

Abstract Submitted
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Mechanisms and methods for biofouling prevention via aeration

NATASHA DICKENSON, CHARLES HENOCH, JESSE BELDEN, Naval Undersea Warfare Center — Biofouling is a major problem for the Navy and marine industries, with significant economic and ecological consequences. Specifically, biofouling on immersed hull surfaces generates increased drag and thus requires increased fuel consumption to maintain speed. Considerable effort has been spent developing techniques to prevent and control biofouling, but with limited success. Control methods that have proven to be effective are costly, time consuming, or negatively affect the environment. Recently, aeration via bubble injection along submerged surfaces has been shown to achieve long-lasting antifouling effects, and is the only effective non-toxic method available [1,2]. An understanding of the basic mechanisms by which bubble-induced flow impedes biofouling is lacking, but is essential for the design of large-scale systems. We present results from an experimental investigation of several bubble induced flow fields over an inclined plate with simultaneous measurements of the fluid velocity and bubble characteristics using Digital Particle Image Velocimetry and high speed digital video. Trajectories of representative larval organisms are also resolved and linked with the flow field measurements to determine the mechanisms responsible for biofouling prevention.

[1] Scardino et al. 2009. *J Mar Sci Technol*. No. A13. pp.3-10.

[2] Bullard et al. 2010. *Aquatic Invasions*. 26: 587-593.

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