

The growing peril of biological invasions

In 2019, in the US, biological invasions remain an unrelenting environmental and economic calamity, impacting all segments of society, from urban welfare and public health to industrial and agricultural systems to cultural and historic resources, at a cost estimated at more than \$100 billion annually. The rapidly growing movement of pathogens, disease agents, animals, and plants into the country reflects the accelerated rates of global bioflow – with an unprecedented potential to trigger epidemics that sweep through human populations, crops, and ocean fisheries, thereby diminishing the quality of life for billions of people. Climate change facilitates the arrival of new invaders and expansion of established ones, with the last four years being the hottest since global records began.

However, for more than 40 years, the US has fully understood that coordinated federal leadership is key to both preventing invasions and reducing their impacts. In 1977, President Jimmy Carter's Executive Order (EO) 11987, "Exotic Organisms", recognized the threat of biological invasions in natural areas and called for such coordination. By way of comparison, in 1999, President Bill Clinton's EO 13112, "Invasive Species", created an environmental policy milestone as the first federal recognition that the complex problems caused by non-native species required coordinated federal agency management. Acknowledging that invasives also affect the economy and human health, EO 13112 prioritized international cooperation and established three critical approaches: the National Invasive Species Council (NISC), the non-federal Invasive Species Advisory Committee, and a regularly updated National Invasive Species Management Plan (NISMP). In 2016, President Barack Obama's EO 13751, "Safeguarding the Nation from the Impacts of Invasive Species", expanded EO 13112, explicitly linking invasive species to national security, including human health and military readiness; recognized the influence of climate change; and again highlighted the necessity of inter-agency cooperation, public education, and technology to prevent and manage invasions.

Yet despite these directives, in 2014 the Asian spotted lanternfly, a major agricultural pest, was found in Pennsylvania; it now occurs from New York to Virginia. In 2016, the Asian reed scale was discovered in Louisiana; it currently threatens marshes that protect the Louisiana coast from hurricanes. In 2017, the Asian longhorned tick appeared in the eastern US; it can transmit the disease theileriosis to cattle, diminishing milk production, and to sheep, decreasing wool quantity and quality. Since 2000, Asian shot hole borer beetles have tunneled into dozens of tree species in California, transmitting an infectious fungal disease that disrupts water and nutrient flow, leading to tree mortality that could help fuel wildfires. What's more, a 2018 report (*PLoS Negl Trop Dis*; doi.org/10.1371/journal.pntd.0006761) concluded that we are entering a new era of emerging vector-borne diseases but that the US lacks any proactive health security research agenda to determine which pathogens threaten the country – despite having sustained such notable invasions as the Asian tiger mosquito, one vector for the Zika virus, which arrived in 2015.

These three EOs brought the impacts of invasions to the attention of the US Congress, which passed, with bipartisan support, the Nutria Eradication and Control Act (2003), the Brown Tree Snake Control and Eradication Act (2004), the Noxious Weed Control and Eradication Act (2004), and the Vessel Incidental Discharge Act (2018). As the one entity with national oversight of invasive species, NISC – along with its 12 Executive Branch members and four White House representatives – produces the NISMP and responds to department and agency requests for time-sensitive white papers on new or impending invasions. For example, NISC's leadership enabled the creation of the international *Arctic Invasive Alien Species Strategy and Action Plan 2017* (<https://on.doi.gov/2ylHBXw>), which was adopted in the 2017 *Fairbanks Declaration*, signed by the US Secretary of State and Arctic Council counterparts. And yet, for Fiscal Year 2020, the current White House proposes to cut the NISC budget by 50%, even as the damage from invasive species grows.

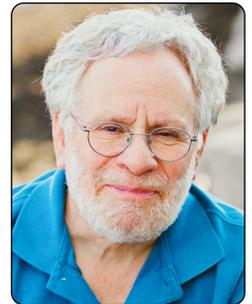
In this year, the 20th anniversary of EO 11312, its fundamental objectives have not changed: the elimination, mitigation, or reversal of the impacts of invasions and of the vectors that import new invasions. We cannot wait for climate change and environmental degradation, facilitated by the weakening of federal laws and rules, to result in waves of new invasions that could drain billions of dollars from the economy. Reactive management is far costlier than proactive planning.

We have before us clear and present rationales to press for investment in and the development of advanced prevention, control, and remediation technologies; enhance the integration of scientific research into all levels of government; and fundamentally strengthen our capacity to safeguard the nation.



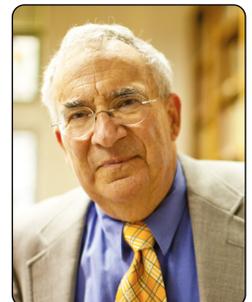
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