
BERNARD BROOKS, Rochester Institute of Technology

A two-population competition model for a finite natural resource

A system of coupled differential equations is used to model the interaction between humans and their natural island environment. The two human populations differ only in their harvesting rates. They compete for a finite natural resource whose growth rate is logistic. Each population can coexist stably with the natural environment in the total absence of the other type of human. Thus there exist two equilibria of the coupled three-differential-equation system; one with only the high-rate harvesters and one with only the low-rate harvesters. It will be shown though the nested box technique that the equilibrium with only high-rate harvesters is stably resistant to invasion from low-rate harvesters whereas the equilibrium with only low-rate harvesters is unstable and susceptible to an invasion of high-rate harvesters. In the end greed wins.