Abstract Submitted
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Development of Turbulence Downstream of a Submerged Aquatic Canopy in Unidirectional and Combined Wave-Current Flows[1] FRANCISCO ZARAMA, ROBERT ZELLER[2], JEFFREY KOSEFF, The Bob and Norma Street Environmental Fluid Mechanics Laboratory, Stanford University — Seagrasses and corals form the essential building blocks of many coastal ecosystems, and the turbulence generated from these canopies have been investigated heavily. However, the effect of these canopies on the downstream flow is poorly understood, particularly for combined wave-current flows. Furthermore, the development of flow characteristcs may have a profound impact on propagule transport and sediment dynamics downstream of the canopy. The present study focuses on the adjustment of turbulence and flow characteristics downstream of a model canopy. These experiments comprise three different canopy heights, three different wave conditions, and three different flowrates. Measurements are taken using an acoustic velocimeter and 2D particle image velocimetry. This work proposes the existence of four distinct regions downstream of a model canopy: the mixing layer, the transition region, the turbulence decay region, and the boundary layer. Each of these regions has distinct characteristics regarding the mean flow, bed stress, TKE, and Reynolds shear stress. The delineation and description of these four regions will allow ecosystem managers and sediment modelers to better understand coastal dynamics.

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