

MANGANESE REMOVAL IN SATURATED GRAVEL BEDS: OBTAINING DESIGN CRITERIA.

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Abstract: Manganese is difficult to remove in passive wetland systems due to high pH requirements for rapid Mn oxidation and solubilization of MnO_2 in the presence of Fe^{2+} . To achieve Mn removal below the federal requirement of 2 mg/L, gravel beds placed after wetlands that remove Fe has been proposed. Although some data is available on gravel beds, not enough is available to recommend design parameters for these systems under a range of operating conditions. A study is being conducted to obtain information on the required Mn loading rates and retention times for adequate Mn removal at the TVA constructed wetland research facility.

Treatments consist of two Mn loading rates of 1.4 and 3.7 g/m²/d and two types of gravel, namely limestone and river gravel. The treatments are replicated 3 times resulting in 12 experimental units. After 3 months of operation, limestone is proving to be more effective at removing Mn than river gravel. Compilation of operating parameters for Mn removal in gravel beds will benefit power utility and surface mining industries by yielding information on a passive system that is inexpensive relative to caustic alkaline drip.

Additional Key Words: iron, wetlands