Potential Impacts of Climate Change on the Distributions of Freshwater Fish Species at Risk in Canada

Nicholas E. Mandrak, C.C. Chu and C.K. Minns

Great Lakes Laboratory for Fisheries and Aquatic Sciences, Fisheries and Oceans Canada, Burlington, ON L7R 4A6, < mandrakn@dfo-mpo.gc.ca >, Ph: 905-336-4842

Over 40 freshwater fish species (not including numerous subspecies and populations) are considered to be at risk in Canada by COSEWIC. The greatest richness of fish species at risk (SAR) is found in the southern portions of British Columbia and Ontario. The range limits of many of these species appear to be thermally restricted. Under climate change, these thermal limits may be relaxed, thus allowing the distributions of these species to expand or, in some cases, contract northward. Physical (e.g. watersheds) and ecological (e.g. biotic interactions) barriers would also have to be overcome for the distribution of these species to actually change in response to climate change. To predict potential changes in the distributions of fish SAR in response to climate change, we are developing models to predict changes in overall fish SAR, and in the distributions of individual fish SAR. Climate norms data (means from 1961-1990) from Environment Canada were used to map the current climate found throughout the tertiary watersheds of Canada. Regression equations based on the current climate data were then used to model current fish SAR distributions. The potential distributions of fish SAR under a climate change were then predicted by recalculating the regression equations using data for future climate scenarios from The Canadian Centre for Climate Modelling and Analysis Global Coupled Model 2-GA1(IS92a) and the Hadley Centre Coupled Model 2-GA1(IS92a) for the years 2020, 2050 and 2080. Realized changes in the distributions of fish SAR would likely have significant implications for future COSEWIC assessments of, and recovery planning for, affected species.