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Microbial Sensor for Characterizing and Monitoring Watersheds and Terrestrial Environments Including the Rhizosphere

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The microbial sensor is an electrochemical sensor measuring the electrical potential generated by microbial communities populating the surface of the probes. The system determines the redox potential and/or dissolved oxygen concentrations of aquatic and terrestrial environments. System instrumentation consists of electrochemical sensors (a cathode and several anodes) and a signal acquisition/communication module. The automated system collects (typically every .5 hour) and transmits data to a web site for visualization and other data reduction methodologies. The sensor system requires no maintenance and sensors have been deployed in sediments for over 900 days with no significant degradation of the signals. Over ten systems are currently deployed in aqueous environments including contaminated aquifers, wastewater treatment facilities, fish farms and algae research operations. Based on the unique characteristics of the electrochemical components, the system can operate in terrestrial environments including the rhizosphere. We will present investigations of both aquatic (laboratory and field) and terrestrial (laboratory) environments.