

UMAP

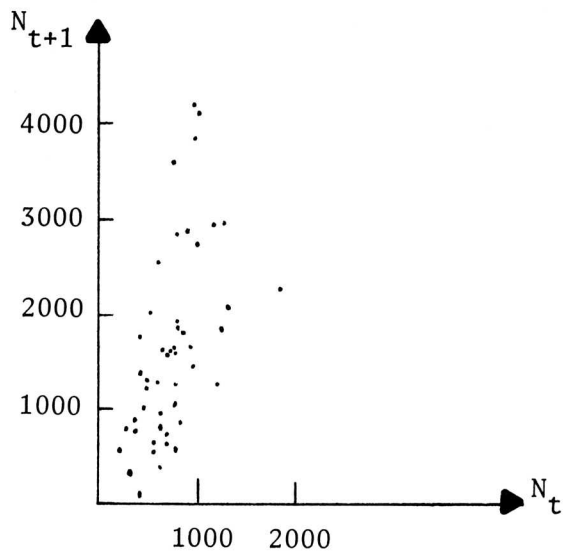
UNIT 653

MODULES AND MONOGRAPHS IN UNDERGRADUATE
MATHEMATICS AND ITS APPLICATIONS PROJECT

The Ricker Salmon Model

by

Raymond N. Greenwell



Applications to Environmental Science

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Intermodular Description Sheet: UNIT 653**Title:** The Ricker Salmon Model**Author:** Raymond N. Greenwell
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Albion, Michigan 49224**Math Field:** Difference equations**Application Field:** Ecology**Target Audience:** Students in a differential equations or modelling course.**Abstract:** A difference equation model describing the dynamics of a salmon population was developed by W.E. Ricker in 1954. This unit derives the model, shows how it can be modified, and introduces the concept of maximum sustainable yield. It also shows how difference equations may lead to periodic and chaotic behavior, and a computer program enables one to explore the periods and chaos. The technique of dynamic programming is introduced to show how to maximize the income from fishing over a finite period.**Prerequisites:** Elementary differential equations.

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MODULES AND MONOGRAPHS IN UNDERGRADUATE
MATHEMATICS AND ITS APPLICATIONS PROJECT (UMAP)

The goal of UMAP is to develop, through a community of users and developers, a system of instructional modules in undergraduate mathematics and its applications that may be used to supplement existing courses and from which complete courses may eventually be built.

The Project is guided by a National Advisory Board of mathematicians, scientists, and educators. UMAP is funded by a grant from the National Science Foundation to the Consortium for Mathematics and Its Applications, Inc. (COMAP), a nonprofit corporation engaged in research and development in mathematics education.

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