



## Illegal domestic bird trade and the role of export quotas in Peru



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### ABSTRACT

Legal international trade of wild animals is controversial because some experts speculate that it facilitates illegal domestic trade in source countries. Wild-caught birds are commonly traded as pets, both legally and illegally, for international and domestic markets. We used Peru's native bird trade as a case study to explore the relationship between legal international and illegal domestic trade. Peru's current quota system started in 2001 and is designed to permit limited export of wild-caught birds, while domestic trade is largely prohibited. We surveyed 40 markets in nine cities (March 2007–July 2011), where we examined tabulated government seizure records and export quotas, and compared proportions of native birds with and without quotas in markets and seizures. Sixteen independent variables were evaluated using generalized linear models to explain native bird abundance in the markets and government seizures. We observed a thriving illegal domestic market with 130 native species ( $n = 35,279$  birds) offered for sale; parrots were the most abundant birds. We found no evidence that Peru's current quota system facilitated illegal domestic trade; authorities confiscated birds regardless of their quota status. While the current quota system did not influence market abundance, historic export trade did. Peru's domestic market, and likely other illegal Neotropical bird markets, developed as a consequence of high historic exports, now appears driven, in part, by tradition and which birds harvesters are accustomed to trapping to fulfill domestic demand. Improved enforcement of Peru's wildlife legislation would likely be more effective in decreasing illegal domestic trade than eliminating quotas.

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## 1. Introduction

Exotic animals are popular pets in many parts of the world. Growing consumer demand for these novel creatures drives a complex, lucrative, and often illicit international trade in wild-caught animals (Bush, Baker, & Macdonald, 2014; Christy, 2008; Laufer, 2010). Legal and illegal trade of the same or similar species frequently occurs simultaneously for national and international markets (Cheung & Dudgeon, 2006; Lyons & Shepherd, 2013). Intertwined legal and illegal markets complicate trade regulation, and fuel debate regarding the perceived costs and benefits of wildlife trade (Fischer, 2004). On the one hand, legal sustainable trade

can provide important economic benefits for rural communities and developing nations while conserving wild populations (Broad, Mulliken, & Roe, 2003; Carpenter, Robson, Rowcliffe, & Watkinson, 2005; Cooney & Jepson, 2006). On the other hand, illegal or poorly regulated trade of wild-caught animals can result in over-harvest and threaten populations and species (Nekaris, Shepherd, Starr, & Nijman, 2010; Shepherd, 2010; Sung, Karraker, & Hau, 2013).

Enforcement of wildlife-trade legislation varies among countries, but typically is insufficient in developing source countries (Bennett, 2011; Brack & Hayman, 2002; Nguyen, 2008; World Wildlife Fund/Dalberg, 2012), where control is complicated by the intersection of legal and illegal markets (Fischer, 2004; Natusch & Lyons, 2012; Zhang et al., 2008). Some have suggested that the existence of legal international trade, such as an export quota system, can enable illegal domestic trade in wild-caught animals in source countries (Gastañaga et al., 2010; Herrera & Hennessey, 2007; Pires & Clarke, 2011). A legal quota system may facilitate illegal trade, in part, through falsification of permits,

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deliberate or accidental misidentification of species, and corruption of wildlife officials. While authors debate the pros and cons of international wildlife trade and trade bans (e.g., Burton, 2006; CITES, 2007; Cooney & Jepson, 2006; Gilardi, 2006; Roe, 2006; World Parrot Trust, 2004), few have evaluated the influence of legal export quotas on illegal domestic markets.

Wild-caught birds are commonly traded as pets, both legally and illegally, for international and domestic markets (Alves, Lima, & Araujo, 2012; Herrera & Hennessey, 2007; Shepherd, Stengel, & Nijman, 2012; Tieguhong, Ndoye, & Mpele, 2006; Wright et al., 2001). Despite declining international trade largely due to trade treaties, import bans, and captive-breeding (Jepson & Ladle, 2005; Pain et al., 2006; Wright et al., 2001), almost 40% of threatened birds experience overexploitation from hunting or pet trade (BirdLife International, 2012), and illegal domestic trade of native birds still flourishes in many countries (Regueira & Bernard, 2012; Shepherd, 2010). Legal and illegal trade in wild-caught birds are likely to continue because demand for pet birds remains strong (AVMA, 2012; Jepson & Ladle, 2005; RSPCA, 2006), and wild-caught birds are inexpensive options for international markets and domestic consumers (Alves et al., 2012; Cantú, Saldaña, Grosselet, & Gamez, 2007).

Peru has among the highest avian diversities in the world ( $n = 1780$  species, BirdLife International, 2014a), and many species have legal export quotas and/or are traded illegally for the domestic pet-bird market (Ríos, Riva, & Canaquire, 2008; Shanee, 2012). Domestic demand for wild-caught native birds is high, in part, because they are often less expensive than captive-bred ornamental species and few other legal pet bird alternatives exist (E. Daut, unpublished data). Bureaucratic and financial constraints have stifled development of captive-breeding programs for native bird species in Peru thus limiting legal native bird options for consumers. As such, birds are captured from the wild and illegally offered for sale in traditional animal markets throughout Peru (Gastañaga et al., 2010; González, 2003; Ríos et al., 2008). Trafficked birds range from common species, such as *Brotogeris versicolurus*, to threatened endemics (e.g., *Forpus xanthops*) (BirdLife International, 2014c), and globally endangered species (e.g., *Brotogeris pyrrhoptera*) (BirdLife International, 2014b). Gastañaga et al. (2010) estimated that 80,000–90,000 wild-caught parrots were illegally sold annually to domestic consumers in Peru. Authors noted that seven of the most abundant parrot species offered for sale had export quotas (Gastañaga et al., 2010; Pires, 2014). Better understanding of the relationship between legal and illegal markets should provide valuable insight into whether legal wildlife export quotas facilitate illegal domestic trade.

We used the native pet-bird trade in Peru as a case study to evaluate the relationship between a legal quota system and illegal domestic trade. We first evaluated the numbers of birds recorded in the domestic pet trade through a five-year survey of animal markets and government seizure records (2007–2011). To assess the role of export quotas, we explored differences in proportions of native birds with and without quotas recorded in markets and seizures. We hypothesized that if the quota system facilitated illegal domestic trade, birds with quotas would be (1) more abundant in the markets, and (2) less abundant in government seizures. We then used regression models to evaluate the influence of eight trade and eight biological factors on avian abundance in the markets and seizures.

## 2. Methods

### 2.1. Export quota system and wildlife commercialization legislation

Peru became a party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1975

(CITES, 2014), and published its first formal commercial avian harvest-export quotas in 2001 (INRENA, 2001). The commercial quota system is designed to permit limited legal export of wildlife and wildlife products. The Ministry of Agriculture (MINAG; currently called Ministry of Agriculture and Irrigation), Peru's CITES Management Authority, regulates wildlife commercialization and publishes an annual calendar of commercial export quotas for native wild-caught species (MINAG, 2001). The number of avian species with quotas nearly doubled from 56 in 2001 to 100 in 2011, but the maximum number of potential exports decreased by 7%, from 86,600 to 80,555 individuals over the same period.

During our study, wildlife commercialization for the domestic market was illegal because it typically was performed without appropriate permits and licenses. The Forestry and Wildlife Law regulations (MINAG, 2001) stated that legal trade required a commercial hunting license and annual authorizations specifying the permitted species, number of specimens, time, location and method of harvest, and fees/taxes to be paid according to the published annual commercial calendar (e.g., MINAG, 2011). A transport permit was required for internal movement of wildlife, including a list of the unique tags/bands used to identify each specimen being transported. Regulations also stipulated that a wild animal may only be kept as a pet if it was a permitted (quota-listed) species, the specimen originated from an authorized management area, breeding facility, or a temporary custodial center, and must be properly identified with a tag/band and registered with MINAG. The commercial sale of wildlife was prohibited in public spaces or places not authorized for that purpose, which included all markets surveyed during our study (Congreso de la República, 2000). As a result, all domestic native-bird trade monitored during this study was illegal for one or more reasons. If convicted, wildlife traffickers could go to jail for 3–5 years and fined approximately US\$1400–3200 (Congreso de la República, 2008).

### 2.2. Market survey

Forty animal markets in nine cities were surveyed for pet birds for sale at varying frequencies between March 2007 and July 2011, excluding March–June 2010 (survey directed by P. Mendoza). These cities represented roughly 73% of Peru's human population (INEI, 2014) and seven of the country's 24 political departments (see Fig. 1 for map). We chose these cities because of their known active bird markets with emphasis on source regions (i.e., Iquitos, Pucallpa, Tumbes, and Chiclayo) and because they were major destination markets along the coast (e.g., Lima and Trujillo). Southern cities were not surveyed. Native bird trade has not been observed in markets in southeast Peru despite regular visits throughout the study period (D. Brightsmith, E. Daut & P. Mendoza, personal observations). Cities in southwest Peru with previously reported bird trade were not prioritized because anecdotal evidence suggested that trade had decreased considerably from the past (Ortiz, 2010; C. Ortiz, Asociación Peruana de Ornitología, personal communication), and due to logistical constraints. Prioritizing the main source and destination regions for native bird trade allowed us to efficiently evaluate the composition of the bird trade for domestic consumers.

The primary objective for the market visits was to survey wild animals for infectious diseases, which have potential to concentrate and spread among species (including humans) at crowded, unhygienic market places (Brooks-Moizer, Robertson, Edmunds, & Bell, 2009; Karesh et al., 2012). As such, we did not visit all markets regularly; markets with large numbers of wild animals were prioritized to maximize sample collection. Annual market visits varied from a low in 2007 ( $n = 51$ ) to a high in 2009 ( $n = 516$ ), totaling 994 visits. Markets were identified with help from local informants and in most cases were well-established market places. The majority of

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