Accuracy Assessment of Aquatic Gap Fish Distribution Models in the Upper Missouri River Basin

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Non-game and native species have become a major focus of conservation and sampling efforts due to limited knowledge of their distribution, abundance, and conservation needs. Thirteen landscape level variables and known fish locations were used to create distribution models for fish species throughout the upper Missouri River Basin to identify areas for aquatic species and habitat conservation. Distribution model accuracy was tested by comparing presence/absence data from 61 sites throughout the Basin and 143 sites in South Dakota targeting species of concern to model predictions. Model performance was quantified using detection probabilities and confusion matrices to calculate weighted and unweighted Cohen's Kappa statistics and correct classification rates. In six drainages sampled throughout the Basin, the mean unweighted Kappa statistic for individual species was 0.12 (range –0.80 to 1.00) indicating slight improvement above chance levels and the mean correct classification rate was 78 percent (range 54-91%). Rare species in South Dakota had weighted Kappa values ranging from 0.32 to 0.61, indicating moderate to substantial model performance above chance agreement levels. Fish distribution models and accuracy statistics will allow managers to quantitatively evaluate model performance for use in directing future nongame and native species sampling and conservation efforts.