

# Introduction to the Biology and Ecology of Gibraltar Range National Park and Adjacent areas: Patterns, Processes and Prospects

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Papers on the biology and ecology of Gibraltar Range National Park were sought to reflect the increased research focus on the area over the past decade. The 12 papers, published here, come from a variety of natural history disciplines. This collection of papers reflects the start that has been made, and, hopefully, will stimulate further biological and ecological investigation of Gibraltar Range National Park.

Gibraltar Range National Park was first dedicated in the 1960s following the construction of the Gwydir Highway connecting Glen Innes and Grafton in northern NSW. Prior to this the area had been used for grazing, prospecting, forestry and had been surveyed for the potential use of hydroelectricity. However, it remained little explored in terms of its biology and ecology until the 1960s and 70s when John B. Williams began to collate species lists and describe the broad patterns of vegetation (Williams 1970, 1976). On his first exploration in 1958 he noted the similarity of the vegetation to that of the Sydney Region but also noted that many of the plant genera have species that are endemic to the granite flora (pers. comm.). This observation is still being examined today and is exemplified in the paper by Jones and Bruhl describing a new species of *Acacia*. John Williams was also acutely aware of the influence of geology and soils on vegetation and the role of these differences in producing diverse habitats. These themes are explored by Williams and Clarke in their description of the vegetation, and by Vernes et al. and Mahony in their accounts of the mammals and amphibians respectively. Whilst we now have a good understanding of vascular plant distribution and abundance there are many gaps in knowledge of

the more cryptic vertebrate fauna and invertebrates. Surprisingly, the more easily studied avifauna has not been well documented at Gibraltar Range despite the wealth of opportunities for behavioural and ecological studies in diverse habitats.

The biological processes that influence the distribution and abundance of community dominants at Gibraltar Range National Park are being better understood through quantitative surveys, comparative biology and experimental manipulations. In particular, the influence of fire regimes on the sclerophyll and rainforest flora has been advanced by the papers in this volume by Campbell and Clarke, Croft et al., Knox and Clarke, and Williams and Clarke. At finer scales Virgona et al. have elucidated the proximal factors governing the distribution of *Banksia* species, which are a keystone resource in heaths and adjacent forests. Furthermore, Vaughton and Ramsey have experimentally examined the reproductive biology of one such *Banksia* species to explore the evolution of plant mating systems. Whilst all banksias set seed at Gibraltar Range National Park some other members of the Proteaceae family appear to be sterile as documented by Caddy and Gross in their population study of a rare species of *Grevillea*.

Future prospects for the biota of Gibraltar Range National Park are seemingly assured through the management of the conservation reserve by NSW National Parks and Wildlife Service. However, the paper by Goldingay and Newell highlights that recreational use of protected areas may impact the quality of habitats for wildlife through the apparently innocuous disturbance of rocks. The complex task of fire management is also highlighted in the study of Knox and Clarke, who conclude that

## INTRODUCTION TO GIBRALTAR PAPERS

short fire frequencies can reduce the resprouting ability of common shrubs. In short, it is clear that enticing prospects for future research and adaptive management are many in Gibraltar Range National Park.

### DEDICATION

John B. Williams (12/2/1932 to 31/7/2005)

This collection of papers is dedicated to John B. Williams who was instrumental in describing the flora of Gibraltar Range National Park and that of the New England Region more generally. John Williams will be remembered for his wealth of knowledge about plants and his intuitive guides and keys to various Australian plant groups. John lectured in Taxonomy and Ecology at the University of New England for nearly 40 years and after 'retirement' remained actively involved in teaching and research. His passion for botany, natural history and conservation was conveyed to a wide range of people through his lectures, public talks, activities in conservation, numerous checklists, ecological notes and published books. His interests in heaths, sclerophyll forests, and rainforests have inspired many to pursue the description and explanation of their ecological patterns and processes. This legacy is reflected in many of the papers published on research done in Gibraltar Range National Park.

### REFERENCES

- Williams, J.B. (1970). A preliminary list of the seed plants of the Gibraltar Range National Park. Unpublished Notes, University of New England, Department of Botany.
- Williams, J. B.(1976). Notes on the vegetation of Gibraltar Range National Park. Unpublished Notes, University of New England, Department of Botany (reproduced below)

### APPENDIX

*Reproduced from Williams (1976)*

Gibraltar Range National Park consists in its upper section of an undulating granite plateau, while the lower section is steeply dissected, and has a variety of underlying rock types.

The plateau section is about 1000 to 1250 m in altitude and its natural features are dominated by the underlying pink granite (leuco-adamellite) - a very

coarse-grained and siliceous rock. This weathers to form shallow, gritty soils with some extreme nutrient deficiencies (especially in phosphate), and the upper slopes and hilltops have extensive bare rock outcrops, and some spectacular tor-fields (groups of very large granite boulders on ridgetops). In the rock crevices and between the tors are patches of low heath and scrub vegetation with several unusual flowering shrubs. The slopes and gullies of the plateau landscape carry LOW OPEN-FOREST with stringybarks and peppermints, and a very large number of shrub species (see separate list).

Several eucalypts are found in these low forests, in varying associations. Four of them are very common and widespread; these are Youman's Stringybark (*E. youmanii*); Privet-leaved Stringybark (*E. ligustrina*), New England Blackbutt (*E. andrewsii*) and Coast Blackbutt (*E. pilularis*). Others with local occurrences are Needle-leaved Stringybark (*E. planchoniana*), Narrow-leaved Peppermint (*E. radiata*) and Round-leaved Gum (*E. deanei*). The remaining eucalypts of the granite areas favour special habitats where they are often locally dominant. So we may find smooth-barked Mountain Ash (*E. oreades*) as a fringe of white-trunked trees around the base of some of the high tor-fields. Among the rocky outcrops there are patches of Mallee (*E. approximans*) in some areas, and stunted trees of the Red Mahogany (*E. notabilis*). Along watercourses in shallow valleys narrow bands of Mountain Gum (*E. dalrympleana*) and Peppermint (*E. acaciiformis*) may occur. In a few deeper gully areas with better, sandy soils and some shelter from wind, patches of TALL OPEN-FOREST are found, with Gum-topped Peppermint (*E. campanulata*), Messmate (*E. obliqua*) and Diehard Stringybark (*E. cameronii*) as the dominants. Such patches are found on the Mulligan's Hut Track.

In several of the shallow valleys of the plateau the forest cuts out abruptly, giving way to extensive open peat swamps with a natural treeless SEDGELAND (moorland) of sedges and rushes, other herbs and low shrubs. This plant community again is dependent on the special way in which the pink granite has weathered, to form swampy valleys with an acid, peaty soil in this high-rainfall area.

The main plants in these wetlands are coarse tough-leaved herbs, including restiads such as *Restio* and *Lepyrodia*, and large, tufted sedges such as Button-Grass (*Gymnoschoenus*), Spike-sedge (*Schoenus*) and Razor-sedge (*Lepidosperma*). [Beware of Razor-sedges, the flat, narrow, leaves and stems have sharp edges which can cause deep cuts.] Along the sluggish watercourses in the swamps are several small shrubs which flower well in late spring and summer. These

include myrtles such as *Leptospermum*, *Baeckea* and *Callistemon* and epacrids such as *Epacris microphylla*. Christmas-bells (*Blandfordia*) are a feature of the swamps in summer. Three small insect-trapping herbs with red, sticky leaves may be seen in parts of the swamps. These are the Sundews, *Drosera spathulata*, *D. auriculata* and the larger, showy *D. binata* with long, forked leaves.

The lower section of the park and some areas near the edge of the plateau have steep slopes, high rainfall and different rock types giving richer, deep soils. Here are found some TALL OPEN-FORESTS with very fine, large specimens of Blue Gum (*Euc. saligna*), Tallow Wood (*E. microcorys*), Silver-topped Stringybark (*E. laevopinea*), Gum-topped Peppermint (*E. campanulata*) and Brush Box (*Tristania conferta*). Some of these trees are over 160 ft high. The understorey in these forests contains wattles, treeferns, some "rainforest" shrubs and vines, and some tall flowering shrubs such as Nightshade (*Solanum cinereum*), Mint-Bush (*Prostanthera*), *Correa* and Tall Everlasting (*Helichrysum rufescens*).

Near the bottom of the range, the rainfall is much lower, and OPEN-FREST of a drier sort occurs, with trees such as Ironbark, White Mahogany, Bloodwood and Broad-leaved Apple.

In sheltered gullies and on some east-facing slopes, the open-forests give way to stands of rainforest, of which two forms are found in the Park. SUBTROPICAL RAINFOREST, with palms, strangling figs, Red Cedar, Yellow Carabeen, Rosewood, Stinging Tree and many large vines occurs on the scarp, and at mid and low altitudes generally. Fine stands may be seen in Cedar Valley, and on the steep descent along the highway below the tick-gate. WARM-TEMPERATE RAINFOREST with Coachwood, Sassafras, Crabapple, Corkwood, Prickly Ash, Laurels, and many ferns, is found above 1000 metres, sometimes right on the plateau surface (e.g. a little north of the Washpool Road turnoff). Large epiphytes such as Birds-nest Fern (*Asplenium nidus*), Elkhorns (*Platynerium*), *Dictymia*, and many orchids are common and conspicuous high up in the trees, especially in the Subtropical rainforests.

