

# Introduction

The stunted trees and spinifex along Australia's western shores presented an uninviting picture of an arid continent to the first European visitors. The east coast, blanketed by moist forests, was seen far more favourably—as a land to be colonised. To Joseph Banks, the botanist with Captain Cook when he landed here in 1770, this vegetation appeared full of promise in its exotic diversity. But to many settlers of the 19th century it came to represent the harshness and fruitlessness of an inhospitable land. The image of an immense and monotonous scrub, seen as an obstacle to be removed from the landscape, became well established during the time of agricultural expansion.

Even today, for most people the enduring image of Australia's natural vegetation remains one of endless tracts of the familiar hard-leaved eucalypts and wattles. At the same time, the now largely urban population sees the bush as a friendly place to visit and its unique character forms a valued part of our distinct national identity. Yet in the space of a few generations the landscape in some agricultural regions has changed so rapidly that areas of natural vegetation have contracted to become remnant islands.

The maps in this volume show the present vegetative cover and a reconstruction of the pre-colonisation

vegetation. Together, they show the distribution and magnitude of the broad changes that have occurred over the last 200 years. While the vegetation structure of more than half of the continent remains largely unaltered, the development of areas of agricultural potential has seen the removal of much of the natural vegetation.

In the years since the Second World War there has been as much land clearance as there had been in the preceding 150 years. In parts of the south-east and south-west natural vegetation survives as isolated trees or in narrow strips along roadways.

## Time scales of change

This continent's vegetation has never been static. The climatic shifts of past geological ages led gradually to the evolution of much of the arid-adapted flora from moist Tertiary rainforests. The dramatic climatic changes of the most recent ice-ages changed critical environmental conditions over wide areas and caused large movements in the zonation of vegetation.

Australia's vegetation was also influenced by humans prior to European settlement. Significant changes in its structure and composition resulted from many thousands of years of Aboriginal land use. In particular, fire-tolerant species became more prominent and open wooded grasslands were maintained by Aboriginal burning practices.

But even this relatively recent influence would have been only gradual when compared to the sudden impact of just two centuries of European land use, which brought extensive clearing and new plants and animals. Urban and rural development have vastly changed the former vegetation and sup-

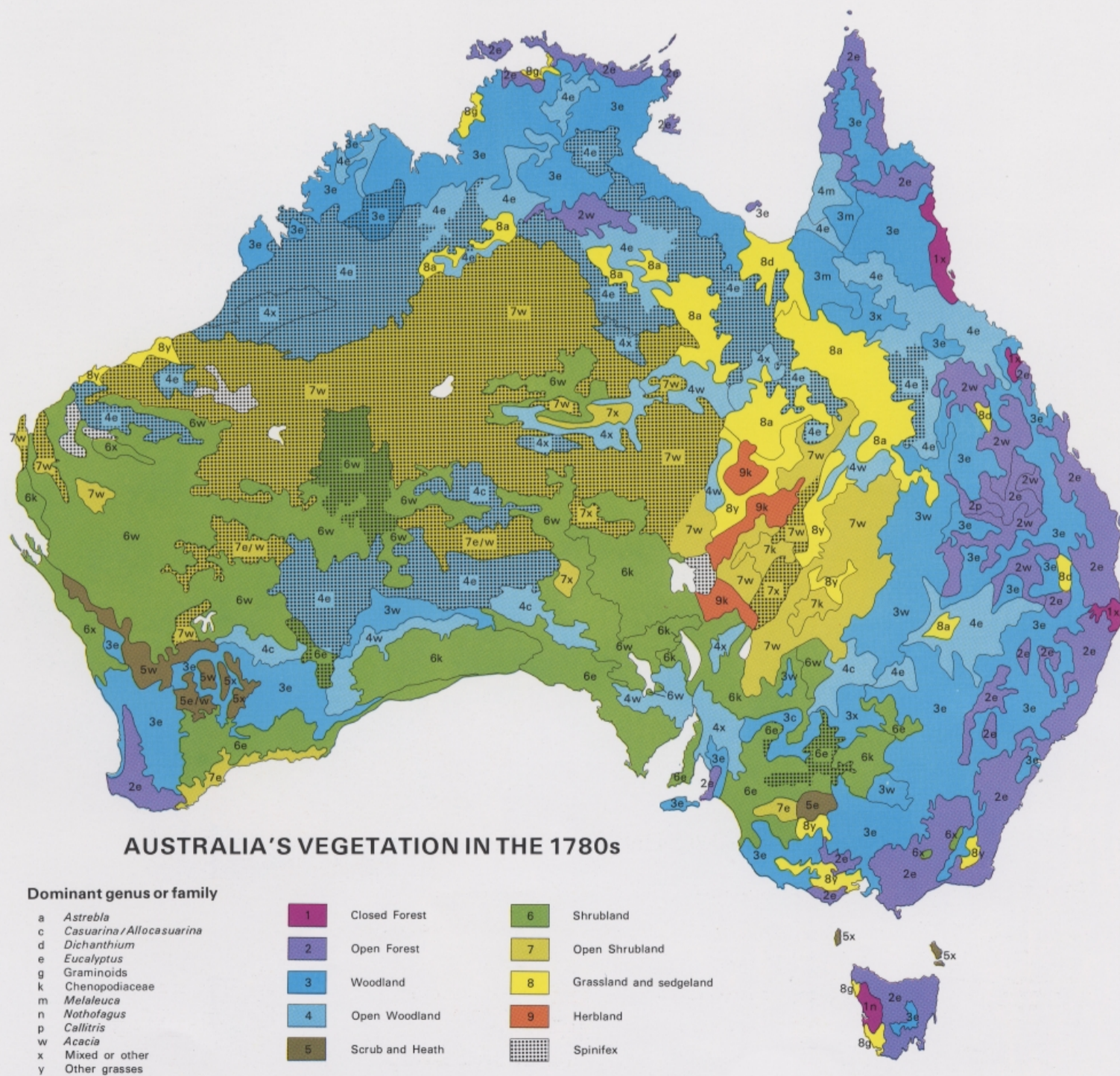
planted it with new and generally well regulated vegetation types.

European settlement has been described by some ecologists as having been catastrophic for the flora and fauna of Australia. Many species and vegetation habitats have been lost but much has also been saved; large tracts of near-pristine bushland are now conserved in national parks and nature reserves. The larger part of the remaining forest land is now managed for multiple use—to allow both conservation and continued timber harvesting.

Environmental awareness has grown in recent times and, as attention turns to the last undeveloped regions in the country, the natural values of these areas are now given equal weight in planning. Issues of long-term environmental degradation aside, Australia has gained a primary production industry which has established it as a developed nation and which still helps maintain a high standard of living.

## Patterns of change

The maps are a generalisation of complex vegetation patterns and often complex changes. At the



continental scale the coding of wide areas of the present vegetation is the same as for the past, but on the ground there are very few places where there is no evidence of European impact on the vegetation, even if it is only the presence of alien weeds along bush tracks.

Throughout the grazing lands there has been a gradual shift in the composition of the shrub and ground layers of vegetation. Inedible species have increased at the expense of more sensitive ones and in many areas these changes were already taking place before botanical surveys were begun. The species involved in the shrub regrowth problem in parts of the inland have undergone a dramatic increase in recent decades. These species were in fact only minor components of the vegetation when selectors first moved onto the land.

While the general pattern of historical vegetation change has been one of reduction in biomass, it has not been entirely uniform. There are examples where the density of particular layers has increased in response to changed environmental factors or the introduction of new species.

In addition, the history of vegetation changes has often been more complex than a single directional shift from the natural to the present state. Many areas now covered by dense vegetation may have undergone several episodes of clearing and regeneration. The two hundred year timespan of European influence exceeds the reproductive age of tree species, so some areas of present forest may represent regrowth from previous clearing.

**What is vegetation?**

The term vegetation describes the entirety of the plant cover—individual plants collectively form distinct floristic associations and spatial patterns. It is these patterns which constitute the different vegetation types which we know as forest or heath or grassland.

Vegetation has been classified by such patterns into 'structural forms', distinctive arrangements of plant height and spacing that can occur over large areas. It is subdivided by the understorey type and by the taxonomic group of the dominant plants, usually to the level of genus or family.

**The maps**

The primary mapping source for the present vegetation was Landsat satellite imagery. Landsat scanners are well suited to the detection of dense vegetation. The imagery is therefore an ideal tool for mapping land clearance and separating vegetation types. Information on structure and floristic composition was drawn from a wide range of secondary sources, mainly larger scale maps and reports on vegetation, along with some field verification.

The reconstruction of the former vegetation in areas where it has been substantially altered is based largely on remnant vegetation and historical sources. Where vegetation has been removed, boundaries are drawn from information on soils and other features. However, reconstruction of parts of the natural vegetation, particularly in south-eastern Australia, remains largely speculative because of inadequate historical information.

The major impact on the natural vegetation has been the change from forest and woodland to pasture and cropping. This stands out clearly on the summary maps

below, which were generalised from the two major maps in the volume. The most dramatic changes are in the temperate south-east and south-west of the continent.

The largest areas of the new vegetation follow the familiar boundaries of the Australian wheatbelt, extending north into the former brigalow lands of eastern Qld. Lesser shifts in the foliage cover and floristic composition have occurred over a much wider area—roughly a third of the continent's vegetation has undergone structural changes resulting from European land use.

The extent of dryland cropping is nearing its climatic limits and vegetation resources for timber and pastoral production, though renewable, are finite in area and ultimately in yield. The most widespread vegetation types, covering much of the dry interior, are suitable only for sparse grazing. Despite its huge land area, Australia is no longer regarded as an unlimited frontier for agricultural development. We now have an overall picture of vegetation cover to support programs underway for the sustainable continued use of the country's environmental resources.

