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Up-Scaled Fish Barrier: Vertically Mounted Electrodes are Economical, Maintainable, Safe

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Our Great Lakes are under attack by the invasive Asian carp. If they were to establish themselves in the lakes, it would prove detrimental to the ecosystem, the multi-billion dollar fishing industry, and recreational lake use. They become harmful airborne projectiles when disturbed by watercraft and will starve out native species. My focus is on the $200 million barrier system put in place to stop the migration of these fish. Currently, these fish are being stopped by a massive horizontal electrode fish barrier system located in Romeoville, Illinois. My research was spurred by the amount of problems with the maintenance of the system. Using horizontal electrodes makes them susceptible to damage and debris, mostly from barge chains and silt. The current maintenance protocol is to poison the water, shut down the barrier, and send a diver into potentially electrified water. I decided to try to model mounting removable electrodes on the side wall to stop the damage. I hypothesized that this would produce the same gradient and stop the fish. I created a 2 percent scale model of both configurations and tested the gradient using a volt meter. My findings show that vertically mounted electrodes will produce the same fish-stopping gradient, and are easier to maintain, safer, and more economical.

Information about the Author:
Brandon Benninger's research has been on the barrier that is being used to stop the migration of Asian carp. He first improved the electrical gradient produced by the barrier. This project was awarded a finalist spot at the International Science and Engineering Fair (ISEF). He then redesigned the barrier to make it safer and easier to maintain. That project allowed him to advance to the Indiana Science and Engineering Fair. He was also awarded his first patent for the project. His research continued with a project that studied the effects of barge traffic on the electrical gradient of the barrier, which advanced him to the ISEF once again where he was awarded fourth place.

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