

Article #: 29

Title: The Importance of Bioeconomic Feedback in Invasive Species Management

Authors: David Finnoff, Jason F. Shogren, Brian Leung, and David Lodge

Journal: Ecological Economics; Vol. 52

Date: 2005

Pages: 367-381(KB 11/12/08)

Abstract:

This paper attempts to show the benefits on an integrated bioeconomic framework to manage invasive species risk cost-effectively by examining the feedback links between the biological and economic systems. In particular, it attempts to determine accounting for feedback matters in the case of zebra mussels in a Midwest lake. There are two levels of feedback considered in this paper:

- Biological-Firm - captures the links between the private economic agent and the biological system
- Manager-Firm - captures the links between the policy maker, private economic agent, and biological system

To judge how important each feedback is to the overall integrated model, the paper "turns off" particular interactions so one player is assumed to have incomplete knowledge (or beliefs) about another player in the system.

The results suggests that accounting for feedbacks can matter, but not necessarily in every aspect. Four main results emerged:

- Only relatively minor ecological consequences were found by not addressing the link between the biological system and the firm, but substantial economic consequences are predicted.
- Neglecting the Biological-Firm feedback leads to a greater likelihood and abundance of invasive species
- Ignoring the Manager-Firm feedback is more variable in biological and economic consequences. The manager can overprevent or undercontrol the firm's behavior, both of which have minor consequences. Or the manager can completely ignore the firm, which as severe consequences in both areas.
- Neglecting all feedbacks reduces the incompleteness of the manager's beliefs because the firm acts as the manager expects it to act, although this still has major consequences both biologically and economically.