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Viewpoint

A century of injurious wildlife listing under the Lacey Act: a history

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Abstract

In its 120-year history, the major injurious wildlife provision of the Lacey Act has remained nearly intact. The purpose of the Federal law has always been to protect the United States from the introduction of invasive and otherwise harmful species. Amendments along the way have transformed the law, sometimes narrowing and sometimes broadening. Here for the first time, the major changes to the injurious wildlife law from 1900 to the current law are compiled to provide a history that is critical to understanding how the nation's oldest invasive species law has varied in its ability to prevent wildlife invasions. In 1900, under the oversight of the U.S. Department of Agriculture, the newly enacted law prohibited the importation of any foreign wild mammal or bird to protect agriculture and horticulture, with exceptions only by permit. A small designated subset of wild mammals and birds could not be imported under any circumstance, and these were the first injurious species. For almost a half century, little changed. The 1939 amendment transferred authority of injurious wildlife to the U.S. Department of the Interior, a change affecting little except the oversight. Then a 1948 amendment removed a critical clause. The deletion suddenly removed the prohibition on the importation of any wild mammal or bird, except for the designated injurious species, which were still unconditionally prohibited. In 1960, Congress expanded the injurious provisions of the Lacey Act (18 U.S.C. 42) by authorizing additional vertebrate and some invertebrate taxa that may be designated as injurious and by authorizing additional categories of interests that could be affected. Simultaneously, however, the unconditional prohibition for injurious species was replaced with a permit exception system, and the 1960 amendments have remained to this day. By presenting how the law varied over the decades, this history will allow scientists to determine the effectiveness of a law that is well into its second century.

Key words: injurious species, invasive species, nonnative, regulation, wildlife importation, 18 U.S.C. 42

Introduction

In the United States, certain types of harmful wildlife species are designated as injurious wildlife under a Federal law that was passed in 1900. The purpose of the law was to prevent the harm that wildlife invasions can cause to U.S. agriculture. However, scientists have been unable to consistently analyze the effectiveness of that law because amendments changed the authorities and purposes for designation over the decades. The U.S. Fish and Wildlife Service (USFWS) now has the authority to designate species as injurious by regulation. However, when I

set out to analyze the effectiveness of injurious wildlife listings for the agency, I was stalled by the lack of accessible statutory history over the century-plus period. I knew how the law operated in its current form for what could be listed as injurious and what the prohibitions were (U.S. Congress 1960) and that the law had changed since its enactment in 1900 (U.S. Congress 1900). Yet how it changed in between was not evident, which complicated an analysis. Before I could evaluate the effectiveness of an evolving law, I had to understand how that law had changed and how the changes may have influenced the effectiveness.

I found no literature sources that described all the amendments over the years, certainly not the early ones. Furthermore, some papers mentioning the law stated details incorrectly. For example, Fowler et al. (2007) stated that: 1) they searched USFWS's news releases for the years 1914 through 2006 (but the USFWS didn't exist until 1940, and the U.S. Department of Agriculture had jurisdiction until then); 2) the statute was amended to include amphibians, reptiles, mollusks, and crustaceans in 1969 (but it was 1960) and fishes in 1981 (but it was 1960); and 3) a critical clause was omitted prior to the 1940s (but it was 1948). Bean (2001) stated that the statute has a particular shortcoming by not addressing hitchhiking organisms because it is directed only at the intentional importation of animals, but the statute makes no such distinction. Alexander (2013) did have many statutory history facts correct but lacked some details, such as which agency had authority. Therefore, for the information in this paper, I directly reviewed the Congressional statute and its amendments from 1900 to the present, Congressional reports, and official reports as early as 1898 from the agencies charged with carrying out the injurious provisions.

The history of the injurious wildlife issues and resulting changes to the statutory landscape from the late 1800s to the present had not previously been cohesively compiled. Thus, I resolved to chronicle the major changes in one place to understand how the law contributed to preventing the introduction of injurious wildlife into the United States. This paper reviews the history of the law covering injurious wildlife, now properly called "18 U.S.C. section 42. Importation or shipment of injurious mammals, birds, fish (including mollusks and crustacea), amphibia, and reptiles; permits, specimens for museums; regulations". This compiled chronology explains why the law was created, how it changed to address evolving issues regarding injurious and invasive species, and what prohibitions are in place today. This information is needed for resource managers to determine if the prohibitions have been effective in preventing wildlife invasions.

Minor amendment changes are not included herein because they do not affect the listing of species as injurious. Such amendments include penalties, transportation, and terminology. For example, in 1909, an amendment added "or any Territory or District thereof" to the area covered by the "United States" with no significant changes otherwise (U.S. Congress

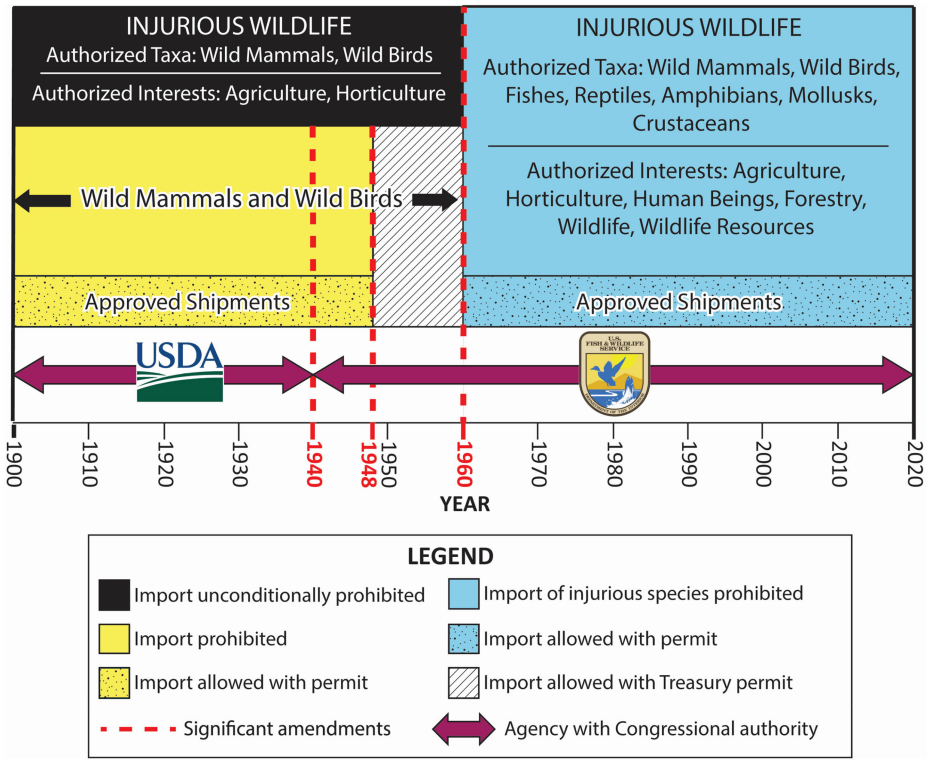

Figure 1. Timeline of the general provisions for injurious wildlife from the Lacey Act statute in 1900 (U.S. Congress 1900) to the current year, with certain amendment changes in 1940 (U.S. Congress 1939), 1948 (U.S. Congress 1948b), and 1960 (U.S. Congress 1960). Provisions shown include taxa that may be designated as injurious, interests for which they can be designated, and which agency has authority. From 1900 to 1948, injurious wildlife species were unconditionally prohibited from import, and all other wild mammals and birds were prohibited from import without a permit (from USDA until 1940 and from USFWS 1940–1948). From 1948 to 1960, only injurious wildlife species were prohibited from importation, but all other wild mammals and birds fell under the 1948 provision for importation under humane and healthful conditions, with permits from U.S. Treasury (U.S. Congress 1948b). Since 1960, injurious wildlife species have been prohibited from import except with a permit from USFWS, and other wild mammals and birds must be transported under humane and healthful conditions. Graphics credit: Don MacLean/USFWS.

1909). The major amendments discussed herein are shown in Figure 1, a 120-year timeline with the major changes that show what taxa could be designated, what interests could be protected, what exceptions could be made, and which agencies were authorized to oversee the statute.

The term "injurious" has remained since the original statute. There is no definition of injurious, only the description from the current statute: "The importation into the United States, . . . of the mongoose . . . ; . . . fruit bats of the genus Pteropus; . . . zebra mussel; and such other species of wild mammals, wild birds, fish (including mollusks and crustacea), amphibians, reptiles, brown tree snakes, or the offspring or eggs of any of the foregoing which the Secretary of the Interior may prescribe by regulation to be injurious to human beings, to the interests of agriculture, horticulture, forestry, or to wildlife or the wildlife resources of the United States, is hereby prohibited" (U.S. Congress 1960). The term can be broadly applied to include species that have invasive traits, which include the ability to establish, spread in the wild, and cause harm (Lodge et al. 2006). A species

may also be listed for the direct harm it may cause, such as being a nonnative, venomous species or the host of a pathogen that can cause disease in humans or any of the other stated interests. For the latter, the salmon family and 20 genera of salamanders are injurious (USFWS 1968 and USFWS 2016, respectively) because they are hosts of harmful wildlife pathogens, not because the hosts themselves are harmful. Native species may be listed. No invertebrates besides mollusks and crustaceans can be listed, nor can any plants.

Several other Federal agencies have Congressional authority to regulate the importation of harmful live animals. For example, the Department of Health and Human Services' Centers for Disease Control and Prevention can regulate the importation of live animals that pose a disease risk to humans. The Department of Agriculture's Animal and Plant Health Inspection Service can regulate the importation of plants and animals that may pose a disease risk to agricultural animals and plants, including insects that harm livestock and eat plants and crops. These agencies are focused on disease prevention and harm to forestry, horticulture, and crops rather than on invasive wildlife or harm to wildlife (GAO 2010).

History

Origin of the Lacey Act

Near the end of the 19th century, in an era of expanding American dependence on homegrown agriculture, U.S. Department of Agriculture (Agriculture) biologists began witnessing extensive economic loss of crops caused by the importation of foreign wildlife. Clinton Hart Merriam, the first Chief of Division of Ornithology and Mammalogy for Agriculture, saw the harm that many foreign birds and mammals were causing to grain, seed, and vegetable crops. In 1886, he cautioned that, "The great calamity that has befallen our agricultural industries in the importation of the English Sparrow [*Passer domesticus* (Linnaeus, 1758)], and the threatened danger from the introduction of the European Rabbit [*Oryctolagus cuniculus*, referring to the damage already caused by European rabbits in Australia], should serve as timely warnings to an intelligent people and lead to legislation restricting the importation of foreign birds and mammals" (Merriam 1887; p. 258).

In 1898, Theodore S. Palmer (Agriculture's Assistant Chief of the Biological Survey) wrote, "The animals and birds which have thus far become most troublesome when introduced into foreign lands are nearly all natives of the Old World" (Palmer 1898, p. 90). The mammals he referred to were rats and mice, a rabbit of western Asia or southern Europe, carnivores (the stoat, weasel, house cat of Europe, and mongoose of India), and the large fruit-eating bats or flying foxes of Australia and the Malay Archipelago.

Two of the birds that Palmer singled out as noxious were the English sparrow and the European starling (*Sturnus vulgaris* Linnaeus, 1758). The sparrow and the starling were displacing native birds that devoured crop-destroying insects, and they were also eating the crops themselves. Palmer supported Merriam's conclusion that the introduction of foreign birds and mammals should be restricted by law, and the law should be under the authority of Agriculture.

Shortly thereafter, on May 25, 1900, the first major Federal wildlife statute in the United States was enacted (U.S. Congress 1900), and it introduced "injurious" as a Federal term (Figure 1). The law became known as "the Lacey Act" because it was introduced by U.S. Representative John F. Lacey from Iowa, despite it never being officially titled as such. John Lacey was heeding the Agriculture biologists' warnings that introduced foreign mammals (referred to as "animals" in the Lacey Act) and birds were causing great harm to U.S. agriculture (U.S. Congress-House 1900). One of the purposes stated for the Lacey Act was to "regulate the introduction of American or foreign birds or animals in localities where they have not heretofor existed." The authority for overseeing the law was given to Agriculture.

John Lacey simultaneously introduced a provision of the statute that covered broad protections of native wildlife and that is now more widely known to the public as the Lacey Act. That provision concerned wildlife trafficking across State lines (later broadened to include plants and trafficking of wildlife and plants from foreign countries; currently 16 U.S.C. 3371-3378). This paper is not about that law (often referred to now as title 16 of the Lacey Act), although a relationship exists because the injurious and the trafficking provisions originated together and some aspects regarding importing and transporting wildlife unlawfully obtained or possessed across State lines may overlap in certain circumstances with the injurious provisions. This clarification is made here because the public often incorrectly attributes aspects of the wildlife and plant trafficking provisions (title 16) to the injurious provisions of the Lacey Act (18 U.S.C. 42, or title 18). This paper is about the injurious provisions in title 18 (18 U.S.C. 42(a)) to provide information about the changes affecting the taxa of wildlife that could be prohibited from importation.

Lacey Act statute's injurious wildlife provisions (1900)

With the evidence supporting the harm from foreign mammals and birds, it is not surprising that the 1900 statute contained a provision stating, "The importation of the mongoose, the so-called "flying foxes" or fruit bats, the English sparrow, the starling, or such other birds or animals as the Secretary of Agriculture may from time to time declare injurious to the interest of agriculture or horticulture is hereby prohibited, and such species upon arrival at any of the ports of the United States shall be destroyed or

returned at the expense of the owner" (U.S. Congress 1900). In addressing the House of Representatives that was considering the bill on April 30, 1900, just prior to the passage of the bill, John Lacey astutely stated, "If this law had been in force at the time the mistake was made in the introduction of the English sparrow we should have been spared from the pestilential existence of that "rat of the air," that vermin of the atmosphere. But some gentlemen who thought they knew better than anybody else what the country needed saw fit to import these little pests, and they have done much toward driving the native wild bird life out of the States" (U.S. Congress-House 1900, p. 4871). Fruit bats, such as the Mariana fruit bat (*Pteropus mariannus* Desmarest, 1822) and the mongoose (*Herpestes javanicus auropunctatus* (Hodgson, 1836)) have remained injurious wildlife species since 1900. The unconditional import prohibition on the named injurious species could today be called a "black list" (species that are banned).

In addition, the 1900 Lacey Act specified a nearly blanket prohibition on the importation of all wild mammals and birds: "That it shall be unlawful for any person or persons to import into the United States any foreign wild animal or bird except under special permit from the United States Department of Agriculture" (U.S. Congress 1900). The inclusion of "wild" allowed for the importation of animals considered beneficial to agriculture, such as livestock and poultry, without a permit.

In today's vernacular, the wild mammals and birds that were approved to be imported with an Agriculture permit could be called a "white list" approach to importation, because only specifically approved shipments were allowed. The approval was case-by-case for shipments, not by species, according to the regulations for wild mammals and birds. The Treasury Department, which had jurisdiction over U.S. Customs, issued regulations in 1933 that codified the injurious provisions of the Lacey Act. The regulation reads: "Permits issued by the Department of Agriculture will be required for the release of any foreign wild animals or birds, other than natural-history specimens (preserved animals, birds, or reptiles) for museums or scientific collections; cage birds brought by passengers, . . . ; and alligators, lizards, snakes . . .), tortoises, and other reptiles and batrachians. The law applies to single animals or birds kept in cages as pets as well as to large consignments intended for propagation in capacity or otherwise" (U.S. Treasury 1933, p. 482). "Release" in this case referred to approved discharge of the shipment to the importer.

Thus, the original injurious species could not be imported for any reason – no permits could be granted. All other wild mammals and birds were also prohibited from importation unless a permit was granted by Agriculture. Other classes of animals were apparently not yet being imported in ways that caused worrisome harm to agriculture.

Injurious wildlife under Agriculture (1900 to 1939)

When the Lacey Act was first passed, the authority to oversee the law was placed with Agriculture's Division (changed to Bureau in 1905) of Biological Survey. The Secretary of Agriculture, in the first annual report to the House of Representatives after being delegated with the Lacey Act authority, stated that he was gratified to report that Congress "has absolutely prohibited the importation of the English sparrow, mongoose, starling, flying fox, and such other species as may be declared injurious to agriculture, and has also prohibited the shipment of such species from one State to another" (Palmer 1900, p. 40-41). He continues, "It is believed that this law will afford the United States greater protection against the introduction of injurious animals and birds than is enjoyed by any other country." Regarding the interstate prohibition, the Secretary was referring to section 3 of the statute: "That it shall be unlawful for any person or persons to deliver to any common carrier, or for any common carrier to transport from one State or Territory to another State or Territory, or from the District of Columbia or Alaska to any State or Territory, or from any State or Territory to the District of Columbia or Alaska, any foreign animals or birds the importation of which is prohibited, . . . " (U.S. Congress 1900). Later, this prohibition would become the subject of a legal debate (see *Interstate Transport* below).

The need for some adjustments to the new law soon became evident. In the Division of Biological Survey's first report after the Lacey Act took effect, Acting Chief Palmer noted that, "During the first three months after the law went into operation permits were required for practically all foreign animals, birds, and reptiles." To "avoid the trouble and annoyance incident to securing permits for the importation of well-known harmless species," the Secretary of Agriculture issued an order that exempted 30 of the largest and best known mammals, 3 well-known groups of birds, and all reptiles on September 13, 1900 (Palmer 1901, p. 155). But reptiles that had already been imported were causing worry in Hawaii. So, in 1902, at the request of the Chamber of Commerce in Honolulu and of some of the sugar planters of Hawaii, an order was issued requiring permits for all reptiles imported into the Territory and prohibiting the entry of venomous species (Merriam 1902). In June 1905, restrictions were extended to cover all snakes, not just venomous ones (Henshaw 1906). While these orders did not designate the species "injurious," they did place further limits on wild animal imports.

Another issue became apparent that led to a new law allowing the introduction of eggs of game birds (such as quail, pheasants, and ducks) for propagation. In 1902, John Lacey recognized the stringency of the 1900 act under which such eggs could not be imported. The new law gave the Secretary of Agriculture the power to authorize the importation of eggs for

propagation only (not consumption) and to prescribe rules and regulations for this purpose (U.S. Congress 1902).

The Secretary of Agriculture added species to the injurious list only once, which was on December 26, 1935, and the order took effect February 20, 1936 (USDA 1936). Many of the added species had been assessed as noxious by Agriculture more than 30 years earlier (Palmer 1898), and continuing economic studies showed potential harm to agriculture (USDA 1936). The species added to the injurious list in 1936, thus unconditionally prohibited from importation, were the following birds and mammals (not identified by scientific name): the European skylark, common or house myna, crested or Chinese myna, European bullfinch, European yellowhammer, greenfinch, chaffinch, the black or house rat, roof rat, common or brown rat, common or house mouse, European rabbit, European hare, all species of mongooses of the family Mungotidae, and all species of fruit bats of the family Pteropodidae (USDA 1936). The Chief of the Bureau of Biological Survey explained the need to add the species to the banned list by noting the effectiveness of the Lacey Act, "It is gratifying to [report] that no forbidden species of bird or mammal has established a foothold in the United States since 1900. The English sparrow and starling had already become established in this country at the time the Lacey Act was passed, but their numbers have not been augmented by any further importations" (USDA 1936, p. 59). The fate of the order is unclear, since it was not amended into the statute.

Agriculture's Bureau of Biological Survey, which had been formed in 1905 (Henshaw 1906), was delegated with wildlife responsibilities, such as overseeing the national wildlife refuges and controlling predators. Under an Executive Branch reorganization to consolidate government agencies in 1939, the Bureau of Biological Survey in Agriculture and the Bureau of Fisheries in the Department of Commerce and their functions were transferred to the U.S. Department of the Interior (Interior) (U.S. Congress 1939), effective July 1, 1939. The former bureau included the conservation of wildlife, game, and migratory birds. On July 1, 1940, the Bureau of Biological Survey and the Bureau of Fisheries were combined to form the "Fish and Wildlife Service" in Interior (White House 1940; Figure 1) and subsequently preceded by "United States" in 1956.

Injurious wildlife under USFWS (1940 to 2020)

The next amendment to the law came on June 25, 1948 (U.S. Congress 1948a). This maintained the critical language that kept the law a "white list" ("No person shall import into the United States any foreign wild animal or bird, except under special permit from the Secretary of the Interior"). The amendment updated the authority language from the Secretary of Agriculture to the Secretary of the Interior and was rolled into a larger bill that included other aspects of crimes and criminal procedures (U.S. Congress 1948a).

However, a major weakening of import prohibitions came with another amendment a mere 4 days later on June 29 (U.S. Congress 1948b). This latter amendment removed the sentence "No person shall import into the United States any foreign wild animal or bird, except under special permit from the Secretary of the Interior." The amendment was already in discussion on June 12, 1948, regarding S. 1447 (U.S. Congress-House 1948) because of the concern by Congress that wild animals were being shipped under inhumane or unhealthful conditions. The existing permit requirement could not remedy the shipping conditions because the statute gave no discretion to the Secretary for issuing or refusing to issue a permit (U.S. Congress-House 1948). In other words, the Secretary must issue the permit if requested.

The amended statute removed the existing permit requirement, which was deemed of little benefit other than keeping records of imports, and replaced it with a subsection on the prohibition of shipping under inhumane and unhealthful conditions, including new permit requirements. In making this change, the entire sentence with the permit requirement was eliminated, including the first clause of the sentence ("No person shall import into the United States any foreign wild animal or bird"), although no discussion was given why this clause was removed. Thus, the Lacey Act changed from a nearly blanket ban of foreign wild mammals and birds with some exceptions (the case-by-case shipments) to a nearly blanket allowance of all such imports unless specifically prohibited (the injurious species). The deletion of this language dramatically reduced the ability of the Lacey Act to protect the United States against harmful species because any species, even potentially harmful ones, could be imported freely unless an affirmative action was taken to designate them as injurious. All that was left was the small number of injurious species that were still unconditionally prohibited from importation (Figure 1). The responsibility of proving injuriousness was placed on the USFWS.

Throughout the 40 years of Agriculture's oversight, the general ban on imports of wild mammals and birds left little need to declare new species as injurious. When USFWS received the authority in 1940, the purpose of the Act remained to protect the interests of agriculture or horticulture, thus minimizing the priority for the wildlife agency to take action. Four years after the change with the 1948 amendment, USFWS issued its first injurious regulation (for mynahs, starlings, European rabbits, and European hares; USFWS 1952), which included regulations under the provisions of another statute for birds (19 U.S.C. 1201, par. 1671). The latter statute was related because it prohibited the importation of the eggs of wild birds, except those of game birds, for propagating purposes.

In 1960, Congress passed legislation to clarify, and make more inclusive, certain provisions related to the importation of injurious species upon recommendations from Interior, the American Association of Zoological

Parks and Aquariums, and the American Society of Ichthyologists and Herpetologists (U.S. Congress-Senate 1960). Clarifications included changing "animals" to "mammals" and providing scientific names to the injurious species. The legislation significantly strengthened the injurious wildlife provisions by adding fishes, mollusks, crustaceans, reptiles, and amphibians to the categories of species that could be designated as injurious (Figure 1), because more venomous snakes, piranhas, and other animals were being imported for private zoos and aquaria and were escaping. Congress also added more categories of interests that could be affected as justification for designating species. These were injury to human beings, forestry, or to wildlife or wildlife resources of the United States. Congress also clarified the definition of "wild" that refers to any creature normally found in the wild state and clarified the shipment clause (see *Interstate Transport* below). No distinction between wild and domestic was made for fishes, amphibians, reptiles, mollusks, and crustaceans.

The amendment also changed the mechanism for designating species as injurious from "as the Secretary of the Interior may declare to be injurious" to "which the Secretary of the Interior may prescribe by regulation to be injurious." Until then, the Secretary of the Interior had not used the declaration authority but had promulgated one regulation (USFWS 1952). The use of the word "may" instead of "shall" has remained constant since 1900 and is notable because it has never required the Secretary to take action to declare or to promulgate a regulation. This discretion may contribute to the relatively few species added to the list, given Interior's numerous priorities and finite capacity. An example of an Interior priority is the Endangered Species Act, which uses the word "shall," and thus mandates action as instructed in that Act.

There was also a subtle weakening of the Lacey Act as an invasive management tool, however, with the addition of permit exceptions for injurious species. This removed the unconditional prohibition and allowed injurious species to be imported for the first time under limited conditions. Permits were restricted to scientific, educational, medical, and zoological purposes. Because agricultural use was not one of the acceptable permit purposes, the only nods to supporting agriculture were maintaining "agriculture" and "horticulture" as justifications for listing, and maintaining the adjective "wild" for mammals and birds, a holdover from the original law so that certain domesticated mammals and birds (including livestock and poultry) would not be listed.

The 1960 amendment also removed the English sparrow and the European starling from the statute (U.S. Congress 1960) as injurious species because the birds had extended their ranges throughout the country and no feasible means for controlling their numbers or ranges had been devised (U.S. Congress-House 1960). This does not necessarily mean that the law failed, because the birds were listed decades after they were

already widespread, abundant, and established in U.S. environments. Another minor change was clarifying the species of mongoose as *Herpestes auropunctatus* and the genus of flying foxes as *Pteropus*.

No other subsequent amendments to 18 U.S.C. 42(a) fundamentally changed the injurious wildlife provisions, but a few added species as injurious: zebra mussel (*Dreissena polymorpha* (Pallas, 1771)) (U.S. Congress 1990), brown tree snake (*Boiga irregularis* (Bechstein, 1802)) (U.S. Congress 1991), bighead carp (*Hypophthalmichthys nobilis* (Richardson, 1845)) (U.S. Congress 2010), and quagga mussel (*D. rostriformis* or *D. bugensis* Andrusov, 1897) (U.S. Congress 2018). All of these species were established in the United States when they were listed. The zebra mussel had been unintentionally introduced into the Great Lakes in ballast water, and the listing was aimed at preventing introduction into other watersheds, such as the Chesapeake Bay (U.S. Congress 1990). The brown tree snake listing was "necessary to prevent the inadvertent introduction of brown tree snakes into other areas of the United States from Guam" (U.S. Congress 1991). The bighead carp was listed with the interpretation that interstate transportation was prohibited, and the species could be kept from other watersheds. A benefit of listing the quagga mussel is similar to that for zebra mussels, because both are carried in ballast water and could be transported into new watersheds from other countries. Another benefit is that zebra and quagga mussels are often inadvertently carried on boats and trailers, and the listing would prohibit importation on boats being trailered from Canada into Alaska and the contiguous States and from Mexico.

The primary mechanism to add injurious species involves USFWS promulgating a rule to amend the regulations. This can be a lengthy process of proposed rulemaking, public comment, peer review, and final rulemaking under the Administrative Procedure Act (U.S. Congress 1946) that may take several years and cost tens of thousands of dollars. The USFWS has made improvements to its ability to predict invasiveness of nonnative species through modeling and studying the invasive history of high-risk species elsewhere in the world. The great strength of the current statute, as in all previous versions, is that species can be designated as injurious before they are introduced into the environments of the United States, thereby preventing the harm they could cause. In fact, most species listed as injurious are not established in the United States. However, listing species already established is occasionally done by USFWS for various reasons, such as keeping species from accessing disjunct regions, documenting support for listing closely related species not yet introduced, and reducing the opportunity to introduce hardier or diseased individuals.

Interstate transport

As noted above, interstate transport of species prohibited from importation made its debut in the 1900 statute (U.S. Congress 1900). Section 2 of the

statute explained what was prohibited from import (anything designated as injurious and any wild mammal or bird without a permit), and section 3 explained that those species could not be transported from one State or Territory to another. Also as noted above, the Report to Congress by the Secretary of Agriculture for the Fiscal year ending June 30, 1900, made it clear that he believed the statute ". . . has also prohibited the shipment of such species from one State to another" (referring to anything designated as injurious and any wild mammal or bird without a permit) (Palmer 1900). However, the history of the closely related components of the Lacey Act (currently 18 U.S.C. 42 and 16 U.S.C. 3371-3378) complicates the understanding and interpretation of the interstate provisions of both laws, but a discussion of 16 U.S.C. 3371-3378 is not the focus of this paper. Because most species are not established at the time of listing, the effectiveness of stopping importation and thus preventing establishment can be analyzed without reviewing what happens once a species is introduced and can be transported across State lines.

The background for understanding the last 60 years of interstate transport authority is simplified here. In 1960, Congress amended the statute to prohibit "any shipment between the continental United States, the District of Columbia, Hawaii, the Commonwealth of Puerto Rico, or any possession of the United States . . ." (U.S. Congress 1960). Since the 1980s, Interior (and Congress in some cases when listing species) interpreted this "shipment clause" language to include transportation between the States in the continental United States. In 2017, the D.C. Circuit court found that the plain language of 18 U.S.C. 42(a)(1) does not prohibit the transportation of injurious wildlife between States within the continental United States (DCC 2017). The decision took effect on April 7, 2017, for all existing and future injurious listings. As a result, the transportation of injurious wildlife between the contiguous 48 States and Alaska is not prohibited by the statute, unless such movement is restricted due to conditions associated with previously issued permits. As is typical of appellate cases, there is more complexity than can be explained succinctly here, but the point is that, for various reasons, the application of this provision has been inconsistent during the history of injurious listing.

Discussion

One hundred twenty years ago, the United States stood as having greater protection against the introduction of injurious mammals and birds than was experienced by any other country (Palmer 1900). When Congress passed John Lacey's bill, foreign wild birds or mammals could not be imported without a permit from the Secretary of Agriculture. Considering the time in history and the purpose of the law, this seemed to be effective at preventing invasions, because relatively few fishes, amphibians, reptiles, or

invertebrates were being imported. Other than mammals and birds, wild animals were being imported primarily for zoological display.

However, as factors regarding live animal imports changed (such as increased global trade and improved survival rates of transported animals), the injurious provisions of the Lacey Act did not change correspondingly with the increasing risks associated with invasive species. In 1948, most of the existing prevention benefits of the law were eliminated, leaving importation of live animals wide open, except for a small number of injurious mammal and bird species. The deletion from the June 29, 1948, amendment of the sentence prohibiting importation except with a permit raises the question: why was the first phrase deleted if the real concern was that the Secretary had no discretion in denying requests for permits? The discussion in Congress prior to the June 29 amendment centered on concern for the "appalling" conditions that many animals endured during long ocean voyages to the United States but did not mention removing the import prohibitions on wild mammals and birds (U.S. Congress-House 1948). If Congress was so concerned about animals being imported under inhumane conditions, why would they suddenly remove "No person shall import . . . any foreign wild bird or mammal . . . ," thus allowing many more animals to be imported? It would seem to make more sense simply to add the humane transport conditions to the existing law.

The lawmakers that were debating the permit language possibly did not want to hold up the comprehensive June 25 amendment with new language and knew they could amend the injurious section shortly afterward. But in that subsequent amendment, Congress could have been so focused on quickly obtaining the humane conditions for shipping that they overlooked how the deletion of the entire sentence would affect other aspects of the law. Similarly, another sentence from the June 25 amendment was seemingly left out of the June 29 amendment: "(b) Whoever violates this section shall be fined not more than $500 or imprisoned not more than six months, or both." This sentence was the only explanation of the penalty in the statute, and it was restored verbatim in the 1949 amendment (U.S. Congress 1949). In testimony to the U.S. House of Representatives for the 1960 amendment, Lansing A. Parker, Assistant Director of the Bureau of Sport Fisheries and Wildlife under Interior stated that, "when the Lacey Act was amended in [June 29] 1948 the part relating to the person transporting it himself was inadvertently omitted . . . ." (U.S. Congress-House 1960). Thus, it is not unreasonable that another inadvertent omission was made in the same amendment.

Before the 1948 amendments, all wild mammals and birds were generally prohibited from being imported, and there likely was not much incentive to undergo additional actions to add to the list of injurious species. The second 1948 amendment placed a great burden on the fledgling USFWS to add more species to the injurious list by regulation or

Secretarial declaration. Other factors added to the increased burden. For example, aviation was advancing, making rapid transoceanic transport a more reliable way to import live animals safely. The first consignment of birds and mammals to cross the ocean by air arrived on the dirigible Graf Zeppelin at Lakehurst, New Jersey, from Germany on August 4, 1929, carrying a gorilla, a chimpanzee, and 593 canaries (USDA 1930). Other transatlantic flights followed.

Over the ensuing decades, live animal imports of potentially injurious species have grown in numbers and in variety of species (Jenkins 2007). Two aspects of the law that seemed to remain constant through all amendments were a lack of a statutory mandate to designate species as injurious and a lack of specifically appropriated funding. Without a strict mandate, little funding, and (until 1960) no conservation purpose authorized, injurious listings may have been a difficult undertaking for USFWS.

The 1960 amendment did increase the authority for USFWS by adding the remaining vertebrate classes and two invertebrate groups and by adding more purposes for listing. However, the new permit section removed the unconditional prohibition on the listed injurious species. What remains more than a half-century later is the authority to promulgate regulations limited to prohibiting the importation and transport of wild vertebrates, mollusks, and crustaceans between the shipment clause jurisdictions with permit exceptions for scientific, educational, medical, and zoological purposes, while otherwise not prohibiting interstate transport on the continent.

Conclusion

The Lacey Act of 1900 was the United States' first nationwide wildlife law, and it protected against importation of foreign species that caused injury to agriculture and horticulture. It unconditionally prohibited a small set of wild mammal and bird species designated as injurious from importation, and prohibited other wild mammals and birds from importation without a permit. Almost a half century later, an amendment to the law maintained the unconditional import prohibition for the enumerated injurious species but did not prohibit the importation of other wild mammals and birds. Lastly, the 1960 amendment expanded the taxa that could be designated as injurious (all vertebrates and mollusks and crustaceans) as well as adding interests to protect, but allowing for permit exceptions for injurious species. This retrospective view of the transformation of the injurious wildlife law, coupled with the change in authority from Agriculture to Interior, sheds light on when and why amendments were made and can help resource managers interpret how the law has contributed to keeping harmful nonnative species at bay.

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