

### APPENDIX 3. Disturbance and vegetation dynamics

In addition to the governance-related shocks referred to in the main text, the New Forest has also been subjected to major disturbance events that are environmental in origin. For example, in 1980-83 there was a population explosion of a number of moth species (e.g. *Erannis defoliaria* and *Tortrix viridiana*), which caused widespread oak defoliation (Tubbs 2001). In the decade 1974-1984, the area experienced a sequence of hot, dry summers, which led to the death of many hundreds of mature trees, and desiccation of wetland habitats.

In the past two decades climate has continued to change, with 10 of the 12 warmest years recorded in the last 350, with winters becoming wetter and summers slightly drier (Jenkins et al. 2007). The most striking impact has been on the health of beech (*Fagus sylvatica*), which has continued to decline in the New Forest as in other areas of southern England (Power et al. 1995). A number of beech stands have undergone canopy collapse as a result of the effects of drought and storm damage, leading to changes in woodland structure and composition (Newton et al. 2010). As noted by Tubbs (2001), the New Forest experienced major wind storms in 1987 and 1990, which contributed to the recent high mortality of mature trees. The evidence of stand collapse in beech supports the suggestion of Gunderson (2000), that systems approaching limits to conservative growth may be brittle, and particularly susceptible to disturbance.

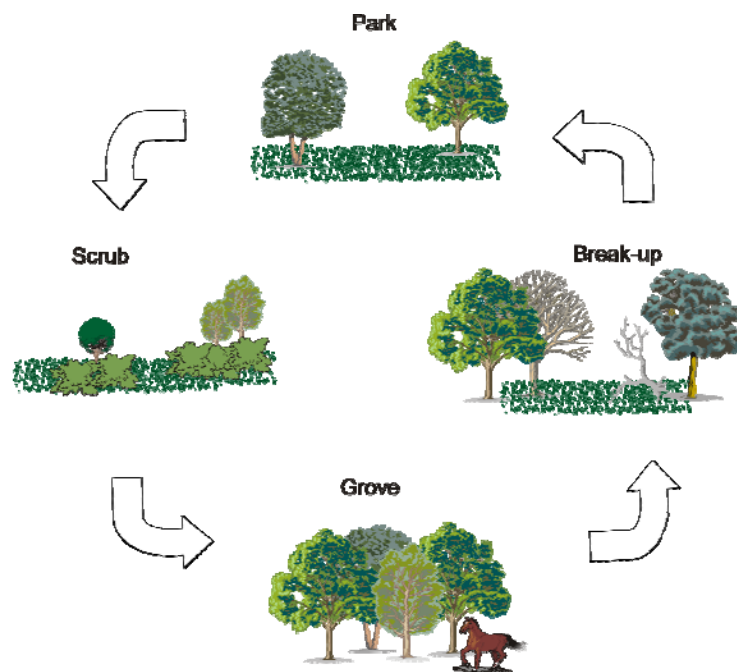
The impact of disturbance on vegetation dynamics has been the focus of some research interest (Newton et al. 2010). The theory developed by Vera (2000), which examines the potential role of vertebrate herbivory in the dynamics of European woodlands, has been particularly influential. The theory is based on the idea that the original vegetation of the lowlands of Europe was a park-like landscape, in which successional processes were determined by large herbivorous mammals and birds (such as the jay) that act as seed dispersal agents (Figure A3.1). Specialised grass eaters, such as wild cattle and wild horses, produced grassland vegetation in which thorny shrubs become established, into which species of tree may become established. These are then protected from herbivory, and develop into groves of trees, which advance into the grassland as the thorny shrubs advance. Regeneration of trees within the grove is prevented because of shade, and because of herbivory, as animals are able to enter the grove as it matures. As a result, the forest grove eventually degenerates into grassland, and the cycle begins again (Figures A3.1-A3.5).

Vera (2000) considered the New Forest in detail, citing it as evidence of support of this theory. However, the theory has not been rigorously tested, and therefore doubts remain regarding its applicability to the New Forest (Newton et al. 2010). If the theory is correct, it may provide a basis for adaptive cycles of vegetation dynamics within the New Forest.

#### LITERATURE CITED

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**Figure A3.1.** Schematic diagram of Vera's cyclical theory of vegetation turnover (after Newton et al. 2010, based on Vera 2000). The Park phase is a largely open landscape with a thin scatter of trees left from the previous grove; vegetation mainly grassland or heath species. In the Scrub phase, spread of thorny shrubs excludes herbivores; young trees grow up with the shrubs and eventually overtop them. In the Grove phase, which is the tree-dominated phase of the cycle, a closed tree canopy shades out the shrubs, and herbivores return, preventing regeneration. In the Break-up phase, the canopy opens out as trees die; vegetation shifts from woodland to grassland species.



**Figure A3.2.** Landscape of the New Forest illustrating a typical mosaic of heathland, grassland and woodland communities.



**Figure A3.3.** Interface between scrub and grassland communities, with New Forest ponies. Tree establishment is visible within the thorny scrub, in accordance with Vera's theory.





**Figure A3.4.** Wood Crates, one of the ancient woodlands of the New Forest, of exceptional value as habitat for wildlife.



**Figure A3.5.** Mark Ash wood, illustrating the canopy collapse that has occurred in some New Forest beechwoods, supporting elements of Vera's theory.