

Methane Emissions from a Hydrologically Altered Region of the Sprague River Salt Marsh, Phippsburg, ME

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Humans have been altering salt marshes for 200 years, by ditching, or excavating channels to drain pools to reduce mosquito habitat and to make the marsh platform suitable for agriculture. The presence of these ditches has had a negative impact on the marsh hydrology. The Sprague River Salt Marsh, located in Phippsburg, ME, has been ditched for centuries. In 2002, the United States Fish and Wildlife Service installed several ditch-plugs in the marsh in and attempt to restore pool habitat and marsh hydrology. This study seeks to examine the effects of one ditch-plug in particular, and the impact it has had on methane emissions, soil salinity, and soil carbon densities. Three sites above and three sites below the ditch-plug were analyzed in these three areas. Methane emissions were slightly elevated above the ditch-plug relative to below the ditch-plug, with average fluxes of 12.9 +/- 4.83 umol/hr/m2 and 3.5 +/- 0.66 umol/hr/m2, respectively. Soil salinities were higher above the ditch-plug, and soil carbon densities were higher below the ditch-plug. These results suggest that the hydrologic regime of the study area has been degraded, resulting in methane emissions, interrupted accretion, decreased marsh self-maintenance processes, stagnation and saturation of seawater in the pores of the sediment. Though salt marshes are generally considered effective carbon sinks, methane emissions may play a role on hydrologically altered marshes in terms of their net contribution to greenhouse gas sequestration.