

Invasive Species and Climate Change

Approved by ISAC on December 9, 2010

Issue

Climate change interacts with and can often amplify the negative impacts of invasive species. These interactions are not fully appreciated or understood. They can result in threats to critical ecosystem functions on which our food system and other essential provisions and services depend as well as increase threats to human health. The Invasive Species Advisory Committee to the National Invasive Species Council recognizes the Administration's commitment to dealing proactively with global climate change. However, unless we recognize and act on the impact of climate change and its interaction with ecosystems and invasive species, we will fall further behind in our effort to prevent, eradicate and manage invasive species. We are already seeing such climate change impacts and need to act now.

Decisive Action is Required

Policy makers at all levels of government must integrate invasive species considerations into climate change policies. The strong interrelationships between climate change and the dynamic nature of invasive species, changing ecosystems, and human activities necessitate such integration. It is critical that practices be developed that strengthen environmental monitoring, management and control of invasive species to minimize impacts on the broad range of ecosystem resources upon which humans depend. The physical process of climate change interacts with the biological and physical processes of the earth's ecosystems, and these are, in turn, linked to the socio-economics of human activities.

Background

Climate change and biological invasions are dynamic, interconnected and interdependent phenomena. They affect human health and well being through their impact on resources, goods and services provided by ecosystems. These ecosystems are critical to agriculture and forests, food security, water supplies and other natural resources. They affect wildlife, recreation, and public health and safety nationwide. Even without climate change, invasive species have repeatedly and rapidly disrupted many ecosystems in the US. While climate change may have either a positive or negative effect on individual invasive species, which can be projected in various models, it is likely to have a negative effect on many specialist native species that are more restricted in their ranges. Invasive species often show higher ability to acclimate to environmental change compared to related native species. Thus, invasive species that tend to be more adaptable are expected to expand and further compromise sensitive native plant and animal communities.

The ongoing change in climate and the expected speed of this change are likely to exacerbate problems by increasing the ability of invasive species to become established, spread through, and disrupt ecosystems. At a minimum, invasive species can reshuffle the landscape for agricultural services and resources including food, fuel, feed, fiber and forests along with quickly changing land use decision pressures. As a parallel, in marine and/or aquatic ecosystems, climate change can induce fisheries collapse as mid-trophic structure species are lost opening new potential niches for tolerant

invasive species. Finally, climate induced shifts in invasive disease vectors, such as those for malaria or avian flu, are of increasing concern.

Evidence indicates that climate change may alter the efficacy of management strategies for invasive species. Furthermore, changes in land cover caused by invasive plants can influence weather and climate. In some regions, both climate change and invasive species are likely to increase the frequency of wildfires which in turn will further facilitate the establishment of fire adapted invasive species leading to even more frequent and intensive fires.

Recommendations

Policy and Legal Responsibilities

We applaud the U.S. Department of Interior's establishment of a Climate Change Response Council to synthesize data and coordinate appropriate management of our nation's lands and waters. We acknowledge the U.S. Department of Agriculture's (USDA) recent presentation of the impact of climate change in its publication: "*Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States.*" We fully support the Department of Commerce's National Oceanographic and Atmospheric Administration's (NOAA) proposal to establish the NOAA Climate Service to meet essential national needs.

Executive Order 13112 requires Federal agencies to address invasive species and establishes the National Invasive Species Council to coordinate planning and response. The International Plant Protection Convention requires analyses of pest risk. Agencies may be able to integrate climate change considerations into their existing risk-assessment protocols and procedures. Environmental laws such as the Endangered Species Act and the National Environmental Protection Act (NEPA) can be used more powerfully to address invasive species.

Opportunities for Action

We call on the member Departments and Agencies of the National Invasive Species Council and potential partners to:

- Use the Global Change Research Act of 1990 (GCRA)⁴⁸ (PL 101-606) to aggregate information about the implications of a changing climate for invasive species spread so scientific data may be synthesized through existing authorities to inform policy-makers.
- Streamline and focus agency programs to address invasive species climate interactions effectively and efficiently by establishing: 1) strategic plans that anticipate climate impacts on invasives, 2) forward-looking environmental compliance documents (e.g., NEPA, nationwide Environmental Impact Statements on invasives prevention, management, and restoration), and 3) focus awareness programs to anticipate and manage potential climate driven ecosystem changes.
- Assess new climate driven invasion pathways and strengthen prevention programs to address invasives in ballast water, bio-fouling, interstate and international movement of materials and equipment (e.g., energy development, wildfire response, national defense), and screening of plant and animal imports taking account of climate impacts.
- Support monitoring and adaptive management programs for invasive species at the landscape scale so that natural resource managers can identify new threats and respond quickly and appropriately to invasive species in changing climatic conditions.
- Foster collaboration of existing networks to address the broad geographic nature and altered management of invasive species issues in a time of climate change. This will allow the national response to be coordinated, efficient, and capitalize on current capacities using a synergistic approach.

- Increase research and development targeted at climate change and invasive species by supporting and expanding the USDA-ARS and US Forest Service Climate Change Programs, as well as competitive research programs such as USDA's Agricultural and Food Research Initiative, the Environmental Protection Agency's Project Grants, NSF's Conservation and Biology program, and NOAA's Sea Grant program. Better understanding of the interaction of climate change and invasive species will result in more relevant prioritization and management on the ground. This includes recognizing the economic basis for invasive species management decisions and supporting work that integrates economic, ecological and biological data providing policy and management support.
- Use climate matching and ecological niche models to prioritize management of species that are most likely to cause the greatest harm in the future as a result of climate change.

This will require the Federal response to be coordinated, empowered, and appropriately funded.