

TITLE: CONTRASTS BETWEEN MARINE AND FRESHWATER BACTERIAL COMMUNITY COMPOSITION: ANALYSES OF COMMUNITIES IN LAKE GEORGE AND SIX OTHER ADIRONDACK LAKES

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Abstract: The bacterial communities of seven freshwater lakes in the Adirondack Mountains of New York state were examined using culture-independent methods. beta-Proteobacteria 16S rRNA sequences were recovered from all seven lakes and their presence was confirmed by direct DNA hybridization. The results are consistent with phylogenetic and in situ hybridization-based studies in other freshwater environments, but are significantly different than the results of marine oceanic studies, where beta-Proteobacteria are noticeably absent. This relationship between evolutionary history and environmental distribution is striking, since these phylogenetic clades have not been correlated with consistent physiological features or biochemical capabilities, and there is no a priori reason to expect differences in phylogenetic composition between the environments. In contrast, freshwater relatives to marine phylogenetic clusters, in particular the SAR 11 cluster of the alpha-Proteobacteria, were identified. The data imply an underlying physiological distinction between the beta- and other Proteobacteria groups and potentially an important difference between the composition of bacterial communities in marine and freshwater environments.