Title: Cooperative management of invasive species: A dynamic Nash bargaining approach

Abstract: We examine scope for bargaining in invasive species problems where a pest may spread from an infested to an adjacent uninfested municipality. Whether and when the pest spreads depends on the choice of costly pest control methods undertaken by the infested municipality and on the characteristics of the invasive species. We consider a problem in which the municipalities bargain over a transfer payment that compensates the infested municipality to undertake control efforts to slow the probability of invasive species spread. These controls require that the infested municipality forgoes nonmarket benefits associated with a host plant species in order to protect the nonmarket benefits in the uninfested municipality. In an application to the problem of Emerald Ash Borer infestation in Minneapolis and St. Paul, Minnesota, we demonstrate that the bargaining outcome depends importantly on the relative bargaining power held by each municipality, the rate at which the probability of spread grows over time, and the efficacy of available controls in stemming spread of the invasive. We find that when the uninfested municipality has a significant bargaining advantage over the infested municipality, bargaining may attain the economically optimal level of control. However, we also show that under a broad range of parameter values, a short-term bargaining agreement is unlikely to succeed, which suggests a potential role for higher levels of government to play in facilitating long-term bargaining agreements even when the details of those agreements are left to the municipalities to negotiate.