

Effects of Introduced Common Carp and Invading Zebra Mussels on Water Quality and the Native Biological Community of Clear Lake, Iowa

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Goals and Objectives:

- Develop a lake ecosystem model for Clear Lake, Iowa
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Progress:

To date, all data have been acquired, processed and entered into a database. Two manuscripts entitled “Strategies to control a common carp (*Cyprinus carpio*) population by pulsed commercial harvest” and “Semi-discrete biomass dynamic modeling: an improved approach for assessing fish stock responses to pulsed harvest events” have been submitted to the North American Journal of Fisheries Management and the Canadian Journal of Fisheries and Aquatic Sciences respectively. In January 2012, a technology transfer was held to demonstrate the Clear Lake Ecosystem Simulation (CLESM) model to Iowa DNR employees. The session was a resounding success evaluating the impacts of ongoing lake restoration and invasive common carp and zebra mussels.

Conclusions and Recommendations:

The objective of this study is to understand the complex interactions and effects of introduced common carp, invading zebra mussels, and the native biological community on water quality in Clear Lake, and to organize this knowledge into a simulation model. The resulting model will enable the evaluation of the effects of both biotic and abiotic factors on water quality in Clear Lake, and facilitate evaluation of a variety of management scenarios on future water quality. The model will provide a tool for scientists, managers and other decision makers to evaluate effects of potential ecosystem changes and management actions on water quality and recreational fisheries in Clear Lake.

We developed four annual mass-balance food web models to evaluate food web consumption, group impacts and structuring, as well as pelagic primary production in a Clear Lake.

We developed the Clear Lake Ecosystem Simulation Model (CLESM) to evaluate potential consequences of invading zebra mussel and established common carp populations on water quality and recreational fishery yield dynamics in a shallow eutrophic lake undergoing restoration.

To view and download the CarpBioDyn and CLESM simulation models go to: <http://www.cfwru.iastate.edu/ClearLake/>. Reports are available at http://www.cfwru.iastate.edu/pierce_reports.htm.