



## **Estimation of Confidence Interval for Halslon Reservoir Sediment filling rate using Monte Carlo Simulation**

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Halslon reservoir is the main reservoir of the Karahnjukar hydropower project in the Eastern highlands of Iceland. Studies for the Environmental Impact Assessment for the hydropower project showed that sediment will fill up the reservoir in about 500 years based on the present sediment transport rate. The main source of the sediment is Bruarjokull outlet glacier which is a part of the Vatnajokull ice cap. Recent studies of influence of climate warming on Icelandic glaciers show that they will decrease significantly and in some cases completely disappear during the next few hundred years. In this study a glacier melting model for the Bruarjokull outlet glacier is constructed to predict how fast the glacier will decrease as a response to accepted climate warming scenario. The results from the glacier model is then used as an input to sediment transport mass balance model for Halslon reservoir which predicts the influence of the glacier melting on the sedimentation in the reservoir. The modeling shows that instead of the reservoir being completely full of sediment in 500 years, the Halslon reservoir will have at that time about 50-60% of its volume remaining as the sediment yield will decrease as a result of the decreasing glacier size. Furthermore, the modeling shows that it will take 6000 years for the reservoir to be completely full of sediment. Prediction far into the future, such as 500 years or more, are highly uncertain and require information about the expected uncertainty in the result. In this study, a Monte Carlo simulation is used to estimate confidence interval for the predicted sediment filling rate of the Halslon reservoir.