Can Policy Makers Reduce Ballast Water Risk?
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Problem Statement:

Marine transportation is one of the fastest growing industries in the world. Increasing maritime traffic results in more vessels visiting U.S. ports each year. Many of these vessels carry and discharge ballast water into local waters. Ballast water is necessary to maintain stability in vessels; it is also the most common vector for the introduction of non-indigenous species. Non-indigenous species are a challenging policy issue facing the United States and the world. Non-indigenous species introduced into port waters have the risk of becoming invasive species resulting in damage to port ecosystems.

Marine invasive species have been a policy problem for the U. S. since the appearance and spread of the Zebra Mussel throughout the Great Lakes in the 1980's. The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 was the first national regulation applied solely to the control, management, and prevention of invasive species. It was amended in 1996 to be the National Invasive Species Act.

Invasions continue to occur despite regulations and oftentimes lead to environmental degradation and loss of biodiversity. Introduced species can negatively affect fisheries by out competing native species, leading to economic loss, and can alter ecosystems. Policy makers should implement policy that will result in a meaningful decrease in introductions. Effective policy must consider all of the important factors, including the ecosystems of the origin and destination ports, the technologies used, the cost of implementation, and the ease of enforcement. Although there is movement toward a global standard for ballast water control—this may not be the most effective method of control. A global standard cannot address the differing conditions at ports. Simple, uniform standards may over protect less vulnerable ports or under-protect the ports at greatest risks.

Ballast water management faces the classic technology and policy conflict. An effective management technique must marry technology and policy with out burdening the ports. Emerging technologies to reduce the introduction of non-indigenous species include ballast water exchange, filtration, UV radiation, and shoreline treatment facilities. However, none is universally accepted. The United States is actively participating in the development of the international convention in hopes that it will decrease the negative impacts of non-indigenous species on domestic waters. This global standard while supported by the governments cannot address the problem at the ports effectively or efficiently. The ports must be involved in the development of the policy to ensure that port specific issues are address and that the policy can be implemented and enforced.

Research Questions:

• What are the important factors that determine the introduction of species by ballast water and what are the associated exposure risks at the port level?

• Do current and proposed ballast water policies adequately reduce the risk to ports of invasive species exposure?

Tools and Techniques:

The first step in the research is the development of a risk-reduction model. The model will include information gained from research of documents, databases, and personal interviews with industry representatives currently involved in addressing introduced species. The model will determine the most effective method of risk reduction for specific ports, by evaluating policies and technologies.

Various sources will provide data including port and maritime exchange records, the National Ballast Water Information Clearinghouse, the US Army Corps of Engineers National Data Center, Maritime Administration, and the American Association of Port Authorities. I will conduct a series of interviews with the representative ports to gather data and present results of the risk assessment.

Current Research:

The initial study using the risk model will be the port of Houston, to determine the risk of the port to introduction by non-indigenous species, and the best method of risk reduction. Expanded research will include a representative sample of U.S. ports and their relative risks to introduction. The sample selection of ports will additionally include west coast ports, east coast ports, and Great Lakes.

The final area addressed by this research will be a policy analysis including discussion of current U.S. regulations and international conventions. I will be addressing the issues of governance, in determining where regulations for non-indigenous species control should lie. I will include in my discussion information from the state, national and international arenas. The analysis will determine the relevancy and comprehensiveness of the current policy. The research will identify the important risks faced by ports, currently not addressed by legislation, and propose the most effective method for risk reduction.

European Green Crab-Invasive Species introduced in larval stage (inset)

Ship Deballasting
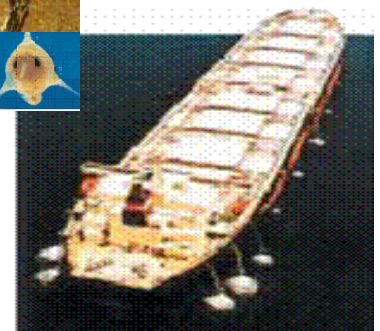
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