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Flow Structure and Turbulence Characteristics downstream of a Spanwise Suspended Linear Canopy through Laboratory Experiments JUNDONG QIAO, SARAH DELAVAN, State Univ of NY - Buffalo — Laboratory experiments were conducted to explore the mean flow structure and turbulence properties downstream of a spanwise suspended linear canopy in a 2-D open channel flow using the Particle Tracking Velocimetry technique. This canopy simulated the effect of one long-line structure of a mussel farm. Four experimental scenarios with the approach velocities 50, 80, 110, and 140 mm s^{-1} were under investigation. Three sub-layers formed downstream of the canopy. An internal canopy layer, where the time-averaged velocity decreases linearly with increasing distance downstream, a canopy mixing layer increasing in vertical extent with increasing distance downstream of the canopy, and an external canopy layer with higher velocity under the canopy, which may bring nutrients from the local ambient environment into this layer. The canopy turbulence results in upward momentum transport downstream of the canopy within a distance of 0.60 of the canopy depth and downward momentum transport beyond 1.20 of it. In the scenarios with relatively lower approach velocities 50 and 80 mm s^{-1}, the wake turbulence results in upward momentum transport. The broader goal of this study is to offer guidelines for the design and site selection of more productive mussel farms. The results suggest that distance interval between the parallel long-lines in a mussel farm should be less than 0.6 times the height of a long-line dropper. Also, potential farm locations that are characterized with current velocity from 50 to 80 mm s^{-1} are suggested.

Jundong Qiao
State Univ of NY - Buffalo

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