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An Agent-Based Modeling Approach for Predicting the Behavior of Bigheadcarp (*Hypophthalmichthys nobilis*) Under the Influence of Acoustic Deterrence

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**An agent-based modeling approach for predicting the behavior of
bighead carp (*Hypophthalmichthys nobilis*) under the influence of
acoustic deterrence**

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Four aquatic invasive species labeled as ‘Asian carp’ are currently threatening the ecological integrity of Lake Michigan. Two of these fish, silver carp and bighead carp, have been identified as immediate threats warranting research and action. This agent-based model validates previous research and expands upon it by adding competition among native and invasive species in a simulated real-world environment. Results show that the barrier is effective up to a population threshold that is a function of the number of invasive fish and the testing area. Additional findings indicate an algal bloom may arise on the protected end of the barrier. Due to the harmful nature of algal bloom to humans and protected native species alike, proximity to recreational areas as well as water treatment facilities would need to be considered for real-world implementation.