

Modelling fish distribution in B.C.

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Species distribution maps, based on observations of species occurrence, are an essential component in setting conservation priorities. Inferring true distributions from species occurrence data is difficult because: species are present in unsampled locations, species that are rare, seasonally occurring or difficult to capture are often undetected and species identification or location information can contain errors. In this paper, we use the case of white sturgeon (WSG) to illustrate a method of estimating the probability of occurrence of BCs fish species at a hierarchy of spatial scales ranging from the BC range, to individual stream reaches. Occurrence data was obtained from the Fisheries Information Summary System and habitat information from databases associated with the BC Watershed Atlas. Ranges were defined from published expert opinion. Out-of-range records were checked for reliability and, if necessary, ranges were expanded. At the watershed scale, principal components analysis was used to compress 28 correlated habitat variables into 3-5 principle components (PC). The habitat suitability of a watershed was inferred from a logistic regression of species presence versus habitat PCs. High leverage points in this regression (i.e. occurrences in unusual habitat) are assessed for reliability. The logistic regression is repeated with any questionable points removed. The logic in the Watershed Atlas is used to link this information on habitat suitability to the locations of known occurrences and barriers in order to estimate a probability of occurrence within a watershed. A similar process can be used to define the relative probability of occurrence among stream reaches within a watershed. For each species, the product of these probabilities is the probability of occurrence within a stream reach at a Provincial Scale. The output will be released as a database in the WLAP data warehouse.