Comment

Use of the Taxonomic Serial Number (TSN) as a Required Data Element in International Wildlife Trade: Response to Fragoso and Ferriss

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Introduction

In Gerson et al. (2008) we suggested that the Harmonized Commodity Description and Coding System (HS) is not adequate on its own as a means for customs and other authorities to monitor and control international wildlife trade. We thus recommended that an additional data element be considered to complement the HS, that is, the adoption of the Taxonomic Serial Number (TSN) developed by the Integrated Taxonomic Information System (ITIS) as a required data element on customs commercial trade documentation for wildlife trade. For this to be effective as an international, standardized monitoring tool, we suggested that government and nongovernment organizations, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), adopt the TSN as a permanent, unique identifier for taxonomic names.

Fragoso and Ferriss (2008) focus their discussion of our proposal on the monitoring of particular species in international trade for conservation purposes. The intention of our paper was the proposal of a monitoring tool that could provide greater knowledge of species in trade, facilitate trade, support efficient trade controls for wildlife, and provide an effective means of sharing species trade data among government and nongovernment agencies. Such a mechanism would allow for monitoring of species of known conservation concern and species whose conservation status is unknown or for which more information about trade and markets is required. Having significant, combined experience in customs, risk assessment, border enforcement, CITES, and taxonomic classification, we argue that the effort required to extract species-specific information through the use of a species data element, that is standardized, harmonized, and coded will be significantly reduced from that currently required. It is because there are millions of shipments of unidentified species processed by customs officers, who without significant improvements to reporting requirements and systems cannot determine admissibility of those species, that we have proposed the use of the TSN.

Effectiveness

A major obstacle associated with assigning HS codes stems from the difficulty of applying HS codes to the broad range of commodities for a given species. Ramin (*Gonystylus* spp.) is illustrative of this point. Examples of ramin products imported into Canada and their respective HS codes are as follows: wooden dowels (HS4409.20); wooden picture frames (HS4414.00); wooden cribs (HS9403.50); and billiard cues (HS9504.20). A taxonomic code for ramin when complemented

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with the HS code for the product would adequately encompass all of these cases. We recognize there will be a relatively small number of products that may not be successfully coded as to species.

Many web-based taxonomic classification systems attempt to encompass the world's biodiversity (e.g., Catalogue of Life, Global Biodiversity Information Facility, Encyclopedia of Life) and, for the most part, are connected to ITIS. The capability of harnessing information on species in trade is growing; the TSN would allow customs authorities to make use of these developing databases. Our proposal would allow for the identification of species that are aggregated in a single item or in situations where there is a mix of species (e.g., mixed hardwoods) by allowing for multiple taxonomic codes or scientific names at taxonomic levels above species. The herbal remedy example of Fragoso and Ferriss could be accommodated by requiring a TSN for each ingredient.

Accuracy

The reasons for the inaccuracies described by Gerson et al. (2008) are related to the incorrect application of HS codes to wildlife and to the broad, informal taxa that the importer can use for most HS codes (e.g., ornamental fishes). The problem is not generally with taxonomic identification by the trader. Most traders know what species they are importing and exporting because the value of a wildlife commodity depends on the species. Even when common names are reported, the importer, when questioned, knows whether they are importing European sea bass (*Dicentrarchus labrax*) (HS0303.77) or Chilean sea bass (*Dissostichus eleginoides*) (HS0303.62).

In the ornamental fish trade, fish species are generally adequately identified on commercial invoices by scientific name, each associated with a price. Frequently included in the same shipments are aquatic plants, amphibians, and invertebrates, all described by scientific names but coded as ornamental fishes (HS0301.10). Accuracy with respect to taxa (e.g., plant vs. animal) would be greatly improved if the TSN was reported for each species in a shipment to complement the HS code. The ITIS assigns a unique TSN to each scientific name—one species, one TSN. The HS is a product-based classification system—one species, multiple HS codes. The HS codes provide too much room for interpretation; TSN codes do not. Reporting of both the TSN and HS for a given species would increase accuracy.

Efficiency and Effort

The monitoring of all species in trade results in greater efficiency, allowing for risk management for a broad range of taxa and implementation of controls for particular species. Any redundancies in reporting will be eliminated once systems are developed and refined by all parties involved.

Hundreds of thousands of species in millions of transactions per year are already reported to customs authorities, whether they are imported, exported, or re-exported, but the data are not available in an electronic coded format and, thus, are not easily accessible. Great effort is currently required to extract species data from customs documentation. For example, Fisheries and Oceans Canada (DFO) requires data on live fish species imported into Canada to conduct risk assessments for potential aquatic invasive species. Consequently, DFO and Canada Border Services Agency conducted an inventory of 1 year of live fish imports into Canada by recording in a database both coded customs information (e.g., country of origin) and species data, the latter manually retrieved from commercial invoices. The study revealed approximately 2500 fish species and close to 30 million individuals identified from more than 4250 transactions (B.C., N.E.M. & H.G., unpublished data). It took 2 years and significant resources to complete the data entry. Had the TSN been in use, retrieving the data would have required minimal effort. In the United States, most live fishes imported are not identified to species level, thus increasing the effort required to conduct risk analysis and screening for invasive fishes (Smith et al. 2008).

Regarding the relevance of re-export data to sustainability of trade, such data can provide important information to decision makers. When species are harvested illegally in one country, processed into products in a different country, and re-exported to market countries (e.g., merbau, *Intsia* spp.), controls become progressively more difficult (Telepak & EIA 2005). Putting the onus on the trader to report at the species level makes the trader more responsible for assuring that the commodity was legally harvested at origin.

Skill

Increasingly a larger fraction of the duties of customs border officers is the inspection of agricultural commodities and safeguarding of animal and plant health (CBSA 2005; CBP 2008). Even with these changes, border officers are not expected to recognize and register scientific names on customs documentation.

Adoption of the TSN will aid and simplify the duties of border officers. The benefits will start with the traders, who will be required to report scientific names and, thus, have to become more knowledgeable about wildlife trade controls and permit requirements. Use of the TSN will allow traders to set up their systems to automatically flag regulated species. Customs authorities will use the TSN

similarly to enhance targeting and referral capabilities. General species trade data can be shared with authorities responsible for assessing risk and tracking and for intelligence purposes. Computer-automated resolution of taxonomic names could be developed to incorporate the TSN as a link to web-based classification systems and assist customs authorities with processing, facilitating, and controlling imports and exports. Verification of questionable and difficult taxonomic identifications will continue to be the responsibility of wildlife experts.

Nomenclature and Purpose

Nomenclatural complexities would not be an issue for the majority of taxa in trade. Customs authorities will not maintain the taxonomic codes; that will be the responsibility of ITIS, which links TSNs for synonyms. As scientific names change, data can be converted to new names; a well-designed system can accommodate these concerns.

The CITES decisions to monitor specific groups such as sea cucumbers and sharks include recommendations to support the use of harmonized codes for reporting international trade in these taxa. As we previously pointed out, use of the HS as a means of monitoring is riddled with problems from the length of time required to create HS codes to the inaccuracies of HS code reporting for wildlife. In addition, species-specific data may sometimes be more important to ascertain than broader taxonomic data with regards to sustainability of trade and enabling admissibility decisions by customs. For example, only three shark species are listed in CITES. How are border officers to determine whether CITES controls apply if traders are not required to provide coded species names for shark fin?

Discussion

The suggestions to use contextual information and legal instruments, such as additional CITES listings and the European Union's Annex D of Council Regulation (EC) No. 338/97 (Fragoso & Ferriss 2008), places the onus on the trader to report only specific species in trade to customs and becomes cumbersome as species are added and deleted. These suggestions are impractical because they rely on the status quo, which we have demonstrated does not adequately address monitoring and controls (Gerson et al. 2008). Targeted legal instruments to record transactions only for species of concern would leave officials in the dark about numerous other species for which there is limited knowledge. Legal instruments may take lengthy periods to implement, resulting in a loss of valuable time when there are conservation concerns.

The suggestion by Fragoso and Ferriss to establish harvest management or certification schemes is one we endorse as effective conservation action. Nevertheless, use of the TSN to report species in trade would complement these schemes and provide enforcement authorities with enhanced capabilities of distinguishing legal trade from illegal trade.

Fragoso and Ferriss also suggest a reporting system that identifies relevant regulatory instruments, such as a tick box on customs forms for declaration of CITES-listed species. The trader must be aware of what species they are trading to know if the species are protected by such instruments. Thus, why not simply indicate the scientific names (TSNs) on customs documents and have the system recognize the regulatory instruments? The approach suggested by Fragoso and Ferriss would not prevent the need to report mandatory taxonomic information for all wildlife transactions. Such a requirement leaves the trader responsible for identifying the applicable regulatory instruments. In our experience traders and their customs service providers are not always knowledgeable about such requirements.

The Global Marine Aquarium Database (GMAD) contains standardized, accessible data on individual marine species in trade. As the Web site indicates (GMAD 2007), company sales records (often paper copies of invoices) are frequently the only source of species information for species not recorded under any other process. Data gathered from companies are converted, formatted, and standardized. This is exactly what we are proposing—converting, formatting, and standardizing data from invoices. We argue that it is indeed a wasted opportunity not to take advantage of the species data already routinely reported to customs authorities.

Border crossings are control points for customs authorities and other agencies. Traders are required to report and describe all goods in international trade to customs. Thus it would appear that the most practical, efficient means of capturing the vast quantity of useful information on species in trade is to require the mandatory reporting of scientific names as a coded data element. The TSN is most suitable for this approach.

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