Foreword

As a somewhat obsessive, but far from expert, sea kayaker, I attend to issues of stability a good deal. Kayakers distinguish two kinds. Primary or initial stability is a measure of how much a kayak rocks in the water when it is displaced from the level. Secondary or final stability is a measure of how readily a kayak capsizes. Beginners instinctively confuse the two. They are concerned that the rocking associated with the primary stability characteristics of a boat reflects its secondary stability, and in overreacting to the former they can overwhelm the latter, and get very wet as a consequence. With practice, one learns to improve the primary stability that is experienced under an increasingly wide variety of conditions of wind and wave, to reduce the likelihood of unintentionally exceeding a kayak's secondary stability, and then to be able to use boats with inherently lower stability of both kinds. In a world in which the abundances and distributions of the majority of organisms are heavily influenced, and often continually buffeted, directly or indirectly by anthropogenic activities, we need to become the population management equivalent of more expert kayakers. This book provides one further step along that course.

Historically, ecologists have spent a lot of time debating whether populations have the equivalent of primary stability (i.e. whether they have their dynamics in some way bounded), how it varies intraspecifically and interspecifically, and what that might mean in turn for the structure and composition of assemblages and communities. Indeed, a plethora of measures have been developed to assess that stability, far in advance of what any typical group of kayakers might think of, but perhaps not dissimilar to the technicalities of boat and ship design. This book reveals that the debate is not over. However, in broad strokes, it is clear that (i) there is an enormous range of population behavior, and it is difficult to categorize in simple terms; (ii) that behavior can be very context specific, with regard to species, space, and time; and (iii) in consequence it can be difficult a priori to predict for any given case without knowing a good deal about those specifics. What is then key to understand is how natural population behavior is reshaped by anthropogenic pressures, just as the wake of a passing vessel can dominate the primary stability experienced by a kayaker, by setting up movements that are commonly at odds with those that were otherwise being felt. Put crudely, do those pressures act in a similar way to those more naturally experienced by a population or are they substantially different in character? This book offers some answers to that question.

More and more, however, the concerns of ecologists are becoming focused on issues of secondary stability. Are there "tipping" points that rapidly throw populations and communities from one state to another (the equivalent of the kayak being the correct or the wrong way up), how can those points be recognized, and under what circumstances do they occur? The challenge here is that the answers may well once again be very context specific, begging the question of whether there are practically (as opposed perhaps to theoretically) useful generalizations, or whether every case has to be considered in its own terms. Again, the chapters of this book have something to say on the issue. For the kayaker, a shift in balance, a paddle stroke and a brace, each exacted at the right time, can prevent the loss of secondary stability or indeed bring that loss about. For the population manager, much the same is likely commonly true for the tools they have at their disposal to influence movements, births, and deaths. For both kayaker and population manager, what is needed is sufficient experience to gauge what actions are most appropriate and when. It has been argued that it takes a skillful kayaker to complete an Eskimo roll when they have lost secondary stability, but far more skill not to lose that stability in the first place.

Of course, for the population manager, as for the kayaker, ultimately what is required is a synthetic understanding of both primary and secondary stability, and how they interact. Only then will it be possible to ensure some degree of understanding or control over the futures of species, assemblages, and communities. This book helps in bringing both sets of issues within the same covers.

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