

My name is: _____

WORD PROBLEM 4, *BOUNDARY LAYERS AND SHEAR STRESS*

In the boundary-layer lecture, I described an experiment in which a small bivalve roughened a sand surface by making tracks plowed into the sediment surface. Median grain size was $118\mu\text{m}$. Velocity profiles of both the smooth sand bed and the tracked sand bed produced shear velocities of 1.74 cm s^{-1} . Roughness length, however, doubled from 0.0006 to 0.0012 cm due to tracking. Assume for the calculation that seawater of 35 salinity at 7°C was used. What was the shear stress exerted on the bed by these flows? What was the mean flow velocity at 3 cm above bottom over the two different roughnesses? What were the two roughness Reynolds numbers? Suggest for each of the two cases whether the flow was likely smooth turbulent, transitional or fully rough turbulent and why you think so.

Due in class 04 October.