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A 10,000 Year Record of Climate, Forests, Land Use, and Chesapeake Water Quality

Dr. Grace Brush - Professor, Johns Hopkins University

Impacts of climate change and land use on the Chesapeake ecosystem are recorded in sediments deposited in the Bay since it became an estuarine system some 10,000 years ago. These surrogate records show the effect of non-human related climate events such as the retreat of the glaciers 10,000 years ago on forest composition throughout the watershed and the change of a river system to an estuarine system. The non-human related Medieval Warm Period 1000 years ago resulted in a shift in species of marsh plants from wet to dry, but did not appear to fundamentally change the Bay system. Changes on the land, brought about by deforestation, draining of the land, changing agriculture, conversion of large areas of land to hard surfaces resulted in the transport of materials including sediments and chemicals from fertilizers into Bay waters. Thus an increasingly eutrophic/anoxic estuary resulted in a change-over from bottom dwelling communities to a living system restricted to the oxygenated upper waters. The delivery of sediment and other materials from the land to the estuary is also affected by the discharge of fresh water into the Bay, an event regulated by climate, and now presumably exacerbated by human influence.

Biography

Dr. Brush is a Professor in Johns Hopkins University's Department of Environmental Health and Engineering. She is also Director of JHU's Integrative Graduate Research and Traineeship, "Climate, Water and Health". Her research has focused on the natural forests of Maryland and their relation to geology, hydrology and soils; and the paleoecology of the Chesapeake Bay using data contained in sediment cores collected throughout the Bay and tributaries. Among her many accomplishments, Dr. Brush has received awards from the Ecological Society of America, the Estuarine Research Foundation, and the Chesapeake Research Consortium. She received her PhD from Harvard University in 1956.