

National Council for Science and the Environment
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Breakout Session: Marine Bioinvasions

The coastal areas of the United States possess some of the world's most diverse and fragile ecosystems and support numerous species that depend on these habitats for survival. Unfortunately, global climate change, human development, and the continuous degradation of coastal ecosystems have rendered these once pristine areas vulnerable to the introduction of opportunistic invasive species. Invasive species have a profound effect on aquatic ecosystems resulting in the displacement of native species, reduced biodiversity, and the alteration of community structure and food webs. As a result, biological invasion is a significant contributor to marine species endangerment, habitat degradation and global biodiversity loss.

In addition to the severe and permanent damage to the habitats they invade, invasive species also adversely affect individuals by hindering economic development. Through damage to human enterprises, invasive species inflict an enormous economic cost; the cost to manage both aquatic and terrestrial species is estimated at \$137 billion per year to the U.S. economy alone. This is more than the combined total of all other natural disasters, suggesting that invasive species are a bigger threat than other environmental crises, including global climate change. It is estimated that a marine species will invade a new environment somewhere in the world on a weekly to daily basis. This rate will continue to increase with global trade and development and is likely to be further augmented by continuing global change, especially climate change. The following recommendations are made to prevent, detect, respond to, and control invasive species in a cost-effective and environmentally sound manner.

Task 1. Reauthorize the National Invasive Species Act. The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA) was intended to identify and implement ways to prevent the unintentional introduction and spread of invasive species into waters of the United States, to work toward minimizing economic and ecological impacts of established nonindigenous species, and to establish a program to assist states in the management and removal of such species. NANPCA was last reauthorized and amended in 1996 by the National Invasive Species Act (NISA); since this time a great deal has been learned about invasive species in regards to their introduction, management, and impact to the environment, economy, and human health. We recommend a reauthorization of NISA to include these additional findings. The Act should also be modified to include authorization of funding for a number of programs including a national monitoring program to document the spread of invasive species, an emergency fund for the rapid response of newly detected invasions, and to perform a comprehensive risk assessment on the vectors of non-native species.

Task 2. Coordinate Vector Management. New invasions need to be prevented through coordinated vector management. Further, management goals need to be clearly articulated.

Working with other agencies, NOAA should continuously review the science for evaluating marine bioinvasions vectors. An invasive species “czar” should be established to coordinate this issue, and others related to invasive species, with other agencies. All marine vectors need to be evaluated (e.g., magnitude and volume of biota that is moved by different transfer mechanisms). Management schemes for addressing flux and reducing the propagule pressure should also be addressed.

Task 3. Control and Management of Invasive Species. In the short-term, plans should be developed for the necessary actions needed to respond quickly to newly detected non-native species that may cause ecosystem, public health and/or socioeconomic impacts. Risk assessments are needed to prioritize species that warrant a rapid response plan. Further, an emergency fund for such efforts should also be established. In the long-term, Federal agencies should develop and implement effective strategies for control and management of invasive species. As an example, environmentally-sound options should be reviewed for establishing markets for invasive species.

Task 4. National strategy for monitoring. When a new species is introduced, the best strategy is early detection and rapid response. This includes monitoring habitats to discover new species soon after introduction, reporting sightings of previously unknown species in an area, and working quickly to keep the species from becoming established and spreading. Extensive monitoring across environments is needed to document the distribution of native species, identify range shifts, and detect invasions. Further, new innovations for early detection should be explored to determine the most efficient, cost-effective means of eradicating new biological invasions.

Task 5. Expand Educational and Outreach Programs. It is imperative that the public has an understanding of the problems and impacts associated with invasive species so that they can be partners in solving the problem. More importantly, people need to know what they can do to help prevent the introduction and spread of invasive species. Increased funding should be given to support national invasive species campaigns (e.g. Habitattitude™ and Stop Aquatic Hitchhikers!), that are designed to increase awareness about invasive species and promote actions that empower audiences to become part of the solution in preventing future invasions. Increased efforts should be incorporated into these campaigns to translate the combined risks from climate change and biological invasion to the public through real-world examples. Additionally, citizen-science needs to be incorporated into invasives species monitoring and management.

Task 6. Fund Research Programs. Dedicated research programs across a diversity of regions (e.g., high, mid and low latitude sites) must be developed and adequately funded to detect species movements and likely interspecies interactions, in order to predict, and possibly prevent, the impact of invasion resulting from global climate change. These goals will best be accomplished via focused, mechanistic studies of invasive species to inform and predict how global climate change factors may impact native species, invasive species and interact with local stressors to affect invasion success.

Task 7. Increased Coordination. Partnerships should be built among international, Federal, state and local agencies, academic institutions, and others to enhance capacity for detecting, responding to, and managing invasive species. Interagency groups (e.g., Coral Reef Task Force) need to build partnerships that broadly implement the other recommendations. The dispersal of invasive species is a global problem; therefore international coordination and cooperation is an important part of the solution. Invasive species are moved around the globe as a result of trade, transport, and travel, thus it is important to develop an international agreement for the management of pathways and to disseminate information on the risks and impacts from invasive species.