# Preface

This book is based on a population ecology course I have taught for many years at the University of California, Davis, primarily to juniors and seniors majoring in Environmental Biology. The material is more than I have ever covered in a ten week quarter, and should be covered comfortably in a semester. This book will also be useful as a supplement to more general texts in population biology and ecology, which tend not to cover nearly enough theory.

The only mathematical prerequisite is one year of calculus (which I assume many students may not remember well). I assume that the student has had some previous exposure to ecological ideas, although this is not an absolute requirement. I believe that the material covered here is essential for any graduate student in ecology or population biology. One principle guiding this book is that students in population biology and ecology are shortchanged if they are not given the opportunity to work through and understand the mathematical models which have become a core part of our discipline. I have not overwhelmed the reader with an excessive number of biological examples in the text – when I teach the course I ask students to read a selection of re-

cent experimental and observational studies to complement the material in the text.

If, after a glance at the table of contents and a look through the book, you begin to doubt that all students in ecology will really be able to do stability analyses, I assure you that students in my classes have had no difficulty rising to the challenge.

I have always tried for the simplest possible explanations of the underlying ideas. For example, I emphasize concepts of age structure in the context of just two age classes. I have also included detailed explanations of all the mathematical concepts and procedures which are likely to be new, at the point they are first used. These are set apart in boxes, so they are easier to find for future reference. Thus, boxes are more frequent in the earlier chapters. Also, since the mathematical development is essentially self-contained, there is more mathematics in the earlier chapters than in the later chapters.

Because the theoretical and mathematical development is such an integral part of the presentation, the book should really be covered in order, with one exception. The chapter on density dependence can be read before the chapter on population genetics. With some care, and review of the boxes in the chapter on population genetics, the chapter on population genetics could be skipped while still maintaining the logical flow of the book.

The extensive marginal notes serve several purposes. Steps that may be confusing for some readers, but clear to others, are explained in the notes. The notes point out connections among different topics. The notes are also used to suggest places where the reader should stop and think (and not just read!).

At the end of every chapter there are problems (some mathematical, some not). Almost all of these have been tested with students. These are an essential part of the text and need to be studied and pondered for a full understanding of the material.

I thank Bill Settle, who took the course many years ago and took careful notes which helped greatly in the preparation of this book. Other students since then have provided extensive feedback on preliminary versions of this text. Emilio Bruna read chapter three. Gary Huxel and Chris Ray have made numerous, helpful comments on the text. Rob Garber, the editor, provided extraordinary

help in all phases, including extensive comments on earlier drafts. Finally, I thank Simon Levin, from whom I first learned ecological modeling.

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