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Glenn Ledder* (gledder@unl.edu). *Modeling the Historical Effects of Overhunting and the Current Effects of Conservation on Whale Populations.*

I will describe a case study that focuses on development and qualitative analysis of a model consisting of a single differential equation for population of a prey species, given a fixed population of predators. The behavior of the model, which can be determined using a nonstandard method for phase line analysis, depends in a critical way on the overall hunting capacity (number of predators times efficiency), a number that has gradually changed through technology and international agreements. The stable equilibrium population can change dramatically as this parameter moves through a bifurcation value, leading to sudden changes in population levels corresponding to small changes in hunting effort. The various scenarios can be strung together to create a historical narrative of whale populations along with a prescription for restoring a sustainable hunting capacity. (Received September 08, 2019)