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A LAND TRANSFORMED: FROM BEAVERS TO DITCHES

A paleoecological record based on over 150 sediment cores collected over the last 40 years from the Chesapeake Bay and tributaries contains a record of changes over the past hundred to several thousand years. The most profound changes occurred following European settlement. The pollen and seed record in the cores show that prior to European colonization the Chesapeake drained a land almost entirely forested and wet. The species composition of the forests ranged from blackjack oak-post oak forests on the drier serpentine and gravel areas to tamarack and bald cypress forests in the swamps. The land was also dissected by 2nd to 4th order streams that flooded every couple of years. Discharge was low as rain soaked into a land devoid for the most part of hard surfaces. Springs were abundant as groundwater was close to or above the land surface. And the land was occupied by beavers whose dams added to the flooding of the land. Denitrification was a primary process on the pre-colonial land and the Chesapeake waters remained clear and able to support a varied and rich estuarine flora and fauna.

Shortly after colonization, the European settlers not only cleared the land of forests in order to grow food plants, but they also dug ditches to dry a land too wet in many places for crops. The drainage ditches resulted in the conversion of a wetland forest to a dry grassland thus decreasing denitrification and providing a direct conduit of materials from the land to the estuary. A second major change to the land was the elimination of the beavers in the mid to late 1700s. Though the beavers contributed nitrogen to water from their waste, they also provided wet anaerobic conditions necessary for denitrification.

The result of the elimination of the beavers and the draining of the land through an extensive ditching program resulted in decreased denitrification on the land and increased nitrification of the estuarine system.