

6. THE AVAILABILITY OF WATER AS A DETERMINANT OF NATIVE  
VEGETATION ON THE NORTHERN SWAN COASTAL PLAIN,  
WESTERN AUSTRALIA

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It is well recognized in Australia that increasing aridity results in a change of the structural and floristic characteristics of a plant community. Structurally this involves a decrease in height and percentage foliage cover of the tallest stratum. Floristically it involves a distinct transitional change. In the plant communities near Perth, the latter is a very distinctive continuum with individual species and groups of species having dissimilar distribution patterns. The concepts are illustrated by reference to the plant communities on the northern Swan Coastal Plain, Western Australia.

The moistness of site has already been delineated as one of the main determinants of the vegetation on the northern Swan Coastal Plain. Results are presented from a monitoring programme investigating the influence of natural fluctuations in rainfall, and consequently soil moisture levels, on a range of plant communities. In response to a series of below average annual rainfall years, between 1966 and 1976, several native plant species reacted to a reduction in soil moisture levels. Obviously species vary in their ability to tolerate different levels of water stress. The characteristic features of many sclerophyllous plants enabled many species to tolerate the fluctuations in water availability. Other species were unable to adjust; in some instances this inability led to the death of plants. Evidence is presented to illustrate the range of responses. The varying reactions have resulted in changes in the plant communities. These changes are discussed in relation to the various land uses on the northern Swan Coastal Plain. One such land use is the development of the underground water resources. These resources consist of both deep artesian aquifers and shallow unconfined aquifers. The extraction of water from the latter may affect other forms of land use which are dependent on the presence of water close to or above the ground surface. Those plant species that did react to the series of below average annual rainfall years are reviewed as indicators of water stress.

Evidence presented emphasizes the need for understanding the biology of individual plant species and the various relationships between the components of the plant communities and the existing environmental conditions.