David A. Schumann, david.schumann@msstate.edu

A Bayesian belief network to estimate conservation need for understudied aquatic taxa

David A. Schumann and Michael E. Colvin

Mississippi State University, Department of Wildlife, Fisheries, and Aquaculture, Mississippi State, MS 39762

The equitable allocation of limited conservation resources requires the prioritization of regions, species, or individual populations for management action. Although legislation provides a preliminary focus for priority setting by listing threatened and endangered species, these efforts extend to relatively few species and exclude many understudied taxa of potential conservation significance. Numerous conservation-prioritization frameworks exist to balance species' relative extinction risk with ecological and economic values (e.g. taxonomic distinctiveness, recreational value) and assist those responsible for maintaining biodiversity with conservation decisions. These prioritization schemes include qualitative descriptions, point scoring procedures, and rule sets, but rely on similar biological criteria to assign conservation priority to species perceived to be most vulnerable and irreplaceable. Criteria for the leading paradigm for assessing extinction risk and conservation status (International Union for Conservation of Nature) were originally designed for higher vertebrates and are difficult to apply to fishes which are typically understudied and lack the necessary data (~46% of Chondrichthyes are "data deficient"). Consequently, current conservation status has only been evaluated for a small number (~20%) of fishes, despite their relatively high extinction risk. In addition, these and related methods (e.g. Species Status Assessment, US Fish and Wildlife Service) are exceptionally labor intensive and only feasible for a few target species and can be severely constrained by uncertainty. We developed a repeatable, transparent, and amenable method to identify fishes in need of conservation attention that is consistent with the concepts of redundancy, resiliency, and representation and applicable at any geographic scale. Our Bayes net model utilizes widely available biological criteria (i.e. life history, ecological traits, museum databases) and well-known threats to set conservation priorities for fishes regardless of species knowledge. This model is broadly applicable to aquatic taxa worldwide and will be particularly useful when applied to highly diverse regions with many poorly known species.