NOAA GLRI Webinar - Project Fact Sheet

Project Title	Food Web Modeling to Support Asian Carp Risk Assessment in the Great Lakes
Project Lead	PI: Ed Rutherford (NOAA GLERL) Co-PIs: Doran Mason (NOAA GLERL)
Funding amount ($) and years funded	FY11-12 ($700,994); FY16 ($152,128); FY17 ($159,590); FY18 ($203,100); FY19 ($105,000); FY20 ($105,000)
External partners, collaborators and/or sub-awardees	Current Collaborators and Sub-Awardees: Hongyan Zhang (Eureka Aquatic Research, LLC; Yu-Chun Kao and Lori Ivan (Michigan State University); Brian Brenton (Brenton Consulting LLC); Andrya Whitten (Illinois Dept. Natural Resources
GLRI Focus Area	Invasive Species
GLRI Action Plan Primary Measure	Objectives 2.1, 2.2; prevent new introductions of Invasive Species; control Invasive Species
	Measure(s) of Progress: number of food web models developed; number of Asian carp food web impact risk assessments completed.
Brief project description	Bighead and silver carp (Asian carps) threaten to invade the Great Lakes and disrupt aquatic food webs and fisheries through their consumption of plankton and detritus in lower trophic levels. Asian carps can cause shifts in phytoplankton and zooplankton species composition and abundances resulting in changes up the food web. In rivers and lakes in North America, Asia and Europe, the introductions of Asian carps have resulted in the decline of many native fish species, with planktivorous larval, juvenile or adult fish being particularly affected. We have modeled the potential risk of Asian carps to Great Lakes food webs using 3 different food web models: • Ecopath with Ecosim – EwE • Individual based bioenergetics model – IBM • Atlantis Ecosystem model Our past model simulations of the potential for Asian carps to grow and impact 5 Great Lakes habitats (Lake Erie, Lake Ontario, Saginaw Bay, main basin Lake Huron, main basin Lake Michigan)

indicates that if Asian carps reach a high biomass, there could be negative consequences for some fishery species (see Figure below). Potential growth and impacts of Asian carp are positively affected by lake productivity, but differ slightly depending upon the resident fish community and their diet preferences in each lake.

Currently, we are analyzing long-term monitoring data on food web response and effects of controlled harvest of Asian carps in the Illinois River, a Great Lakes tributary where they have already invaded. We will use our food web models to simulate Bighead and Silver Carp population growth and food web response in the Illinois River, and comparison model-predicted impacts to observed impacts. Results will better inform managers about the risk of Asian carp to the Great Lakes.
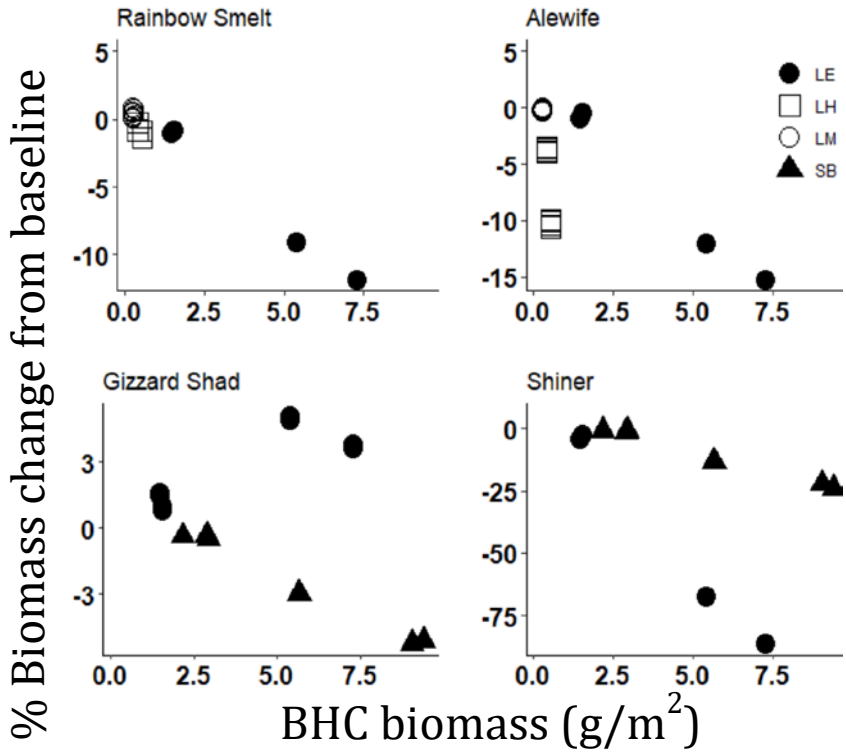
Figure 1. Model simulated effect of bighead and silver carp (collectively 'BHC') biomass on prey fish in Great Lakes habitats.