Forum

Should Australia Export its Native Birds?

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Commercial export from Australia of native birds, wild or captive bred, is prohibited. This paper firstly describes the current legislation and regulations that restrict the export of native birds and discusses why governments have adopted such a regulatory approach to bird species preservation. Secondly, the paper reviews the debate concerning the export ban, pointing out strengths and weaknesses in arguments and indicating the important role of CITES.[1] Lastly, the paper outlines a new case for a conditional lifting of the ban, whereby DNA fingerprinting is used to establish transferable property rights to overcome a main source of market failure in the preservation of bird species. Application of this DNA technology offers an opportunity both to protect wild populations and to develop a legitimate export industry based on breeding in captivity.

1. Introduction

The issue of international trade in native birds has been a policy issue for decades. In Australia in 1976, after a two year inquiry, the Standing Committee on Environment and Conservation delivered 16 recommendations, including one for the relaxation of exports of native birds provided they were common or pest species or were bred in captivity. The Council of Nature Conservation Ministers (CONCOM) discussed these recommendations in July 1977 and August 1978. Finally, the Fraser Government accepted all of the recommendations, except two, one being the lifting of the ban on exports of native birds.

In 1983, 1984 and 1985 CONCOM needed to further discuss the issue of export prohibition. In 1991 the Australian and New Zealand Environment and Conservation Council (ANZECC) also addressed this issue and called for a review of the Wildlife Protection (Regulation of Exports and Imports) Act 1982 that prohibits the export from Australia of Australian native birds. This review (Ley 1992) has not led to any change in export prohibition, although import of birds into Australia has been slightly relaxed.[2]

2. Current Legislation Restricting Export of Native Birds

The Wildlife Protection (Regulation of Exports and Imports) Act 1982 is administered by the Australian National Parks and Wildlife Service and it has few exceptions in its prohibition on export of Australian native birds. The exceptions are interchanges between zoos, the export of household pets, exports for scientific purposes and special cases of management programs or captive breeding programs. These latter special cases allow carcases of mutton birds to be exported from Tasmania and the meat and oil from captive bred emus to be exported from several mainland states. However, as outlined by Kingwell (1993), these exceptions are subject to tight regulation and policing and provide little scope for widespread commercial export of Australian native birds.

The main purpose of the ban is to facilitate the preservation of wild populations of Australia's native birds. The ban applies to all native species, ranging from those with pest status to others endangered or near extinction.[3]

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[1] CITES stands for Convention on the International Trade in Endangered Species.

[2] Since 1984 the Act has been amended several times, including the Wildlife Protection (Regulation of Exports and Imports) Amendment Bill passed in August 1991.

[3] Since European settlement of Australia 10 species of native birds have become extinct (Ley 1992).

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Although the Act prohibits the export of Australian native birds, it does allow the import and export of several introduced bird species (eg Macaws) as well as the import of some Australian birds captive bred overseas. For example, special strains of budgerigars and mutated lines of yellow princess parrots, lutino elegant parrots and pied red rump parrots are exported to Australia from Great Britain (AQIS 1992). However, once imported, these same birds and their offspring, native to Australia, cannot be exported for commercial purposes.

Maintaining and policing the current legislative ban on exports of native birds requires the involvement of many state and national authorities. The list includes the Australian Customs Service, the Australian National Parks and Wildlife Service, the Australian Federal Police, the Australian Bureau of Criminal Intelligence, the Australian Quarantine and Inspection Service, Australia Post and several state/territory wildlife agencies and police services. Defining and maintaining the co-operative roles and precise jurisdictions of all these bodies relevant to the policing of the export ban is a costly and difficult task, as acknowledged in the legislative review.

3. The Rationale for Regulation

The regulatory approach to preserve wild populations of species indicates that governments have rejected alternative approaches that may rely on or facilitate the operation of markets to determine the extent to which wild populations birds should be preserved. The economic defence for regulation is based on the failure of markets to appropriately determine the preservation of native flora and fauna (Bishop 1980, Jakobsson and Dragun 1989). Several factors influence the nature of the market failure (Dasgupta 1990, EPAC 1992).

Firstly, wild populations of native birds attract an existence value with public good characteristics (Ciriacy-Wantrup and Bishop 1975); non-rival and non-excludable, yet no market exists for it (Bishop 1978). Secondly, it is difficult to establish and enforce property rights over native bird populations. Many populations are migratory, at various times residing in habitats on publicly or privately owned land.

Further, some species are located in remote or sparsely populated areas making policing of property rights difficult; detection and apprehension of poachers, for example, is costly. Also it is not possible to determine visually the species of some birds from their egg or even juvenile stages which adds further difficulties to establishing clear property rights. Open access to wild populations, difficulties in proving and enforcing property rights and the high value of some bird species, particularly on international markets, often leads to poaching and smuggling of wild birds or their eggs (Gavitt 1989, Warren 1992, TRAFFIC 1987).

Thirdly, externalities associated with preserving wild populations occur locally and globally. The benefits of preserving an endangered species may be shared nationally or globally, but farmers and land-holders in or near the species habitat may bear many costs (or forego income) as a result of the birds' preservation. Fourthly, lack of information about the consequences of endangerment or extinction of bird species in natural or introduced ecosystems does not facilitate market determination of species preservation.

Lastly, the irreversibility of extinction of a bird species, and the failure of markets to appropriately signal the cost of extinction, is particularly an issue when future generations value species more than the present generation (Saddler *et al.* 1980, Bishop 1980). Throughout Australia local extinctions of many bird species have occurred due to urbanisation, clearing for agriculture, plantation forestry and introduced fauna (e.g. Saunders *et al.* 1985). Historically, the likelihood and costs of such local extinctions have often been overlooked in development decisions. The general conclusion is that markets for preserving bird species will fail to reflect truly all benefits (Tisdell 1979). Market signals alone will lead to underinvestment in preservation of wild populations because the benefits of preservation will be undervalued relative to the

Table 1: Asking Prices for Breeding Pairs of Various Australian Bird Species in the United States and Australia

Common name	Price ($US) in the USA[a]	Price ($Aus) in Australia[b]
Yellow-vented Bluebonnet	700	200
Crimson wing	525 to 1000	200
Princess of Wales	400	180
Redcap	700	60
Turqoisines	150 to 200	75
Galahs	3000 to 4000	35
Sulphur-crest	1100 to 1900	350
Eclectus	1495 to 2300	3500
Gouldian finches	90 to 125	80 to 120
Star finches	60 to 65	18 to 35

[a] These are the asking prices of aviculturists as reported in the USA avicultural trade magazines "The AFA Watchbird" and the "American Cage-bird Magazine", mainly in late 1986 and 1987.

[b] Based on the 1987 recommended retail prices of the Avicultural Society of Western Australia.

benefits of developing the species' habitats and exploiting their populations (Gavitt 1989).

The acceptance of a regulatory solution to increase the likelihood of species preservation has yielded the export ban that creates a legal and market division between Australian and overseas buyers of Australian birds. Although local and overseas buyers both have no legal access to ownership of wild birds, local buyers at least have access to a wide range of captive bred Australian bird species while overseas buyers in theory have no legal access to these birds from Australian sources.

The ban on export has increased the scarcity value of many Australian birds to potential overseas buyers. The supply of Australian birds to these buyers now comes either from illegal smuggling or from captive bred bird stocks of overseas aviculturists. For example, the Netherlands and Denmark alone export annually over $15 million of Australian native birds (WAAM 1992).

The scarcity of supplies of some Australian birds and the demand for ownership of these birds generates high prices for some Australian bird species (see Table 1).

Some parrot species not listed in Table 1, are rare locally and internationally, and are likely to attract very high prices overseas. For example, red-tailed black cockatoos sell in Europe for around $16,000 a breeding pair, palm cockatoos for around $38,000 a breeding pair; in South Africa a breeding pair of Major Mitchells sells for $14,000 (WAAM 1992) while breeding pairs of the glossy black cockatoo sell overseas for over $50,000 (Halstead 1992). Overseas the wide range in asking prices for Australian birds reflects demand and supply factors such as the suitability of the species as a household pet and the ease or difficulty of breeding the species in captivity.

Table 2: Main Arguments For and Against the Ban on Export of Australian Native Birds

Issue	Argument for the export ban	Argument against the export ban
CITES	Under CITES trade that endangers native birds must be prevented.	Captive breeding programmes are consistent with CITES; plus harvesting pest species is allowable.
Smuggling	Smuggling will increase if exports are permitted.	Smuggling will diminish if exports are permitted.
Pest damage	There are other avenues besides harvesting or killing bird populations to reduce pest damage.	Harvesting wild populations is an effective and potentially profitable way to reduce pest damage.
Profits	Profits from native bird exports will be inadequate.	Profits from native bird exports will be adequate.

4. The Debate about the Ban on Exports of Native Birds

The Australian export ban on native birds, particularly as it applies to pest species, has been the subject of some debate. The main issues or arguments surrounding the ban are listed in Table 2. Each of these issues is discussed, highlighting their various strengths and weaknesses.

4.1 CITES Obligations

In 1976 Australia became a signatory to CITES (Convention on International Trade in Endangered Species of wild fauna and flora). This convention, sponsored by the United Nations, now has over 111 signatory countries and it aims to regulate international trade in wildlife so that no species becomes endangered through commercial exploitation. The convention uses a system of reciprocal permits or certificates only issued by formally recognised government organisations or agencies.

Under CITES, any species identified in danger of extinction is listed in the convention's appendix I and any commercial trade in this species is prohibited. Appendix II of the convention lists species for which international trade must be regulated and monitored in order to safeguard against excessive trade which may result in the species being threatened with extinction. Appendix III allows signatories to the convention to list any native species whose international trade it wishes to be monitored through the issue of export permits.[4]

Resolution 1.6 of CITES states that: "Mortality in trade and captivity is high. This Conference urges exporting countries to endeavour to restrict gradually the collection of wild animals for the pet trade and that all contracting Parties encourage the breeding of animals for this purpose, with the objective of eventually limiting the keeping of pets to those species which can be bred in captivity." At the most recent CITES conference at Kyoto in March 1992, the United States introduced a further resolution to suspend trade in shipments of signifi-

[4] Australia has no listings on Appendix III. Australian birds listed in Appendix II include most cockatoos such as the Major Mitchell, the gang-gang and the red tailed black cockatoo. Of the 370 species of parrots in the world only 3 species are not listed either on Appendix I or II of CITES (US Congress House Report No 102-749(I) 1992).

cantly traded wild birds listed in Appendix II of CITES. Although this resolution was defeated the United States offered a subsequent resolution that enabled signatories to regulate trade in species listed in Appendix II to achieve sustainable wild populations. This resolution was adopted. It marks what may be a turning point for CITES insofar as the regulatory and protectionist policy stance that has dominated CITES resolutions was questioned by some nations who advocate sustainable use of endangered or threatened species.

Although CITES may be a successful international legal agreement, it has several acknowledged shortcomings (Yancey 1980, Trexler and Kosloff 1989, Ley 1992). Yancey describes how lack of clarity in parts of the treaty have led to different interpretations and resulted in several costly legal actions in the United States. Trexler and Kosloff (p.331) conclude their review of CITES by saying the "global implementation of its provisions is inefficient, fragmented, often self-defeating, and largely ineffective." The United States Congress House Report No 102-749(II) in 1992 (p.1610) echoes these criticisms by saying "CITES has been ineffective in stemming the decline in wild bird populations because many exporting countries lack the resources or expertise necessary to perform comprehensive population analyses of their wild bird populations." Ley reports on the Kyoto CITES meeting that signatories recognized the criteria for listing species in Appendices I or II were less than objective and that the Convention needed greater flexibility.

In assessing export controls like those in CITES the National Academy of Sciences (1987) found that exports from the United States were being unnecessarily impeded and that regulation compliance was discouraged by the complexity of controls. Driver (1980) also makes the general observation about export regulation that it is easier to find obvious but often relatively harmless regulatory irregularities than it is to identify and stop true problems. For the trade in birds, the most damaging shipments are almost certainly those avoiding any documentation, rather than those with minor documentary irregularities. Hence, although Australia is a signatory to CITES, and may well be a model of regulatory propriety, it is relatively easy for smugglers to post eggs from Australia to other countries where incubation and false documentation is easily arranged; the birds then being re-exported through legitimate channels (Halstead 1992).

In spite of these criticisms and shortcomings of CITES, Australia is nonetheless one of its signatories and therefore is bound to prevent the harvest and export of wild birds threatened with extinction. However, native birds not threatened with extinction could be exported, although exporting birds listed on Appendix II of CITES requires regulation. Changes to CITES, however, may increasingly restrict such trade, as evidenced by the special debate on international trade in wild birds at the Kyoto CITES meeting. Also there is a trend towards greater control of this trade.

For example, in the United States, which is the world's largest importer of exotic birds, the Wild Bird Conservation Act of 1992 specifies that after October 1996 importation of any species of exotic birds will be illegal unless the bird species is on an approved list compiled by the Secretary of the Interior. To be on this list a species must at least be subject to a management plan in its country of origin that provides for the conservation of the species and its habitat. Brazil and Bolivia now ban the export of all their native birds for commercial trade. The EEC has increased its regulatory control of bird imports whereby it will not allow imports of birds unless it is satisfied that such trade is not detrimental to wild populations. In the United States, in the last decade, the States of New York and New Jersey have banned the sale of all wild-caught birds. Also in the United States, Petland, a chain of 130 stores, and Docktor Pet Centers, a chain of 150 stores, recently have adopted policies to no longer sell wild-caught birds. Lastly, concerns about the mortality risks, particularly to wild caught birds, have led several airlines to cease transporting live birds (US Congress House Report No. 102-749(I) 1992).

Thus to fulfil the spirit and letter of CITES in its current form, Australia is bound to allow only the export of captive bred birds or wild birds whose populations and habitats are managed and protected such that they will not become endangered if subject to harvesting for international trade.

4.2 Smuggling

Most bird smuggling is undertaken by small, highly organized groups of people with international connections and mostly eggs rather than young birds are taken (Halstead 1992). The illegal harvesting and export of eggs not only robs localities of replacement birds but often the method of poaching destroys scarce breeding sites (Mell and Wetherall 1992) and can jeopardise the viability of local bird populations. In Australia since 1984 over $5 million worth of smuggled wildlife (mostly birds) has been seized through enforcement of the Wildlife Protection Act (Manly 1992). It is not known what percentage of the illegal bird trade such seizures represent but acknowledged deficiencies in detection (ANPWS 1989, Ley 1992) would suggest many illegal exports escape detection.

Opponents of the export ban argue that its relaxation would increase the supply of Australian birds on international markets and would reduce the profitability and therefore incentive for smuggling. To be consistent with CITES only birds either captive bred or bird species whose populations are unlikely to become classed as threatened could be exported. By allowing the harvest of wild birds with pest status and encouraging the breeding in captivity of other rarer Australian birds, the inhumane treatment suffered by wild birds due to smuggling and shooting would be reduced.

Fewer birds classified as native pests would be shot or poisoned if they were subject to a management programme that included harvesting and exporting a portion of their populations. In addition, some of the revenue gained through export and inspection fees could bolster surveillance and policing to further deter smuggling.

A counter-argument is that, although relaxing the ban may eventually depress market prices, smuggling may increase. Relaxing the ban would offer smugglers a hitherto unavailable legal avenue to illegally export certain birds through bribery, forgery or deception. This avenue would permit smugglers to export birds rather than eggs and to achieve less mortality among birds in transit. There is evidence, both locally and internationally, that smugglers will use these legal avenues, if available.

Jenkins (1992) reports the case where a crate of homing pigeons being transported for legitimate offshore races contained some parrots disguised with docked tails and dyed feathers. In the 1980s in the United States, after lifting the prohibition on sale or export of captive bred birds of some rare and endangered species, wild specimens of these species were still being smuggled. In spite of close supervision of breeding and sales by the US Fish and Wildlife Service, a 3 year investigation revealed that forgery of government permits and leg bands normally used on captive bred birds enabled hundreds of peregrine and gyr falcons to be illegally taken from the wild. Prosecution of offenders in courts proved costly and difficult.

Supporters of the export ban suggest its lifting would encourage smugglers to disguise birds from other valuable species in batches of species permitted to be exported. Such deception is facilitated in certain cases by similarities in colourings of the young of the species. Even if the export ban was lifted only on captive bred birds then smugglers would attempt to by-pass the costs associated with captive breeding by masquerading wild birds as captive bred. Lastly, supporters of the ban point to the practical advantages of administering a blanket ban on exports as opposed to the costs of monitoring and additional administration that would accompany a partial lifting of the export ban.

Ethically and legally smuggling is unacceptable. However, from an economic viewpoint the main issue is whether or not a relaxation of the ban on exports yields net social benefits. Any increase or

decrease in smuggling is thus only relevant insofar as social costs and benefits are affected. The major economic issue, to be addressed later in this paper, is whether or not mechanisms exist to yield net social benefits and which allow the profitable legal export of native birds from Australia. Later in this paper such a proposal is discussed, along with its likely effect on smuggling.

4.3 Pest Damage

The abundance and feeding activity of several native bird species imposes costs on many farmers through damage to crops (Long 1985) and bird control (e.g. netting over crops, bird-scarers and shooting). Opponents of the export ban argue that allowing the harvest and export of pest species of birds would reduce these costs caused by these birds. As an example of this argument; a motion was passed at the 1984 conference of the Western Australian Fruitgrowers' Association recommending that the Western Australian Government export a minimum of one million parrots before 1 June, 1985. The parrot species of most concern were the red-capped and Port Lincoln that damaged horticultural crops. Other pest species in Australia that could be harvested would include the galah, the little corella, the long billed corella and the sulphur crested cockatoo. Rather than shooting or poisoning these birds many farmers see advantages in earning export revenue from the birds and reducing crop losses.

Supporters of the export ban point out that aviculturists acknowledge the temperament of mature wild birds that are subsequently caged makes them generally unsuited for sale as household pets.[5] Hence, only the young of species could be harvested and sold, leaving adult birds free to continue inflicting crop damage. The capture and sale of young birds would alter population dynamics and may lead to populations in some localities becoming threatened with local extinction which would be unacceptable to conservation and wildlife groups.

Supporters of the export ban also suggest other ways of reducing the damage caused by birds without killing or harvesting the birds. For example, some on-farm options are placing crops away from trees and power lines; planting crops that mature when other natural food sources are available and planting cheaply, low value alternative food sources near high value crops. Lastly, supporters of the export ban point out the dangers of increased smuggling that would accompany any relaxation of the export ban.

After considering these arguments concerning pest damage, it is clear that the harvest and export of pest species of native birds would reduce crop damage and bird control costs and would generate millions of export dollars. Official monitoring of these harvests and policing of exports, paid for through export licences would reduce the likelihood of local extinctions of pest species and increase deterrents for smuggling.

One resolution adopted at the Kyoto meeting of CITES enables signatories to regulate trade to achieve sustainable wild populations of birds listed on Appendix II. Hence, harvesting pest species and even some other threatened species is consistent with CITES. In practice, however, several safeguards would need to accompany the export of these birds to deter smuggling and avoidance of payment of export fees.

4.4 Profits from Sale of Either Harvested Wild Birds or Captive Bred Birds

Another issue with divided opinion is whether or not the income and cost-savings flowing from relaxation of the export ban would cover the monitoring, administration, policing and industry costs associated with the ban's relaxation.

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[5] For example, in the early 1980s in the United States' quarantine facilities which house many South American, mostly mature birds, trapped in the wild, mortality rates averaged 24 per cent.

Under CITES, sale of captive bred birds is permissible as is exporting a harvested portion of native birds that are declared pest species or that may be listed on Appendix II. Whether such harvesting remains compatible with the spirit and letter of CITES depends on the outcomes of current discussions among signatories and members of the CITES secretariat.

Opponents of relaxing the export ban point out that only young and immature birds that adapt better to caged life are the marketable portion of harvested birds. Revenue from their sale is asserted to be inadequate to cover the administration and policing costs of this option, especially if all fees are set for full cost-recovery as has been recommended by the Office of Regulation Review (Ley 1992). A counter to this assertion of unprofitability is the observation that a profitable centre for galah breeding exists in Tanzania, where a complex of 900 aviaries supplies galahs mainly to Paris (WAAM 1992). Such breeding in captivity incurs many more expenses than would harvesting younger birds in wild populations. Hence, even with the additional costs of population monitoring and policing, it is unlikely that such harvesting would be unprofitable, especially when international prices for pest species are substantially greater than those on domestic markets (see table 1 and Halstead (1992)); plus given the cost savings from less crop damage and less expenditure on crop protection.

Procedures of harvesting and exporting could be devised to ensure that bird populations and habitats were not endangered, that illegal harvesting and export were discouraged and that costs of regulation were fully recovered. One option would be for a government authority or contracted agency to research and monitor bird populations and decide on annual harvest numbers and locations. Avicultural exporters could tender for the right to receive some portion of the bird harvest with the tender revenue and subsequent export fees going to pay in part for the research, harvest, habitat protection, administration and policing costs of the government.

Another export option, based on captive breeding, is discussed in the next section. The export revenue from the export of Australian birds could be substantial. For example, in the early 1980s the number of parrots annually imported into the USA was around 400,000 and the annual value of parrot trade in the USA at the same time was estimated at $US 300 million. Admittedly, many of these parrots were wild-caught in South America, and such trade is being restricted. However, the volume and value of this parrot market, when combined with other market opportunities in Europe and south-east Asia suggest the potential for a valuable export market for Australia, particularly of captive bred birds.[6]

5. A New Export Option

For markets to equate the demand and supply of Australian birds (thus affecting their preservation) in an efficient and equitable manner requires property rights to be clearly defined with non-payers able to be excluded from ownership of birds. Only in this decade has affordable technology emerged to allow property rights over birds to be clearly defined. This technology is DNA fingerprinting which is based on procedures developed by United Kingdom scientists in 1985 and is being applied to an increasing number of species (Wetton *et al.* 1987, Thommasen *et al.* 1989, Cocciolone and Timms 1992).

The technology requires taking small blood samples from birds and through various processes (Mell and Wetherall 1992) developing a photographic record of the characteristic DNA (deoxyribonucleic acid) of the birds. The chemical properties of a bird's DNA enable its unambiguous identification and the determination of its family relationship or pedigree within the population of DNA-tested birds. The current cost of DNA fingerprinting is about $100 per bird.

[6] In 1994 the Rural Industries Research and Development Corporation is funding research on the export of native birds.

Researchers at Curtin University in Western Australia have completed genetic profiles on several species, including the white-tailed and red tailed black cockatoos (Mell and Wetherall 1992), known to be subject to poaching. Results of DNA testing have already facilitated the prosecution of several aviculturists in Western Australia who were attempting to pass off birds taken from the wild as being captive bred.

In Western Australia the efficacy of DNA testing in facilitating conviction has already caused a change in the reported rates of successful captive breeding of some species known to be difficult to breed in captivity (Ley 1992). This suggests that some aviculturists were capturing wild birds or purchasing illegally trapped wild birds and passing them off as bred in captivity. Hence, even with export prohibition, there has been an illegal poaching of birds from the wild with these birds subsequently being sold on the domestic market.

Most of the debate over the pros and cons of lifting the export ban has occurred prior to the availability of DNA fingerprinting. However, the 1991 review (Ley 1992) of the Wildlife Protection (Regulation of Exports and Imports) Act 1982 considered DNA fingerprinting. Although the review recommended no interim change in export regulation, it nonetheless indicated a need to examine (p.xxx) "the practical aspects of establishing a fully funded administrative control mechanism to allow strictly regulated commercial exports of a limited number of species of captive bred native birds which are not endangered or threatened;". In appendix I of the review, Ley (1992) and in concluding comments of Halstead (1992), a licensing system is offered as a possible means of relaxing the export ban. The licence options in Ley and Halstead acknowledge a role for DNA fingerprinting and implicitly recognize how it facilitates the establishment of clear transferable property rights.

Because Australia is a signatory to CITES and because of changes already mentioned in the important United States market and in some other markets, the harvest and export of wild bird populations may not be an acceptable political option. However, the introduction of DNA fingerprinting could jointly protect wild populations from some poaching and facilitate establishment of a captive breeding industry supplying Australian birds to export markets.

The regulatory proposal discussed here is based on DNA fingerprinted core breeding flocks for species allowed to be exported. The breeding pairs of these flocks constitute the initial breeding stock for export sales and all birds in these flocks would be DNA fingerprinted. These breeding pairs could then be sold by auction or tender. Conditions of the tender or sale of these birds would be the maintenance of breeding records and unrestricted access to those records, aviaries and birds by authorities. At cost to the exporter, all progeny or some undisclosed proportion would be DNA tested either prior to export or at other times as a check on the veracity of breeding records. Export permit fees could be set to recover full costs of administering and policing the new industry.

The agency overseeing the export of the birds could widely advertise to aviculturists a verification service, whereby the DNA pedigree of birds could be assessed. This service would allow potential buyers or breeders of birds to ascertain whether or not the claimed pedigree of birds on offer was legitimate or not.

Such a system would clearly establish transferable property rights and ensure that export income was not based on the exploitation of wild populations. Aviculturists found to be in breach of the regulations would receive appropriate penalties. The rotation of inspectorial, laboratory and administrative staff would reduce the risk of bribery and fraud.

Part of the revenue derived through regulatory compliance could fund research and monitoring of wild populations and their exposure to poaching. Regulations and legal penalties covering illegal capture of birds, bribery, fraud or smuggling of Australian birds would need to be designed to facilitate prosecution and act as strong deterrents.

The continuation of exports of native birds would be subject to formal periodic review to firstly ensure the policy and its administration is cost-effective and not corrupt and that no native bird species was being deleteriously affected. Secondly, these reviews could ascertain which other species, if any, should be added to the list of species whose regulated export was permissible. The design of regulations and policing of the bird exports would seek to be effective in detecting smuggling and reducing risks of bribery and fraud, yet not so laborious as to deter exporters' compliance with necessary paperwork and approvals.

In relaxing the export ban on certain captive bred native birds it is acknowledged that Australia would be exporting some bird species which, if accidentally or deliberately released from captivity in the importing country, may cause environmental damage. How serious are these damage risks depends on the nature of the bird species, the legal requirements surrounding the housing, and care of the birds and the nature of the locality in which the birds are released.

Although there are several easily cited examples of damage caused by introduced birds (eg starlings in Australia), such damage has been mainly due to deliberate, planned and often repetitious releases of these birds (Long 1981, BRR 1992). Such planned releases of birds are now unlikely to occur in most modern importing countries. Further, legal restrictions can apply to the housing and care of birds in importing countries such that the risk of a wild population being established from accidental releases of caged birds is lessened. Lastly, many importing countries make their own assessments as to the likelihood and size of damage risks, and accordingly make recommendations about the legality of importing particular bird species.

6. Conclusions

The issue of international trade in native birds has been a policy issue for decades. Much of the debate surrounding the pros and cons of lifting the ban on export of native birds, however, has occurred prior to the emergence of DNA fingerprinting. This technology allows transferable property rights to be clearly established for native birds bred in captivity. It facilitates the legitimate sale of native birds on domestic and international markets while lessening the risks of exploitation of wild populations that might otherwise accompany a relaxation of the export ban.

This paper offers a regulatory proposal based on DNA fingerprinting and a conditional lifting of the export ban. It is consistent with Australian government obligations under CITES and yet establishes a legitimate export industry. It makes it easier to detect birds captured from the wild, feigned as captive bred. Its administration is designed to be effective in detecting smuggling and reducing risks of bribery and fraud thereby lessening the risks of exploiting wild populations of birds.

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