

# **Microbial Iron Acquisition is Influenced by Spatial and Temporal Conditions in a Glacial Influenced River and Estuary System**

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In Arctic regions, glaciers are major sources of iron to rivers and streams; however, estuaries are considered iron sinks due to the coagulation and flocculation processes that occur at higher salinities. It is unknown how iron dynamics at the interface between a glacial influenced river and an estuary environment affect microbial mechanisms for iron acquisition. Microbial taxonomic and functional sequencing was performed on samples taken throughout the year from the Kenai River and estuary, Alaska. Microbial community diversity was more similar by time of year than by location despite the river and estuary having distinct iron, sodium, and other nutrient concentrations. Feo system genes were more abundant in river environments, while siderophore genes were more abundant and diverse in estuary environments. Siderophore transport and iron storage genes were found in all samples but potentially influenced by physical drivers such as discharge rates and nutrient distributions. Differences in iron metabolism between river and estuary ecosystems indicate microorganisms employ different mechanisms to sequester iron depending on environmental conditions. This could have implications on iron transport as the Arctic continues to warm.