

LAW ENFORCEMENT SESSION

AN OVERVIEW OF PROBLEMS OF INTRODUCED SPECIES AND APPROACHES BY STATES TO CONTROLLING EXOTICS

by

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ABSTRACT

Several problems associated with introduced species are discussed as are problems caused when native species are removed to new areas. Data from a survey of states on laws governing importation of exotics and on control of animal holding facilities are presented.

Potential problems from introduced species have long been recognized. Palmer (1899) mentioned several of the problems and the Lacey Act of 1900 was enacted to prevent problems with several "noxious" species. At the present time many of the most serious vertebrate pests in North America are introduced species. Considerable literature on species of vertebrates introduced into the United States exists and many of the major reports are mentioned below.

Substantial numbers of vertebrates are imported yearly. In recent years data on numbers and classification of species have been reported (Banks 1970; Jones 1970; Banks and Clapp 1972; Jones and Paradiso 1972; Clapp and Banks 1973a, b; Paradiso and Fisher 1973; Ramsey 1973; Clapp 1975). Data on numbers of species and individuals imported are given in Table 1.

Numbers of imported animals tend to increase despite apparent trends in the data presented in Table 1. Primary reasons for reductions in imports were bans on importation of certain species for disease control, particularly Newcastle disease. Other species not affected by the bans tended to increase.

Of particular interest was the importation of specifically banned species of mammals (mongooses etc.) each year surveys of imports were made (Jones 1970; Jones and Paradiso 1972; Paradiso and Fisher 1973).

Reasons for imports of animals are several and include the supply of animals for research, for display, for the pet trade and in some instances for stocking as game animals or sport fishes. Agricultural animals are also imported. Generally those animals imported for research purposes are maintained in quarters which limit possibilities of their escape. Escapes are not impossible and in some instances occur accidentally during consignment. Animals imported for display purposes have limited prospects of escape. Such species usually are valuable and are maintained by responsible people most of whom realize the consequences of their escape and establishment.

Increasingly people seek pets and exotic species hold an ever increasing attraction for many. Among species imported as pets the prospects of their escape and establishment is greater than for species imported for other purposes. This is especially the case with birds and with fishes as in some instances holding facilities are less than adequate leading to inadvertent release while in others deliberate release occurs.

The object of stocking game species implies their release to the wild in most instances. Directly imported domesticated species are unlikely to realize a feral existence but descendants of once domesticated livestock exist ferally in many parts of the country (McKnight 1957, 1958, 1959, 1961, 1975). Ironically one such species—the wild horse—is considered an endangered species in parts of the country by many who seek its preservation.

Establishment of Non-game Introduced Animals

Phillips (1928) reviewed all attempts at stocking of birds in the United States prior to that time. Many of the releases he documented involved relocation of species within the country. A later report (Cooke and Knappen 1940) documented the naturalization of several new species in North America. A more recent series of reports (Bull 1973; Hardy

Table 1. Data on numbers of individuals and species imported into the United States.

Major Category	Year	No. Species	No. Individuals	No. Exporting Countries	Reference
Mammals	1968	302 minimum	129,520	—	Jones 1970
	1969	338	122,991	—	Jones & Paradiso 1972
	1970	299	93,653	64	Paradiso 1973
Birds ^a	1968	—	513,694	—	Banks 1970
	1969	—	647,318	—	Banks & Clapp 1972
	1970	745	937,938	55	Clapp & Banks 1973a
	1971	750	966,561	63	Clapp & Banks 1973b
	1972	624	640,995	53	Clapp 1975
	1968-1972	1540	3,706,506	72 ^c	Clapp 1975
Freshwater aquarium fishes	October 1971 ^b	365	7,923,099	—	Ramsey 1973
Marine aquarium fishes	October 1971 ^b	217	46,430	—	Ramsey 1973
Aquarium fishes	October 1971 ^b	582	7,969,529 ^c	41	Ramsey 1973

^aDoes not include numbers of bird eggs imported.

^bBased on 1970-1972 only.

^cImports for October 1971 only; represents 8.1% of total aquarium fishes imports for 1971.

1973; Owre 1973) documented the establishment of several species of pet birds in New York City, Southern California, and Southeastern Florida, respectively. All of these species have become established in suburban areas presumably from release of domestic pets. Fisk and Crabtree (1974) provide evidence of probable breeding by black-hooded parakeets in Southern California.

Problems of introduced species of fish have been the subject of much literature most of which has been reviewed (Lachner et al. 1970; Courtenay and Robins 1973; Courtenay et al. 1974; Stroud 1975). Problems of introduced species are not unique to the United States and McDowall (1968) discussed exotic fish introductions to New Zealand and the many problems caused by introductions.

Ecological Problems Caused by Introduced Species

Introduced species caused ecological interruption. Elements of competition includes increased pressure on food supplies, critical habitats, nesting sites, habitat destruction, sometimes predation, and possibly disease and parasite introduction or augmentation. Moyle (1973) documented the adverse effects on native frogs in California of the introduction of bullfrogs. Problems with fishes were discussed by Lachner et al. (1970), Courtenay and Robins (1973), Courtenay et al. (1974) and Stroud (1975).

An individual introduced animal is not necessarily just that. Rather it is much more likely to be a "package" including possibly internal and external parasites, bacteria, viruses and pathogenic fungi. Considerable precautions can be taken to minimize risks of introducing infections and parasites but such precautions are by no means foolproof and are likely to be minimal in many cases with introduced wild animals as relatively little is known of diseases and parasites of a great many species. Stroud (1976) recently cited an instance of introduction of an exotic tapeworm with Asian Carp which has spread to native species. Problems of stocking animals from the standpoint of disease transfer have been illustrated by Nettles et al. (1975) and Jacobson et al. (1976) in the case of introduction of a raccoon parasite into rabbit and woodchuck populations by raccoons entering a new habitat. Jacobson and Cross (1976) discuss disease consequences of rabbit stocking.

Another element of the "package" a stocked animal represents is the possible ability to partake in interbreeding with the native fauna. Among the many introduced fish species flourishing in Florida waters are several hybrids (Courtenay et al. 1974). These present formidable management problems. The problem of interbreeding is particularly bad with waterfowl especially ducks. Weller (1969) in arguing against the introduction of exotic duck species provides an excellent discussion of the problem using examples of introduced duck species in many parts of the world.

Game Species

Among mammals and birds game species are the most likely candidates for deliberate release. Game species of fish, forage species, and species for control of aquatic vegetation

have been the subjects of releases or proposed releases. Additionally bait fishes have been inadvertently released by fishermen. While release of game species likely has provoked some considerations of the biological consequences of their introduction it is difficult, if not impossible, to predict all the effects, positive and adverse, of releasing new species.

Bratton (1974a,b) discusses the adverse effects of release of the European Wild Boar on the Great Smoky Mountains National Park. The original release to the wild was unintentional as the initial stocking came from an escape from a hunting preserve. The ecological impact of the species is tremendous ranging from destruction of flora, through change in ecological succession, changes in habitats, competition for food sources with a wide range of species, predation on many species and disruption of streams. The problem is particularly severe in a National Park as hunting cannot be used as a means of population control. Even where hunting is possible similar problems can occur. It can be seen that problems associated with this desirable game species can be severe, and even though it's an extreme example it points out the complex nature the decision to introduce should be. Weller (1969) points out many examples from all over the world of adverse effects of ill considered introductions of waterfowl as game species.

Approaches by States to Regulating Exotics

Fansler (1974) presented a report on the development of the law in Georgia on animal importation control. The approach seemed comprehensive and a strong, readily enforceable law was the result. The data in Table 2 summarized whether the state has appropriate laws and lists whether means of enforcement are available. While most states seem to have laws governing import of exotics the practical ability to enforce the laws effectively may be lacking.

RECOMMENDATIONS

1. A general tightening of regulations on importation of exotic species would be desirable. These would include obligations on the importer to identify the species being imported in taxonomic terms.

2. Serious consideration should be given to reducing the capability of introduced species to survive and reproduce in the wild. This might include pinnioning of bird species which could survive in the wild in this country and especially those which are likely to be nuisance species. The approach might also include sterilization of individual animals.

3. Means of preventing the illegal importation of reptiles should be studied. At present snakes are illegally imported by means of parcel post.

4. A license should be required of all individuals and businesses trading at wholesale and retail levels, in exotic pet species. Frequent reporting of numbers and species sold should be required. Regular inspections should be carried out to ensure that license conditions are being met. Requirements for housing animals during transport and exposure for sale should be specified and enforced.

5. All exotic birds imported for sale should be individually marked by leg-bands at the port of entry. This can provide a means of tracing individual birds if recovered from the wild. Also lack of tags on individual birds might be useful in assessing if reproduction is taking place. Tattooing or other marking techniques might be considered for other species, especially mammals and snakes.

6. Animals dying prior to sale should be subjected to post-mortem examination at the expense of the dealer. This would be useful in developing handling conditions for species and for expanding the data base on parasites, and diseases of exotic animals.

7. Serious efforts should be undertaken to educate those owning exotic pets and those purchasing them to the ecological dangers inherent in their release. Means of proper disposal of unwanted pets should be specifically stressed. Literature could be distributed at retail outlets.

8. Upon discovery of escaped exotic species in an area rapid and positive steps should be taken to ensure their recovery or elimination from the wild. A policy should be set in advance so that all actions taken may be readily defended at the public level.

9. Monitoring of existing fauna should be done at regular intervals to ensure that new additions are recognized and appropriate management procedures are undertaken. This

might take the form of routine perusal of Christmas Bird Counts, their augmentation with breeding bird counts over the same areas and also in areas of states where Christmas Bird Counts are not done. Routine monitoring is especially important in the case of fishes as new introductions may not be readily recognized or taken without specialized techniques.

10. A period of quarantine for all imported species is recommended. This would reduce possibilities of introduction of disease and parasites. It would add to the cost of species for sale as pets and indirectly limit demand for exotic species.

11. As a clear need for regulation of interstate transport of exotic species exists coordination of efforts between states is essential.

Table 2. Results of a 1975 survey of all states and District of Columbia on existence of animal importation laws and animal holding inspection procedures for animal holding facilities.

State	Has an existing importation law?	Has pet shop and zoo inspection procedures?	Had animal holding regulation?		Comments
			RE: caging standards	Re: health standards	
Alabama	Yes	No	No	Yes	Some facility requirements given
Alaska	Yes	No	No	No	
Arizona	Yes	Yes	No	No	
Arkansas	Yes	No	No	No	
California	Yes	Yes	No	Yes	
Colorado	Yes	No	No	No	
Connecticut	Yes	Yes	Yes	Yes	Inspections pertain to dogs only.
Delaware	Yes	No	No	No	Importation refers to endangered exotics.
District of Columbia	No	Yes	No	Yes	
Florida	Yes	Yes	Yes	Yes	
Georgia	Yes	Yes	Yes	Yes	
Hawaii	Yes	No	No	No	
Idaho	Yes	Yes	Yes	Yes	Zoos only subject to inspection.
Illinois	Yes	Yes	No	Yes	
Indiana	Yes	No	No	No	
Iowa	Yes	No	Yes	Yes	Holding requirements relate to cats and dogs only.
Kansas	No	No	No	No	
Kentucky	No	No	No	No	Laws being proposed
Louisiana	—	—	—	—	No reply
Maine	Yes	Yes	Yes	Yes	
Maryland	Yes	Yes	No	Yes	
Massachusetts	Yes	No	No	No	
Michigan	Yes	Yes	No	Yes	
Minnesota	Yes	No	No	No	
Mississippi	Yes	No	No	No	
Missouri	Yes	Yes	No	No	
Montana	Yes	Yes	No	Yes	Only zoos subject to inspection.
Nebraska	Yes	No	No	Yes	
Nevada	Yes	No	No	No	Municipalities may set their own animal holding laws.
New Hampshire	Yes	No	No	No	
New Jersey	Yes	No	No	No	
New Mexico	Yes	No	No	No	
New York	Yes	Yes	Yes	Yes	
North Carolina	Yes	Yes	Yes	Yes	Zoo inspections only.
North Dakota	Yes	No	No	No	
Ohio	Yes	No	No	No	
Oklahoma	Yes	No	No	No	
Oregon	Yes	Yes	No	No	Zoo inspections only.
Pennsylvania	Yes	Yes	Yes	Yes	Zoo inspections only.
Rhode Island	Yes	No	No	No	
South Carolina	—	—	—	—	No reply.
South Dakota	Yes	No	No	No	
Tennessee	Yes	Yes	No	Yes	Zoo inspections only.
Texas	Yes	No	No	No	Have regulations re breeding facilities.
Utah	Yes	Yes	No	No	
Vermont	Yes	No	No	No	
Virginia	Yes	No	No	No	
Washington	Yes	No	No	No	
West Virginia	Yes	No	No	No	
Wisconsin	Yes	Yes	No	Yes	Inspection authority exists—not routinely done
Wyoming	Yes	No	No	Yes	

12. Benefits from control of exotic animal importation will accrue in the areas of public health and prevention of agricultural damage and loss. Consequently, funds for regulation of importation of exotics ought to be drawn from those designated for public health and agricultural damage control and not exclusively from those designated for wildlife management and wildlife law enforcement.

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