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THE INTRODUCTION OF EXOTIC SPECIES INTO THE UNITED STATES: THERE GOES THE NEIGHBORHOOD!

*Julianne Kurdila**

I. INTRODUCTION

The introduction of species from abroad into United States ecosystems is not a new phenomenon.¹ The 19th century saw the deliberate introduction of the house sparrow,² brown trout,³ and ringneck pheasant.⁴ These and many other exotic species provide new food sources⁵ and sporting challenges.⁶ The European travelers who introduced these exotics into the United States, however, did not realize that many of the newly imported species were harming the environment.⁷ Thus, Congress responded to the wave of introductions by restricting the importation of certain species through the passage of the Lacey Act⁸ in 1900.

Unfortunately, even with its subsequent amendments, the Lacey Act does not provide adequate protection for United States ecosystems today. Numerous introductions have resulted in the loss of native animals and the disruption of sound ecological systems.⁹ Pend-

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The author dedicates this Comment to the memory of Gerald A. Kurdila (1936-1987), a good friend and a true inspiration.

¹ See, e.g., G. LAYCOCK, THE ALIEN ANIMALS 1-3 (1966) [hereinafter ALIEN ANIMALS].

² *Id.* at 68.

³ *Id.* at 38.

⁴ *Id.* at 19.

⁵ See *infra* notes 26-27 and accompanying text.

⁶ See *infra* notes 18-20 and accompanying text.

⁷ See Laycock, *The Importation of Animals*, 63 SIERRA 20 (1978).

⁸ Ch. 553, 31 Stat. 187 (current version at 16 U.S.C. §§ 3371-3378 (1982 & Supp. IV 1986)).

⁹ See ALIEN ANIMALS, *supra* note 1, at 2-3.

ing introductions continue to threaten local and regional environments.¹⁰ In addition, states lack uniformity in their policies and procedures for exotic introduction.¹¹ Thus, if one state chooses to introduce a certain species, it can do so regardless of its neighboring states' wishes.¹²

Realizing a need for uniformity in exotic introduction procedures, President Carter promulgated Executive Order 11,987 in 1977.¹³ The Order directed executive agencies to restrict the introduction of exotic species into ecosystems that the agencies regulate, and urged the agencies to persuade local and state governments to do the same.¹⁴ The Order also empowered the Secretary of the Interior and the Secretary of Agriculture to develop and implement procedures to govern the introduction of exotic species throughout the United States.¹⁵ The procedures, however, were never finalized and the promise of Executive Order 11,987 slowly diminished.¹⁶

This Comment argues that uniform procedures for the introduction of exotic species into the United States are necessary to achieve the safest possible introductions. Such procedures would promote regional environmental planning and would prevent interstate disputes which occur when state laws differ on exotic introduction. The Lacey Act and other statutes do not provide adequate protection for United States ecosystems because they only indirectly affect exotic introduction procedures. Thus, the Departments of the Interior and Agriculture should promulgate such uniform procedures pursuant to Executive Order 11,987. Alternatively, Congress should enact legislation, similar to the Lacey Act, which addresses the introduction of exotic species directly.¹⁷

The second section of this Comment presents background on the introduction of exotic species, focusing on the benefits and detriments of such introductions. The third section discusses statutes and

¹⁰ See, e.g., North Central Division of the American Fisheries Society, Resolution (1986) (regarding the planned introduction of the zander into North Dakota).

¹¹ See *infra* notes 124-136 and accompanying text.

¹² See *infra* notes 125-129 and accompanying text.

¹³ Exec. Order No. 11,987, 3 C.F.R. 116 (1977) *reprinted in* 42 U.S.C. § 4321 (1982).

¹⁴ *Id.* at § 2(a).

¹⁵ See *id.* at § 3.

¹⁶ See W. BROWN, *The Federal Role in Regulating Species Introductions Into the United States*, in *EXOTIC SPECIES IN MARICULTURE* 258, 262-63 (R. Mann ed. 1979).

¹⁷ For the purposes of this Comment, "exotic" species are defined as those species not native to the United States. The "introduction" of a species refers to its deliberate release into an ecosystem, while "import" simply means that the United States has received a species delivered from outside the United States.

executive actions that, directly and indirectly, affect the approval process of exotic introductions in the United States. In addition, the third section provides a current example of a proposed controversial introduction. Finally, this Comment proposes uniform procedures for regulating the introduction of exotic species, including suggestions for implementing the procedures.

II. BACKGROUND

A. *The Benefits of Exotic Introduction*

A properly introduced exotic species can provide benefits in its new ecosystem. One of the most common reasons for introducing an exotic species is the sporting benefits a new species can provide.¹⁸ For example, in the 1800s brown trout often accompanied Europeans who were traveling to new parts of the world.¹⁹ The brown trout was a favorite sport fish of the Europeans and continues to present a challenge to skilled anglers today.²⁰

The introduction of an exotic species into a new ecosystem can also provide commercial benefits.²¹ For instance, some of the Hawaiian Islands introduced the mongoose for the purpose of depleting native cane rats that had been feasting on the sugar cane crop.²² The introduction of aquatic species is often commercially motivated as well.²³ Aquatics are sometimes stocked simply because of the need for a larger number of commercially available species.²⁴ For example, many areas of the western United States introduced Pacific oysters in response to the depletion of native fisheries and the absence of similar species.²⁵

In addition to sport and commercial benefits, an exotic species can also increase the food supply of the region into which it is intro-

¹⁸ See Welcomme, *International Measures for the Control of Introductions of Aquatic Organisms*, 11 FISHERIES 4, 5 (1986) (improvement of recreational fishing as one of the earliest motives for introduction). See also Laycock, *supra* note 7, at 20.

¹⁹ ALIEN ANIMALS, *supra* note 1, at 38.

²⁰ *Id.* at 39.

²¹ Welcomme, *supra* note 18, at 6.

²² Laycock, *supra* note 7, at 21. The mongoose itself then became a pest in the Islands. *Id.*

²³ Welcomme, *supra* note 18, at 6.

²⁴ See R. MANN, *Exotic Species in Aquaculture: An Overview of When, Why and How*, in EXOTIC SPECIES IN MARICULTURE 331, 331-32, 336 (R. Mann, ed. 1979).

²⁵ *Id.* at 336, 352 n.1. "In most cases, *C. gigas* [Pacific oysters] was imported to fill a vacated (or predominantly so) ecological niche to return a fishery from a state of 'have-not' to a state of 'have.'" *Id.* at 336.

duced.²⁶ The ringneck pheasant, for example, is not only hunted for sport, but is also a food supply for those who hunt it.²⁷

The introduction of an exotic species into a new ecosystem can also increase the numbers of a species nearing extinction in its native ecosystem. For instance, New Mexico imported the oryx from Africa and introduced it to the United States.²⁸ The oryx type of antelope was close to extinction in its native Africa.²⁹ While there is little chance of a population explosion, the oryx has already reproduced enough to allow limited hunting.³⁰

Another benefit of exotic introduction is that introduced exotic species can beneficially control disease and water weeds in the new ecosystem.³¹ For example, certain species of fish have been introduced into tropical areas to eat mosquitos and arrest the spread of diseases carried by the insect.³²

A final reason for introducing an exotic species into a new environment is sentiment. For instance, Europeans introduced a long list of songbirds into the United States in the 1800s.³³ Species such as starlings, nightingales, blackbirds and song thrushes were introduced into major cities such as Cincinnati, St. Louis, Portland and Philadelphia, regardless of the fact that those cities contained an abundance of beautiful native birds.³⁴

Thus, an exotic species placed into a new ecosystem may provide sport, commercial advantages, food, and other benefits to the new environment. Beneficial results of exotic introduction, however, are not automatically assured. Even well-intentioned introductions can produce catastrophic results.³⁵

²⁶ See, e.g., ALIEN ANIMALS, *supra* note 1, at 34, 38.

²⁷ See *id.* at 34. The ringneck pheasant also provides economic benefits to those areas that stock it. *Id.*

²⁸ T. LUND, AMERICAN CASES IN WILDLIFE LAW 68 (1980).

²⁹ *Id.*

³⁰ See *id.*

³¹ Welcomme, *supra* note 18, at 7; C. KOHLER AND J. STANLEY, *A Suggested Protocol for Evaluating Proposed Exotic Fish Introductions in the United States*, in DISTRIBUTION, BIOLOGY AND MANAGEMENT OF EXOTIC FISHES 387 (W. Courtenay & J. Stauffer eds. 1984).

³² See Welcomme, *supra* note 11, at 7. Critics of such introductions contend that the introduced fish eats native fish and larvae as well as the mosquitos. *Id.* The benefits of introducing such a fish may nonetheless outweigh the detriments. See *id.*

³³ Laycock, *supra* note 7, at 20.

³⁴ *Id.* at 20-21.

³⁵ See G. NEWKIRK, *Genetic Aspects of the Introduction and Culture of Nonindigenous Species for Aquaculture*, in EXOTIC SPECIES IN MARICULTURE 193 (R. Mann ed. 1979); Laycock, *supra* note 7, at 22.

B. The Detriments of Exotic Introduction

The common carp is a prime example of good intentions gone awry. Imported from Germany in the 1870s, the carp promised to be an abundant food source.³⁶ Congress supported carp importation, and several representatives enthusiastically pushed for carp introduction into their home states.³⁷ Unfortunately, carp is now considered to be a serious problem nationally.³⁸ Carp have rampantly invaded the waters of native species.³⁹ Their promise as a food source deteriorated as the carp adjusted to its new environment in the United States and lost its pleasing flavor.⁴⁰

The Hawaiian introduction of the myna bird is another good example of the possible detrimental effects of well-intentioned introductions. Hawaii introduced the myna bird to remove pesty cutworms and army worms from sugar cane.⁴¹ The myna succeeded in consuming the worms and in helping control the worm population.⁴² The myna, however, also feasted on the fruit of the recently introduced lantana plant and in so doing excreted lantana seeds throughout the state.⁴³ The rampant spread of the lantana plant caused it, too, to become a pest.⁴⁴ Hawaii then had to introduce an exotic parasitic insect to respond to the lantana problem.⁴⁵

In addition to helping create the lantana problem, the myna birds' incessant warbling at all hours of the day and night irritated island residents and hotel guests.⁴⁶ In fear of an economic repercussion because of the irritating noise, hotel managers employed numerous tactics, including the use of firecrackers and high frequency sound waves, to try to reduce the number of mynas.⁴⁷ These examples

³⁶ Laycock, *supra* note 7, at 20.

³⁷ *Id.*

³⁸ Raloff, *An Exotic Problem*, 117 *SCIENCE NEWS* 398 (1980). At least two states, Ohio and Missouri, banned carp introduction. Laycock, *supra* note 7, at 21.

³⁹ Laycock, *supra* note 7, at 20.

⁴⁰ Raloff, *supra* note 38, at 398. Although Missouri banned the carp from its waters, it is nonetheless plagued with the problems of carp introduction because of Arkansas' introduction of the species. *See infra* notes 152-157 and accompanying text.

⁴¹ ALIEN ANIMALS, *supra* note 1, at 113.

⁴² *Id.*

⁴³ *Id.* at 114.

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ *Id.* at 112.

⁴⁷ *See id.* at 112-13. Because of the problems the myna bird caused in Hawaii, California deliberately killed mynas that were inadvertently introduced into Los Angeles. *Id.* at 115.

illustrate that even rationally based introductions can lead to disastrous results.

The introduction of an exotic species can have other detrimental effects in its new ecosystem. One such effect is the competition that may arise between the exotic species and one or more native species.⁴⁸ This competition can manifest itself in a variety of ways. Competition for food is a common concern.⁴⁹ Dietary overlap has proved detrimental to some native species.⁵⁰ For instance, burros introduced into the Northwest United States have diminished the main food source of native bighorn sheep and seed-eating birds by consuming an inordinate amount of forage.⁵¹ The problem was so great in Bandalier National Monument that the Court of Appeals for the Tenth Circuit upheld the power of the National Park Service to eliminate exotic burros in the Monument.⁵² A National Park Service Report indicated that the burros were a threat to vegetation and to archaeological ruins in the Monument.⁵³

Introduced exotic species also compete for space and can aggressively displace native species.⁵⁴ For example, spawning carp arguably contribute to nest desertion and a higher mortality rate among some native species, including cenerarchids.⁵⁵ Similarly, brown trout have displaced native salmonids.⁵⁶ Such displacement can result in ecological imbalance and in economic loss if the introduced species is not of comparable or superior economic value.⁵⁷

Predation is also a problem for natives whose ecosystem is invaded by an exotic. The brown trout, for instance, feeds on numerous varieties of native fish.⁵⁸ Non-aquatic introduction often results in

⁴⁸ J. TAYLOR, W. COURTENAY & J. MCCANN, *Known Impacts of Exotic Fishes in the Continental United States*, in DISTRIBUTION, BIOLOGY AND MANAGEMENT OF EXOTIC FISHES, *supra* note 31, at 322, 341 [hereinafter J. TAYLOR].

⁴⁹ *Id.*

⁵⁰ See Laycock, *supra* note 7, at 22. In aquatic species, however, dietary overlap indicates only the potential for competitive activity. Kohler & Courtenay, *American Fisheries Society Position on Introductions of Aquatic Species*, 11 FISHERIES 39, 40 (1986).

⁵¹ Laycock, *supra* note 7, at 21-22. The burros consumed ten tons of forage daily in Death Valley alone. *Id.* at 22.

⁵² *American Horse Protection Ass'n v. Department of the Interior*, 13 Env't'l L. Rep. (Env't'l L. Inst.) 20465 (10th Cir. 1982).

⁵³ *Id.*

⁵⁴ J. TAYLOR, *supra* note 48, at 346.

⁵⁵ See *id.* at 349.

⁵⁶ *Id.* at 347.

⁵⁷ NEWKIRK, *supra* note 35, at 193.

⁵⁸ J. TAYLOR, *supra* note 48, at 343.

the loss of native vegetation.⁵⁹ Indeed, introduced exotics have been labelled "biological pollutants" because of this potential to harm new environments.⁶⁰ The burros in the Northwest are one example of introduced species which threaten native vegetation.⁶¹ In addition, scientists believe that feral goats introduced on San Clemente Island off the Southern California coast are responsible for the destruction of eight species of endemic plants, as well as the endangerment of an additional eight species.⁶² Likewise, the introduced feral pig is at least partially responsible for destroying vegetation in the Great Smoky Mountains.⁶³ Eighty-eight percent of the ground is bare in areas inhabited by the pig, while uninhabited areas show no bare ground.⁶⁴ The introduced pigs also change the composition of the soil, in turn altering the fertility of the soil.⁶⁵

Hybridization of exotic and native species is another potential detriment and can cause genetic deterioration.⁶⁶ Although naturally occurring hybridization among aquatics is rare,⁶⁷ such hybridization often causes the creation of pests or the regression of one or the other parent into a pest.⁶⁸ Inbreeding among closely related species can also produce offspring with reduced growth rates and survival.⁶⁹

Exotics may carry foreign bacteria, viruses, or parasites that threaten native species.⁷⁰ Perhaps one of the most severe threats to native aquatic species is the threat of disease carried by introduced exotic species.⁷¹ For example, penaeid shrimp introduced from Pan-

⁵⁹ See, e.g., Miller, *Invasion of the Ecosystem*, 127 SCIENCE NEWS 410 (1985); ALIEN ANIMALS, *supra* note 1, at 151.

⁶⁰ Raloff, *supra* note 38, at 398.

⁶¹ See Laycock, *supra* note 7, at 22. See *supra* notes 50-53 and accompanying text for a discussion of the burro's effect on food supply in its new ecosystem.

⁶² *Id.*

⁶³ Miller, *supra* note 59, at 410.

⁶⁴ *Id.*

⁶⁵ See *id.*

⁶⁶ Kohler & Courtenay, *supra* note 50, at 40.

⁶⁷ *Id.* Brown trout, however, have hybridized with native species in North America. *Id.*

⁶⁸ NEWKIRK, *supra* note 35, at 194.

⁶⁹ See *id.* at 199. Newkirk proposes a selective breeding program when aquatic species are introduced into an ecosystem. See *id.* at 205. Such a program would insure that a species is reproducing with itself and not with a native species. *Id.* at 205-06.

⁷⁰ Kohler & Courtenay, *supra* note 50, at 40. The Department of Agriculture, through the Animal & Plant Health Inspection Service, is empowered to inspect most plants and animals being imported into the United States. 9 C.F.R. §§ 92.1-92.43 (1987). The inspection includes comprehensive disease testing. See *id.* Exotic species may nonetheless carry diseases new to the United States which prove detrimental to its ecosystems. See Kohler & Courtenay, *supra* note 50, at 40.

⁷¹ See *id.*

ama infected Hawaiian shrimp with hypodermal and hematopoietic necrosis (IHHNV).⁷² IHHNV is pathogenic and mortalities from the virus have been documented.⁷³ Because of the Department of Agriculture's Animal and Plant Health Inspection Service, which is authorized to inspect imported animals, disease introduction may be less probable today than in the past. Nonetheless, any exotic species is capable of carrying a disease that is hard to detect.⁷⁴

These examples indicate that the introduction of an exotic species into a new environment can threaten, as well as benefit, the site proposed for introduction.⁷⁵ They also indicate a need for timely comprehensive research on the potential effects of the proposed introduction. An analysis of the benefits and detriments of exotic introduction leads to the conclusion that it is difficult to predict which introductions will harm the new ecosystem. Thus, it is necessary and productive to focus on the process of decisionmaking that determines which species will be permitted to enter the United States.

III. AUTHORITY AFFECTING THE APPROVAL PROCESS OF EXOTIC INTRODUCTIONS IN THE UNITED STATES

A. Executive Order 11,987

The primary federal authority for the introduction of exotic species into the United States is Executive Order 11,987, issued in 1977.⁷⁶ Recognizing a need for ecological conservation, President Carter promulgated the Order to restrict the introduction of exotic species into U.S. ecosystems.⁷⁷ Under the Order, executive agencies were authorized to restrict the introduction of exotic species into any ecosystem which the agency owned, leased, or held for administrative purposes.⁷⁸ The Order also directed executive agencies to encourage state governments, local governments and private citizens to prevent the introduction of exotic species into any United States ecosystem.⁷⁹

⁷² *Id.*

⁷³ Sindermann, *Strategies for Reducing Risks from Introductions of Aquatic Organisms: A Marine Perspective*, 11 *FISHERIES* 10, 13-14 (1986).

⁷⁴ See *supra* note 70.

⁷⁵ See *ALIEN ANIMALS*, *supra* note 1 for a discussion of the introduction of twenty-one species of wildlife into the United States.

⁷⁶ Exec. Order No. 11987, 3 C.F.R. 116 (1977) reprinted in 42 U.S.C. § 4321 (1982).

⁷⁷ *Id.* § 2(a).

⁷⁸ *Id.*

⁷⁹ *Id.*

The Order empowered the Secretary of Interior and the Secretary of Agriculture to promulgate and implement uniform rules and regulations governing the introduction of exotics into United States ecosystems.⁸⁰ It also allowed the Secretaries of Interior and Agriculture to grant permission for certain exotic introductions if the proposed introduction would not adversely impact the natural ecosystem.⁸¹

At first blush, Executive Order 11,987 was encouraging. It was the only attempt to regulate exotic introduction into the United States directly. The Order called for uniform guidelines in introducing all breeds of exotic animals and it allowed for the responsible introduction of exotics. Unfortunately, the authorized guidelines were neither finalized nor implemented.⁸² Until the Departments of Interior and Agriculture exercise their duty to formulate the guidelines, or until Congress addresses the issue, the introduction of exotic species into United States ecosystems will not be federally controlled.

B. *The Lacey Act*

Although no comprehensive federal statute regulates the introduction of exotic species into the United States, the Lacey Act⁸³ directly regulates the importation of exotics and thus indirectly affects exotic introduction. As originally enacted in 1900, the Lacey Act aided states in controlling the interstate commerce of certain wildlife by restricting the importation of mongooses, fruit bats, English sparrows, starlings, and "such other birds or animals as the Secretary of Agriculture may from time to time declare injurious to the interest of agriculture or horticulture"⁸⁴ The term "birds or animals" was initially interpreted to apply only to game birds and fur bearing mammals.⁸⁵ In response to this interpretation, Congress passed the Black Bass Act⁸⁶ in 1926 to protect certain species of

⁸⁰ *Id.* § 3.

⁸¹ *Id.* § 2(d).

⁸² U.S. FISH AND WILDLIFE SERVICE, POLICIES FOR REDUCING RISKS ASSOCIATED WITH INTRODUCTIONS OF AQUATIC ORGANISMS (Oct. 2, 1987) [hereinafter FWS DRAFT].

⁸³ 16 U.S.C. §§ 3371-3378 (1982 & Supp. IV 1986).

⁸⁴ M. BEAN, THE EVOLUTION OF NATIONAL WILDLIFE LAW 115 (1983) (citing Lacey Act § 2, 18 U.S.C. § 42 (1976 & Supp V 1981) (current version at 16 U.S.C. §§ 3371-3378 (1982 & Supp. IV 1986))).

⁸⁵ *Id.* at 107.

⁸⁶ 16 U.S.C. §§ 851-856 (1976) (repealed by Lacey Act Am. of 1981, 16 U.S.C. §§ 3371-3378 (1982 & Supp. IV 1986)).

fish.⁸⁷ Congress has since repealed the Black Bass Act and has consolidated it with the Lacey Act amendments of 1981.⁸⁸

These latest amendments strengthen the Lacey Act significantly. Today, all wild animals, including those bred in captivity, and certain wild plants are included in the protected class.⁸⁹ The 1981 amendments also increase the penalties and jail sentences for violating the Act.⁹⁰ In addition, the 1981 amendments add a reward provision for providing the government with information that leads to enforcement action against or conviction of a violator.⁹¹

The Lacey Act should be viewed as the federal government's tool for supporting state wildlife laws.⁹² In its current form, the Act prohibits the importation or exportation of any fish, wildlife or plant taken, possessed, transported, or sold in violation of the laws of a state, Indian tribe, foreign country or in violation of a treaty.⁹³ The Secretaries of Agriculture, Treasury, Transportation, Commerce and the Interior enforce the Act's various provisions.⁹⁴

In implementing the Lacey Act, the Secretary of the Interior has formulated what much of the affected public considers to be "dirty lists"⁹⁵ of identified species whose import and export is restricted or banned.⁹⁶ The list is limited to species currently thought to be injurious.⁹⁷ Under the "dirty list" approach, the Department of the Interior has the burden of proving that a species is injurious to the environment.⁹⁸

Advocates of strict regulation of the importation of exotic species were pleased with the Department of the Interior's 1973 plan to implement a "clean list" approach.⁹⁹ In order to protect more ade-

⁸⁷ M. BEAN, *supra* note 84, at 107.

⁸⁸ Pub. L. No. 97-79, 95 Stat. 1073 (1981). Congress previously amended the Lacey Act in 1935 and 1949. M. BEAN, *supra* note 84, at 108 (citing Act of June 15, 1935, ch. 261, tit. II, § 201, 49 Stat. 380), 110 (citing Act of May 24, 1949, ch. 139, § 2, 63 Stat.). The amendments broadened the Act's powers in the area of interstate commerce of wild animals, birds, and parts or eggs thereof and prohibited inhuman or unhealthful importation of wild animals or birds. *Id.* at 108, 110.

⁸⁹ *Id.* at 111 (citing 16 U.S.C. § 3372(a) (Supp. V 1981)).

⁹⁰ *Id.* See *infra* notes 106-112 and accompanying text for a discussion of penalties under the Lacey Act.

⁹¹ *Id.* at 113.

⁹² See Lacey Act Amendments of 1981, Pub. L. No. 97-79, 1981 U.S. CODE CONG. & ADMIN. NEWS (95 Stat.) 1748, 1749.

⁹³ *Id.* at 1754.

⁹⁴ Lacey Act, § 3373(a).

⁹⁵ See also W. BROWN, *supra* note 16, at 259.

⁹⁶ 16 C.F.R. 16.1-16.15 (1986).

⁹⁷ *Id.*

⁹⁸ See FWS DRAFT, *supra* note 82, at 2.

⁹⁹ See Laycock, *supra* note 7, at 22.

quately United States ecosystems, the "clean list" approach presumed that every introduction of an exotic species would injure the environment and allowed an introduction only upon a showing of "low risk."¹⁰⁰ The party requesting the introduction would have had the burden of proving that an unlisted animal was harmless.¹⁰¹ Although groups such as the Sierra Club endorsed the Department of the Interior's plan, other special interest groups, specifically pet trade enthusiasts and the zoological and scientific communities, pressured the Department to reject the "clean list" approach.¹⁰² In 1976, after two and one half years of working on the "clean list" project, the Department of the Interior abandoned the plan and asked for congressional clarification of its powers.¹⁰³ Congress never made such clarification¹⁰⁴ and today the "dirty list" approach prevails.¹⁰⁵

The Lacey Act provides both criminal and civil sanctions.¹⁰⁶ If an importer or exporter knowingly takes or possesses a specimen in violation of an underlying law or treaty, he or she can be assessed a criminal penalty of \$20,000, imprisoned for up to five years, or both.¹⁰⁷ If the violator is not an importer or exporter, the penalties only apply if the market value of the wildlife involved is more than \$350.¹⁰⁸ If a person knowingly engages in conduct that is prohibited and should have known that the involved wildlife was taken illegally, he or she can be fined \$10,000 and imprisoned for up to one year.¹⁰⁹ Civil penalties of up to \$10,000 for violations of the Act are assessed at the Secretary of the Interior's discretion¹¹⁰ after proper notice

¹⁰⁰ W. BROWN, *supra* note 16, at 260-61.

¹⁰¹ Laycock, *supra* note 7, at 22.

¹⁰² M. BEAN, *supra* note 84, at 116.

¹⁰³ *Id.* at 117.

¹⁰⁴ *Id.*

¹⁰⁵ See 16 C.F.R. § 16.1-16.15 (1986).

¹⁰⁶ Lacey Act, 16 U.S.C. § 3373 (1982).

¹⁰⁷ *Id.* at § 3373(d)(1)(A). The Omnibus Crime Control Act, Pub. L. No. 99-217, 99 Stat. 1987 as amended by Pub. L. No. 99-217, 99 Stat. 1728 (codified throughout 18 U.S.C.), which applies to almost all statutory federal offenses, Kasloff & Trexler, *The Convention on International Trade in Endangered Species: No Carrot, But Where's the Stick?*, 17 *Env't'l L. Rep.* (Env't'l L. Inst.) 10222, 10223 (1987) (citing 18 U.S.C. § 3623(a)(3), (b)(3) (section repealed Nov. 1, 1987); 18 U.S.C. § 3571(b)(1)(A), (b)(2)(A) (effective Nov. 1, 1987)), increased the fines to \$250,000 for individuals and \$500,000 for persons other than individuals. *Id.* at 10231. The government need not prove that the violator knew of the Lacey Act's existence. M. BEAN, *supra* note 84, at 112.

¹⁰⁸ 16 U.S.C. § 3373(d)(1)(B).

¹⁰⁹ *Id.* § 3373 (d)(2). The Omnibus Crime Control Act increased the fine to \$100,000. Kasloff & Trexler, *supra* note 107, at 10231 (citing the Lacey Act, 18 U.S.C. §§ 3623, 3571).

¹¹⁰ See *id.* § 3373(a)(1). When assessing the penalty, the Secretary of the Interior must take into account several factors. These include the nature, circumstances and gravity of the violation, the degree of culpability of the violator, and the violator's ability to pay. Kasloff & Trexler, *supra* note 107, at 10232.

and hearing.¹¹¹ Finally, the violator must forfeit the wildlife involved in the transaction.¹¹²

Overall, the Lacey Act has had limited success in regulating wildlife importation. It is, however, ineffective in regulating the introduction of an exotic species into United States ecosystems. In effect, the Lacey Act operates *ex post facto*, given that the exotic species must prove detrimental to the United States before it is placed on the "dirty list." Prohibiting the importation of an exotic species after it has damaged the environment is counterproductive to ecological conservation. An exotic species can be imported properly and still create a threat when introduced into the new ecosystem.

C. *The Endangered Species Act*

The Endangered Species Act,¹¹³ enacted in 1974, also limits the introduction of exotic species into the United States indirectly. This Act's stated purposes are to conserve threatened and endangered species and to protect threatened and endangered species' ecosystems.¹¹⁴ Accordingly, the Act prohibits the import, export, sale, shipment and possession of designated threatened and endangered species.¹¹⁵ The Act requires that importers and exporters of fish, wildlife, or plants receive permission for their actions from the Secretary of the Interior.¹¹⁶

Similar to the Lacey Act, the Endangered Species Act contains both criminal and civil sanctions.¹¹⁷ If a person knowingly violates any provision of the Act, he or she can be fined up to \$20,000, can be imprisoned for up to one year, or both.¹¹⁸

¹¹¹ 16 U.S.C. § 3373(a)(4).

¹¹² *Id.* § 3374(a)(1). For a discussion of the forfeiture of tools or machinery used in the illegal act, see Kasloff & Trexler, *supra* note 107, at 10232.

¹¹³ 16 U.S.C. §§ 1531-1543 (1982 & Supp. IV 1986).

¹¹⁴ *Id.* § 1531(b).

¹¹⁵ *Id.* § 1538(a)(1).

¹¹⁶ *Id.* § 1538(d)(1). Non-endangered fish or shellfish taken for human or animal consumption or taken from U.S. waters or from the high seas for recreational purposes are excepted from the permit requirement. *Id.*

¹¹⁷ *Id.* § 1540.

¹¹⁸ *Id.* § 1540(b)(1). These penalties, like those under the Lacey Act, were increased by the Omnibus Crime Control Act, Pub. L. No. 99-217, 99 Stat. 1987 *as amended by* Pub. L. No. 99-217, 99 Stat. 1728 (codified throughout 18 U.S.C.). Effective November, 1987, the new penalties are up to \$25,000 for individuals and up to \$100,000 for organizations. Kasloff & Trexler, *supra* note 107, at 10,230 (citing 18 U.S.C. § 3571(b)(1)(B), (b)(2)(B)). In the past, pecuniary gains by the violator or losses by a victim increased the penalty. *Id.* (citing 18 U.S.C. § 3623(c)(1) (repealed November 1, 1987)).

The Secretary of the Interior has discretion to assess civil penalties of up to \$10,000 against persons who knowingly violate the Act and against importers and exporters who violate the Act.¹¹⁹ Proper notice and an opportunity for a hearing must be provided.¹²⁰ The Secretary of the Interior also may revoke import and export licenses¹²¹ and confiscate the wildlife, fish or plants involved in the transaction.¹²² A defendant in a civil suit may be given the opportunity to settle the claim by transferring all interests held in the involved wildlife to the United States government.¹²³

The Endangered Species Act, by definition, is concerned primarily with threatened and endangered species. The Act only prevents those introductions that will affect a threatened or endangered species. Thus, imported exotics that are not designated as threatened or endangered, as well as imported exotics that will not be introduced into the ecosystem of a threatened or endangered species, are not covered by this Act.

Just as the scope of the Endangered Species Act is limited, so, too, are many of the state regulations that do not specifically address the problem of exotic introduction.

D. State Regulations

A survey published in 1984 revealed that thirty-one out of the forty responding states had adopted resolutions or legislation addressing the introduction of exotic species.¹²⁴ Several factors, however, indicate that the responding states did not have consistent policies behind their resolutions.¹²⁵

First, the definition of the term "exotic" ranged from a species not indigenous to a region to a species not indigenous to North America.¹²⁶ Second, state resolutions and legislation often addressed

¹¹⁹ See *id.* § 1540(a)(1).

¹²⁰ *Id.*

¹²¹ *Id.* § 1540(b)(2).

¹²² *Id.* § 1540(e)(4)(A).

¹²³ See 50 C.F.R. § 12.25 (1986).

¹²⁴ C. HOCUTT, *Toward the Development of an Environmental Ethic for Exotic Fishes*, in DISTRIBUTION, BIOLOGY AND MANAGEMENT OF EXOTIC FISHES, *supra* note 31, at 376, 377. Charles Hocutt, an ecologist and ichthyologist, conducted the survey. See *id.* at 384. The specific question posed was: "Has your state adopted legislation specifically addressing exotic species, especially fish?" *Id.* at 377.

¹²⁵ See *id.* at 382-83. Consistent regulations are important because exotic species do not heed jurisdictional boundaries. Thus, introductions affect regional as well as local ecosystems. See R. MANN, *supra* note 24, at 332; FWS DRAFT, *supra* note 82, at 7.

¹²⁶ C. HOCUTT, *supra* note 124, at 376-77.

the importation, rather than the introduction, of exotic species.¹²⁷ As indicated earlier in this Comment, regulating the importation of exotic species does not automatically protect the environment from the introduction of a potentially dangerous exotic species.¹²⁸ Finally, enforceability often presents a problem for the states that have resolutions or legislation addressing the importation or introduction of exotic species.¹²⁹

Typical state statutes utilize the "dirty" list approach. The relevant Pennsylvania statute,¹³⁰ for instance, makes the transportation of any wildlife, live game, or eggs of any bird and the release of any wildlife or game unlawful if the importation of the species is prohibited by the Pennsylvania Game Commission or by federal law.¹³¹ In addition, similar to the Department of the Interior's "dirty list" under the Lacey Act, the Pennsylvania Game Commission has the power to promulgate a list of banned species in the interest of preserving native game and wildlife.¹³² The State of Maryland's Secretary of Natural Resources is similarly empowered to adopt rules and regulations restricting the importation and release of non-native wildlife into the state in the interest of protecting native wildlife.¹³³

Even states with protective policies, however, can fall victim to a neighboring state's introduction,¹³⁴ since some states do not have resolutions or guidelines addressing the introduction of exotic species.¹³⁵ Such a total lack of regulations poses a great risk to local and regional environments. If the policies of neighboring states are similar, regional planning and protection could be implemented feasibly. Unfortunately, such consistency is not common.¹³⁶

A current example of a proposed introduction exemplifies the need for consistent introduction guidelines in order to abate interstate

¹²⁷ See *id.* at 377.

¹²⁸ See *supra* notes 112-13 and accompanying text.

¹²⁹ "[T]he lack of enforceable laws and regulations in most States is a major impediment to broader use of [the Lacey Act] in addressing policy issues related to the importation and introduction of fish and, possibly, other aquatic organisms." FWS DRAFT, *supra* note 82, at 4.

¹³⁰ In a phone conversation in October of 1987, Lynn Starnes of the United States Fish and Wildlife Service stated that the relevant Pennsylvania statute is a typical exotic importation statute.

¹³¹ 34 CONS. STAT. ANN. § 2163 (Purdon 1987).

¹³² See *Id.*

¹³³ MD. [NAT. RES.] CODE ANN. § 10-903 (1983 & Supp. 1987). This statute applies to all species not native to Maryland, and thus includes interstate transfers. *Id.*

¹³⁴ See *infra* notes 152-157 and accompanying text.

¹³⁵ See C. HOCUTT, *supra* note 97, at 377.

¹³⁶ See *supra* notes 125-29 and accompanying text.

disputes. South Dakota, Minnesota, and Canada have opposed North Dakota's proposed introduction of the zander.¹³⁷ North Dakota does not have a statute addressing the importation or introduction of exotic species, and the introduction will probably occur regardless of regional concerns.¹³⁸

In May of 1987 North Dakota received a shipment of 125,000 zander eggs from Holland.¹³⁹ Less than three weeks after the importation, however, a disappointed North Dakota Game and Fish Department destroyed the newly hatched eggs.¹⁴⁰ A possible virus (pike fry rhabdo virus) that zander carries was the reason for the destruction.¹⁴¹ Although these particular zander posed little risk as disease carriers, the North Dakota Game and Fish Commissioner decided not to take the risk.¹⁴² North Dakota still plans to introduce zander into its waters, however, in the near future.¹⁴³

Prior to the May 1987 shipment, South Dakota, Minnesota, and Canada expressed concern over the proposed introduction.¹⁴⁴ Minnesota requested that North Dakota follow protocol provisions authored by the American Fisheries Society (AFS).¹⁴⁵ After the failed introduction, the AFS issued a resolution urging North Dakota to conduct a thorough evaluation of the effects of zander introduction before attempting another introduction.¹⁴⁶ As of January, 1988, Minnesota, Canada, and the AFS had not received any data on the zander introduction, although the North Dakota Game and Fish

¹³⁷ See Letter from Sheila Tooze, Environmental Affairs Officer, Canadian Embassy to Wilson A. Riley, Jr., Environmental Affairs Officer U.S. Department of State (Apr. 30, 1987) [hereinafter Canadian Letter].

¹³⁸ Telephone interview with James Ragan, Fisheries Chief North Dakota Game and Fish Commission (Jan. 19, 1988) [hereinafter Ragan Interview].

¹³⁹ *Zander Program Setback*, DAKOTA COUNTRY 28, 28 (July 1987). The zander is a game fish similar to the native walleye. *Id.* at 29. (The first attempt to introduce zander occurred in 1986, but the eggs died in the Netherlands before shipment to the United States.) Letter from Paul J. Wingate, Fisheries Research Supervisor Minnesota Department of Natural Resources to Gil Radonski, President Sport Fishing Institute (Jan. 15, 1987) [hereinafter Minnesota Letter].

¹⁴⁰ See *Zander Program Setback*, *supra* note 139, at 28.

¹⁴¹ *Id.*

¹⁴² *Id.* North Dakota Game and Fish Commissioner Dale Heneger was ". . . 99.99% sure nothing would happen to those [the introduced] fry . . ." *Id.*

¹⁴³ See *id.*

¹⁴⁴ See Minnesota Letter, *supra* note 139; Canadian Letter, *supra* note 137.

¹⁴⁵ See Minnesota Letter, *supra* note 139.

¹⁴⁶ North Central Division of the American Fisheries Society, Resolution, *supra* note 10. The AFS has no federal authority. Rather, they promulgate suggestions which are analyzed and adopted or rejected by the Fish and Wildlife Service, Department of Interior. Telephone interview with Lynn Starnes, Department of the Interior, Fish and Wildlife Service, Washington D.C. (Oct. 1987).

Department (the Department) claimed to be in the process of finishing the AFS protocol.¹⁴⁷

The North Dakota Game and Fish Department claims that zander will flourish in North Dakota waters.¹⁴⁸ The Department also claims that zander are equal to the walleye in sporting and eating quality, and grow more rapidly than native game fish.¹⁴⁹ The Department is planning to introduce zander into closed waters in order to determine possible detrimental effects of the introduction.¹⁵⁰ Even if zander were first introduced into an experimental closed water system, one cannot overlook the possibility of zander transfer to other waters by fishermen, as has happened in the past with other introduced species.¹⁵¹

The zander conflict is not an unusual one. In the 1970s, grass carp were introduced into Arkansas waters.¹⁵² The neighboring state of Missouri had banned grass carp and opposed the introduction.¹⁵³ Unfortunately, Missouri lacked the power to prevent the introduction.¹⁵⁴ Because the carp were too numerous to destroy, Missouri was forced to succumb to the carp invasion into its waters.¹⁵⁵ Missouri must now confront the problems caused by a neighboring state's exotic introduction. These problems include the displacement of native fish and the silting of spawning waters.¹⁵⁶ The carp also has proved unsuccessful as a game or food fish.¹⁵⁷

While some states have protective legislation regulating the introduction of exotic species, the controversy surrounding the introduction of the zander into North Dakota and the catastrophe of the introduction of the grass carp show the need for a comprehensive

¹⁴⁷ Ragan Interview, *supra* note 138. Unlike the filing of Environmental Impact Statements, *see* National Environmental Policy Act, 42 U.S.C. § 4332(c) (1982), the filing of AFS protocol provisions is not legally required. Although North Dakota claims to be working on the AFS protocol, the North Dakota Game and Fish Commission does not believe that such action should be mandatory before exotic introduction. Ragan Interview, *supra* note 138. Environmental Impact Statements are required when any federal agency proposes an action that will significantly affect the quality of the human environment. 42 U.S.C. § 4332(c).

¹⁴⁸ 378 SPORT FISHERIES INSTITUTE BULLETIN 5 (Sept. 1986) [hereinafter SFI BULLETIN].

¹⁴⁹ *Id.*

¹⁵⁰ *Id.*; DAKOTA COUNTRY, *supra* note 139, at 29.

¹⁵¹ SFI BULLETIN, *supra* note 148, at 5.

¹⁵² *See* Laycock, *supra* note 7, at 21.

¹⁵³ *Id.*

¹⁵⁴ So long as Arkansas did not import an animal on the Department of Interior's "dirty list" or violate Arkansas state law, the introduction is not in violation of the Lacey Act.

¹⁵⁵ Telephone conversation with Jim Fry, Missouri Conservation Department (Oct. 1987). Missouri subsequently lifted the ban on grass carp. *Id.*

¹⁵⁶ Laycock, *supra* note 7, at 20.

¹⁵⁷ *Id.*

policy governing the introduction of all exotic species. Mandatory regulations would make interstate controversy less likely and would decrease the chance of a harmful exotic introduction into the United States.¹⁵⁸

IV. PROPOSED FEDERAL ACTION

A. *Existing Protocol Provision*

Recognizing a need for uniform guidelines to govern the introduction of exotic aquatic species, several committees of the American Fisheries Society published a preliminary report outlining comprehensive protocol provisions.¹⁵⁹ The suggested protocol calls for evaluation of the proposed exotic species, in progressive stages, to determine if the introduction is ecologically safe.¹⁶⁰

The Review and Decision Model (Model) employs five levels of review.¹⁶¹ At each level, the exotic species' introduction can be accepted, rejected, or forced onto the next level and subjected to a higher level of scrutiny.¹⁶² Under the Model, an Exotic Fish Protocol Committee would be established to evaluate each proposed introduction.¹⁶³

The Model's first level of review addresses four separate issues. The first issue is the purpose(s) for the introduction.¹⁶⁴ This review includes the validity of the stated reasons for introduction and the degree to which native species could fulfill the same purpose.¹⁶⁵ If a native species could fulfill the same purpose and is abundant in the proposed ecosystem, the introduction will not be allowed if other factors, such as potential risk, make the introduction questionable.¹⁶⁶

¹⁵⁸ In addition, such mandatory regulations could foster international cooperation. Canada has already expressed concern for certain proposed introductions into the United States. See *supra* note 144 and accompanying text.

¹⁵⁹ J. McCANN, *Involvement of the American Fisheries Society with Exotic Species*, 1969-1982, in *DISTRIBUTION, BIOLOGY AND MANAGEMENT OF EXOTIC FISHES*, *supra* note 31, at 4; C. KOHLER & J. STANLEY, *A Suggested Protocol for Evaluating Proposed Exotic Fish Introductions in the United States*, in *DISTRIBUTION, BIOLOGY AND MANAGEMENT OF EXOTIC FISHES*, *supra* note 31, at 387, 388. This report represented the views of the particular authors, and not necessarily those of the AFS. C. KOHLER AND J. STANLEY at 388.

¹⁶⁰ See *id.* at 400. The protocol addresses transplanted as well as exotic aquatic species. See *id.* at 388.

¹⁶¹ *Id.* at 400-02.

¹⁶² See *id.* at 400, 402.

¹⁶³ *Id.* at 398.

¹⁶⁴ *Id.* at 400.

¹⁶⁵ *Id.*

¹⁶⁶ See *id.* at 401.

The second issue on this level concerns the exotic's abundance, or lack thereof, in its native range.¹⁶⁷ If the proposed exotic is an endangered species in its native range, the proposal for introduction will be rejected, unless the new ecosystem would help preserve the endangered species.¹⁶⁸

The third issue on the first level of review addresses the problem of disease introduction.¹⁶⁹ The proposed exotic would presumably have to be judged disease-free and pass United States health and inspection laws before the introduction could be approved.¹⁷⁰

The final issue on the first level of review evaluates the proposed introduction site and distinguishes between "closed" systems and "open" systems.¹⁷¹ In a "closed" system, the exotic's potential impact on native species is limited, since the number of species presently in that system is limited. If the proposal for the introduction of an exotic species includes the use of a "closed" system, safeguards would have to be assured in order to avoid an accidental release into an "open" system.¹⁷²

Under the Model, an introduction would be approved if issues one, two and three on review level one were answered satisfactorily and if the introduction were to be made into a "closed" system.¹⁷³

The Model's second level of review examines the exotic's ability to adapt to the new environment.¹⁷⁴ In order to ascertain the exotic's survival capability in the new ecosystem, the exotic's native ecosystem should be compared with the site of the proposed introduction.¹⁷⁵ A determination of like climate and reproduction habits should be obtained.¹⁷⁶ An analysis of this data is important because it could dissuade the continuance of a proposal if the exotic species has a small chance of survival. Under the Model, if the exotic has even a small chance of establishing a self-sustaining population, approval for the introduction would be granted.¹⁷⁷

¹⁶⁷ *Id.* at 400.

¹⁶⁸ *Id.* at 401.

¹⁶⁹ *Id.* at 399, 401.

¹⁷⁰ *See supra* note 70.

¹⁷¹ *Id.* at 401. Logically, introductions into "open" systems present more potential risks than introductions into "closed" systems, because more native species can potentially be affected in an open system.

¹⁷² *Id.*

¹⁷³ *Id.*

¹⁷⁴ *Id.*

¹⁷⁵ *See id.* at 392.

¹⁷⁶ *Id.* at 392-93. This is especially important for aquatic species, where spawning can displace native species or their eggs. *Id.* at 398.

¹⁷⁷ *See id.* at 401

The Model's third level of review examines the exotic species' potential impact on the ecosystem(s) of the proposed introduction.¹⁷⁸ The potential for displacement of a native species should also be analyzed.¹⁷⁹ The exotic species should not be a predator of any native species in the proposed site.¹⁸⁰ Nor should the exotic substantially threaten the food supply of the natives in the proposed site.¹⁸¹ Finally, this level of review would analyze any of the exotic species' potential impacts on humans.¹⁸²

Review level four of the Model requires an evaluation of relevant literature on the proposed exotic species.¹⁸³ The literature would then be used to complete a species synopsis.¹⁸⁴ This synopsis would include the impacts of the exotic species' prior transplantations.¹⁸⁵ If the synopsis indicates that the proposed exotic species would be desirable for introduction, the introduction would be allowed.¹⁸⁶ If the available literature, however, is not sufficient to complete a synopsis, the species would be subjected to analysis on review level five.¹⁸⁷

The Model's fifth level of review requires additional research to complete the species synopsis of the proposed exotic species.¹⁸⁸ This research might include testing in locations near the proposed site.¹⁸⁹ Under these guidelines, the Exotic Fish Protocol Committee would reserve the right to evaluate the qualifications of the staff and research facilities used in the synopsis research.¹⁹⁰ Apparently, this evaluation would insure credible research and would dissuade going through the evaluation process merely as a pretense.

The American Fisheries Society and the International Council for the Exploration of the Sea (ICES) have also suggested guidelines for exotic fish introduction.¹⁹¹ Similar features of the various initia-

¹⁷⁸ *Id.* at 401.

¹⁷⁹ *See id.* at 398.

¹⁸⁰ *See id.*

¹⁸¹ *See id.*

¹⁸² *Id.* at 401.

¹⁸³ *Id.* at 402.

¹⁸⁴ *See id.*

¹⁸⁵ *Id.*

¹⁸⁶ *See id.* at 399.

¹⁸⁷ *Id.* at 402.

¹⁸⁸ *Id.*

¹⁸⁹ *Id.*

¹⁹⁰ *Id.* at 398.

¹⁹¹ Kohler & Courtenay, *Regulating Introduced Aquatic Species: A Review of Past Initiatives*, 11 *FISHERIES* 34, 34-36 (1986) [hereinafter *Past Initiatives*]; Sindermann, *supra* note 73, at 11.

tives and the presented Model include a stated rational basis for the introduction,¹⁹² a determination of the degree to which native species are affected,¹⁹³ a study on the possibility of disease transfer,¹⁹⁴ and the desirability of experimental releases in confined ecosystems.¹⁹⁵

Although the Model presents competent protocol procedures, loopholes nonetheless exist and are discussed below. Dangerous introductions are possible because of these loopholes. Therefore, this Comment proposes the following guidelines, based on the Model, for uniform regulation of the introduction of exotic species.

B. Guidelines for Uniform Regulations Controlling the Introduction of Exotic Species

Although the preceding protocol suggestions specifically addressed aquatic introductions, they can nonetheless be applied to all forms of exotic introduction. Because of their comprehensive nature, they are being used as a stepping stone for the following proposed federal action for the responsible introduction of exotic species.

Ideally, the review of every proposed exotic introduction should mandate the preparation of some type of environmental impact statement by biological and environmental experts.¹⁹⁶ The Model does not satisfy this standard. Although possible disease introduction is evaluated on review level one in the preceding Model, possible impacts on the proposed site are not evaluated until review level three. This disjointed approach does not ensure that an impact statement will be completed for every introduction, since the introduction could be approved at an early level of review.

This Comment argues that federal guidelines should mandate that an exotic species pass through at least two levels of review. If a safe introduction is uncertain after review on these two levels, the introduction should be subjected to a higher level of scrutiny on a third level of review.

For the first level of review, this Comment adopts the first level of review of the preceding Model.¹⁹⁷ As under the Model, the proposed species may be rejected after scrutiny on this level.¹⁹⁸ Unlike

¹⁹² Sindermann, *supra* note 73, at 14.

¹⁹³ *See id.* at 15; *Past Initiatives*, *supra* note 191, at 34, 36.

¹⁹⁴ *Past Initiatives*, *supra* note 191, at 34.

¹⁹⁵ Kohler & Courtenay, *supra* note 50, at 41.

¹⁹⁶ *See supra* note 147.

¹⁹⁷ *See supra* notes 164–73 and accompanying text.

¹⁹⁸ *See id.*

the Model, however, the guidelines set forth in this Comment would not accept a proposed introduction after the successful completion of this level. The Model accepts the introduction after the first level of review if the first three issues on this level (purpose of introduction, exotic's abundance in native range and disease control) are answered satisfactorily and if the introduction is made into a "closed" system.¹⁹⁹ This Comment suggests that ecological damage can occur even in "closed" systems. Thus, in order for a proposed introduction to be approved, the effects of the species introduction on the new ecosystem must at least be analyzed.

This Comment proposes that the second mandatory level of review regulating exotic introductions combine levels two and three of the preceding Model.²⁰⁰ These levels examine the proposed exotic species' ability to adapt to the new environment²⁰¹ and the potential impact of the exotic on the ecosystem(s) of the proposed introduction.²⁰² Under the Model, an exotic species with a negligible chance for survival in the new ecosystem would be accepted.²⁰³ This Comment suggests that an exotic species with even a small chance of survival is capable of causing irreparable environmental damage before it dies. Thus, the potential for detrimental effects from the introduction must also be examined. This Comment accepts the Model's suggestions for examining potential effects of an exotic species on a new ecosystem.

After the issues of review level two have been addressed, a proposal for introduction would be accepted if the available evidence strongly suggests that the proposed exotic will not adversely affect the new ecosystem. If the chances for a safe introduction are questionable, however, the proposed exotic would be subjected to a third and final level of review. Any proposal for introduction should automatically pass to the third level of review if there is even the slightest chance that the introduction would harm an endangered species or an endangered species' ecosystem.

This Comment suggests that the final level of review combine levels four and five of the preceding Model.²⁰⁴ This level of review requires a species synopsis, with detailed research if necessary. As under the Model, a full literature review of information on the exotic

¹⁹⁹ See *supra* note 173 and accompanying text.

²⁰⁰ See *supra* notes 174-82 and accompanying text.

²⁰¹ C. KOHLER & J. STANLEY, *supra* note 159, at 401.

²⁰² *Id.*

²⁰³ *Id.*

²⁰⁴ See *supra* notes 183-90 and accompanying text.

species would be compiled in order to analyze the scientific community's opinion of the proposed exotic.²⁰⁵ In addition, this Comment adds to the Model by requiring that any species subjected to this level of review, if finally accepted, be tested in a "closed" system before being released into an "open" system.

This Comment also suggests that the species synopsis include relevant data on relatives of the proposed exotic that have previously been introduced into new ecosystems. Shared characteristics of the exotic and its relative could indicate that the proposed introduction will have effects similar to the relative's effects on its new ecosystem.

These proposed guidelines for uniform regulation of exotic introductions are beneficial because they allow a balancing among several factors, such as eating habits, reproductive practices, acclimatization and the purpose(s) for the introduction. In addition, these guidelines do not allow the acceptance of an exotic species simply because the exotic will be introduced into a "closed" system or because the exotic's chance for survival is low. These guidelines, if adopted, will eliminate haphazard introductions of exotic species while allowing for reasonable introductions into the United States.

C. Implementation of the Proposed Guidelines

Suggested implementation of protocol provisions ranges from economic incentives for state adoption to concrete federal guidelines governing adoption.²⁰⁶ Controlling all exotic introduction is more complex than controlling one species, such as fish. Comprehensive control of the introduction of all species necessitates adopting uniform procedures.

The federal government is capable of adopting such uniform procedures. The federal government has already asserted its authority in environmental areas such as endangered species²⁰⁷ and pollution.²⁰⁸ The introduction of exotic species into the United States directly relates to these two governmental interests. First, introduced exotics can endanger native species.²⁰⁹ Through predation and competition, an introduced exotic can displace native wildlife.²¹⁰ Arguably,

²⁰⁵ C. KOHLER & J. STANLEY, *supra* note 159, at 402.

²⁰⁶ FWS DRAFT, *supra* note 82, at 10.

²⁰⁷ Endangered Species Act, 16 U.S.C. §§ 1531-1543 (1982 & Supp. IV 1986).

²⁰⁸ Clean Air Act, 42 U.S.C. §§ 7401-7626 (1982).

²⁰⁹ See *supra* notes 48-56 and accompanying text.

²¹⁰ C. KOHLER & J. STANLEY, *supra* note 159, at 398. See *supra* notes 48-60 and accompanying text.

if the displaced native was endangered at the time of the introduction, the native species could disappear almost immediately. In addition, absent alternative ecosystems, a non-endangered species may become endangered through displacement.

Second, introduced exotics have been labelled as potential "biological pollutants."²¹¹ Adverse ecological effects of introduced species are often irreversible.²¹² Moreover, even reversible effects may be corrected only over long periods of time. Hence, federal adoption of these proposed guidelines with secured state involvement in the analysis procedure would be consistent with United States environmental policies governing endangered species and pollution.

Federal implementation, however, does not preclude state participation in the decisionmaking process. When a person or organization formally requests an exotic introduction, the state of the proposal could use its own environmental and scientific experts to evaluate the the available data according to the proposed regulations. At the same time, experts from the neighboring states whose ecosystems will be affected by the introduction can meet to evaluate the data and discuss the proposal. In order to keep costs down and tempers in check, this Comment suggests that no more than three or four experts represent the environmental interests of each state in the evaluation process. The federal government would contribute to the process by dictating strict procedures under the federal regulations for the state actors to follow. In addition, the federal government could also contribute experts if state experts disagree.

Alternatively, the states could contribute a list of desired environmental and scientific experts to be used in the evaluation process. The federal government could then choose the experts for the project.

Federal adoption of the proposed guidelines would also be consistent with the intent of Executive Order 11,987.²¹³ The Secretary of the Interior and the Secretary of Agriculture have been granted the authority to develop and implement guidelines for the introduction of exotic species into the United States.²¹⁴ This Comment suggests that these proposed regulations will aid the Departments of the Interior and Agriculture in exercising their authority under Executive Order 11,987.

²¹¹ See Raloff, *supra* note 38, at 398.

²¹² *Id.*

²¹³ See *supra* notes 76-82 and accompanying text.

²¹⁴ See *supra* notes 80-81 and accompanying text.

The adoption of uniform guidelines will ensure safer introduction of exotics into local and regional ecosystems. Such adoption will also give states more participation in all environmental decisions which affect their ecosystem.²¹⁵

V. CONCLUSION

While the introduction of exotic species into the United States can provide recreational, commercial and other benefits, such introductions can also seriously disrupt native ecological systems. For instance, the introduction of exotic species can result in the loss of valuable native species. Present federal and state regulations do not adequately protect the environment. In addition, the present system of regulation in this area does not encourage regional environmental planning, and allows states to damage neighboring states' ecosystems.

Federal adoption of the proposed guidelines for the introduction of exotic species, with state participation in the exotic species evaluation process, would promote ecosystem conservation and would be consistent with present United States policies on endangered species and pollution. Such an adoption would also promote regional ecological planning and encourage interstate participation in exotic introduction.

²¹⁵ A state's ecological right not to have its environment impaired from sources outside the state can also be upheld under federal common law. *Illinois v. City of Milwaukee*, 406 U.S. 91, 99-100 (1972) (interstate water pollution) (citing *State of Texas v. Pankey*, 441 F.2d 236, 240 (1971)). Furthermore, injunctive relief is available where it is highly probable that a defendant's actions will lead to a nuisance. PROSSER & KEETON ON THE LAW OF TORTS 640 (W. Keeton 5th ed. 1984). If harm is uncertain to occur, courts might not always grant injunctive relief. *Id.* at 641.

Arguably, however, a state could bring a cause of action against a neighboring state's introduction, and let the specific court decide whether the potential nuisance is severe enough to grant the injunction. In *Village of Wilsonville v. SCA Services*, 86 Ill.2d 1, 426 N.E.2d 824 (1981), for example, the court discussed the importance of balancing the competing interests in public nuisance cases. *Id.* at 25, 426 N.E.2d at 829. The concurring opinion stated that there are times when an anticipated harm would be so devastating that defendant's conduct should be stopped, even if the harm is uncertain to occur. *Id.* at 37-38, 426 N.E.2d at 842 (Ryan, J., concurring).

This Comment argues that until federal regulations addressing the introduction of exotic species are adopted, injunctions barring exotic introductions would be feasible. The state opposing the introduction would have to prove that the introduction constitutes a potential nuisance. Undoubtedly, those who promote limited introduction prefer the proposed federal regulations, where the burden to research ecological effects of the introduction is on the party proposing the introduction. One could argue, however, that frivolous lawsuits are discouraged when the state opposing the introduction bears this burden of proof.