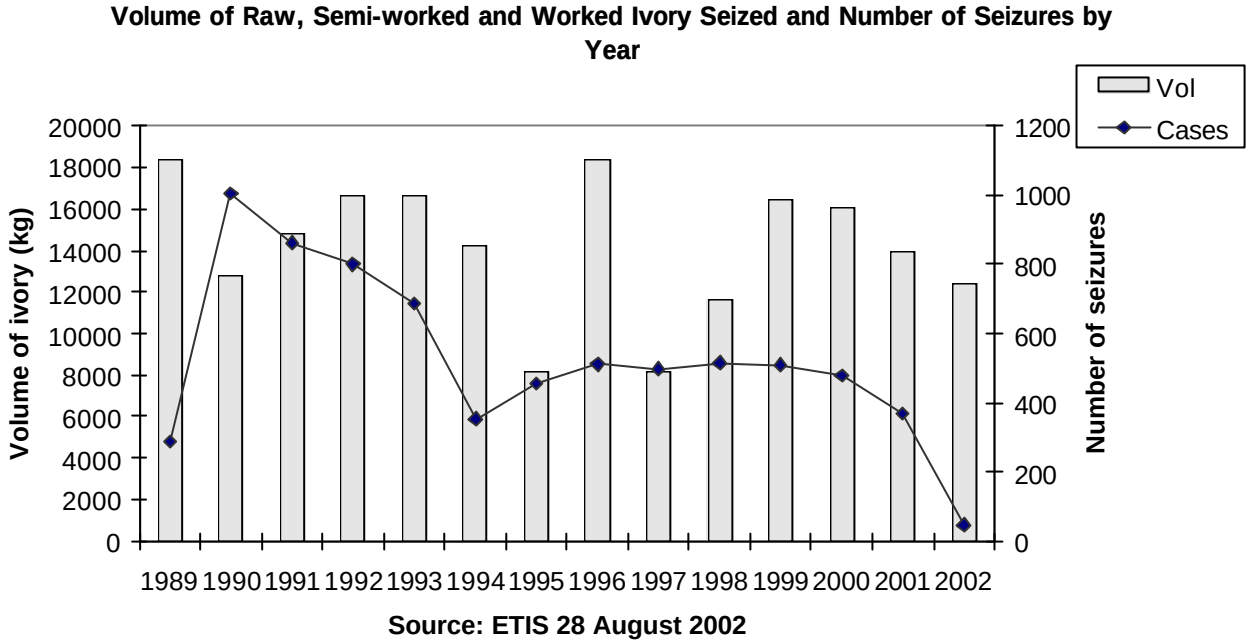
Year	Seizures**	RIW Pcs	RIW kg	SWI Pcs	SWI kg*	WI Pcs	WI kg*	G. Total
1989	288	3,010	17,315	4,128	857	5,087	196	18,368
1990	1,005	1,205	7,149	53,040	2,137	19,024	3,506	12,791
1991	863	2,415	11,642	6,286	695	12,235	2,496	14,833
1992	800	2,383	12,887	2,815	264	9,516	3,475	16,626
1993	687	2,939	13,057	17,195	1,404	6,092	2,175	16,636
1994	353	2,819	12,561	7,430	694	32,563	1,023	14,278
1995	456	1,342	6,675	11,243	495	8,542	964	8,134
1996	511	4,721	15,739	20,338	1,882	3,655	802	18,424
1997	497	1,434	6,991	4,095	517	4,744	607	8,115
1998	514	2,183	9,827	461	110	16,943	1,715	11,652
1999	510	3,302	14,141	1,701	169	8,582	2,121	16,431
2000	478	1,579	14,626	3,514	746	6,375	656	16,029
2001	368	2,657	12,986	324	53	3,440	946	13,985
2002	46	2,106	10,768	40,810	719	341	944	12,431
G. Total	7,376	34,094	166,363	173,381	10,743	137,139	21,627	198,734

*Weight for semi-worked and worked ivory was adjusted to raw ivory equivalent

**Seizures of non-ivory elephant products are excluded

Collectively, the records in ETIS indicate that the equivalent of nearly 200 tonnes of raw ivory have been reported as seized throughout the world since January 1989 (Table 4). These seizures are estimated to represent 34,094 tusks or pieces of raw ivory, 173,381 semi-worked ivory blocks, and 137,139 worked ivory products (Table 4). These data, along with the number of seizure cases for the year in question, are graphically depicted in Figure 1. Readers are cautioned not to interpret Table 4 or Figure 1 as representing absolute trade volumes or as suggestive of trends over time.

Figure 1: Volume of ivory seized and number of seizures (28 August 2002)



Source: ETIS 28 August 2002

Methodology

The basic conceptual framework of ETIS is presented in CoP12 Doc. 34.1 Annex 1. To review briefly, by definition, ETIS will never be able to provide estimates of the absolute volume of illegal trade in ivory, as the key unknown parameter is the proportion of the amount of illegal ivory in circulation that law enforcement succeeds in detecting. Leaving the issue of bias in the data aside for the moment, it is assumed that the law enforcement data in ETIS responds to *changes* in the overall volume of illegal ivory trade, and measuring these changes over time makes it possible to track trends. Thus, in a basic sense, the trends that emerge from this analysis of the ETIS data are believed to be indicative of the actual volume of ivory in illegal trade over time.

To undertake a trends analysis, the total volume of ivory (raw ivory equivalent in kg) covering the period 1989 to 2001 was assessed. The reason for excluding 2002 from the analysis was that data for that year were incomplete. Without adjustment, the volume of ivory represented by the seizures data in ETIS (as shown in Figure 1 above) is potentially misleading because of a number of factors causing bias. Before estimating global trends, it is necessary for the seizures data to be adjusted to account for these factors. The main sources of bias result from:

– uneven data collection effort between countries and between years;
– variation in law enforcement effort and efficiency; and
– variation in the reporting rate.

There are no obvious direct measurements of these effects, but a number of proxy variables were devised on the basis of available information. The variables used were as follows:

(1) *Uneven data collection*: Over the years, TRAFFIC has actively targeted certain countries in an attempt to collect data on ivory seizures, while at the same time, other countries have reported seizures without any deliberate prompting. For each country and for each year, a data collection score was calculated as the proportion of seizures that result from deliberate targeting.

(2) *Law enforcement effort and efficiency*: For each country, the ratio of the volume of ivory reportedly seized by the country itself to the total volume for all seizures in which the country was implicated, was taken as an indicator of law enforcement effort (and efficiency). This variable undoubtedly also partially accounts for variation in reporting rates. It should be noted that this ratio was found to have useful discriminating power in the analysis of the spatial and static aspects of the ETIS data reported in CoP12 Doc. 34.1 Annex 2. The Corruption Perception Index (CPI), based on the scoring system of Transparency International, was included as an additional indicator of law enforcement efficiency.

(3) *Reporting rate*: As a proxy variable representing further information on rates of reporting, in addition to what is measured by the ratio described above, a measure of the success of each country in submitting CITES Annual Reports was used. This measure was described in the *Rates of Reporting: CITES Annual Reports Database* in CoP12 Doc. 34.1 Annex 1.

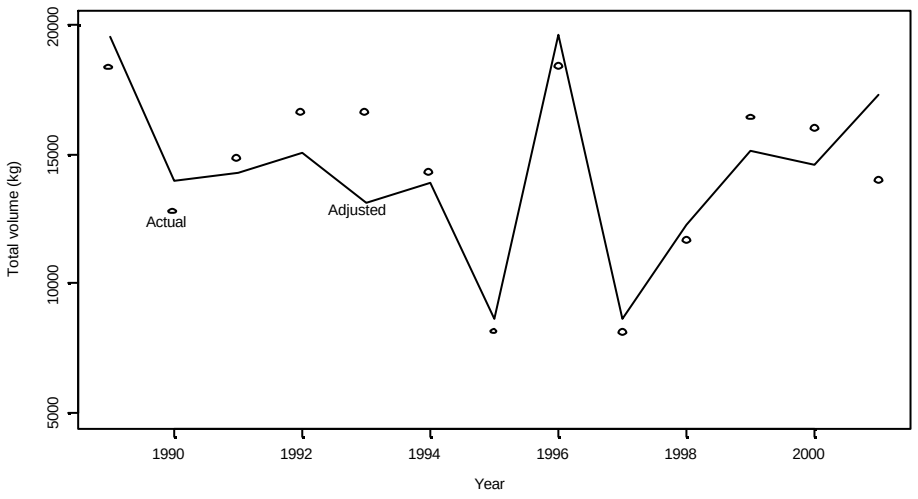
The statistical method used for making the adjustments was to fit a regression model to the volumes of ivory seized for each country in each year, with the above variables as explanatory variables. The estimated effects of these variables were subtracted from the country's total volume. The resulting value is the adjusted volume. The total adjusted volume was obtained by summing over all countries for each year. The regression model was in fact a linear mixed effect model with random regression coefficients (Pinheiro and Bates, 2000). The estimated adjustments were the "best linear unbiased predicators" (BLUPs) of each the variables for each country.

Results

The Unsmoothed Trend:

With the bias removed as described above, Figure 2 shows the adjusted total volume of ivory (i.e. solid line) represented by the seizures data in relation to the unadjusted data points (i.e. circles, which mirror the annual totals presented in Table 4 and Figure 1). As can be seen, the adjusted volume of ivory falls below the actual totals in 1991 through 1994, and in 1999 and 2000; this corresponds most directly to the fact that, during these years, targeted data collection efforts were made in a range of countries. The reverse influence is seen in other years where data collection for ETIS was more passive. In these years, particularly 1989 and 2000, the adjusted total volume of ivory is greater than the actual total volume of ivory represented in the Seizures Database as depicted in Table 5 and Figure 1.

Figure 2: Adjusted and unadjusted volume of ivory in 'raw ivory equivalent' values represented by the ETIS data (28 August 2002)

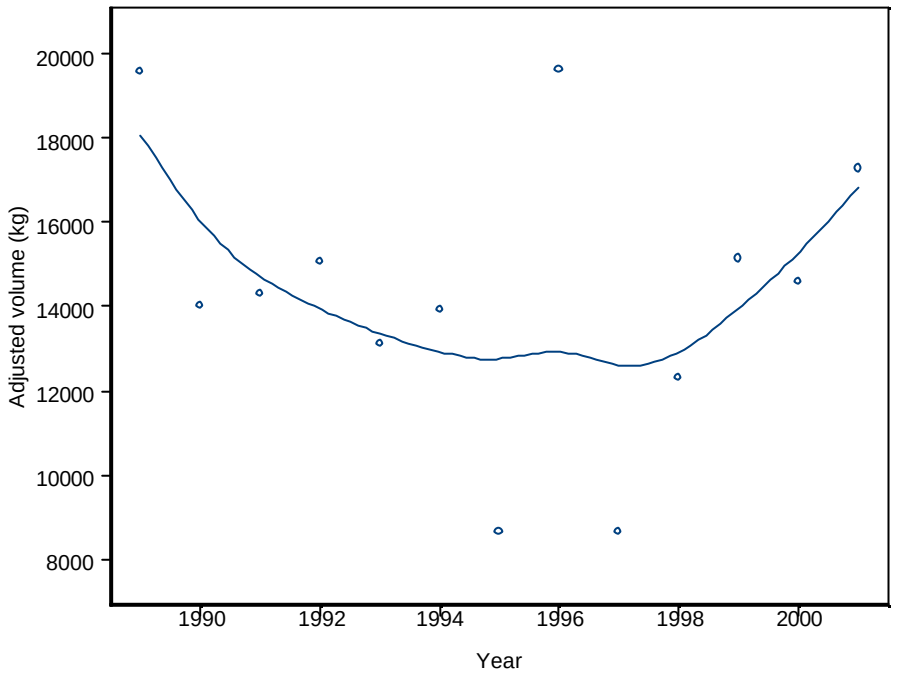


In Figure 2, a general decline in the volume of ivory seized globally is seen between 1989 through 1995. In fact, the actual decline is probably much sharper in view of the fact that the number of ivory seizure cases reported to ETIS for 1989 is the lowest for any year assessed in the trends analysis (Table 4); in other words, more data would certainly push the volume of ivory seized that year considerably higher up the scale. The downward trend from 1989 is fairly consistent until 1996, when the volume of seized ivory rose abruptly to the highest point reflected in the data, a level slightly higher than the volume found in 1989. The following year, 1997, the volume of ivory seized precipitously dropped to the lowest level found in the data for the period under consideration. From that point, the adjusted trend line shows a generally persistent increase upwards through 2001.

Smoothing the Trend:

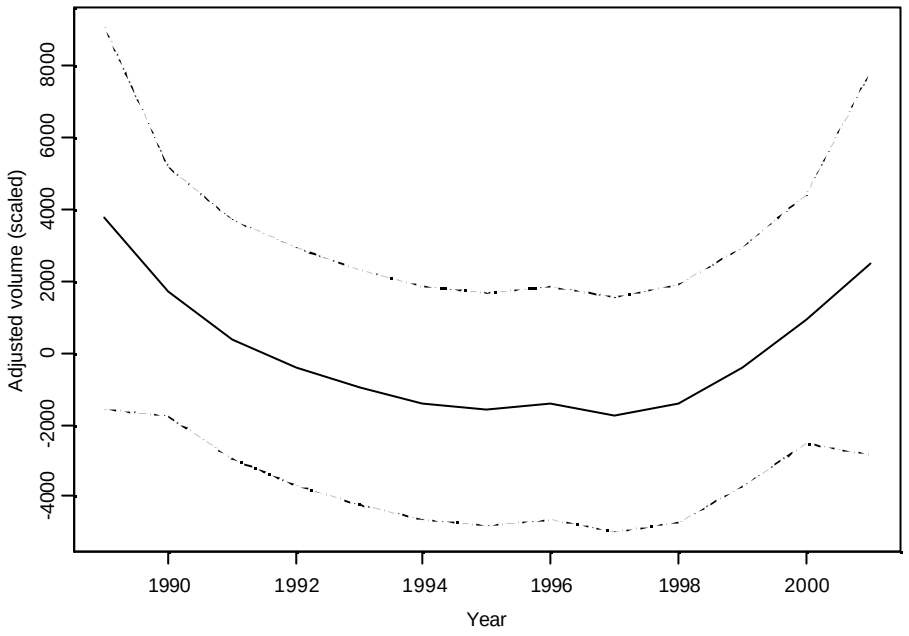
The underlying trend is somewhat masked by the severe fluctuations from year to year, especially between 1995 and 1997. Using 'smoothing' techniques, an estimate of the trend is shown in Figure 3 below, which was obtained by fitting a generalized additive model with a cubic spline (Chambers and Hastie, 1992).

Figure 3: Smoothed adjusted trend line and actual volume of ivory (28 August 2002)



In Figure 4, the same smoothed trend line is presented together with approximate 95% confidence limits. The interpretation is roughly that we can be "95% confident" that the true underlying trend lies between these two limiting curves.

Figure 4: Smoothed adjusted trend line (scaled) +/- 2 standard errors (95% confidence interval) (28 August 2002)



Discussion

Assessing the Trend: The View of Economists vs the Issue of 'Signals'

In 1989, at the time the decision was taken to transfer all African Elephant populations to Appendix I and prohibit all international commercial trade in ivory, there was much discussion about the ultimate impact of the trade ban. Pointing to econometric modeling of the effect of trade bans associated with other commodities of high economic value, some economists argued that ivory trade volumes would initially drop rapidly and markedly in the face of the CITES trade ban. Over time, however, if demand for ivory persisted, it was predicted that illegal trade would steadily increase, irrespective of the ban, as new sources of ivory became subject to exploitation and new trade routes and markets developed (Barbier *et al*., 1990). Thus, it was argued that "*the positive impact of the ban should be felt only once, and only at the outset of the ban; thereafter, this gain will be chipped away at by the illegal traders*" (Barbier *et al*., 1990).

An alternative explanation holds that the listing of all elephant populations in Appendix I of CITES is itself the key to successful elephant conservation (Anon, 1994). This view asserts that the CITES trade ban on ivory was a global public awareness phenomenon that successfully reduced ivory demand, prices and elephant poaching. It further holds that proposals or decisions to transfer any elephant populations from Appendix I to Appendix II, or to allow conditional trade arrangements for elephant products, undermine and threaten the success of an Appendix I listing by signaling to international ivory syndicates that trade will soon open. Thus, the issue of 'signals' under CITES has featured in the elephant debate since 1989.

Unlike the predictive model described by the economists above, the issue of 'signals' relies on perceptual and motivational factors which are unobservable and for which proxy measures are nearly impossible to obtain. This presents a challenge for the purposes of modeling data to test this hypothesis. Further, while the econometric model, based on market forces, holds that an upward trend is inevitable if demand for ivory remains, the 'signals' argument most directly relates to CITES events, with some arguing that even the act of

submitting downlisting proposals has the effect of stimulating elephant poaching and illegal trade (Menon *et al.*, 1997).

In this regard, it needs to be noted that proposals to transfer elephant populations from Appendix I to Appendix II have been a feature at every single Conference of the Parties since 1989. These meetings were held in March 1992, November 1994, June 1997 and April 2000, however, the proposals themselves were in the public domain by October 1991, June 1994, January 1997 and November 1999, respectively. Three elephant populations were accepted for transfer to Appendix II in June 1997, a decision which took effect in September 1997, but trade in ivory was not authorized until February 1999, ivory auctions held in Africa in April 1999, and the ivory delivered to Japan in July 1999. Finally, it is not clear from those who articulate this argument whether the impact of such 'signals' will be realised immediately or otherwise in terms of increased illicit trade in ivory. Equally, it is also possible that the 'signal' becomes translated into one of increased vigilance on the part of law enforcement authorities and that heightened awareness about CITES interactions leads to more ivory seizures. Given the frequency of events under CITES, however, it can be argued that there have essentially been 'signals' of one sort or another throughout the entire period.

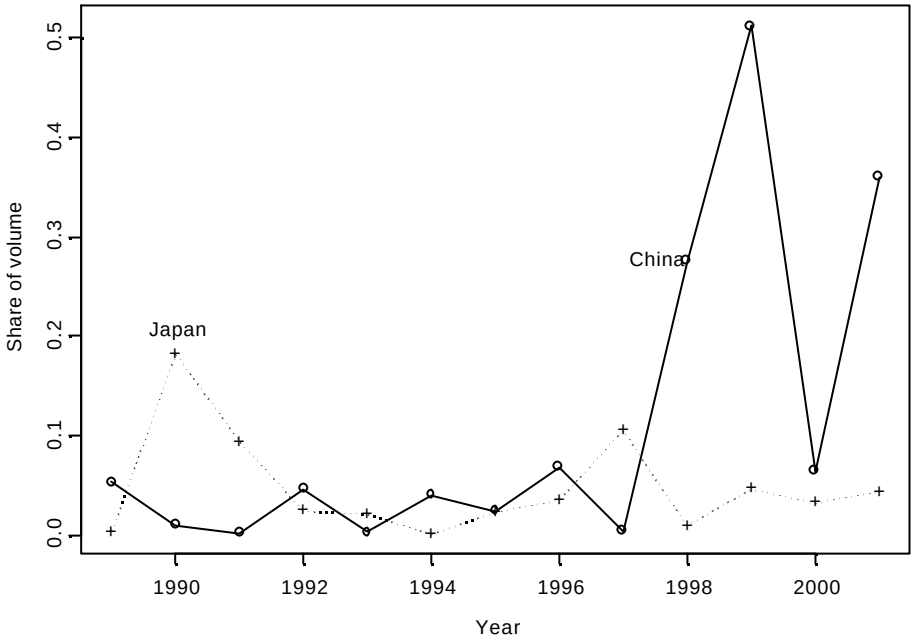
In general terms, the smoothed adjusted trend in Figure 3 lends itself most readily to an explanation based upon the general model described by the economists above. In the first instance, the CITES trade ban gave rise to far reaching national policy interventions and law enforcement initiatives throughout the world directed at the imposition of trading restrictions and the interdiction of ivory. This had the direct effect of shattering pre-ban ivory trading structures from source to end-use market, producing a declining pattern of ivory trade volumes as represented by the ivory seizure data in ETIS. This pattern is reflected in the adjusted and smoothed trend above where a downward trend is clearly evident from 1989 to 1994 (Figure 3). But demand for ivory clearly remains active and any further decline is arrested at that point. Over the next four years, a relative period of stability at the 1994 level is seen until, from 1998 onwards, the volume of ivory seized begins to increase again. This development reflects the emergence of new sources of demand for, and supply of, elephant ivory.

With respect to the 'signals' argument, it is perhaps best to look at the unsmoothed adjusted trend in Figure 2 to get a more vividly nuanced view of illegal trade dynamics during the period under consideration. Although there is a general trend downward through 1995, there are slight increases in 1992 and 1994, years in which CITES Conferences of the Parties were held. In 1997, however, the year the Parties agreed to transfer three elephant populations to Appendix II, ivory seizures reflect the lowest level of trade. Thereafter, there is an upward trend through 1999, the year ivory is actually traded under a CITES-approved arrangement, but a slight decrease in the volume of seized ivory is noted in 2000, the year another elephant population was transferred to Appendix II. In summary, the pattern noted in 1992 and 1994 is seemingly reversed in 1997 and 2000, and does not remain entirely true to the logic of the 'signals' argument. That said, the general upward trend since 1998 is noteworthy and needs to be carefully examined in the context of demand and supply dynamics.

Factors Behind the Trend: Looking at Demand

With respect to the demand side of the equation, the impact of China emerges as the single most important factor behind the upward trend in illicit trade in ivory from 1998 onwards. As demonstrated in the cluster analysis presented in CoP12 Doc. 34.1 Annex 2, of all countries identified in the ETIS data, China stands out as the country of primary importance in terms of its current role as a large-scale, unregulated end-use market for illegally-traded ivory. To further illustrate the temporal aspects of this development, Figure 5 presents China's share of the total volume of ivory represented by the seizures data, in contrast to the influence of Japan, the only end-use market designated for legal trade under the auspices of the CITES one-off sale of ivory in 1999.

Figure 5: China's and Japan's share of the total volume of ivory represented by the ETIS data (28 August 2002)



As can be seen, China's role as a destination for illegal consignments of ivory was fairly minor from 1989 through 1997. Thereafter, however, China emerges as the single most important destination for ivory that has been seized and reported to ETIS. In 1999, for example, China alone is identified as being involved in over 50% of all ivory that was seized that year throughout the world (Figure 5). In fact, the influence of China is so great during this period that it alone essentially explains the upward trend in illegal trade in ivory since 1998. Put another way, if the seizures data associated with China were excluded from the analysis, the trend line would be markedly altered, becoming essentially flat in the most recent years. In sharp contrast, Japan, once the world's leading consumer market for ivory, exerts minor influence on the trend when contrasted with China. As shown in Figure 5, Japan's greatest impact was in 1990, shortly after the CITES trade ban, but has remained at a fairly consistent low level ever since (although recent developments with respect to a large seizure in Singapore allegedly involving Japan may alter this finding somewhat in future analyses).

Other recent studies of China's importation of natural resources illustrate similar patterns, including the importation of tropical timber where a similarly steep upward trend has been sustained by China since 1997 (Adams and Castano, 2002). Simultaneous with this development, Japan's tropical timber imports are declining, consistently losing market share to China (Adams and Castano, 2002). While the upward trend in Chinese timber imports also certainly relates to specific policy initiatives that limit harvesting operations nationally, developments in other sectors of China's economy provide further evidence of emerging consumptive patterns. For example, retail sales of jewelry in China, a trade category closely associated with ivory, increased five fold from USD 360 million in 1994 to over USD 1.85 billion in 2000 (O'Connell-Rodwell and Parry-Jones, 2002). In many respects these patterns of trade and consumption are not surprising given China's remarkable performance in terms of economic growth over the last decade, at a time when Japan's economy is faltering badly.

From 1989 to 2000, gross national product (GDP) grew by 3.15 times and gross national income (GNI) increased 2.5 times in China (Anon, 2002), perhaps the best performance of any country in the world given the scale of the Chinese market. This has all occurred in the context of China's transition from a centrally planned economy to a system based largely on free market forces (O'Connell-Rodwell and Parry-Jones, 2002).

Other studies have concluded that Chinese demand for ivory products appears to be growing rapidly against a backdrop of an expanding economy and middle class (Anon., 2000). The emergence of China as a paramount consumer of ivory is thus linked to the growth in the private retail sector and a surge in consumer purchasing power (O'Connell-Rodwell and Parry-Jones, 2002).

Ivory has a strong traditional value within China, and there is little doubt that the remarkable expansion of disposable income has made the commodity suddenly affordable to large sectors of the world's largest population over the last few years. In 1989, ivory name seals, used in China in lieu of signatures, were four times more expensive than those made of stone and twice the retail value of seals fashioned from jade (Laurie, 1989). With the ongoing growth in personal income noted above, coupled with the fact that raw ivory prices have dropped appreciably in comparison to the pre-CITES ban period (Martin and Stiles, 2000), ivory name seals and other products have now become more affordable to larger segments of the population than ever before. Surveys conducted in China's prosperous coastal provinces in 1999 found that Chinese were personally consuming more ivory due to the country's growing economy (O'Connell-Rodwell and Parry-Jones, 2002). At the same time, expanding economic linkages with Africa, and the presence of ever-growing numbers of Chinese nationals on the African continent, allows for direct access to ivory sources (O'Connell-Rodwell and Parry-Jones, 2002). Various studies in the past have documented the advent of Asian-run, but Africa-based, ivory processing operations that produce and ship a variety of small ivory items to the Chinese market (Dublin et al., 1995). As a result of these factors, trade in ivory is currently, and for the foreseeable future, a growth industry in China.

In sum, the influence of the Chinese market is the single most important factor behind the observable change in the trend in ivory seizures in recent years. Implicit in such a finding is the fact that the influence of other factors greatly diminishes in the face of this explanation. In this regard, it would be difficult to relate the changes in the trend to the listing of certain elephant populations in Appendix II of the Convention or the one-off experimental sale of ivory between three southern African countries and Japan, unless it can be demonstrated that these events were the major influence in determining China's demand for ivory during this period. Further modeling of the seizure data in ETIS against China's economic growth and other variables could result in statistical clarification of this issue, but such work was not possible in the scope of this analysis and will be conducted separately in the future.

In the meantime, it is worth noting that recent observations in other Asian ivory markets concluded that "*not a single shop owner nor vendor…in South or South East Asia mentioned these official sales in southern Africa to the investigators because they either did not find them significant or more likely had never heard of them. Thus, the auctions* [the approved one-off ivory sales under CITES] *did not cause the ivory trade to increase in South and South East Asia, as had been feared*" (Martin and Stiles, 2002). It is, however, appreciated that the situation in other parts of Asia may not reflect what is going on in China adequately, so this issue needs further examination with respect to China.

Factors Behind the Trend: Looking at Supply

If demand for ivory is increasing, where is the supply coming from? In terms of understanding contemporary dynamics of supply, the events of 1996 bear deeper scrutiny and are perhaps indicative of one of the principal explanatory reasons. As previously indicated above, in 1996, the volume of ivory seized rose sharply to the highest level found in the ETIS data (Figure 2). In fact, three seizures alone, all of which occurred in Tanzania at the port of Dar es Salaam, accounted for 9,007 kg of the 18,424 kg -- or nearly 50% -- of ivory seized that year. While the final destination of these extremely large consignments remains unknown, in terms of source, circumstantial evidence has linked these shipments to armament deals to support various militia factions involved in the ongoing conflict in eastern and northern parts of the Democratic Republic of Congo and neighbouring countries (S. Pillinger, pers. comm., 1996). This contention is further supported by evidence of ongoing and large-scale elephant poaching in this African sub-region (Barnes *et al.*, 1999; Mubalama and Mapilanga, 2001), and the simultaneous emergence of Uganda as a country of important significance in the illicit trade in ivory over the last few years (see CoP12 Doc. 34.1 Annex 2). The role of Burundi, another country identified in CoP12 Doc. 34.1 Annex 2, as a source of ivory is also related to this conflict. Burundi has no indigenous elephant population and in the pre-CITES ban period functioned as a major conduit to

international markets for ivory of illicit origin (Luxmoore et al., 1989). Elsewhere in Africa, background elephant poaching continues to be documented, but not on a scale to sustain repeated, large-scale shipments of ivory.

Conclusions

This analysis of the temporal and dynamic aspects of the ETIS data has served to address the first two objectives for ETIS mandated by the CITES Parties in Resolution Conf. 10.10 (Rev.). In terms of measuring *"levels and trends, and changes in levels and trends, of illegal...trade in ivory"* and *"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"*, the following conclusions can be made:

– The seizures data in ETIS, when adjusted to remove bias and smoothed to indicate more clearly the underlying trend, show a declining trend in the volume of ivory seized worldwide during the period 1989 to 1994, a period of stability between 1994 through 1998, and an increasing trend from 1998 to the present. This trend is indicative of the model outlined by a number of economists at the time the trade ban under CITES was imposed.

– The change in the observed trend, specifically the upward trend since 1998, is most directly related to the emergence of demand for ivory in China. The influence of the Chinese market is the single most important reason for upward trend from 1998 onwards. This result mirrors similar developments for other aspects of China's trade in natural resources and retail sales of luxury products, for example, tropical timber and jewelry. In this regard, the upward trend is believed to relate to sustained economic growth and the expansion of disposable income as the country moves from a centrally-planned economy to one based upon free market forces. The influence of China on illicit trade in ivory is likely to grow in the face of a continuing strong economic performance.

– Because the change in the observed trend is explicitly explained by the China factor, it is an implicit finding that other factors have exerted a minimal influence in comparison. This study has not been able to detect that change in the listing of elephant populations in the CITES appendices and the one-off legal trade in ivory under CITES are important explanatory variables for the trend. It is believed that further analysis of the ETIS data in conjunction with economic variables and other factors will support this conclusion.

– While not directly observable through this analysis of the ETIS data, circumstantial evidence indicates that the conflict in the Democratic Republic of Congo, which involves a number of neighboring countries, particularly Uganda and Burundi, stands behind the increasing supply of ivory for international consumption.

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