

## ORIGINAL PAPER

### Wildlife across our borders: a review of the illegal trade in Australia

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Australian flora and fauna are highly sought for the international black market in wildlife. Within Australia, trade in exotic wildlife supplies avid hobbyists. Using data on wildlife seizures by Australian Customs between 2000 and 2007 and case prosecutions from 1994 to 2007, we assessed the scale and enforcement of wildlife crime in Australia. Most seizures were minor: less than 1% resulting in prosecution of the persons involved. Of cases prosecuted, 46% were for attempted export and 34% for attempted import. Reptiles were targeted most (43%), then birds (26%), and native plants (11%). Seventy percent of prosecutions was a fine only (maximum of \$30,000), consistently less than the black market value of the seized goods. Prison sentences increased from an average of 10 months (between 1994 and 2003) to 28 months (between 2004 and 2007). Formation of the Australian Wildlife Forensics Network and ongoing support from the Australian Federal Police for research into improved options for policing are exciting developments. Priority for effective regulation of legitimate commercial trade and effective policing of illegal trade is likely to increase in coming years as trends toward greater globalisation of commerce continue and restrictions on trade relax.

**Keywords:** wildlife trade; poaching; pet trade; wildlife enforcement; wildlife legislation; Australia

#### Introduction

Australia has such a rich and unique biota that it has gained international recognition as one of the 25 biodiversity hotspots, particularly in the south west of Western Australia<sup>1</sup>. These hotspot regions have been identified based on the large number of species present and the high proportion of species that are found nowhere else in the world (i.e. endemic species). Over 80% of Australian flora and fauna are endemic and it is this very attribute that attracts traders of illegal wildlife worldwide. Illegal trade of wildlife is a serious and growing crime worth more than US \$20 billion dollars per year<sup>2</sup>. Highly organised criminal networks spanning several countries including Australia have been implicated in large-scale wildlife smuggling operations. Such operations are often not only cruel, with many animals dying in the process, but also endanger wild populations because overexploitation to supply the illicit trade can rapidly cause extinction. Exotic species that are smuggled into Australia also pose a significant biosecurity risk because they can potentially establish themselves in the wild and become pests. They can also carry seeds, parasites, and viruses which, if released to the environment, would have devastating impacts on native fauna and flora, and on the agricultural and aquaculture industries.

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Despite the black market commerce in wildlife being of considerable risk to Australia's unique biodiversity and to our industries, there are no recent studies describing the extent of the illegal trade in Australia. Using data from the Australian Customs Service of wildlife prosecutions over the past 13 years, this review describes the extent of illegal trade of wildlife in Australia with a focus on wildlife that is imported into or exported out of Australia. Case prosecutions for illegal trade of wildlife and wildlife products in Australia are typically dealt with by Magistrates Courts and are not reported, so they do not reside on any standard legal databases. Instead, we drew data from the wildlife prosecutions database of Australian Customs Service for the period 1994–2007, and examined the records to assess whether illegal trade operations are on the increase, which taxa are targeted, and the types of penalties they incur. We also describe new technologies, such as DNA technologies, that can be used to provide evidence for prosecutions of illegal trade of wildlife. Finally we suggest future directions of services to detect and provide evidence for wildlife crime in Australia.

### **Australian wildlife legislation**

The Convention on International Trade of Endangered Wild Fauna and Flora (CITES), to which Australia is one of 172 signatories, was established in 1963 and aims to ensure that international trade in wild specimens of plants and animals does not threaten their survival. The CITES agreement provides a framework for signatories to adhere to and to enforce the treaty via their domestic legislation. Animals and plants are listed in three appendices according to their vulnerability of extinction from overexploitation for trade. CITES Appendix I listed species include those threatened with extinction that cannot be traded except under exceptional circumstances. Appendix II species require trade controls to ensure their survival, and Appendix III species are protected in at least one country with assistance required from other signatories to control their trade.

In Australia, adherence to CITES is regulated under Part 13A of the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act). The Act regulates the export of Australian native species (unless identified as exempt), exports and imports of all CITES listed species, and the import of live plants and animals that could adversely affect native species or their habitats. Penalties for breaches of the EPBC Act (1999) are fines up to AUS \$110,000 for an individual or \$550,000 for a corporation, and up to 10 years' imprisonment. In addition, persons may be convicted under State wildlife protection and animal welfare legislation.

Penalties in Australia are more severe than in the US, where the maximum penalty is US\$100,000 for an individual or US\$200,000 for an organisation and up to one year imprisonment for breaches of The Endangered Species Act (1973). Sentences are also more severe than the UK, which has a maximum of 7 years' imprisonment and unlimited fines for breaches of the Customs and Excise Management Act (1979) and the Control of Trade in Endangered Species (Enforcement) (Amendment) Regulations 2005 (COTES).

### **Legal wildlife trade across our borders**

Not all international trade of wildlife in Australia is illegal. Large-scale commercial operations have been established for import and export of wildlife and wildlife products internationally, although the export of live wildlife is effectively prohibited. All commercial operations must be approved by the Australian Government, specifically the Department of Environment, Water, Heritage, and the Arts (DEWHA). Prior to

approval a comprehensive wildlife trade management plan meeting the requirements of the EPBC Act (1999) must be submitted; approvals may be granted for up to five years. To export wildlife specimens a permit must be issued by DEWHA. The permit will only be issued if the specimen is sourced from an approved captive breeding, aquaculture, artificial propagation, or wildlife trade operation. Australia's primary commercial wildlife exports are from commercial fisheries, crocodile farms, native flora, and kangaroo meat from approved harvesting operations. A permit is also required to commercially import wildlife into Australia. Species that are CITES II listed and are ranched or harvested from the wild must be sourced from an approved commercial import program. However, amendments to the EPBC Act made in 2006 (Environment Protection and Biodiversity Conservation Act (amended) 2006), specify that this condition is only required if the species appears on the declared specimens list. This list is subject to change at any time as deemed appropriate by the Minister for Environment. In addition, permits are also issued for imports and exports of wildlife for non-commercial purposes such as for research, education, exhibition, household pets and for personal use.

### **Illegal wildlife trade across our borders**

Attempted exports and imports of wildlife are usually detected by the Australian Customs Service at airports, in the mail system or through raids on properties as a culmination of investigations carried out by DEWHA or State wildlife enforcement authorities. The majority of wildlife specimens detected that are destined for sale in the black market internationally or within Australia are seized by the Australian Customs Service. Customs is the principal agency managing and securing the integrity of Australian borders. They work in close alliance with the Australian Federal Police (AFP), the Australian Quarantine and Inspection Service (AQIS), the Department of Immigration and Citizenship and the Department of Defence.

The total number of wildlife detections and seizures has increased considerably in the past 3 years, with 7533 seizures in 2006–2007, compared to 3902 in 2004–2005 (Figure 1). The majority of seizures of prohibited wildlife imports involve minor breaches and mostly concern processed wildlife products purchased in international markets. Persons involved in minor seizures are typically not aware that the products they are attempting to bring into the country are prohibited. Major seizures are those in which the persons involved are interviewed or where prosecutions are commenced. The proportion of seizures considered to be major has remained at less than 1% of total detections (Figure 2) although there were considerably more major seizures in 2001 and 2002. The increase in the total number of detections since 2004 may be due to increased baggage screening at Australian airports.

The number of prosecutions for illegal trade of wildlife varied from year to year, ranging from 6 cases in 2005 to 14 cases in 2002 (Figure 3). The majority of prosecutions from 1994 to 2007 were for attempting to illegally export native flora and fauna (46%). Attempting to illegally import exotic fauna, flora, and wildlife products contributed to 34% of prosecutions, while for the remaining 20% of cases there was no information available as to whether the specimens seized were native or exotic species<sup>3</sup>. These 'unknown' cases were predominantly seizures of bird eggs where species can be very difficult to identify.

### **Organised crime and wildlife trade in Australia**

Organised criminal networks conducting large-scale illegal wildlife smuggling operations spanning several countries have been detected in Australia. In the most recent case of June

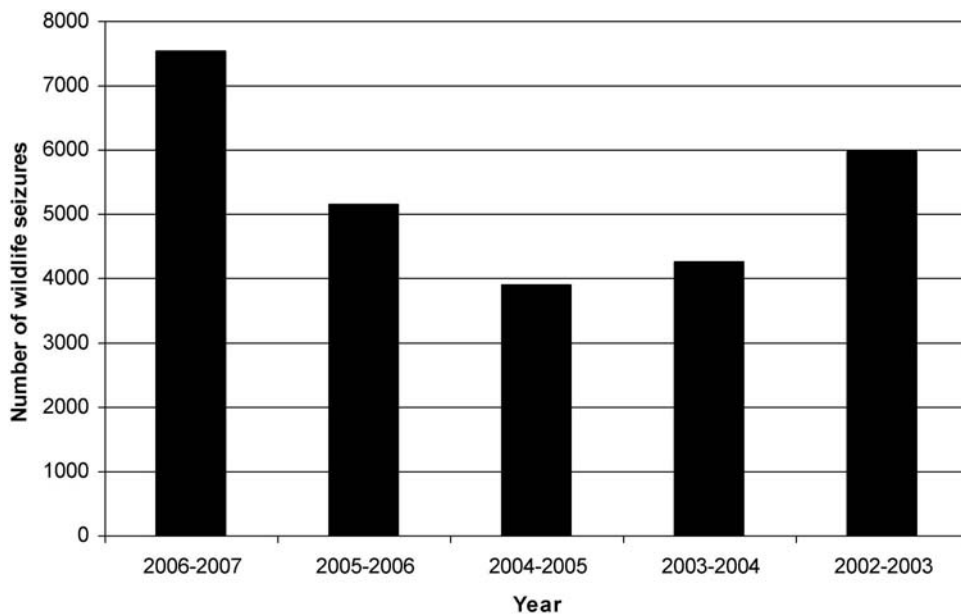


Figure 1. The total number of wildlife seizures reported in annual reports of the Department of Environment, Water, Heritage and the Arts (DEWHA) from 2002 to 2007<sup>45-49</sup>. Reported wildlife seizures include attempted imports and exports of plants, animals and derived products.

2006, a package containing 25 kg of a powder derived from CITES II listed seahorses was seized in New Zealand. Investigations by Australian Customs Service and the New Zealand Wildlife Enforcement Group revealed that the seahorse powder had been illegally imported into Australia from China, and then illegally exported to New Zealand for sale in conventional medicine outlets<sup>4</sup>. In September 2004 an international wildlife smuggling syndicate dealing in reptiles and birds from Australia, South Africa and South East Asia was disrupted when raids were conducted on five rural properties in Queensland, Western Australia, New South Wales and Victoria. The raids followed a seizure of 19 pythons and 52 bird eggs by Customs officers at Brisbane airport<sup>5</sup>. In another case in 2001, six people in the United States, including an Australian connection, were convicted for a million dollar cycad and orchid smuggling operation spanning the United States, Australia, South Africa and Zimbabwe<sup>6</sup>. The covert and sophisticated nature of these operations spanning several countries makes these criminal networks difficult to detect by local authorities.

### **The Internet and the illegal wildlife trade**

The Internet is a convenient medium for illegal wildlife traders to advertise and sell their wares anonymously, and enables direct sales to the buyer thereby eliminating the 'middleman'. In a single week, over 9000 general listings of animals and animal products were found on the Internet by the International Fund for Animal Welfare<sup>7</sup>. For elephant ivory alone, there were 197 listings on eBay Australia, of which only 2 were found to be compliant with wildlife legislation<sup>8</sup>. In excess of 2500 mail packages have been seized at Australia Post Services in Sydney containing commercial weight loss products derived from the CITES II listed Hoodia plant that had been sold over the Internet<sup>9</sup>. In another case in August 2004, a Western Australian person was convicted for attempting to sell, via

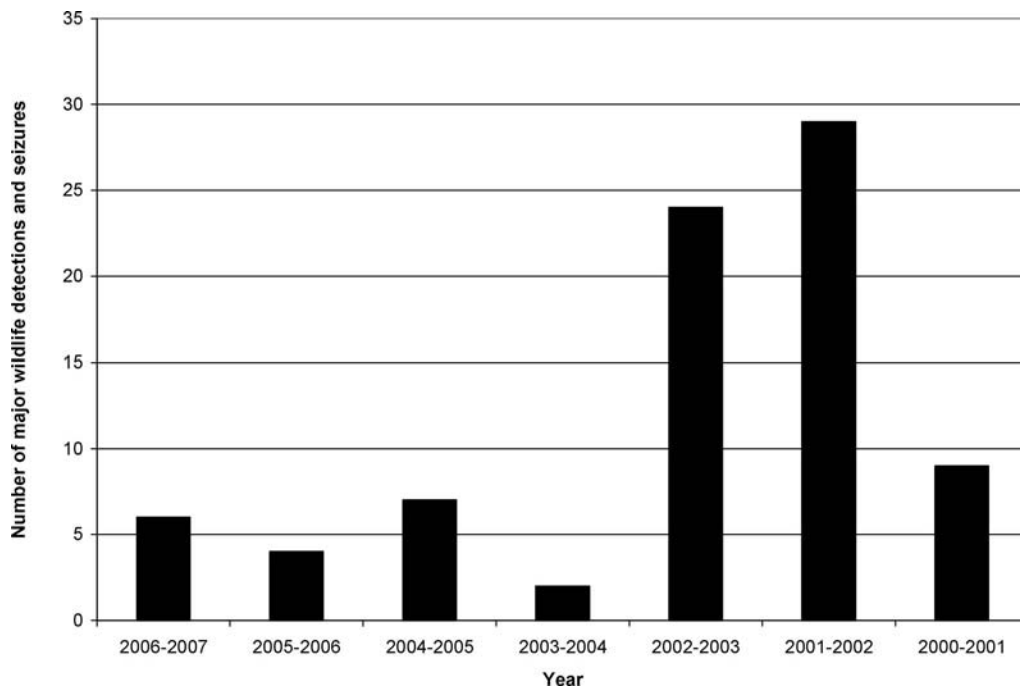


Figure 2. The number of major wildlife detections and seizures included attempted imports and exports reported in annual reports of the Australian Customs Service for 2000 to 2007 inclusive<sup>50-56</sup>. A major find refers to an incident in which the persons involved are interviewed or prosecutions are commenced.

the Internet, endangered CITES II listed Indian star tortoises, *Geochelone elegans*, that had been illegally imported into Australia<sup>10</sup>. The Internet has become the medium of choice for illegal wildlife traders and regular surveillance of popular Internet sites is critical in efforts to curb the illegal commerce of wildlife internationally, and within Australia. However, to our knowledge, Australia does not engage in routine surveillance of the Internet to detect wildlife crime. Surveillance is typically undertaken only in support of specific cases that have already come to the attention of authorities. This is clearly an opportunity for improvement.

### Taxa targeted for the illegal wildlife trade

Reptiles were most targeted group of taxa in our study and were involved in 43% of prosecution cases from 1994 to 2007 (Figure 4), with 21 attempted exports, 22 attempted imports, and 12 cases where the species information was not available. Of the cases that involved reptiles, 24 were for illegal trade in snakes, 21 for lizards, 18 for turtles, and 2 cases where frogs and crocodile products were seized. Many seizures had a mixture of many different species<sup>3</sup>. Reptiles are favoured by illegal traders of wildlife because they can fetch large prices on the black market for pets, and are relatively easy to conceal and transport as live specimens. Reptiles have been found in a wide variety of places including packages in the mail<sup>11</sup>, concealed inside ornaments<sup>12</sup>, toys<sup>13</sup>, books<sup>14</sup> and computer hardware<sup>15</sup>, wrapped in socks<sup>16</sup> and stockings, and stuffed in cigarette packets carried in a specially built vest<sup>17</sup>. The largest reported major seizure of reptiles in Australia occurred in

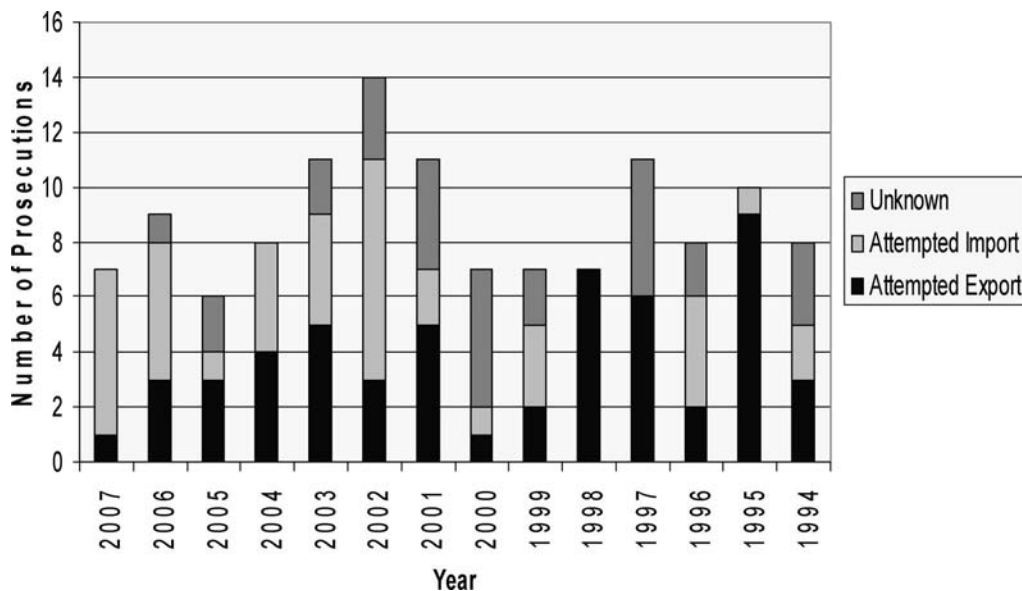


Figure 3. The number of prosecutions involving illegal importation and exportation of wildlife in Australia as reported by the Australian Customs Service in annual reports from 1994 to 2007<sup>50-56</sup>. Unknown refers to cases in which bird eggs were seized and it could not be established whether they were from native or exotic bird species.

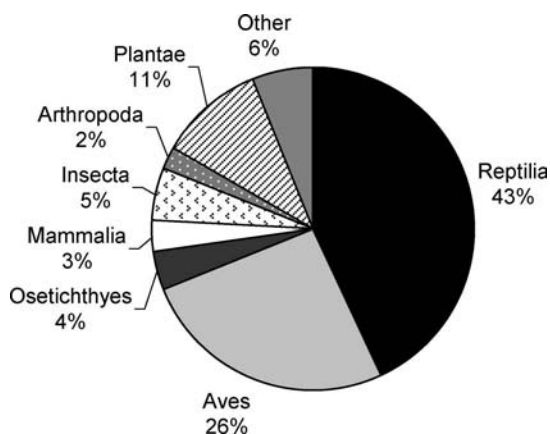


Figure 4. Types of wildlife involved in prosecutions from 1994 to 2007 including both illegal imports and exports from the Australian Customs Wildlife Prosecutions Database<sup>3</sup>.

2003, in which a British national attempted to smuggle 219 reptiles and frogs out of Perth Airport, many of which were rare and endemic to the South-West of Western Australia<sup>18</sup>. In addition, and of considerable concern, several incidences involved the illegal importation of red eared slider turtles, *Trachemys scripta elegans*<sup>3,19</sup>. These turtles are a declared Class I pest under Queensland state wildlife legislation (Land Protection (Pest and Stock Route Management) Act 2002) because they can multiply rapidly and spread in waterways, probably compromising native turtles and other aquatic wildlife<sup>20-22</sup>.

Live birds and bird eggs are the second most common major seizure by the Australian Customs Service accounting for 26% of all case prosecutions (Figure 4). This conflicts with the report of the Senate Select Committee on the Commercial Utilization of Native Australian Wildlife<sup>23</sup> which considered birds as the most common taxon involved in illegal wildlife trade, but we are unsure if this reflects a change in the composition of traded animals since 1998 or results from different methodologies. Certainly, live birds, rather than bird eggs, were more commonly seized prior to 2000 and this may have affected rates of detection. The high mortality rate of live birds during illegal international transport may have prompted a shift to smuggling of bird eggs because they have a lower mortality rate (although it is still considerable) and are easier to conceal under clothing vests specially made for this purpose. Australian parrots are highly sought after by overseas collectors with each parrot egg fetching up to \$30,000. This demand is reflected by the high proportion of attempted exports of native birds and their eggs (62%), compared to only 24% for attempted imports<sup>3</sup>. For 15% of cases involving birds there was no information available as to whether it was an attempted export or import (these cases predate 1997). One of the largest seizures was an attempted export of 31 native bird eggs in 1995, estimated to have been worth more than \$300,000 on the international market<sup>3</sup>.

The trade of wildlife products for sale as complementary medicines is prolific. In 2003, two shipping containers containing 160 kg of illegally imported wildlife products and body parts of endangered tiger, snakes, rhinoceros, pangolin and an endangered plant (*Saussurea costus*) were found by Customs officers during a routine inspection<sup>24</sup>. It is impossible for Customs officers to inspect every shipping container that arrives in Australia and only a very small proportion of the shipments containing wildlife products are likely to be detected. In 2004, there was a crackdown on the sale of prohibited wildlife products with raids conducted by Customs, the Australian Federal Police, and DEWHA on five complementary medicine outlets in Sydney, Melbourne, and Brisbane. Large quantities of illegal imports containing products derived from endangered species were uncovered, including products labelled as bear bile, tiger bone and rhinoceros<sup>25</sup>.

There were also significant prosecutions for attempted illegal export of native flora, especially cuttings of native flowering plants, tree ferns, and orchids (Figure 4). Australia is a biodiversity hotspot for flowering plants, particularly in the South West of Western Australia. Many of these species are endemic, rare, and vulnerable to extinction from overexploitation<sup>26</sup>. Exotic fish are also occasionally smuggled into Australia and present a significant biosecurity threat to our aquaculture industries. Fish are often concealed in elaborate ways, such as in water-filled bags in padded luggage or, in one case, in water-filled plastic bags placed in pockets sewn into a specially built unit worn underneath a skirt<sup>27</sup>. Other fauna that are frequently smuggled are insects, beetles, scorpions and spiders. These are usually smuggled through the mail system, where the majority die during transit. Corals, ivory, hides, teeth, furs, and skins are also routinely confiscated by Customs officers<sup>3</sup>.

### Impacts of illegal trade on Australian flora and fauna

The philosophy of the black market for wildlife where rare and endangered species are valued more than common species promotes overexploitation in these rare species. Demand is driven by rarity, such that when a species becomes scarce the market value escalates, making them even more attractive to collectors despite the greater effort required to collect specimens. This feedback process can rapidly drive species to extinction<sup>28</sup>. Listing of species for CITES and classification of species according to their

level of vulnerability to extinction (i.e. vulnerable, endangered, or critically endangered) has been criticised by some experts because it may promote, as opposed to curb, the illegal trade in species by inadvertently advertising their rarity.

It is difficult to measure the direct impacts of illegal wildlife collections on wild populations of fauna and flora in Australia because it is probable that the majority of illegal harvests remain undetected. A nine-year study of the broad headed snake, *Hoplocephalus bugaroides*, in Morton National Park, New South Wales, demonstrated that illegal collectors have seriously endangered the resident population<sup>29</sup>. Rapid decline of the Morton National Park population in 1997 was most likely caused by increased illegal collection stimulated by an amnesty that allowed permits to be obtained for illegally collected broad headed snakes<sup>29</sup>. Many more such studies are required to assess the direct impacts of illegal harvests on rare and endangered fauna and flora of Australia. In addition, native flora and fauna can also be indirectly impacted by illegal trade resulting in the potential introduction of exotic pests and diseases<sup>30,31</sup>.

### Penalties for illegal international trade of wildlife in Australia

Fines were the most common penalty for wildlife case prosecutions between 1994 and 2007 (Figure 5). Fines are usually much less than the value of the wildlife goods on the international black market. The largest fine to date was \$30,000 for the attempted exportation of 19 parrot eggs in 1998, only half of their estimated black market value of \$60,000<sup>3</sup>. In another case, in August 2005 a Japanese national was charged and fined \$24,600 for an attempted smuggling of 24 long necked turtles (*Chelodina oblonga*) and a shingleback lizard (*Tiliqua rugosa*) via mail to Japan. Of the 24 turtles, 13 died during the attempt<sup>32</sup>. Despite the hefty fine, it was considerably less than the estimated market value of the fauna. The turtle would typically sell for \$1400 and a shingleback for \$4000 in the Japanese black market, making the total seizure worth \$37,600. Fines provide little deterrent to criminals, especially when they are less than the market value of the smuggled wildlife.

Less than one-quarter (22%) of case prosecutions between 1994 and 2007 resulted in a prison sentence (Figure 5). The maximum sentence was 3 years and 6 months

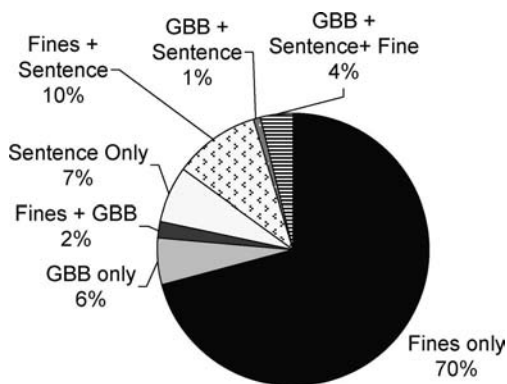


Figure 5. Types of penalties for wildlife case prosecutions from 1994 to 2007 reported by the Australian Customs Service Wildlife Prosecutions Database<sup>3</sup>. GBB refers to a penalty of a Good Behaviour Bond where the defendant is released under strict conditions and non-compliance will result in imprisonment or a hefty fine.

imprisonment for the importation into Australia of 20 exotic reptiles including 6 CITES II listed species<sup>3</sup>. The number of prosecutions which have received a prison sentence has not changed significantly since 1994 (data not shown), but the severity of the sentences has increased. There was an average of 10 months' imprisonment for convictions between 1994 and 2003, compared to 28 months for convictions between 2004 and 2007. Good behaviour bonds have been issued in 13% of all convictions. In these cases, the defendant is released under strict conditions and non-compliance will result in imprisonment or a hefty fine.

Compared to the UK and US, Australia has tougher penalties for breaches against our wildlife legislation, but the penalties that are actually issued for cases of illegal wildlife trade tend to be less severe. In the UK, the maximum sentence to date for wildlife trafficking is 6 years and 6 months imprisonment, which was given for a case involving 22 counts of illegal trafficking of endangered species. The maximum fine issued by the UK was for £125,331 for 3 counts involving 126 rare and endangered orchids<sup>3</sup>. In the US perpetrators have been fined up to \$60,000 for illegal trafficking of wildlife with 71 months imprisonment<sup>34</sup>. Although all cases differ and hence are not directly comparable, the overall trends suggest that Australia's penalties for illegal wildlife trafficking have been less severe compared to the US and UK. Australia needs to adopt a tougher stance on the enforcement of its wildlife legislation by increasing the severity of fines and prison sentences to deter criminals from engaging in wildlife trafficking.

### **Tools to detect, and provide evidence for illegal wildlife trade cases**

Accurate identification of the specimen is critical for the investigation and prosecution of illegal wildlife trade cases, firstly to ascertain whether the seizure was native or exotic, and then to identify whether the specimen is CITES listed. Penalties may be more severe for CITES listed species, in accordance with the EPBC Act (1999), because these species are the most vulnerable to extinction from overexploitation for trade. Morphological examination by taxonomists or experts is usually sufficient for species identification of a specimen, but this can be impossible when specimens are highly processed (such as products commonly found in conventional medicines) or when distinguishing features are lacking (such as for bird eggs). Bird eggs can be incubated and hatched for species identification purposes, but this is time-consuming. Often the eggs are no longer viable because they have been crushed by the perpetrator or mishandled, and if the eggs are of an exotic species they can be a biosecurity risk. Stray feathers attached to the eggs can in some cases be used for species identification<sup>35</sup>, but these techniques have not been developed for the identification of Australian birds. Mammalian hairs also have characteristic microscopic characteristics that can be used for species discrimination<sup>36,37</sup> and can be used to identify most Australian mammals and marsupials (Silvana Tridico, personal communication). When feathers or hairs are not suitable for species identification or the products are finely processed such as in complementary medicines, DNA methods are ideal for species identification. DNA techniques were successfully used to provide evidence for a case in January 2007, in which 23 bird eggs illegally imported from Thailand into Sydney were identified to be two CITES II listed species; the African grey parrot (*Psittacus erithacus*) and the Electus parrot (*Eclectus roratus*), and one rare CITES Appendix I listed species, the Moluccan cockatoo (*Cacatua moluccensis*). These birds were valued at \$250,000 on the black market, and the defendant was subsequently convicted based on the DNA evidence, and sentenced to 2 years' imprisonment and a \$10,000 fine<sup>38</sup>.

In addition to identifying the species, DNA approaches can also be used to identify the geographic origins of a seizure. Identifying the geographic origins of a seizure can be used to distinguish between commercial trade and poaching<sup>39</sup>, identify areas where taxa are most vulnerable to illegal collection<sup>40</sup>, and to repatriate seized animals and plants to their place of origin<sup>41</sup>. Unique DNA profiles can also be generated for individuals. These DNA profiles can be used to determine sex and verify the source of animals held by licensed breeders to ensure that the breeding stock is not being replenished or supplemented with illegal collections from wild populations. DNA profiles that characterise individuals have also been used to estimate the numbers of individuals traded in markets<sup>42</sup>. This technique may also be effective to estimate the numbers of animals that are used in various types of complementary medicines.

### **Future directions for wildlife forensics in Australia**

Wildlife crime in Australia is a low priority, and as a consequence much trade goes undetected. It is not commonly associated with organised crime, seen rather as the domain of individual transgressions, despite strong indications to the contrary. Severe restrictions on commercial trade reduce pressure from that quarter for effective policing, and a blanket ban on live wildlife exports, whether they be rare or common, engenders a public perception that concerns are largely to do with animal welfare. These are primary drivers likely to change over time and increase attention to wildlife crime in Australia, and the development of new more effective tools for regulation of legal trade and policing of illegal trade.

In the case of commercial activity, wild flowers and bush tucker are traded in a growing international market with public acceptance. Kangaroo leather and meat, emu meat, oil and crocodile products are also exported. Export of live native animals, however, is tightly restricted and commercial trade prohibited even for the ubiquitous budgerigar and cockatiel. One can anticipate increasing pressure for the commercial use of wildlife in Australia both under captive breeding programs and in the context of harvesting in the wild. The Northern Territory Government has already moved in this direction, allowing harvest under licence of a wide range of native wildlife species for sale domestically, and a number of reports have evaluated the commercial and potential conservation benefits of trade in native wildlife and wildlife produces<sup>43,44</sup>.

In 1998, the Senate Select Committee on the Commercial Utilization of Native Australian Wildlife<sup>23</sup> raised concerns that protectionist conservation practices are not working well and are expensive while covering only a small proportion of land. The Committee made a number of recommendations to explore a wider range of options for commercial use of native wildlife to achieve more satisfactory conservation outcomes off reserves.

This would include relaxing the tight restrictions against the export of live native species for species that are neither rare nor threatened. We can anticipate an increase in commercial trade in non-CITES wildlife as part of more general agreements on global free trade with attendant greater attention to the issues of regulation of that trade to protect wild populations, and increased pressure for more effective policing both domestically and at our borders. Legitimate commercial interests will demand greater policing of illicit trade where this undermines their profitability.

We can also anticipate improvements in DNA technologies with application to wildlife forensics, driven by the revolution in genomic knowledge and rapid screening techniques,

are likely to see greater effectiveness of enforcement in the interests of both conservation of wild populations and commercial viability of legitimate enterprises. Over the past five years, the Australian Federal Police has funded several research programmes for the development of DNA technologies to provide evidence for crimes against Australian wildlife. These recent developments herald an exciting new era for wildlife forensics in Australia and if these efforts continue Australia may become one of the leading countries in the international effort to curb illegal trade of wildlife. The unique nature of Australian fauna and flora, and our geographic position, are such that our enhanced capability in this area is a critical and present need.

The degree to which DNA technologies can improve wildlife regulation and enforcement will depend on the structures put in place to pursue crime. The US Fish and Wildlife Service Forensics Laboratory located in Ashland, Oregon is the only laboratory in the world that is dedicated to crimes against wildlife. The laboratory is organised into seven operational units: administration, chemistry, criminalistics, genetics, morphology, pathology, and digital evidence. The administration unit is responsible for the processing of the evidence, maintaining chain of custody, and quality assurance. Crime scene investigation, fingerprint collection, fibre, bullet and glass comparisons are some of the diverse tasks carried out by the criminalistics units. Other units are involved in the provision of evidence including species identification of the seizure (chemistry, genetics, and morphology units), identification of gender and age (genetics and morphology units), analysing the composition of complementary medicines (chemistry), determining the cause of death of a seizure (pathology), and analysis of digital evidence (digital evidence unit). This team of specialists support the US federal law enforcement of over 200 special agents and wildlife officers, as well as the 50 State Fish and Games Commissions, and all signatories of the CITES Treaty.

As a CITES member, Australia can receive support from the US Fish and Wildlife Service, but the expertise for Australian fauna and flora resides largely within the Australian scientific community. It is unlikely that the volume of wildlife-related crimes would be sufficient to justify a wildlife forensic laboratory in Australia. Alternative solutions need to be explored. Some of these were canvassed at a workshop held in Melbourne in October 2007, with representatives and experts from the National Institute of Forensic Sciences (NIFS), Department of Environment, Water, Heritage and the Arts (DEWHA), Australia Customs Service, Australian Federal Police (AFP), museums, and universities to discuss the future of services for wildlife crime in Australia. A facility dedicated to wildlife-related crime was identified as a priority by all representatives. An Australian Wildlife Forensic Network (AWFN) was established to support, educate, and provide evidence for wildlife-related crime in Australia. We argue that this initiative needs to be carried one step further, with Australia establishing a national clearing house for wildlife crime to deal with important issues to do with chain of custody, storage of forensic samples, and the coordination of a national network of experts to present the evidence and testimony.

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### Wildlife across our borders: a review of the illegal trade in Australia

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