Mark-recapture Jolly-Seber abundance estimation with classification uncertainty

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Wildlife managers and ecologists are often interested in estimating abundance of animals belonging to a certain fixed group (e.g. sex), but in some cases group membership cannot always be ascertained. Group assignment uncertainties can occur either through the inability to assign group membership because of a lack of group-specific characteristics (e.g. males and females look alike), lack of training (e.g. volunteers), or through errors in assignment. Recently, methodological advances in closed population capture-recapture models have allowed for the inclusion of classification uncertainties in parameter estimates. We build on this work by addressing identification uncertainty in abundance estimation (open population models), providing a general method for dealing with multiple groups/states when the true underlying group/state can be considered fixed for the duration of the experiment. We then apply this methodology to estimate the sex-specific abundances of walleyes (*Stizostedion vitreum*) in Mille Lacs, Minnesota.