Mapping Uncertainty: Sensitivity of Predictive Ecosystem Mapping Habitat Ratings to Expert Opinion

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Predictive ecosystem mapping is currently the predominant source of ecological and habitat information for conservation planning across British Columbia. Despite the extensive use of these maps in planning activities, there has been little effort to evaluate the precision of habitat ratings. We assessed the uncertainty and sensitivity of wildlife ratings resulting from potential variation in expert opinion and PEM base mapping. Uncertainty and sensitivity analyses allow conservation professionals to consider all sources of uncertainty simultaneously and determine if the model and input data reliably support the decision process. We first used Monte Carlo simulations to quantify uncertainty around resource suitability indices of sample ecological units and predict the change in the total area of highly-ranked habitats across the Muskwa Kechika Management Area. Following uncertainty analyses, we applied the Fourier amplitude sensitivity test (FAST) and identified model parameters with a strong influence on predictions. Simulations suggested that variation in expert opinion results in considerable uncertainty in wildlife habitat ratings regardless of Biogeoclimatic Ecosystem Classification zone, sampling distribution or method of calculating standard deviation of estimates. FAST revealed that model uncertainty was not consistently associated with a particular parameter and that the relative influence of parameters varied across the study area. Our results suggest that uncertainty in habitat rankings should be an important consideration during conservation and resource development planning.