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REPORT TITLE: Engineering Design and Analysis for More
Secure Salmon Net Pen systems

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ABSTRACT

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The purpose of this project is to promote the Maine salmon aquaculture industry by applying state of the art engineering tools to develop more secure net pens and mooring systems. The goal is to reduce farmed fish escapement and to open up more exposed areas necessary for industry growth. The approach involves deploying instrumentation to measure the environmental forcing characteristics and to mooring system loads. Current velocity data sets, considering flow reduction, are then used as input to a fluid-structure interaction computer model simulations are performed to calculate the distribution of mooring system loads. These results are compared with data sets obtained from load cells deployed at the site to validate the numerical approach. The resulting loads of these simulations are then used with a structural finite element model of the net pen flotation pipe, made of High Density Polyethylene, to determine yield strength characteristics. Using the validated models for mooring system design and net pen structure analysis, the techniques were applied to an exposed site off the coast of Maine. Site conditions were determine a preliminary specification of components were made.