

Lagrangian and Eulerian approaches to sediment transport, biogeochemistry, and environmental law

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Abstract. Natural scientists must combine temporal and spatial information to develop an understanding of the biophysical dynamics that shape the distribution of natural resources, organisms, communities, and chemicals. How scientists do this has been shaped by the basic reference frames for studying movement: Lagrangian and Eulerian. Recent developments in sensor technology are transforming temporal and spatial resolution of data collection. These developments will likely alter how data are collected, and potentially alter our most conceptualizations of how natural systems work. This seminar will explore the evolution of reference frames in hydro-ecology (hydraulics, sediment transport, fish movement, biogeochemistry), and how different measurement techniques have caused the re-conceptualization of reference frames. The seminar will then expand into environmental law, with the notion that U.S. environmental law is just as sensitive to frames of reference as fluid mechanics, cartography, and any other discipline that studies natural phenomena, and that the assumed reference frame predetermines how we conceive of environmental problems and liability far more than we realize. The emergence of novel measurement technologies will not only change hydro-ecology, but has the potential to invert accepted applications of U.S. environmental law.