**Predicting Potential Dusky Grouse Habitat in Montana

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Effective population monitoring protocols are needed for dusky grouse (*Dendragapus obscurus*). As a first step towards developing a method for unbiased population monitoring, we developed a habitat model to determine appropriate sampling sites. Our objectives were: 1) explore relationships between habitat characteristics and relative probability of use by dusky grouse, and 2) develop a state-wide habitat model for Montana using multiple modeling techniques. We used dusky grouse observations collected during the Integrated Monitoring in Bird Conservation's (IMBCR) spring (April-June) point count surveys from 2009–2020 and extracted habitat information using geospatial datasets for detected (used)/not-detected locations (pseudo-absent). We compared habitat characteristics at used and pseudo-absent locations using resource selection functions and random forests. We evaluated both model techniques using Area Under the Curve/ Receiver Operating Characteristics (AUC/ROC) and with an independent dataset. We averaged the predictions from both models to create a final habitat model for predicting dusky grouse habitat. Overall, we found a number of landscape level metrics to be important for predicting dusky grouse habitat, including tree height, tree canopy, elevation, slope, and several conifer forest vegetation communities. In the future, our model will assist in determining sampling sites for population monitoring.