Development of methods to produce de-listing criteria and to evaluate management options for recovering endangered salmon stocks

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Some Pacific salmon stocks have dramatically decreased in abundance in recent years. Insufficient research has been done to determine optimal management actions for allowing stocks to recover, let alone establish criteria for determining when a stock has sufficiently recovered to be removed from the list of species-at-risk. However, recovery teams set up under Canada's new Species-at-Risk Act will need to develop such recovery plans and de-listing criteria for species listed under this act. Using Bayesian decision analysis, we determine the rank order of various de-listing criteria and recovery plans for the seriously depleted Cultus Lake, British Columbia, sockeye salmon population. We develop a stochastic simulation model of the Cultus Lake sockeye population's dynamics and management procedures and use it to estimate risks associated with various levels of harvesting at different stages during the recovery of the stock. We perform extensive sensitivity analyses to identify the de-listing criteria and management actions for the recovering stock that best meet management objectives while also being robust to changes in various assumptions. Optimal actions vary, depending on the desired long-term goals for the stock and the acceptable probability of attaining those goals. The model structure and decision analysis framework developed in this project are applicable to other recovering salmon stocks and other species groups.