

## F.H. RIGLER MEMORIAL AWARD LECTURE: PROGRESS TOWARD PREDICTING THE IMPACTS OF NON-NATIVE SPECIES ON FRESHWATER ECOSYSTEMS

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Non-native species are invading lakes and rivers at increasing rates worldwide and the impacts of the vast majority of these invasions are poorly known. Many invasions appear to have had only minor ecological effects, whereas others have caused remarkable changes to water quality, ecosystem functioning, native biodiversity and fisheries. Managers lack risk assessment tools to identify and prioritize high-impact invasion threats. Predicting the impact of an invasion is a longstanding challenge that is complicated by several factors – most notably, the context dependencies that arise from the influence of local environmental variables. My colleagues and I are developing some promising hypotheses, statistical approaches and experimental methods that may contribute to a better predictive understanding of invader impact. These developments are based on a conceptual framework that explicitly considers the relationship of the invader to its physical and biological environment; studies that have explored this relationship have discovered patterns that explain spatial and temporal variation in impact. Identifying such patterns is a major step toward building predictive models that can allow managers to identify, in advance of invasion, which alien species pose the greatest ecological threat and which habitats are at greatest risk of disruption. Further progress is needed to deal with heavily invaded ecosystems, as burgeoning numbers of invaders can cause synergistic effects that are difficult to anticipate and manage.