

How would an Asian Carp invasion affect fish in Lake Erie?

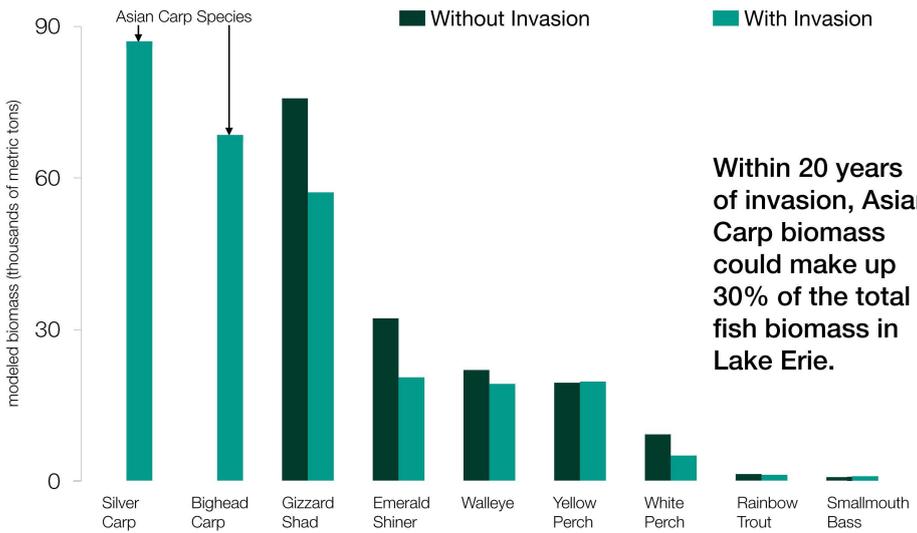


Lake Erie satellite photo taken 3/23/2012, courtesy of NASA.

Of all the Great Lakes, Lake Erie is most susceptible to an Asian Carp invasion because of its high productivity, its connectivity to other watersheds where Asian Carp have already established, and its availability of suitable spawning habitats. Scientists used a food web model to study how an Asian Carp invasion might change the populations of other fish species in Lake Erie.

Like any model, this one required input variables - namely having to do with how the food web works, who eats how much of whom, etc. The scientists used a technique called "structured expert judgment" to come up with values for their input variables, wherein they actually asked a number of fish experts their estimates of the variables.

The model predicted Asian carp would reach their carrying capacity within twenty years after invasion. **The chart below shows the biomass** (wet weight of the entire population) of select fish species in Lake Erie predicted by the model after 135 years of simulation (this doesn't mean it would take 135 years to get to this point -- this is just the length of the model run). Two different model scenarios were run, one in which Asian Carp (Bighead and Silver carp) do not invade Lake Erie and one in which they do.



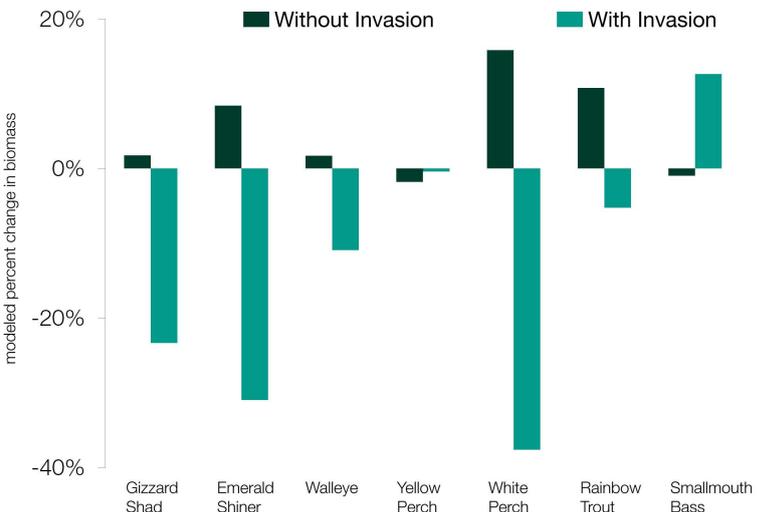
Within 20 years of invasion, Asian Carp biomass could make up 30% of the total fish biomass in Lake Erie.

The next chart shows the modeled percent change in biomass for the non-carp species over the duration of the simulation, again under two different scenarios of invasion and noninvasion.

Though the data are the same, the way they are presented here differs from the way they were presented in the paper and initial press releases.

In the paper, the ending biomasses of the various species with and without Asian Carp (like in the top chart) were compared to find percent difference between the two scenarios.

Here, the beginning and ending biomasses of the species are compared to find the percent difference over time, with and without Asian Carp.



Graphic based on: Hongyan Zhang, Edward S. Rutherford, Doran M. Mason, Jason T. Breck, Marion E. Wittmann, Roger M. Cooke, David M. Lodge, John D. Rothlisberger, Xinhua Zhu & Timothy B. Johnson (2016) Forecasting the Impacts of Silver and Bighead Carp on the Lake Erie Food Web, *Transactions of the American Fisheries Society*, 145:1, 136-162

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