

Predicting the Total Abundance of Resident Salmonids within the Willamette River Basin, Oregon - a Macroecological Modeling Approach

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I present a simple, macroecological model of fish abundance that was used to estimate the total number of non-migratory salmonids within the Willamette River Basin (western Oregon). The model begins with empirical point estimates of net primary production (NPP in g C/m^2) in forested streams. These NPP estimates are combined with stream length and width measurements to obtain a total NPP estimate for the complete stream network. Two key assumptions are then used to predict fish abundance from total NPP: (i) energetic resources are transferred to higher trophic levels at a predictable rate; and (ii) population density is an allometric function of body size. When the model is calibrated with historical information on species' distributions and body sizes, it predicts species' abundances that are consistent with empirical field estimates. I therefore submit that the macroecological model is a useful tool for predicting fish abundances at large spatial scales.