

Technology Policy Implications for Ballast Water Introduction of Non-indigenous Species ABSTRACT

Nonindigenous species have the potential to harm local economies, ecosystems, and in some cases public health. The problem of non-indigenous species introductions only escalates, as the world becomes a global economy. Increased trade between different locations provides new vectors of introduction for many non-indigenous species. Nonindigenous species are introduced to coastal environments through a variety of vectors, but the most common method of introduction has been identified as ballast water from ships.

The scientific community is currently trying to evaluate the economic, ecological, and human impacts of these introductions, but it is increasingly important that policy analysts become involved in the research. There is currently not a model that can determine the likelihood that an introduced species will become invasive, it therefore is necessary to evaluate the potential of reducing the risk factors that lead to introductions. Policy makers at the national and international level are currently struggling to formulate and implement policies that will effectively reduce the risk of introductions to coastal waters. The proposed policies advocate a global standard that may not adequately protect the environment and may impose unnecessary restrictions or financial burdens on the shipping industry.

The risk reduction model developed through this research evaluates both the likelihood of invasions from oceanic voyages as well as coastwise shipping introductions. The model characterizes three elements: 1) the port of origin environment (e.g. salinity, temperature), 2) the voyage factors (e.g. treatment method, length of voyage, volume of ballast, and ballasting events), and 3) the port of destination environment to determine the risk reduction potential of technology policy combinations. A series of four case studies are presented to illustrate the predictive power of the model.

The risk reduction model can be applied to any port to determine which policy and technology combination will most effectively reduce the risk of invasive species introductions. The model developed by this research will inform the policy making process by evaluating the factors that are controllable by regulations, technology, and policy requirements. Previous research and models in this area have address the biological conditions necessary for invasion, these cannot be changed by regulations, therefore it is necessary to develop a model that involves the ports and ships, the two areas that can be regulated.

OUTLINE

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V. Conclusions