Summary Asian Carp Invasion of Great Lakes SEJ

Bighead and Silver Carp were introduced into the Mississippi basin to control algae in commercial fish farms. After flooding in the Mississippi river, these species escaped into the Mississippi river basin and have caused considerable damage. In some places they now constitute 80% of the biomass and displace valuable native species. Having moved up the Mississippi watershed, they now directly threaten Lake Michigan and Lake Erie and indirectly Lakes Huron and Ontario. Large commercial interests are threatened. The likelihood of Asian Carp establishment depend on many factors, including the native food webs, the suitability of spawning areas, and the effectiveness of engineered barriers. Structured expert judgment was used to quantify the uncertainties of establishment in light of these various unknowns. The study provided actionable information on the effectiveness of barriers and the impact of establishment on high value native species. Expert performance was gauged on the basis of answers to calibration questions involving dietary fractions and biomass of native species gleaned from next year measurements. Performance based combinations of experts' judgments was effective in providing statistically accurate and informative answers to ecosystem managers. Although an Asian Carp invasion in Lake Erie would affect walleye, perch and small mouth bass, the projected effect was not as large as those seen in the Mississippi basin. Most engineered barriers were deemed t have a marginal effect.

Literature:

Zhang, Hongyan, Rutherford, Edward S. , Mason, Doran M. , Breck, Jason T. , Wittmann, Marion E. Cooke, Roger M. , Lodge, David M. Rothlisberger, John D. , Zhu, Xinhua, and Johnson, Timothy B., (2015) Forecasting Impacts of Silver and Bighead Carp on the Lake Erie Food Web, appearing in Transactions of the American Fisheries Society

Cooke, R.M., Wittmann, M.E., Lodge, D.M., Rothlisberger, J.D., Rutherford E.S., Zhang, H. and Mason, D.M. (2014) "Out-of-Sample Validation for Structured Expert Judgment of Asian Carp Establishment in Lake Erie", Integrated Environmental Assessment and Management, open access. DOI: 10.1002/ieam.1559 <http://onlinelibrary.wiley.com/doi/10.1002/ieam.1559/abstract>

Wittmann, M.E., Cooke, R.M., Rothlisberger, J.D., Lodge, D.M. (2014a) " Using Structured Expert Judgment to Assess Invasive Species Prevention: Asian Carp and the Mississippi - Great Lakes Hydrologic Connection", Environmental Science & Technology, DOI: 10.1021/es4043098 Publication Date (Web): January 27, 2014 Copyright © 2014 American Chemical Society, 2150–2156

Wittmann, M.E., Cooke, R.M., Rothlisberger, J.D., Rutherford, E. S., Zhang, H., Mason, D., Lodge, D.M. (2014b): Structured expert judgment to forecast species invasions: Bighead and silver carp in Lake Erie, Conservation Biology . DOI: 10.1111/cobi.12369