CONVERSION OF LEWIS AND CLARK LAKE AND LAKE FRANCIS CASE TO SUSTAINABLE SYSTEMS

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ABSTRACT

Sedimentation will eventually fill the mainstem reservoirs of the Missouri River. The two lower reservoirs are the most endangered because they receive 25% of the sediment but constitute only 8% of the total storage volume. Both have lost about 20% of their original capacity. Proposed is the removal of the sediments from these reservoirs at their annual rate of inflow and transporting them by pipeline below Gavins Point Dam for return to the Missouri River channel. From there the sediments can wend their way to the Gulf as they did historically.

As the reservoirs fill, several benefits are lost. The relationship between the loss of these benefits and sedimentation may be described by a loss function whose general economic relationship to project cost has been analyzed. The sum of the annualized capital and annual operating costs of the pipeline has been minimized to determine expressions for the optimal slurry velocity and pipe diameter. Two special purpose pipeline loaders, one for sand and the other for silt and clay, are proposed as being much cheaper to operate than dredges. The overall analysis is still in process, but there appears to be sufficient basis justify a comprehensive economic, engineering, and environmental investigation of the proposal.