DISPERSION AND DRAG

through VEGETATION in the FLORIDA EVERGLADES

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Overview

The South Florida Water Management District (SFWMD) has identified a need for a hydrodynamic model to plan future stages of the Kissimmee River Restoration Project. Because vegetative resistance (drag) must be characterized to develop this model, a field experiment including measurements of stage, velocity profiles, and dye spreading was conducted in the Loxahatchee Impoundment Landscape Assessment (LILA), a field model of the Everglades. The field experiment is illustrated in Figure 1. Dye was released (Fig 2); as it dispersed it flowed through a variety of vegetation natural to the Everglades (Fig 3 and 4). Concentration was measured downstream by seven fluorometers spread across the flow path (Fig 5); concentration was plotted with respect to time (Figure 6) and the observed measurements were normalized (Fig 7) using the Frozen Cloud Approximation (Fischer, 1968)[1]. This approximation allows us to derive estimates of longitudinal dispersion (D_x) which is used to estimate an appropriate value for drag, C_d.

Figure 1

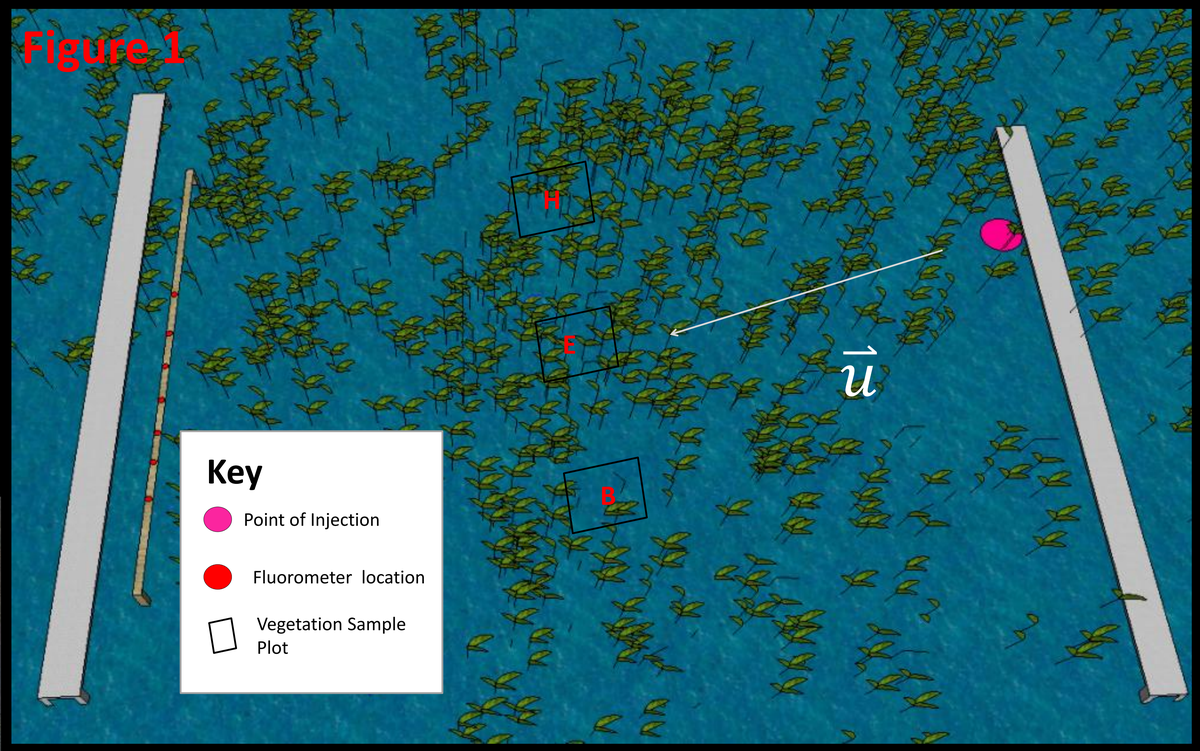


Figure 2

Figure 3

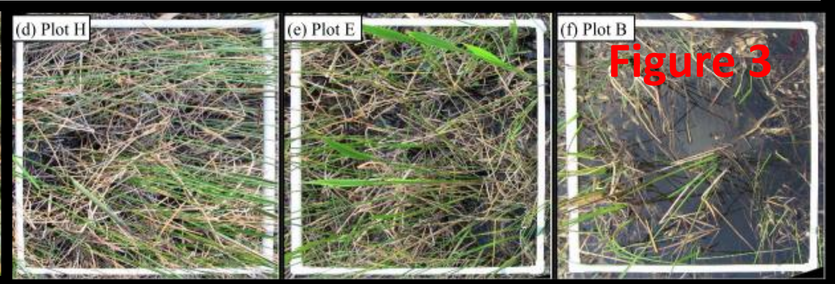


Figure 4

Figure 5

Figure 6

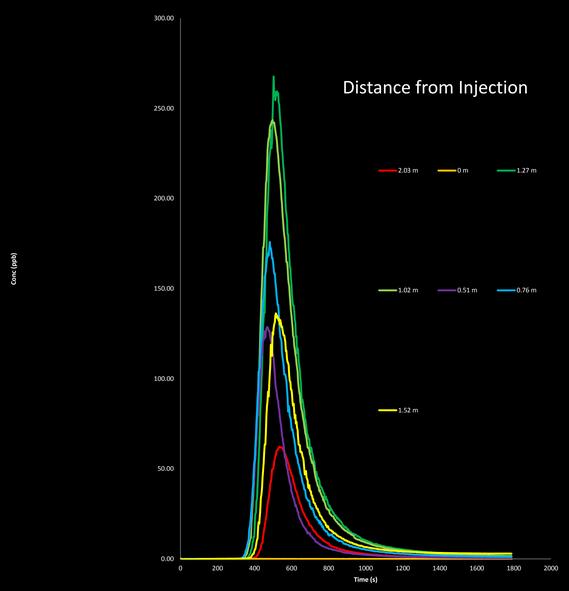
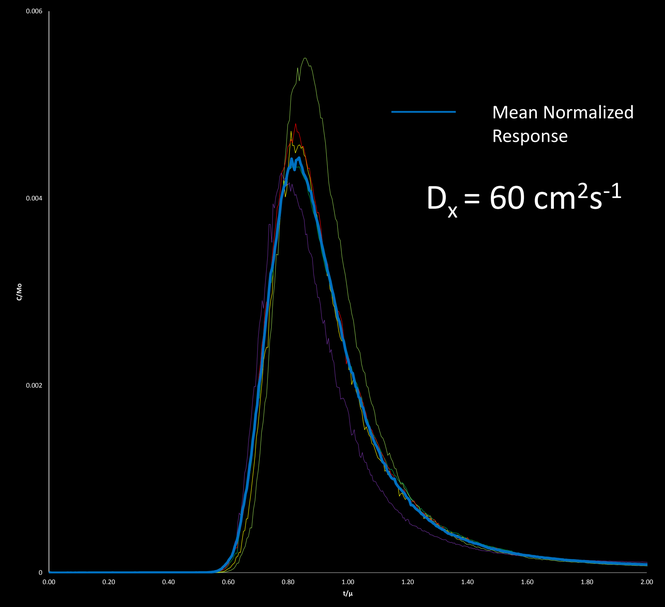


Figure 7



[1]Fischer, H. B. (1968). "Dispersion prediction in natural streams." J. Sanit Eng. Div. Am. Soc. Civ. Eng., 94 (5), 927-941.