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Developing Habitat Models for Aquatic-Dependent Wildlife. *COPELAND, JANE L.¹, *KUHN, ANNE² and *BRENNAN, MARK³. ¹Computer Sciences Corp, Narragansett, RI, USA; ²US Environmental Protection Agency, Atlantic Ecology Division, Narragansett, RI, USA; ³NH Loon Preservation Committee, Moultonborough, NH, USA.

Minimizing the risks of chemical contaminants to wildlife populations remains an important goal for the EPA. However, approaches are also needed for evaluating risks from non-chemical stressors on populations of aquatic-dependent wildlife. Habitat modeling provides an empirical approach to summarize effects of multiple stressors on the basis of spatial relationships. Results from these models provide insight into environmental factors and conditions that may be causally related to changes in abundance and distribution of wildlife populations. We are using geospatial modeling approaches to identify environmental factors that have the highest correlations with presence of the Common Loon *Gavia Immer*. Using loon nest location data collected by the NH Loon Preservation committee, we have developed a set of landscape metrics for over 600 lakes between 1980 and 2000. Generalized linear models (GLM) including logistic regression analysis are used to describe and evaluate the ecological relationship between loon presence and these landscape metrics. These statistical analyses are also used to assess the relative risks of multiple stressors such as dietary methylmercury, lake acidification, habitat alteration and human disturbance to Common Loon populations. This research supports the EPA's Wildlife and Aquatics Stressors Research Strategy Program and will lead to the development of protective criteria for wildlife and advance the ecological risk assessment process.

◆ **Modeling Forest Cover in Central America From 1880-2000 Using GIS.** *CORNELL, JOSEPH D. State University of New York, College of Environmental Science and Forestry, Syracuse, NY, USA.

Changes in the distribution of forest cover in Central America from 1880 to 2000 were simulated in ten year intervals using spatial and nonspatial data. Spatial data included historical maps of forest cover for 1920 for all of Central America and for 1965 and 1982 for some countries as well as remote sensing data for the entire region for 1994 and 2000. Nonspatial data on the amount of forest cover in each country was obtained from the FAO online database and from extrapolation, yielding estimates for the entire 120-year period. A spatially-explicit model of Land-Use Change (LUC) called GEOMOD was used to convert these non-spatial estimates of forest cover into a time-series of maps showing the distribution of forest cover for each ten year period. GEOMOD simulates LUC by converting gridcells in an initial map of forest cover from forest to non-forest. GEOMOD requires non-spatial data on the amount of change that will occur during a given time period and a spatial image of forest cover at the beginning of the time period being simulated. GEOMOD uses "driver" maps to select gridcells for

conversion. The driver maps used were maps of Holdridge life zones and of Parks and Protected Areas. Results were validated using the available spatial data. Model agreement with the spatial data ranged between 74 to 91 percent. The result of this study is a new time series of maps of forest cover for Central America for the entire 120-year period. These maps now can be used to inform other studies such as the role of tropical forests in the global carbon cycle. Preliminary analysis shows that between 1880 and 2000, about 7 Gt of carbon was released due to LUC. This loss represents about 60 percent of the total carbon storage potential of vegetation and soils in Central America.

Feral Honey Bees in Pine Forest Landscapes of East Texas. *COULSON, ROBERT N.¹, PINTO, ALICE¹, TCHAKERIAN, MARIA D.¹, BAUM, KRISTEN A.², RUBINK, WILLIAM L.² and JOHNSTON, SPENCER J.³. ¹Texas A&M University, Department of Entomology, Knowledge Engineering Laboratory, College Station, TX, USA; ²Louisiana State University, Department of Biological Sciences, Baton Rouge, LA, USA; ³Texas A&M University, Department of Entomology, College Station, TX, USA.

The goal of this study was to investigate the diversity of feral honey bee races in pine forest landscapes of east Texas, subsequent to immigration of Africanized honey bees, *Apis mellifera scutellata*. The specific objectives were (i) to assess the immigration of *A. m. scutellata* into east Texas pine forest landscapes and (ii) to evaluate the suitability of the pine forest landscape to feral honey bees. This mesoscale landscape study was conducted on the Sam Houston National Forest in east Texas. Swarm traps and aerial pitfall traps were used to monitor feral honey bees. Spatial databases were used to evaluate suitability of the pine forest landscape for honey bees. Scoring mitochondrial DNA type (mitotypes), we found representatives of *A. mellifera scutellata*, eastern European, western European, and *A. mellifera lamarckii* races in pine forest landscapes of east Texas. The significant conclusions that follow from this evaluation are (i) honey bees are a ubiquitous component of the pine forest landscape in east Texas, (ii) mitotype diversity persists in the presence of significant immigration of *A. m. scutellata*, and (iii) *A. m. scutellata*, is an added element of the mitotype diversity in the landscape. The landscape structure in 1256 ha units surrounding 6 swarms of honey bees captured in swarm traps was examined. The metrics used to characterize the kind, number, size, shape, and configuration of elements forming the landscape, defined a heterogeneous environment for honey bees that included food and habitat resources needed for survival, growth, and reproduction.

Examples of forest landscape ecology in practice: Case study – U.S. Forest Service. * CROW, THOMAS R. USDA Forest Service, Washington, DC, USA.

Scientists in the United States Forest Service conduct research on a broad array of topics in the biological, physical, and social sciences. Although there are few Research Work Units in the Forest Service with