The number of operating nodes in a sensor network can vary in time due to battery consumption and external factors. We investigate the estimation of the number of operating sensors in a network in which the data collection is made by a mobile access point. We propose an estimator based on the Good-Turing estimator of the missing mass and generalize it to other related problems such as the estimation of sensor battery levels. We analyze the performance of the estimator using the theory of large deviations. We present closed-form bounds on the large deviation exponent and characterize confidence intervals for the estimator. Furthermore, we derive a surprising scaling law for the minimum number of samples required for the convergence of the estimator.