

S.T.A. Pickett and P.S. White, 1985. The ecology of natural disturbance and patch dynamics. Academic Press, Orlando, San Diego, New York, xiv, 472 pp.

Over the last two decades, park managers have become increasingly aware of the importance of natural disturbance regimes within parks. Natural perturbations, such as fires, floods and landslides are no longer feared as adverse events, but are considered critical to the maintenance of both unique species and successional biotic communities. Pickett and White have assembled a selection of review papers, covering plant and animal responses to disturbance and the major types of ecosystem change. Some of the discussions report work from park or reserve areas. James Runkle's "Disturbance in temperate forests," for example, describes the effect of tree fall in the Great Smoky Mountains. Other discussions touch on topics of high interest to contemporary managers. Norm Christensen, for instance, has prepared a review of "Shrubland fire regimes and their evolutionary consequences." Although a majority of the papers concentrate on forested ecosystems, the habitats discussed vary from rocky intertidal shores to deserts of the southwest.

Pickett and White have done a commendable job, both in selecting the papers and in editing them. The papers integrate theoretical issues with field data, and include two overviews that summarize the contents of the volume. The general bibliography at the end of the book serves as a valuable master list of the best available references on disturbance ecology.

For the ecologist working on patch dynamics or succession, the volume presents several stimulating discussions of contemporary disturbance theory. Part IV, on "Implications of patch dynamics for the organization of communities and the functioning of ecosystems," includes reviews of disturbance mediated coexistence of species, nutrient dynamics, energetics and forest modeling.

The book points out the importance of two current hypotheses concerning disturbance: 1) "... species richness will be greatest in communities experiencing some intermediate level of disturbance" and 2) "When disturbance recurs more frequently than the time required for competitive exclusion, richness should be maintained . . ." but leaves the basic issues in an uncertain state. The volume produces more questions than answers. Through several discussions of gap-phase succession, for example, the question of whether tropical forest species are "adapted to gap regeneration" or are reproductively "haphazard with regard to gap conditions" remains undecided.

Despite the value of the book to the research

scientist, the manager should be warned that the book may be difficult to use for direct application to park problems. First, the text is written at graduate level and assumes a knowledge both of basic theoretical ecology and of the technical vocabulary used in ecological journals. Some chapters, such as the one on shrubland fire, will contain familiar ideas. Others, such as the one on forest modeling, may present so much new material they may be difficult to decipher. Second, although Pickett and White briefly discuss management and some of the chapters are directly relevant, *The Ecology of Natural Disturbance and Patch Dynamics* makes it all too clear that much of this new theory has yet to be applied by managers, and that further translation will be necessary to make some of the key discoveries of the last ten years useful for decision making in parks.

Pickett and White themselves admit that disturbance ecology lacks coherent theory, and no general principles exist that can be safely applied from one ecosystem to the next or from one species to the next. This deficiency may well be limiting practical applications. Science activities within the National Parks should, in fact, help convert results from natural history studies into useful tools for managing disturbance in wildland settings. It is encouraging to see Peter White, as a National Park Service scientist, doing trend-setting work in both theoretical and applied plant ecology.

In summary, ecologists working with perturbations of natural ecosystems and large parks with numerous management issues concerning disturbance processes will find the volume a valuable reference to add to their libraries. Park managers may wish to borrow a copy of the book and devote time to chapters relevant to their areas, but will probably find some of the discussions to be of little local interest or too theoretical to apply to immediate problems.

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