Analyzing Tradeoffs Between The Threat Of Invasion By Nonnative Trout And Effects Of Intentional Isolation For Native Westslope Cutthroat Trout Using A Bayesian Belief Network

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Conservation of inland cutthroat trout can involve either the placement or removal of migration barriers to address threats from invading species and habitat fragmentation, respectively. Such efforts may proceed without a formal mechanism for considering potential tradeoffs from addressing these competing threats. A consistent decision process would include an analysis of when and where intentional isolation or removal of barriers is most appropriate, and we explored the application of a Bayesian belief network (BBN) as a tool for such analyses. We focused on westslope cutthroat trout (*Oncorhynchus clarkii lewisi*) and nonnative brook trout (Salvelinus fontinalis), and current understanding of environmental factors influencing both

species, their potential interactions, and the effects of isolation on the persistence of individual cutthroat trout populations. Analysis indicated the tradeoff between isolation and invasion was strongly influenced by the size of the stream network (or cutthroat trout population) to be isolated and existing demographic linkages within and among cutthroat trout populations. Intentional isolation was predicted to benefit demographically isolated cutthroat trout populations facing certain invasion by brook trout. The relative benefits of isolation depended strongly on the size and quality of isolated habitat. Intentional isolation generally reduced the probability of persistence for migratory populations regardless of invasion threat. The BB does not provide a decision; rather it allows a biologist or manager to explore management options within streams and prioritize conservation actions among streams with a transparent and consistent logic. It can also facilitate discussion that encourages clarification of conservation values, management goals, and biological uncertainties.