Groundwater-transported dissolved organic nitrogen exports from coastal watersheds

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ABSTRACT: We analyzed groundwater-transported nitrogen (N) exports from 41 watershed segments that comprised 10 Cape Cod, Massachusetts watersheds to test the hypotheses that chemical form of N exports is related to land use and to length of flow paths through watersheds. In the absence of human habitation, these glacial outwash-plain watersheds exported largely dissolved organic N (DON) but at relatively low annual rate. Addition of people to watersheds increased rates of both total dissolved N (TDN) and DON export through groundwater. Percent of TDN as DON in groundwater was negatively related to path length of groundwater through aquifers, but %DON was not significantly related to population density on the watersheds. DON was often the dominant form of N exported from the watersheds, even at high population densities. Our results suggest that natural sources are not entirely responsible for organic N exports from watersheds, but, instead, a substantial portion of anthropogenic N introduced to watersheds is exported as DON. This finding is in disagreement with previous results, which suggest that anthropogenic N is exported from watersheds largely as NO_3^- and that DON exported from watersheds is from natural sources.