Use of Bayesian Belief Network Models for Evaluating Final EIS Alternatives for Wildlife Viability[TWS]

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The Terrestrial Science Staff of the Interior Columbia Basin Ecosystem Management Project has developed "causal web" models relating key environmental

correlates (KECs) of wildlife species, to potential population response under the Project's Final EIS alternatives. The models involve use of Bayesian belief networks (BBNs), which represent conditional probabilities of population response given environmental conditions at two scales of spatial resolution. The KECs were identified by use of literature and expert panels and formalized into a Species-Environment Relations database. The probabilities and BBN model structures were derived from literature and, where needed, expert judgment. The BBN models provide a consistent, testable framework by which to represent simple habitat relations of a wide array of species. Sensitivity analyses using entropy-reduction metrics identify controlling KECs that may be worthy of further study or monitoring. BBN species modeling represents a major step beyond using expert panels to evaluate population viability; it opens the "black box" of expert opinion by formally modeling the subjacent ecological relations.