

Preface

The use of stable isotopes in the ecological and biological sciences is a rapidly growing area of research that was historically constrained within the domains of the earth and geological sciences. Today stable isotope measurements are becoming a routine, widespread, and integral component of many large-scale ecological and interdisciplinary environmental studies. Isotopic methods are invaluable for investigating the ecology of individuals and populations.

Here we focus on the very specific topic of using stable isotopes in unraveling terrestrial animal migration at various spatial scales around the globe. Migration is a compelling area of evolutionary and ecological research and understanding movement patterns in animals has become a topic of concern as we struggle to conserve threatened and other species that move across geopolitical boundaries. Previous traditional applications of tagging techniques have met with little success except for only a few larger and conspicuous species that can be intercepted with high probability. For the vast majority of migratory birds, mammals, and insects, more fundamental internal markers are required and, among these, stable isotopes show greatest promise if used appropriately.

The aim of this volume is to provide a college and graduate level handbook that will serve to introduce ecologists and biologists interested in terrestrial animal migration to the key elements of measuring, applying, and interpreting stable isotopes in terrestrial migratory systems. The reader will very quickly appreciate that this topic has not recently developed in isolation, but draws from many decades of foundational stable isotope research in the geological, hydrological, biological, and statistical sciences. A volume like this would not have been possible a few decades ago.

From an educational perspective, until recently there were no textbooks available for biologists and ecologists that provided a good overview of stable isotopes. Fortunately several textbooks have now appeared, and newcomers to the field of stable isotopes are also encouraged to consider reading books by B. Fry, *Stable Isotope Ecology* (2006); R. Michener and K. Lajtha, *Stable Isotopes in Ecology and Environmental Science* (2007), T. Dawson and R. Seigwolf, *Stable Isotopes as Indicators of Ecological Change* (2007) in addition to older benchmark books like P. W. Rundell, *Stable Isotope in Ecological Research* (1989). In addition, some internet websites are also of interest, primarily as an electronic forum for researchers using isotopes in migration. These include “Migrate” (www.migrate.ou.edu) and the biannual “Applications in Stable Isotope Ecology” international scientific meetings (www.isoecol.org).

Our hope is that the foundations laid here will provide a research stimulus for spawning new ideas and research into the fascinating topic and mysteries of animal migration in terrestrial and aquatic environments into the future.

*Keith A. Hobson
Leonard I. Wassenaar*