1003-92-1274   **Louis J. Gross*** (`gross@tiem.utk.edu`), Dept. of Ecology and Evolutionary Biology, 1416 Circle Dr. - 569 Dabney Hall, University of Tennessee, Knoxville, TN 37996-1610. *Ecology: towards mathematical insights and computational understanding.*

Mathematicians have long mined ecology as a source of inspiration for new and interesting mathematics, with multi-dimensional dynamical systems, non-linear reaction-diffusion equations, and ergodicity of random matrix products being examples. While this mathematical work has often provided a basis for theory in ecology, a very large fraction has had little if any influence on practicing ecologists. Starting with some central issues in current ecology, I will present open problems that are potentially feasible for analysis, as well as problems that present unique computational challenges. Many of these will be driven by experiences with important applied questions, such as Everglades restoration, an immensely complex undertaking. My comments will focus on the potential for mathematical analysis to effectively integrate the interactions of complex phenomena. As biology has become more and more reductionist in nature, with ever more detailed information arising from molecular and cellular-level studies, a whole organism context has been neglected, offering numerous opportunities for mathematicians to contribute to very practical matters such as personalized medicine, population-level phenomena arising from individual behaviors and trophic interactions as they affect biodiversity. (Received October 04, 2004)