

Practitioner Guidance for Managing Iron Sulfur Compounds During Wetland Restoration

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Restoration projects are being implemented to address natural and anthropogenic threats to coastal wetlands, including sea level rise and historic landuse alterations. The US Army Corps of Engineers (USACE) and other organizations introduce dredged sediments into coastal environments to increase elevation and stabilize marsh platforms, and efforts to expand these beneficial uses are expected to increase in the coming decades. However, some dredged sediments either contain iron sulfide compounds [e.g., iron monosulfide (FeS) and pyrite (FeS₂)] or form them after marsh sediment applications. Under aerobic conditions, such as drought, FeS and FeS₂ can rapidly oxidize, generating acidity that can dramatically lower the soil pH, impact plant establishment, and threaten the success of wetland restoration projects. As a result, recommendations are needed to properly manage iron sulfide containing materials through project design, screening, monitoring, and adaptive management. Tools and techniques exist to evaluate dredged sediments for the presence of FeS and FeS₂ prior to and following marsh sediment applications, and project design and construction approaches can minimize associated acidification risks. This presentation outlines a framework for properly identifying and managing sediments containing iron sulfide minerals while conducting wetland restoration projects. These technical recommendations provide dredged sediment beneficial use practitioners a decision support tool for the successful management of iron sulfide containing dredged sediments to increase the ecological function and sustainability of wetlands.