FENDING OFF INVASIVE SPECIES: CAN WE DRAW THE LINE WITHOUT TURNING TO TRADE TARIFFS?

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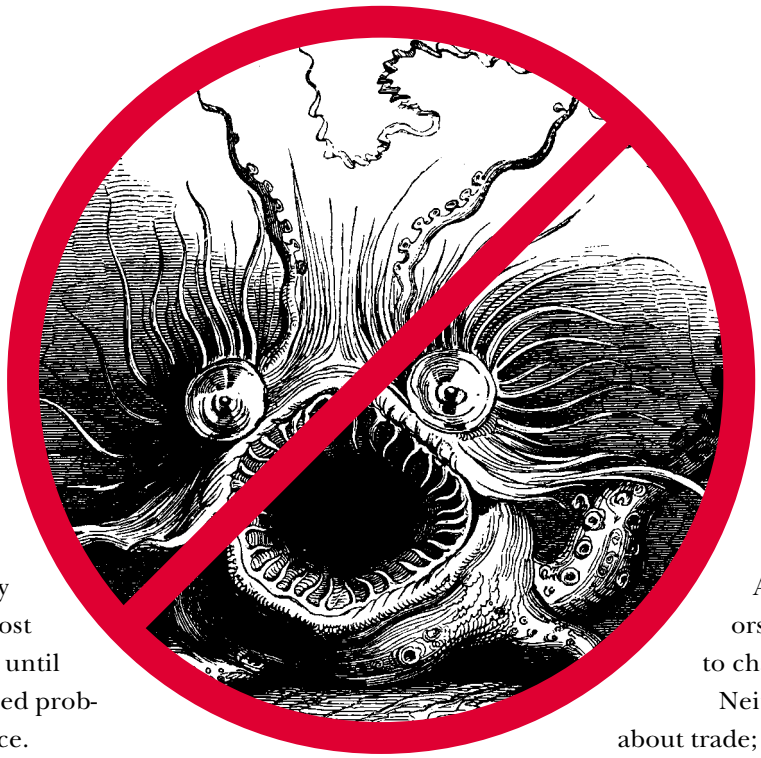
Next to habitat loss, the main threat to endangered species is the spread of other species. The introduction of goats onto San Clemente Island, California, for example, has led to the extinction of eight plant species and threatens at least eight more. Most of the American chestnut trees are now gone, due chiefly to a fungus known as chestnut blight. And when the great African snail became a serious garden pest in Hawaii, the rosy wolf snail was introduced to prey upon it and wound up instead eradicating several other snail species native to the islands it was supposed to protect.

Hundreds of these "invasive species" have by now been identified, and the damage they do is not limited to biodiversity. Mollusks foul industrial water-intake systems and navigation routes, numerous pests ravage crops, and the spread of European cheatgrass in the American West has contributed to the increase of fires. Other invasive species cause large changes in ecological processes such as the flow of nutrients and the amount of light reaching lake bottoms or forest floors.

This new ecological reality is part of the price of prosperity, a side effect of large-scale production, trade, and travel. Invasive species spread along the landscape disturbances created by roads, railways, and canals, and they also travel across oceans clinging to ship hulls or hiding in bilge water or packing material. While many invasive species have been introduced intentionally by people who had no idea they could cause harm, most invaders arrive in their new homes by accident. Agricultural shipments, especially those



of live plants, often include insect eggs or fungal colonies that are extremely difficult to detect. In most cases, no one thinks to look until a particular species has caused problems somewhere at least once.

In fighting the spread of invasive species, national boundaries are an appealing line of defense. Goods and people crossing those boundaries are under some scrutiny in any case and are generally restricted to a few entry points. In the United States, most trade and travel involves transportation across oceans, which means many of the life forms arriving at ports would almost never appear in the natural course of their own movements. Preventing problem species from arriving in the country has so far been the main focus of federal efforts, and environmental activists interested in the question mostly want to see more of the same. Bans are currently being sought on both the importation of logs that have not been heat-treated and on the use of solid-wood packing materials (chunks of wood used to prevent cargo from unpredictable shifting that can damage it), both of which are common pathways for forest pathogens. Others urge a crackdown on the importation of live organisms.

GUARDING OUR BORDERS

If the kind of crackdown environmental groups now want is attempted, we can expect a second generation of trade-environment conflicts, this one potentially much harder to resolve than the previous. The first time around, green groups were caught by surprise when conservation efforts ran up against trade agreements. The cases that have aroused the most passion are the 1991 ruling that the United States could not restrict tuna imports to protect dolphins and the rather belated discovery that the North America Free Trade Agreement had given investors a new venue through which to challenge regulations.

Neither of these cases is really about trade; they are about regulatory jurisdiction, and what led to the anger is that activists kept finding that the jurisdiction was not where they had thought it was. All they really needed to do was learn some new law and craft proposals with trade law in mind for the bulk of that conflict to disappear and, by and large, that's what happened. In the invasive species case, however, the nature of the threat to the environment stands in direct opposition to the very purpose of trade agreements.

International trade is not the sole source of the problem. Trade between regions—say, the East Coast and California—can also spread invasive species, and efforts at prevention have proceeded with no special difficulty because the federal government has unquestioned authority to regulate interstate commerce and has chief responsibility for preventing the spread of invaders. On the international scale, however, that responsibility is largely in the hands of national governments, and there is no institution with equal power over trade among them.

THE TROUBLE WITH TARIFFS

To appreciate the difference this makes, one must consider what the World Trade Organization (WTO) and related international organizations actually do. Anyone who has casually studied international trade has probably wondered why these institutions are needed. After all, free trade is in the interest of every country; why not skip all the negotiating and just let goods flow freely?

That would, in most cases, be best for consumers, but it is

politically impossible. The reason is that the benefits of a barrier to imports are enjoyed by relatively small groups of people, while the costs are spread over the whole consuming public. Few consumers can be troubled, for example, to complain to their representatives that sugar costs twice what it would under free trade, but the sugar producers happily support a full-time office dedicated to keeping it that way. The well-known virtue of free trade implies that the extra cost paid by American consumers for sugar is actually somewhat greater than the extra profit earned by the producers; however, because it amounts to only a few dollars per month for any family, the domestic political process is unlikely ever to get rid of America's sugar quota system.

International trade talks offer a way around this tension. Every trade barrier harms both buyers and sellers, and if the buyers are a scattered group in one country, the sellers are probably a concentrated group in the other. The United States, in seeking to open markets for producers with influence in Washington, is also generating a benefit for foreign consumers, while American consumer interests are represented by the negotiating teams from other nations. By swapping access to each other's markets, trade negotiators have been able to move the world haltingly and partially towards the free trade ideal.

Once nations have agreed on what kind of market access to grant each other, they must agree how to guarantee that access. The simple part is to get rid of the tariffs and quotas that were explicitly designed for no other purpose than to interfere in trade. It is much harder, however, to deal with policies that discourage trade but also serve a clear social purpose—such as keeping out invasive species. Getting rid of the policies openly designed to discourage trade does nothing to get rid of the political dynamic that gave rise to those policies. So how do those political forces play out?

INTEREST-GROUP INFLUENCE

Jason F. Shogren, of the University of Wyoming, and I have developed theoretical models to answer that question, building on a model of interest-group influence that has been widely used to explain which industries get tariff protection. In these models, government officials are assumed to care both about the general welfare and campaign contributions. The cynical interpretation of this theory is that incumbents care only about getting reelected, the probability of which depends on how well-off voters feel and how much campaigns can spend on propaganda. A more charitable view is that they want to do what is right for the society, but are aware that they can lose the ability to do so by being outspent.

The damage done by invasive species that enter via imported goods alters the general-welfare component of the government's objective but has no direct impact on the private interest groups. It does, however, indirectly alter interest-group behavior. If you represent an interest group that wants a particular import discouraged, and you know the government is going to put high tariffs on that import anyway because it carries invaders, you can save your contributions, while if you wanted free trade in that good you must contribute. The result of all these calculations is a tariff that is greater or less than the socially optimal tariff depending on the industry incentives to lobby.

What this implies is that if governments agree in trade talks to eliminate tariffs, but leave in exceptions for the goods that harbor invasive species, they almost might as well not have bothered. Unless governments can also agree on how

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potential invasive species damage is to be valued—which has not been contemplated in any trade agreement so far—the tariffs on those goods will rise far beyond what the damage done can really justify. And virtually every import can be a pathway for some undesirable species.

In practice, trade agreements have addressed this sort of problem not by allowing for tariffs, but by allowing regulation of the import process. For example, banning the import of logs from locations not certified as free of certain pests, or requiring that logs from such locations be heat-treated, is allowed under current agreements. Such policies have the clear advantage of focusing more narrowly on the problem than do tariffs. But it turns out that as a way to prevent protectionist abuse, this approach is not much better, and in some cases may be worse, according to our ongoing research. If there are no restrictions placed on how stringently governments set the importation standards or inspect for compliance, the import-competing lobbies will seek to have inspections increased to levels that drive import prices about as high they would have been with tariffs. Consumers may wind up even worse off than with tariffs, since the price-gauging function is now being performed by the use of real resources—to wit, the excess time spent by the inspectors.

Trade negotiators have been aware of these problems for some time. By the time the WTO was formed, there had been many cases in which importers alleged bad faith. As a result, the WTO founding documents include an Agreement on Sanitary and Phytosanitary Standards (SPS). According to the agreement, regulations intended to protect the health of animals and plants must have a scientific basis, but it turns out not to be so easy to agree on what that means. At present, the European Union is putting up with tariff retaliation rather than conceding that its ban on hormone-treated beef is unscientific, and the same may soon hold for genetically modified foods. And these issues, like almost every SPS case decided so far, have arisen in the context of agricultural trade, which is by far the least free trade on the planet. With explicit quotas and tariffs still in place, farmers have relatively little incentive to use standards as disguised protectionism. If, as seems likely, the invasive species issue begins to implicate more economic sectors where quotas and tariffs have been taken off the table, the clashes can only be louder and more frequent.

ALTERNATIVES TO TRADE INTERVENTION

Once an invasive species gets started somewhere, there are a variety of strategies available to keep it in check. As already mentioned, sometimes another species is brought in to prey on the invader; often species that are innocuous in their home become invasive when transported because they escape from the predators with which they co-evolved. The snail example cited above is one of many cases in which such "biocontrol" strategies have gone awry, but the science is evolving and, in some situations, releasing predators is still deemed the best response. Other options include chemical treatments, the release of sterilized specimens of the invader itself (to distract mates from the fertile) and manual removal of invaders from the field. The last option is preferred for its minimal impact on the environment, but tends to be expensive.

For manual removal to be truly effective, it is critical to interrupt an invasive species' life cycle at just the right point. In separate work with biologists Jennifer Ruesink and Eric

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Buhle of the University of Washington, we have adapted an analytical strategy first developed for identifying the life cycle phase at which an endangered species most needs to be protected. The main difference is that rather than defending this weak spot in the invasive species, we wish to attack it. Typically, invasive species have short life spans and produce many offspring. Killing adults is ineffective as compared to killing the same percentage of juveniles, eggs, larvae, and so on.

There is, however, a second way in which invasive species are not just endangered species turned backwards. To protect an endangered species, we must succeed at every stage of the life cycle. To get rid of an invasive, we must only succeed at one stage. This frees us to adapt our strategy much more aggressively to the relative cost of intervention at each stage, which makes quite a difference. In many cases, killing off a given percentage of the adults is much less expensive than getting the same fraction at the other life stages, since adults tend to be larger and easier to find. This is the case for the Japanese oyster drill, a species of winkle infesting farmed and wild oysters on the West Coast. If the relative cost is ignored, analysis of the oyster drill life cycle indicates one should gather eggs; however, when cost is considered, the most effective approach is to concentrate all resources on gathering adults.

This lesson does not extend to all species—it matters greatly that in this case the adults do not move around a lot—but the analytical method does. This is but one component of a large ongoing effort by biologists and economists to design efficient strategies to combat invaders. For the foreseeable future, however, there will be no substitute for keeping them out in the first place, and the global trade system remains ill-prepared to deal with the consequences. ■

Michael Margolis is an RFF fellow. Trade and the environment, especially trade between rich and poor nations, is the focus of his research agenda.

FURTHER READINGS

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www.issg.org. The Invasive Species Specialist Group (ISSG), part of IUCN, is a global group of 146 scientific and policy experts on invasive species from 41 countries. ISSG provides advice on threats from invasives and control or eradication methods to IUCN members, conservation practitioners, and policymakers. This website offers extensive resources.