

Piedmont Project Report
Michael Rogers
Summer, 2005

I wrote to several persons, who recommended to me by Piedmont Project Resource Persons and fellow participants, asking them if they could help me with my project to find models of ecological and environmental systems appropriate for a beginning differential equations course. They sent papers and references and tips on good journals to look into. I followed up with some library work. What I found was that the world is a very complicated compared to the sort of thing my course teaches, which are basics concepts using examples the ordinary brain can grasp. It is out of these basic concepts that the complicated models used by environmental scientists are put together. It is the advances in computing power that allows them to study, test, and apply their models. Nonetheless, there were some models that turned out to be appropriate in some way to the course as well as some concepts that may be integrated into the course. Mass-balance equations in modeling pollutants, a predator-prey systems where the predator sometime eats the food the prey eats as well, and nutrient recycling systems can be adapted for the course. I also learned about an important environmental problem that I can at least talk about (part of the “hidden curriculum”), eutrophication. One can even create an over-simplified differential equation model. Also, the differential equation concepts of equilibria and stability can be related to sustainability in various ways.