Presentation Type:

Platform Preferred, invited

Track:

Special symposium

Session:

Advancing Population-Level Ecological Risk Assessment: an International Perspective

Abstract Title:

Predicting risks to wildlife populations from multiple stressors: mercury, habitat alteration and common loons breeding in New Hampshire, USA

Authors:

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Abstract:

We applied a generic approach to estimate and test predictions of population risks of mercury (Hg) exposure and habitat alteration on common loons (*Gavia immer*) breeding in New Hampshire (NH), USA. We developed a publically-accessible data system, integrating environmental data and fish Hg data, to estimate dietary Hg exposure to NH loons and used information from observational and controlled studies of loons and other birds to estimate effects on loon vital rates of predicted dietary Hg. We also linked land use and lake characteristic information to observational information on NH loons, gathered by a private conservation agency, to develop loon habitat models. These models associated natural and human-mediated lake shore features with loon presence and reproductive success. Information on the productivity of NH loons was partitioned by lake to develop and parameterize a loon 'reference state' population model, reflecting relatively low levels of dietary Hg and human disturbance. The effects of dietary Hg and habitat alteration typical of NH lakes were integrated into the reference state model to produce predictions of NH loon productivity, which were then tested or "ground-truthed" for their coherency with independent NH field data. Our results were found to be generally coherent with the dynamics of the NH loons, and suggested human disturbance presents a greater immediate risk to loon persistence than current levels of dietary Hg. Our research demonstrated a generic process and methods to integrate toxicological information from controlled studies with field-based demographic studies to produce defensible estimates of wildlife population risk from chemical exposures, alone and in combination with other natural or anthropogenic stressors, providing a scientifically sound basis for the development of regulatory criteria protective of wildlife populations.