A HISTORICAL PERSPECTIVE ON RECENT LANDSCAPE TRANSFORMATION: INTEGRATING PALAEOECOLOGICAL, DOCUMENTARY AND CONTEMPORARY EVIDENCE FOR FORMER VEGETATION PATTERNS AND DYNAMICS IN THE FLEURIEU PENINSULA, SOUTH AUSTRALIA.

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ABSTRACT

Palaeoecological records, documented historical records and remnant vegetation were investigated in order to construct a multi-scaled history of vegetation pattern and change in the Fleurieu Peninsula, South Australia over the last c. 8000 years. The inquiry aimed to better understand post-European landscape transformation; thus addressing the inherently historical components of the problems of regional biodiversity loss, land sustainability and the cumulative contribution to global climate change.

The relationships between environmental variables, either directly or indirectly representing the environmental regimes, affecting vegetation distribution and (1) remnant vegetation and (2) historical records of nineteenth century vegetation pattern, were investigated. The potential of relationships, when extrapolated in geographic space, to represent pre-European vegetation pattern was considered. It was shown that nineteenth century records, made during the first systematic land surveys, were suitable for quantitative landscape investigations. In some cases these records provided the only means of assessing ecological patterns prior to widespread vegetation removal. Remnant vegetation provided a vital adjunct to the interpretation and use of historical records. However, their utility for landscape-scale reconstruction of potential historical vegetation was limited by their poor environmental distribution. Remnant vegetation and environmental relationships more markedly represented patterns of European land selection than historical environmental relations.

Modern pollen production, distribution and the pollen morphology of members of the Myrtaceae family were investigated to provide a basis for the interpretation of fossil pollen records. Fossil pollen, charcoal and sediments from the European period were investigated at three sites. Substantial changes to terrestrial and wetland vegetation occurred in the initial phase of European settlement. No obvious response in floristic composition of the overstorey of sclerophyll vegetation types was detected. However, intensified burning regimes, selective harvesting and grazing affected understorey composition. Wetland vegetation underwent further dramatic changes later in the European period, probably in response to broad scale vegetation clearance carried out in the mid- twentieth century causing regional shifts in hydrological and nutrient regimes. Lower sedimentation rates since land clearance suggests relative catchment stability since that time.

A Holocene palaeoecological record was investigated to place European impacts in a long-term context. It revealed a transition from an early Holocene-*Eucalyptus* dominated woodland to an *Allocasuarina* dominated wet heath in the humid mid-Holocene and a return to *Eucalyptus* dominated woodland in the drier Late Holocene. Charcoal and pollen records suggested that Aborigines occupied the highland forested regions of the Fleurieu Peninsula throughout the mid-late Holocene and that the upland wetlands may have constituted an important resource base. Substantial vegetation changes occurred through the period of Aboriginal occupation but these changes seem to be in response to changing climate regimes rather than being anthropogenic in nature.

The degree to which the different sources were comparable, and could be integrated, was discussed by considering their relative classificatory, spatial and temporal resolution and their accuracy. It was contended that a multiple-line history is required to reveal historical ecological relations and human impacts. Integrated sources showed that recent European changes occurred at a much greater rate than those in the Holocene and differed in nature in fundamentally important ways. Pre-historical disturbances were local while post-European were broad scale and thus regional. Pre-historical vegetation changes resulted in reduction or migration of community types while post-European resulted in their elimination. Regional vegetation changes of the post European period invoked permanent changes to other integrated components of the biotic and abiotic environment and these changes are without precedent in the Holocene.