Empirical Models for Estimating On-Stream Reservoir Storage Capacity

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Accurately estimating reservoir storage capacity without a bathymetric or topographic survey seems impractical or unattainable due to the extreme geomorphic variability on the planet. Traditional methods for estimating reservoir storage consider simplified geometry to provide ‘ballpark’ storage approximations infused with unreliability. New empirical models for estimating reservoir storage capacity without a bathymetric or topographic survey are proposed. The new models are based on data representing over 400 on-stream reservoirs in California impounded by dams under the State’s jurisdiction. The study considers reservoirs with easily observable areal geometries, the degree of reservoir incursion based on dam type, and the reservoir’s geologic environment. Provided are upper bound, lower bound, and best fit storage capacity estimates. This paper also presents a summary of existing methods for estimating storage, and the proposed models are compared to these methods. A modified form of the volume of a cone equation is also proposed as an alternative method.