Mitigating Stresses to Migrating Ichthyoids Caused by Man-Made Obstructions

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The purpose of this project was to create a motorized fish ladder to aid anadromous fish trying to bypass dams to reach migratory breeding or feeding grounds. Currently, fish struggle to cross dams using stationary fish ladders, which have a success rate of about 3% according to the Yale School of the Environment. My goal was to make it easier for fish to “climb” dams by reducing the physical effort and stress placed on the fish, both of which can decrease their survival rates. My model is powered by a water pump motor; however, the full-scale model would be hydro-powered for cleaner and more environmentally friendly energy. Throughout the design process, I made many changes to improve my design, including modifying material, redesigning the box posts, and testing various shapes of the boxes to maximize efficiency. I measured the success of my design by using marbles to simulate fish in water moving up the steps, counting the number of successful transfers up the motorized ladder. I had a success rate of 94% (94 out of 100 marbles climbed the ladder successfully). This demonstrates the motorized ladder may be up to 91% more successful then present stationary ladders. My next step will be to enlarge the scale of my ladder to allow for real-time testing with live fish and explore using a hydro-power source. I would also convert the material of the ladder from wood to Lexan, a good candidate for the real version since it is light, available, strong, somewhat flexible, and resistant to wear and tear of everyday use.

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