

Testimony by David M. Lodge

before the

U.S. House of Representatives Committee on Natural Resources
Subcommittee on Insular Affairs, Oceans and Wildlife

Legislative Hearing On H.R. 669: "*Nonnative Wildlife Invasion Prevention Act*"

To prevent the introduction and establishment of nonnative wildlife species that negatively impact the economy, environment, or other animal species' or human health, and for other purposes.

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Madam Chairwoman and Subcommittee members, I am honored to have the opportunity to participate in this hearing. I thank the subcommittee, especially Chairwoman Bordallo, for the invitation to testify.

As you may know from my resume, I am a biologist. I come to the issue of invasive species from the perspective of an active researcher on the distributions and interactions of plant and animal species, and from my experiences at the science-policy interface. I have been working on invasive species for 26 years. I am the Director of the Center for Aquatic Conservation and a Professor of biology at the University of Notre Dame. My colleagues, collaborators, and I have many on-going research projects on various aspects of invasive species. The topics of particular relevance to this hearing include: (a) forecasting the spread and the environmental and economic impact of many aquatic nuisance species; (b) measuring and controlling the impact of invasive rusty crayfish and other species spread intentional introductions; (c) developing species risk assessment (screening) protocols, focused on fishes, aquatic mollusks, aquatic and wetland plants and other potential aquatic nuisance species; and (d) combining economic and ecological risk analyses to guide allocation of resources among management options. I am a past Chairman of the national Invasive Species Advisory Committee. I was also the chairman of a committee appointed by the Ecological Society of America to write an assessment of the science and policy of invasive species, which was published in 2006 (Lodge et al. 2006). The current state of science, economics, management, and policy on invasive species was assessed by many scientists and economists in a book my colleagues and I edited, which was published last month (Keller et al. 2009). Thus, I can represent a consensus of views from the scientific and social sciences on invasive species impacts. In particular, I will address recently developed technical capacity that exists to inform

improved risk assessments for species proposed for importation. Below, I first describe the magnitude of the problem. Second, I briefly summarize the current policy situation. Finally, I illustrate in more detail the risk assessment solutions that recent scientific advances offer.

The problem: increasing numbers of harmful alien species and mounting costs

Everywhere biologists look, we find more and more alien species, with the total number of alien species increasing over time, apparently at an accelerating rate in some places (Cohen and Carlton 1995, Ricciardi 2006, Hulme et al. 2009). Perhaps more important than the number of species is the fact that in many situations the abundance of these aliens reaches extremely high levels--like that of silver and bighead carp in midwestern rivers, the aquatic weed hydrilla in southeastern waterways and increasingly in Midwestern lakes, nutria in Chesapeake Bay and Louisiana coastal marshes, snakehead fishes in the Potomac River, apple snails in South Carolina and along the Gulf Coast—so that there is literally very little room left for native species, even those that are highly valuable in recreation or for commercial harvest. The total environmental and financial impact is very high. In addition, imported animals, or the parasites and pathogens that come with them can endanger human lives, as the 2003 outbreaks of monkeypox and SARS so vividly illustrated.

As one of hundreds of examples, the state of Arkansas recently spent about \$700,000 attempting to eradicate one of five populations of northern snakehead in Arkansas, illustrating the high cost of reacting rather than preventing. A more comprehensive effort in Arkansas and other locations for just northern snakehead would cost millions of dollars. Under the authority of the Lacey Act, beginning in 2002 the USFWS made it illegal to import snakeheads into the US. Unfortunately, snakehead were already well established before then, and have continued to spread and increase in abundance since then, including just a few blocks away from here in the Potomac River. As with so many species imported in the past (and continuing today), we can wait and accept the costs of damage to the environment, economy, human health, and wildlife health. Or we can pay expensive control costs such as Arkansas is currently suffering. The current policy is a lose-lose proposition.

The loses are everywhere. Alien species are one of the major management challenges faced on most of the national forests, wildlife refuges, national parks, the Great Lakes, and in coastal waters. Hundreds of alien species inhabit even our most highly valued natural areas, and the situation is often worse in less protected areas. In aggregate, some have estimated the damages to the US from alien species to be at least \$120 billion/year (Pimentel et al. 2005). We also, of course, export damaging species to other countries, especially our major trading partners in the temperate zone, China and the EU countries. The most recent estimate for aggregate damages from alien species in the EU is \$13 billion, but this estimate and the \$120 billion estimate for the USA are likely to be large underestimates.

The primary pathways by which live animal species are intentionally introduced into the U.S. include the pet industry; the watergarden industries; the live bait industry; the biological supply industry; the live food industry; aquaculture; and other intentional stocking by private and public agencies (Lodge et al. 2006, Keller & Lodge 2007, Kraus 2009, Leprieur et al. 2009, Romagosa 2009). These pathways are collectively referred to

as ‘organisms in trade’ or ‘commerce in live organisms’ (Lodge et al. 2006). Nationwide, all have been important. Among these pathways, probably the most important by number of species and number of individual organisms introduced are the pet (including the aquarium trade) (Padilla & Williams 2004, Defenders of Wildlife 2007) and watergarden industries (Keller & Lodge 2007).

For most of these industries, it is not the intention of importers, wholesalers, or retailers that animals escape or be released into natural environments. It is usually consumers--ordinary citizens--that release animals or allow them to escape into the environment. But, of course, even with reasonable confinement, animals do often escape. For example, somewhere in my house in South Bend, IN there is (or was) a harmless corn snake that escaped from my son’s cage. In addition, many species are released when they grow too large for confinement, their behavior becomes threatening, they become too voracious to feed economically, or their owners simply become tired or scared of them (Gertzen et al. 2008). For example, many people release pythons, boa constrictors, frogs, lizards, and many species of fishes for these reasons. For aquarium fishes, which are probably less likely to escape or be released than reptiles, about 7% of owners release fish (Gertzen et al. 2008).

More risk is posed by other industries in which the alien animals are intended to be placed outside, e.g., the live bait and the watergarden pathways. In these cases, the intended use of the animals for sale predisposes them to escape and establish self-sustaining and spreading populations.

Escape and release are therefore the inevitable results of live animal sales, whether the animals are intended to be held inside or outside. Looking to the future, by far the most cost effective alternative to the current lose-lose situation is to prohibit the importation of damaging species to begin with, while allowing continued commerce in species that pose little threat. While we are now stuck with many damaging species, which require better local, state, and federal legal authority and resources to control or eradicate them, I will focus in the next two sections on the benefits and long-term cost effectiveness of preventing the importation of additional harmful species.

Current policy situation

The situation is dire: while our borders have become much tighter for humans, we continue to leave the door wide open for alien organisms from any part of the world. While some have suggested that our screen door has huge holes in it, a more accurate metaphor might be that the door is simply open. The screening program that exists at the USFWS is not up to the task. With few exceptions, virtually all organisms besides humans are allowed free entry into this country, whether or not they have high potential to introduce or carry human disease, disrupt fisheries or forestry or aquaculture, or destroy our wildlife and ecosystems. Under current policy animal species are not screened for potential harm before they are imported. Rather species are outlawed only *after* they cause serious and widespread harm. At that point, the invasion is often irreversible, and we are doomed to suffer the damages forever.

If we applied these same risk assessment practices to the importation of food or the introduction of drugs into the marketplace, few of us would be alive. Those who remained alive would frequently suffer serious illness from food borne pathogens or serious side effects from untested pharmaceuticals. Increasingly that is exactly the state

of our cultivated and natural ecosystems—rapidly declining ecological health from an onslaught of invasive alien species. Under current policies, there are few exceptions to this *laissez-faire* approach (see Defenders of Wildlife 2007 for a more complete review).

I believe that it would surprise most of your constituents--and perhaps you--to learn that importing into the US any of the following alien species—and thousands of others--would be perfectly legal (as long these species could be legally exported from their native countries):

- Australian saltwater crocodiles
- African puff adders
- Gaboon viper
- King cobra
- Australian crayfish

An average of 4100 venomous snakes were imported annually from 2000-2005, about 95% of which were imported for the pet trade (from FWS LEMIS database via Dr. Christina Romagosa, Auburn University, pers. comm., Romagosa 2009). Unless state or local laws prevent it, your neighbors could legally import and possess hundreds of these snakes. And they will escape. I'm highlighting venomous snakes, of course, because they pose obvious danger to humans.

Yet in terms of past damage, they are a small part of the problem. Many other species of animals are threatening us or the things we care about in less obvious ways. Burmese pythons are not venomous, but they are consuming endangered species in the Everglades; lionfish from the Indian Ocean are increasingly abundant along the Atlantic and Gulf coasts and can poison SCUBA divers; and carps from Asia are bankrupting commercial fisheries in Midwestern rivers.

In 2003, imported mammals included a mixed bag of African rodents that caused a human epidemic of monkey pox in the Midwest. An effort to exterminate Gambian pouched rats—the species most responsible for the monkeypox outbreak, from Florida's Grassy Key is still underway. Of the Center for Disease Control's 32 most important zoonotic pathogens—organisms that cause disease that can be transmitted from animals to humans--40% are species alien to the U.S. Many probably arrived in legal imports of animals in the pet trade. In short, every conceivable sort of creepy-crawly, together with their diseases, are flooding into the US from every part of the globe. This booming trade is all perfectly legal.

According to the U.S. Fish and Wildlife Service (FWS) annual imports into the U.S. include at least 203 million fish, 6.4 million reptiles and amphibians, 260,000 birds, and 90,000 mammals. The identity of many of these imported animals is not even reported or is at least not retained, as Defenders of Wildlife's 2007 *Broken Screens* report documented (www.defenders.org/animalimports). This is particularly true in the wholesale and retail markets for both animals, as we have documented (Keller and Lodge 2007). Nevertheless these unknown organisms, along with any hitchhiking parasites and pathogens, are allowed entry and sale throughout the US. We will be suffering damages and/or paying to control these species for generations to come. The existing policies and their implementation are not consistent with established policy goals. Congress and the Executive branch have made clear repeatedly that it is their goal to dramatically reduce the harm from existing alien invasions and prevent new invasions.

Among the 1.5 million known species on earth, there are thousands of species that (a) would be harmful if introduced to the US; and (b) are increasingly likely to be introduced as the industries that introduce live organisms grow and become increasingly international. Yet we still do not have in place policies by which these species, particularly animal species, will be screened for potential harm *before* they are imported. The need for improved policies becomes more urgent every day.

It is understandable that in past decades we did not have policies that could effectively accomplish the current policy goals of prohibiting the introduction of harmful species. The threats were much smaller; and the relevant scientific and technical expertise did not exist to screen species accurately before they were imported (Lodge et al. 2006, Hulme 2009). What is important for today's hearing, and for using science to inform this policy discussion, is to recognize that there is a cost effective alternative to the current situation in which the US allows free importation of species with no mandatory consideration of possible harm. Only the federal government can effectively reduce the flow of harmful organisms across the US border. By employing recently developed technical approaches to risk assessment to distinguish harmful from benign species, improved federal policies could prevent the introduction of additional harmful species. Not only would this allow continued commerce in most species, but it would likely reap net economic benefit for the country because of the avoided future damages. Employing improved risk assessments would be convert the current lose-lose situation into a win-win situation.

The solution: better policy in which to implement recent scientific tools

Many of these species imported as pets or ornamental plants bring beauty, interest, and pleasure into our lives. The biological supply industry supports vital education and research missions. Aquaculture and bait species provide recreation and food. But a substantial proportion of species imported by each of these and the other commercial pathways in live organisms, on the other hand, are very harmful. They contribute greatly to the estimated \$120 billion in annual damages caused to the US by invasive alien species. Taxpayers or other industries end up suffering damages that cannot be slowed or reversed, or they pay for private or government control and eradication efforts where those are feasible. In other words, the industries that import live organisms are currently subsidized by the tax payer. In economic terms, these industries have substantial externalities that require a policy remedy.

The solution is a policy like those that govern other substantial risks in the U.S.: a policy under which species (like drugs and food) are screened for potential harm before their entry into the marketplace is allowed (Suedel et al. 2007). While the scientific expertise to do this with sufficient accuracy did not exist a few decades ago, recent scientific advances, in which species screening is often $\geq 80\%$ accurate, make this possible (Kolar & Lodge 2002, Marchetti et al. 2004a, Marchetti et al. 2004b, Lodge et al. 2006, Fowler et al. 2007, Keller, Drake & Lodge 2007, Keller & Lodge 2007, De Poorter et al. 2008). Where risk assessment tools are not immediately available, the information necessary to construct them is increasingly available (e.g., for reptiles and amphibians, Kraus 2009). Species proposed for importation can be screened, the screening can be done quickly, and entry can be prohibited for those most likely to be harmful, while the vast majority of alien species, which are benign, can remain in

commerce. We can be confident of applying these principles to the U.S. because they have been tried and proven effective in Australia, New Zealand and increasingly elsewhere (Koike et al. 2006, Bomford 2008, Hulme et al. 2009).

A recent analysis demonstrates that the Australian Weed Risk Assessment, instituted in 1997, has probably paid for itself, and will save Australia the equivalent of \$1.8 billion over 50 years (Keller, Finnoff & Lodge 2007). By preventing the importation of the small percentage of plants that would cause harm, the lost revenues are more than compensated for by avoiding the damage that would have accrued. By one estimate, the aggregate costs from alien plants in the U.S. are at least \$35 billion annually. Such calculations are based predominantly on the easily quantified costs of herbicides, equipment, and labor to spray, pull, cut, burn or otherwise control these weedy plants in agricultural systems. The damage done to natural forests, wildlife habitat, native plants, waterway navigation, or the water supplies on which humans depend is not fully considered. So the good news—that risk assessment can reduce costs—is even better.

This is especially true because sales of plants and pets in the US are much larger than in Australia, so a screening policy would deliver even larger net benefits to the U.S. The bottom line: the net benefits of global commerce in living organisms are increased by reducing the negative side-effects of that trade. An ounce of prevention is indeed worth a pound of cure.

It is neither fair nor economically rational to allow importers of harmful alien species to reap profits while others suffer disease or damage or are left to pay to control the imported species that spread and cause harm. We do not allow drugs to come to market or chemicals to enter the industrial pipeline without screening for harmful side effects. Why should we accept analogous risks from alien species when an alternative policy of screening would bring both financial rewards and large environmental benefits?

Congressional action is urgently needed to accomplish the following recommendations, which are consistent with stated policy goals, and with recent analyses and recommendations by numerous scientific, NGO, and government reports, including those by OTA (US Congress 1993), the National Invasive Species Council (2001), the National Research Council (NRC 2002), and the Ecological Society of America (Lodge et al. 2006).

- Require risk assessment of animals *before* importation into the U.S., and legal authority to prohibit the importation of species that constitute too high a risk (the current draft HR669 does this);
- Require FWS to develop and implement screening protocols that are based on the most recent scientific and technological tools, requiring these agencies to adopt best available screening technology as tools and protocols improve over time;
- Support research to improve tools that currently exist, and adapt them for management use, and develop tools for taxonomic groups and regions for which no current tool exists (no clear mechanism in current bill to accomplish this);
- Require risk assessment protocols that are
 - Developed in concert with and peer reviewed by university and agency scientists
 - Quantitative wherever possible

- Repeatable
- Tested for accuracy using best available technology, with tests peer-reviewed and publicly available
- Transparent in every application of the tool to a species proposed for importation
- Quick, with a time limit of weeks to months to assess any species
- Specifically, the FWS should have authority analogous to that of USDA and HHS; the injurious wildlife provision of the Lacey Act requires revision or replacement to
 - clarify authority for and require pre-import screening
 - elevate this function to the highest levels within FWS
 - provide powers for emergency listing
 - establish a clear, transparent process for petition by public, requirement for public notification of petition, and rapid timetables for screening
 - clarify whether risk management decisions can incorporate mitigation measures to lower risk (i.e., permit importation under certain conditions);
 - clarify the role of cost-benefit considerations in risk management decisions to avoid years-long revolving door of proposed rule-making, public comment, proposed rule-making, etc.
- Provide appropriations and/or a fee structure sufficient for USFWS and other agencies to fulfill their legal responsibilities in developing and conducting risk assessments, and in making risk management decisions

Damages from invasions spread—an invasion in any congressional district is a threat to every other district

It is ironic that with all the talk and effort to close our borders to bad food, bad drugs, and terrorists, we continue to invite harmful alien plants and animals, unscreened, into our country. Invasions of alien species are time bombs; the initial self-sustaining population of a species may go unnoticed because so little biological monitoring is done. The population grows slowly at first. By the time it is noticed, the bomb has already exploded. By this point, the species is usually widespread, and its damages are largely irreversible. In the context of endangered species, you’ve probably heard it said that “extinction is forever.” Unfortunately, it is also usually true that invasion is forever. Biological invasions are the least reversible form of pollution. In contrast, most other forms of pollution—like the nitrogen and sulfur compounds of air pollution, the CFCs that destroy ozone, and PCBs—degrade or get buried (unless they are resurrected by invasive mussels), and the problems they cause decline eventually, if only we stop adding molecules of them to the environment. Chemical pollutants, in other words, do not reproduce; species do. Even if we stop adding individual Burmese pythons to the Everglades, nutria to the Chesapeake Bay, brown tree snakes to Guam, and apple snails to South Carolina waterways, their populations and those of many other invasive species will continue to grow, they will continue to spread throughout their regions and eventually across the continent, and their environmental and economic damage will grow exponentially. New policies can prevent that outcome and bring net economic benefits to the U.S., consistent with U.S. trade obligations under WTO.

Thank you again for the opportunity to offer my thoughts on the impact of invasions, on current policies on risk assessment of imported animals, and how those policies might be improved to better meet established policy goals.

Please enter my entire written and oral testimony into the published record. I look forward to responding to your questions.

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