

# Common plants and soil salinity in the Lower Boro area, Southern Tablelands, New South Wales

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## Abstract

Kodela, P.G. & D.A. Foster (School of Geography, University of NSW, Kensington, Australia 2033) 1990. *Common plants and soil salinity in the Lower Boro area, Southern Tablelands, New South Wales. Cunninghamia* 2(2): 217-222. Over 130 vascular plant species were recorded from the Lower Boro area of New South Wales. Pastures cover much of the landscape, with eucalypt forests and woodlands remaining mainly on hillslopes and steeper ridges. Dryland salinity, associated with clearing of the native vegetation for grazing, occurs on alluvial flats along several watercourses, and on gentle hillslopes. Salt-tolerant species are identified in the survey.

## The study area

Lower Boro is located about 30 km north of Braidwood on the Southern Tablelands of New South Wales (approximately 35°10'S, 149°45'E, see Map 1). A temperate subhumid climate prevails, with a mean annual rainfall of 709 mm recorded for Braidwood. Braidwood experiences mean daily maximum temperatures of 25.7°C in January to 11.9°C in July, and mean daily minima of 12.1°C in January to -0.1°C in July (Bureau of Meteorology, 1975). The geology, topography and soils of the area are described in detail by Gunn et al. (1969), Felton and Huleatt (1977) and Soil Conservation Service of NSW (undated). Solodic soils (yellow massive earths) have developed on Tertiary alluvial deposits in the gently undulating lowlands, while yellow podzolics (texture-contrast soils) and solodic soils are found on the undulating to rolling terrain of folded Silurian and Ordovician sedimentary rocks and probably Devonian age granodiorite. Local hilly areas have lithosols (skeletal soils) on steep slopes and crests. Quaternary alluvium, with various soil types, occurs in the valley floors of tributaries to the Upper Shoalhaven River.

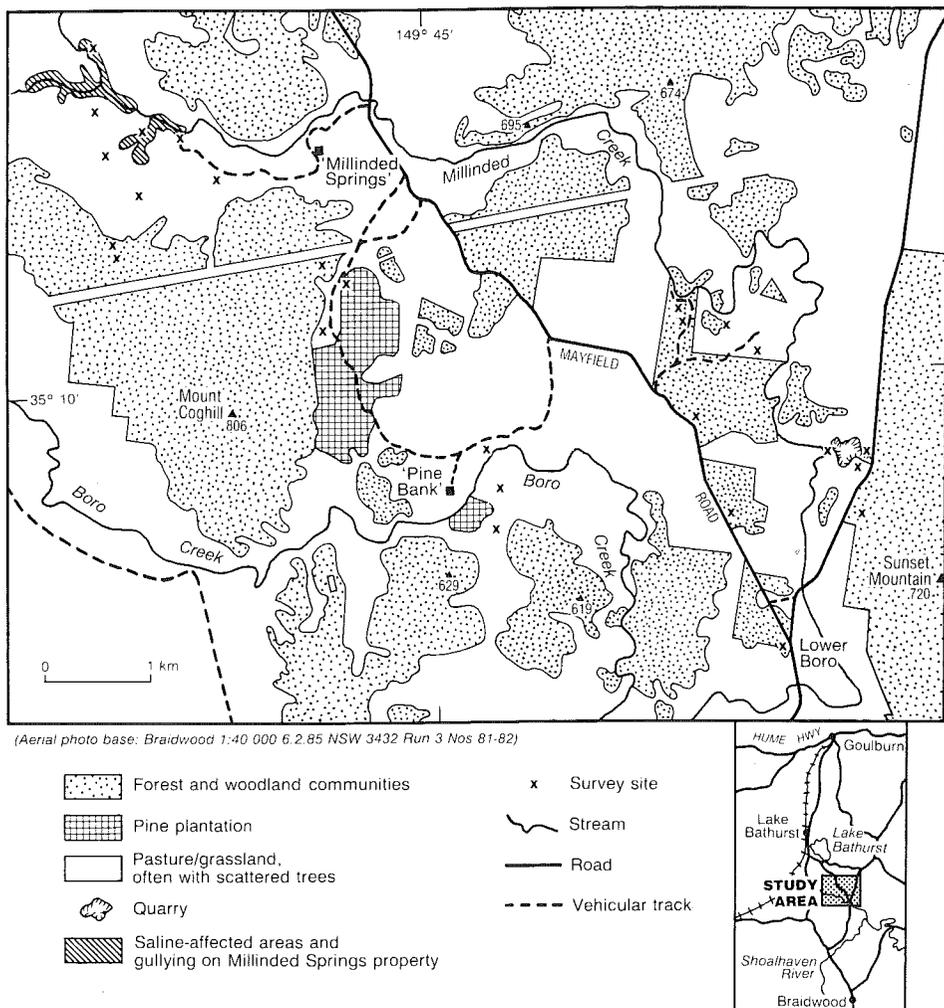
## Vegetation

### Previous studies

Vegetation in the region is more closely associated with water relationships and climatic conditions than with rock type or soil (Gunn et al., 1969). Species' distributions and plant growth are influenced by exposure to frosts, heat and dry westerly winds. Vegetation structure and composition are influenced by local climatic conditions that vary with altitude, aspect and topography.

Pryor (1938, 1954), Costin (1954), Story (1969), Burbidge and Gray (1970) and the Soil Conservation Service of NSW (undated) provide early accounts of the Southern Tableland's flora and plant communities. They describe dry sclerophyll forests as occurring on the upper slopes and ridges (hilly terrain), and savannah woodland on the lower slopes and valley floors. Eucalypt forest communities contain associations of *Eucalyptus rossii*, *E. mannifera*, *E. dives*

and *E. macrorhyncha*. *E. rubida* can be found mixed with these species on cooler aspects, while *E. sieberi* often occurs on drier, stony crests and upper slopes. Savannah woodland may be thinned dry sclerophyll forest containing the above species, or occur naturally in cool areas on footslopes and valley floors with major species including *E. bridgesiana*, *E. melliodora*, *E. rubida* and *E. blakelyi*. Groundcover in forests and woodlands varies with mixed heath (sclerophyllous shrubs) and herbs. Communities of *E. pauciflora* and *Poa* spp. occur in colder areas. Grasslands were originally found mainly on river flats or frost pockets, but have since increased in area from clearing of forests and



Map 1. Study area showing location of sampling sites.

woodlands (Soil Conservation Service of NSW, undated).

### Present survey

A plant survey of the Lower Boro area was undertaken to provide an inventory of vascular plant species, and identify species tolerant of saline soils. Field observations were made during mid-January 1989. Appendix 1 lists vascular plant species observed at various sites (see Map 1), and ground traversed between sites. Descriptions of vegetation structure follow the classification of Specht (1981).

Natural grasslands and improved pastures cover much of the land suitable for agriculture. Within pastures there are scattered individual or patches of trees and shrubs, damp soaks with sedges, and bare erosional scars. Pastures often merge with low open-woodlands to woodlands where clearing of the understorey allows grazing.

Shrub-dominated communities occur in pastures, or form the understorey of woodlands. Heathland/open-heathland/low heathland is common on rocky ridges, while slightly taller heathland/scrub formations are found along the banks of watercourses. *Melaleuca parvistaminea* and *Kunzea parvifolia* are dominant species near creeks and drainage lines, while shrubby species of Epacridaceae, *Hakea sericea*, *Allocasuarina paludosa* and *Leptospermum* are more common on drier slopes and ridges.

Eucalypt open-forest to low open-forest formations occur mainly on the hillslopes. In more exposed and semi-cleared areas woodlands/low woodlands prevail. *Eucalyptus dives* and *E. rossii* are common trees throughout the region. Small trees preferring the alluvial flats in the lowlands include *E. aggregata* and *E. melliodora*. *E. amplifolia* occurs on the cool lowlands and at higher elevations as a low tree with several stems. Many of the eucalypt species have a mallee habit in more exposed situations or as a response to fire damage and clearing (Soil Conservation Service of NSW, undated). Trees must be tolerant of fire, and in the broad valley lowlands to cold air drainage and frosts. *Allocasuarina littoralis* is common in the understorey of open-forests as well as dominating regrowth stands at the edges of eucalypt forests. Forest and woodland stands have highly variable understoreys. On dry exposed ridges and steeper slopes there are scattered low shrubs and herbs, with many rock outcrops. In more protected areas, and where deeper soils occur, there are shrub layers, or scattered medium-tall shrubs to small trees. However, human disturbance has left many forest stands with open understoreys and herb-dominated groundcovers, often with deep litter layers. Herb-dominated groundcovers also occur naturally in lowland woodlands due to the cold climatic conditions. *Acacia decurrens* is common in disturbed areas forming monospecific stands with grass understorey near and amongst the pine plantations at 'Pine Bank'.

Dryland salinity and associated vegetation denudation and gully erosion occurs at 'Millinded Springs' where the Soil Conservation Service is currently undertaking a rehabilitation program. Low available potassium may be a key factor limiting plant growth in these areas (Melville pers. comm.; Hood 1989). *Eucalyptus aggregata* and *E. melliodora* appear to tolerate the salt-affected sediments that result from saline seepage. Other species surviving along these watercourses are indicated in Appendix 1. Some of these species may be suitable for stabilising bare saline areas that are highly susceptible to erosion.

At 'Pine Bank' *Pinus radiata* is planted on slopes and near gullies to help arrest salinity and associated erosion problems. Although *Melaleuca parvistaminea* appears to be a promising shrub for stabilising creek banks in the area it often forms dense thickets that may limit stock access to water. Problems with erosion around shrub roots and the formation of small islands may also occur (property owner pers. comm.).

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## Appendix 1

## Vascular plant species recorded from Lower Boro.

Nomenclature follows Jacobs & Pickard (1981) and Jacobs & Lapinuro (1986). Habitat information is provided in code as follows: I-eucalypt forests and woodlands, II-heathland (often in pastures), III-pastures and wasteland, IV-salt-affected areas, V-near stream in protected valley, VI-CSIRO Forestry & Research experimental trial plantation at 'Pine Bank', established 1979. \* indicates introduced taxa.

- PTERIDOPHYTA**  
**DENNSTAEDIACEAE**  
*Pteridium esculentum* I, III, V
- ADIANTACEAE**  
*Cheilanthes* sp. I, III
- GYMNOSPERMAE**  
**PINACEAE**  
 \**Pinus radiata* III, IV, plantations
- ANGIOSPERMAE-**  
**DICOTYLEDONEAE**  
**APIACEAE**  
 \**Eryngium rostratum* III  
*Hydrocotyle laxiflora* I, III
- ASTERACEAE**  
*Cassinia aculeata* I, III  
 \**Centaurea calcitrapa* III  
 \**Cirsium vulgare* III  
*Gnaphalium sphaericum* I, III  
*Helichrysum apiculatum* III  
*H. bracteatum* III  
*H. diosmifolium* IV  
 \**Hypochoeris radicata* I, III  
*Lagenifera* sp. I  
*Pseudognaphalium luteoalbum* III  
 \**Tolpis umbellata* III  
*Vittadinia muelleri* III
- BORAGINACEAE**  
 \**Echium plantagineum* III
- CAMPANULACEAE**  
*Wahlenbergia* spp. I, III
- CARYOPHYLLACEAE**  
 \**Paronychia brasiliiana* III  
 \**Spergularia rubra* III, IV
- CASUARINACEAE**  
*Allocasuarina littoralis* I, III  
*A. paludosa* I, II
- CONVOLVULACEAE**  
*Convolvulus erubescens* II, III
- DILLENIACEAE**  
*Hibbertia acicularis* I  
*H. obtusifolia* I, II, III
- EPACRIDACEAE**  
*Acrotriche serrulata* III
- Astroloma humifusum* IV  
*Brachyloma daphnoides* I  
*Lissanthe strigosa* II, III  
*Melichrus urceolatus* II, III
- EUPHORBIACEAE**  
*Poranthera microphylla* I, III
- FABACEAE**  
**FABOIDEAE**  
*Glycine* sp. I  
*Hardenbergia violacea* I  
*Jacksonia scoparia* I, III  
*Kennedia prostrata* I  
*Mirbelia platylobioides* I  
*Pultenaea scabra* I  
*P. subspicata* I  
 \**Trifolium* spp. III
- MIMOSOIDEAE**  
*Acacia brownei* II  
*A. buxifolia* I  
*A. decurrens* I, III, V  
*A. irrorata* subsp. *irrorata* I, III, IV  
*A. terminalis* I
- GENTIANACEAE**  
 \**Centaurium erythraea* III
- GOODENIACEAE**  
*Goodenia bellidifolia* I, II, III  
*G. hederacea* I, II
- HALORAGACEAE**  
*Gonocarpus* sp. I  
*Myriophyllum propinquum* III
- LAMIACEAE**  
*Mentha diemenica* III
- LAURACEAE**  
*Cassytha pubescens* I
- LOBELIACEAE**  
*Pratia pedunculata* III
- LOGANACEAE**  
*Mitrasacme polymorpha* I, III
- MYRTACEAE**  
*Eucalyptus aggregata* IV  
*E. amplifolia* I, IV  
*E. dives* I  
*E. globoidea* I  
*E. globulus* subsp. *bicostata* VI

- E. globulus* subsp. *globulus* VI  
*E. laevopinea* VI  
*E. macrorhyncha* subsp. *macrorhyncha* I  
*E. mannifera* I, III  
*E. melliodora* I, IV  
*E. obliqua* VI  
*E. olsenii* VI  
*E. rossii* I  
*E. rubida* I  
*E. sieberi* I, VI  
*E. viminalis* V  
*Kunzea parvifolia* I, II, III  
*Leptospermum brevipes* (variant) II  
*L. multicaule* I  
*L. myrtifolium* II, III  
*Melaleuca parvistaminea* I, II, III, IV, V
- OXALIDACEAE  
*Oxalis corniculata* I, III
- PLANTAGINACEAE  
 \**Plantago coronopus* III, IV
- POLYGALACEAE  
*Comesperma volubile* I
- POLYGONACEAE  
 \**Acetosella vulgaris* III
- PRIMULARIACEAE  
 \**Anagallis arvensis* III
- PROTEACEAE  
*Banksia marginata* I, III  
*B. paludosa* I  
*B. spinulosa* I  
*Hakea dactyloides* I, III  
*H. decurrens* I  
*H. sericea* I, II, III  
*sopogon prostratus* I  
*Lomatia ilicifolia* I  
*Persoonia linearis* I  
*P. mollis* subsp. *livens*
- ROSACEAE  
*Acaena ovina* III  
 \**Rosa rubiginosa* III  
*Rubus parvifolius* I
- RUBIACEAE  
*Galium* sp. III  
*Opercularia aspera* I
- RUTACEAE  
*Philotheca salsolifolia* I
- SANTALACEAE  
*Exocarpos cupressiformis* III
- SCROPHULARIACEAE  
*Veronica arvensis* III  
*V. plebeia* I, III
- SIMAROUBACEAE  
 \**Ailanthus altissima* III
- SOLANACEAE  
*Solanum aviculare* V
- STYLIDIACEAE  
*Stylidium graminifolium* I, II, III
- VIOLACEAE  
*Viola hederacea* I, III
- ANGIOSPERMAE-MONOCOTYLEDONEAE
- CYPERACEAE  
*Eleocharis acuta* III, IV  
*Lepidosperma laterale* I  
*L. urophorum* I  
*Schoenus apogon* III
- HAEMODORACEAE  
*Haemodorum planifolium* I, II
- IRIDACEAE  
*Patersonia glabrata* I
- JUNCACEAE  
*Juncus australis* III, IV  
*J. planifolius* III
- LILIACEAE  
*Dianella* sp. I
- POACEAE  
*Agrostis avenacea* III, IV  
*Aristida ramosa* III  
*Chionochloa pallida* III  
*Cynodon dactylon* III, IV  
*Danthonia carphoides* III  
*D. monticola* III  
*D. racemosa* III  
 \**Eleusine tristachya* I, III  
 \**Eragrostis mexicana* III, IV  
 \**Hordeum leporinum* III  
 \**Lolium perenne* III, IV  
*Microlaena stipoides* III  
 \**Phalaris aquatica* III  
*Poa* sp. I, III  
 \**Polypogon monspeliensis* III, IV  
*Sporobolus creber* III  
*Stipa mollis* I, III, IV  
*S. scabra* subsp. *falcata* III  
*Themeda australis* I, III
- XANTHORRHOEACEAE  
*Lomandra glauca* I  
*L. longifolia* I, V  
*L. obliqua* I  
*Xanthorrhoea resinosa* subsp. *concava* I, II, III

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