

A MODEL FOR ECOLOGICAL RISK ASSESSMENT OF WADING BIRDS

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ABSTRACT

The contribution of certain contaminants to reproductive failure in many avian species has been an ongoing concern. Appropriate quantitative techniques have focused either on the individual organisms by providing explicit bioaccumulation dynamics or on whole ecosystems by looking at the fate of the contaminant but fail to make the necessary link via population dynamics of interacting individuals. We used the individual-oriented approach in an effort to quantify effects of chronic contaminant exposure on individual birds. This was made possible by the use of an object-oriented model, where individual birds are interacting objects, and their actions are implemented by passing to them appropriate messages. Using this modeling approach a breeding colony of Great Blue Herons (*Ardea herodias*) is simulated as an assemblage of interacting individuals whose daily actions (foraging, growth, feeding of the young) are simultaneously followed over short time intervals for a nesting season. Spatial distribution of the contaminants in prey resources is used on a cell by cell basis and their effects on certain behavior characteristics of adult birds (e.g. foraging efficiency, effects on flying efficiency, parental care) are taken into account. Results showed that sublethal effects could have a considerable effect on colony success. Appropriate selection of endpoints for risk assessment yields a variety of scenarios for colony success.