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ABSTRACT:

Fisheries resource agencies in the California Bay-Delta region have been conducting both monitoring programs and fish survival studies for many years. Often a two-step analysis procedure is carried out: (1) parameters are estimated on a per year basis, e.g., survival; (2) the annual estimates are regressed against covariates of interest, e.g., water temperature. Such an approach fails to simultaneously account for environmental (between year) variation and sampling variation. Bayesian hierarchical models are an alternative that accounts for both sources of variation. The freely available softwarepackage WinBUGS is a powerful tool for fitting such models. An example using several years of juvenile salmon survival study data is presented.