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Wetland Ecogenomics – The Next Generation of Wetland Biodiversity and Functional Assessment

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ABSTRACT

Biological monitoring and assessment is routinely used to help answer questions about stream and wetland health or presence of species of interest, such as invasive or sensitive species. Molecular methods, such as traditional DNA barcoding, have been explored as tools to improve resolution and efficiency of biomonitoring programs. Despite the advantages of these tools, they require intensive sample processing (e.g., sorting individual organisms) and can only detect targeted species. Extracting DNA from environmental samples (eDNA), combined with next generation sequencing offers promise by allowing for relatively rapid detection of species presence without the need to sort individual specimens. The integration of NGS, eDNA, and metasytematics for wetland assessment we term *wetland ecogenomics*. Wetland ecogenomics is already opening new avenues for wetland assessment by allowing for efficient assessment of multiple trophic levels, functional genes, and taxonomically comprehensive community composition as measures of wetland function. Here we discuss the stages necessary for the successful implementation of an ecogenomic approach to wetland monitoring and assessment.

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