

DELINEATION of IMPORTANT HABITATS of THREATENED PLANT SPECIES in SOUTH-EASTERN NEW SOUTH WALES



RESEARCH REPORT
to the
Australian Heritage Commission

J.D. Briggs & J.H. Leigh

CSIRO Division of Plant Industry
GPO Box 1600
Canberra ACT 2601

December 1990

***Phebalium ralstonii* (F. Muell.) Benth.**

Family: Rutaceae

Conservation Status: Vulnerable (Code 2VCi/N/58C)

(Conservation Status prior to survey: Rare (Code 2RCi/N/58C))

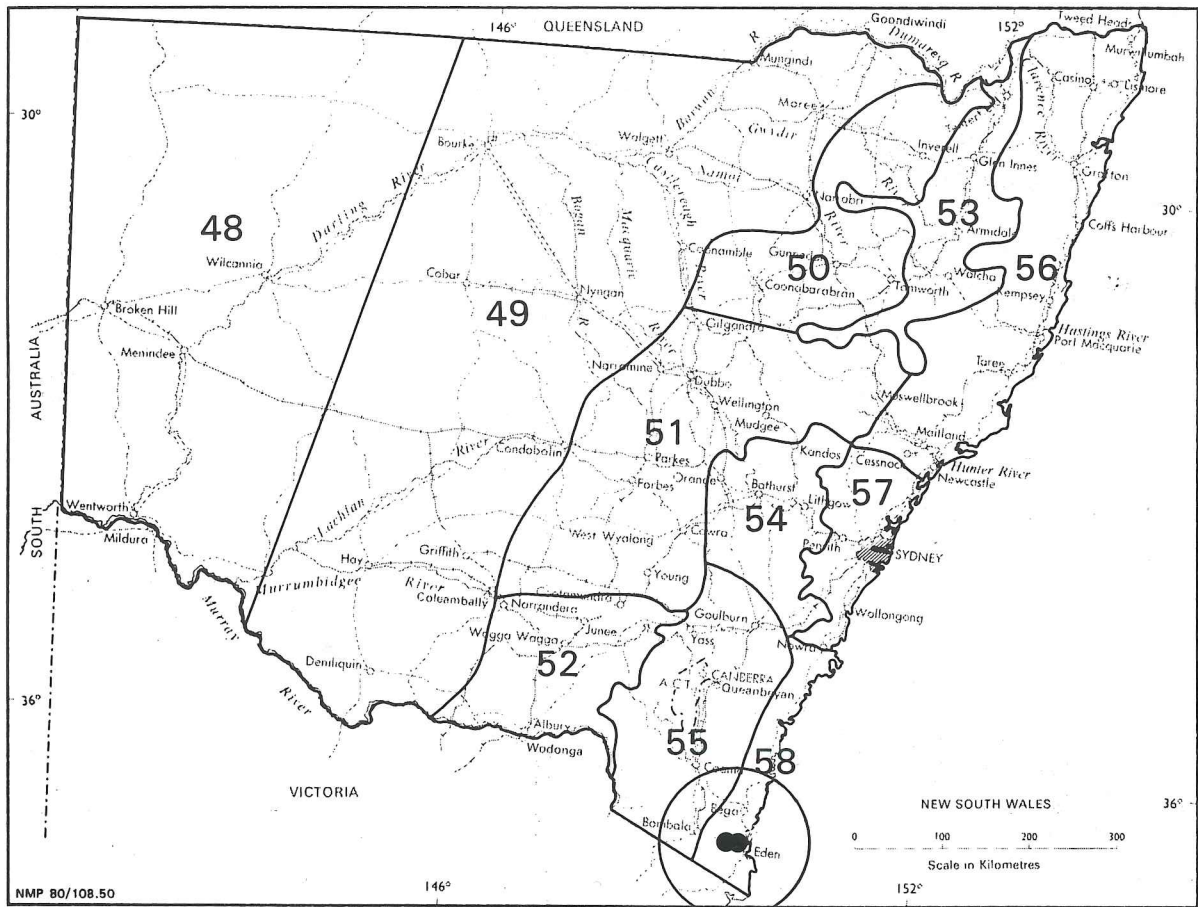


Flowering branchlet.

Description

Slender, erect to somewhat straggly, open, woody shrub to 1 m high with strongly angular branchlets. *Leaves* stalkless, narrowly obovate with the edges rolled under, 2.5-4 cm long and about 6 mm wide. *Flowers* arranged in clusters of 4-7 borne on a common pendulous stalk arising from the ends of the branchlets. Individual flowers are up to 2.5 cm long with green petals about 8 mm long and with numerous protruding and conspicuous yellow stamens about 16 mm long. *Fruit* is a capsule about 10 mm across and 4-5 mm high which is deeply divided into 4 chambers.

Flowering: Recorded from July to October, but probably commencing earlier than July.

Distribution of *Phebalium ralstonii*



On many sites shrubs of *P. ralstonii* flower when only 30-40 cm high, as shown in this photograph.

Distribution

Largely confined to an area of about 15 km x 8 km centred about 15 km inland and located between Pambula and Eden on the New South Wales far South Coast. There is one slightly disjunct westerly occurrence on Jingera Rock, about 25 km inland. The species has now been recorded from 21 sites and has a total population of between 2,000 and 2,500 plants.

Prior to the discovery of the species on rhyolite outcrops south-west of Pambula by D. Albrecht in 1985 the species was only known with certainty from Jingera Rock in Egan Peaks Nature Reserve, although there were two previously recorded occurrences from Pambula and Wyndham in 1915 and the type collected was from the Yowaka River in 1860.

The distribution of *P. ralstonii* is now reasonably well established as the general area and most rock outcrops potentially supporting this species have been extensively surveyed since 1986 by various workers such as Albrecht, Parris, Fisher, Keith and J.D.B.. Nevertheless, it is likely that other small occurrences of the species will eventually be found in as yet undiscovered outcrops in the more inaccessible parts of the species range. During the present survey 7 outcrops surveyed independently by D. Albrecht were not re-visited by J.D.B. as it was considered more desirable to direct survey effort to other unexplored outcrops, particularly as Albrecht had already nominated his 4 best sites for inclusion on the Register of the National Estate. The 7 sites surveyed independently by Albrecht are not therefore detailed in this report but a summary of their locations is presented at the end of the Site Details section.

Habitat Summary

On rhyolite, ignimbrite and occasionally pyrophyllite rock outcrops with skeletal loamy soils usually supporting localised shrub communities. Occasionally *P. ralstonii* extends into *Eucalyptus-Allocasuarina* open-forest. It occurs on all aspects, but is less common on south-facing sites on hillsides of coastal ranges dominated by eucalypt open-forest.

Threats Summary

Because of the natural protection afforded to most sites by the extensive areas of bare rock associated with the outcrops, most shrub communities have been infrequently burnt. This is evidenced by the very large specimens of fire sensitive species such as *Kunzea ambigua*, *Melaleuca armillaris* and *Acacia subtilinervis* on most sites. Many sites appear not to have been burnt for more than 50 years. An increased burning frequency for the shrub communities is likely to be detrimental to both *P. ralstonii* and the general ecology of the sites. Care should thus be taken that hazard-reduction burns conducted in adjacent State Forests and private property do not encroach upon these shrub communities. Particular care should be taken with any programme of aerial ignition to ensure that incendiaries are not dropped into the shrub communities.

Whilst logging activities are not likely to directly affect most *P. ralstonii* sites because they do not support forest, particular care should be taken during any logging of adjacent forest to ensure that machinery, roading or

other activities do not damage the sites and that soil erosion does not cause deposition of silt onto the outcrops.

There has been some interest in quarrying some of the rhyolite outcrops for use as decorative paving stone (C. Parramore, pers. comm.) and at some of the sites, e.g. Sites 10 and 11 there was evidence of some exploratory drilling and blasting. One site (Site 12) is potentially threatened should there be a major expansion of an adjacent pyrophyllite rock quarry currently operating.

The only formally reserved population is on Jingera Rock where feral goats are present. The *Phebalium* and general habitat at this site could be damaged by browsing if goat numbers increase. Whilst most other outcrops supporting *P. ralstonii* do not appear to be currently affected by browsing by feral goats, these animals had caused serious damage to parts of Site 4 and could be a potential threat to other outcrops if their numbers build up in the general area.



Hazard reduction fires should not be permitted to travel onto shrub community sites as has happened in the past where a fire had encroached onto the south-eastern edge of Site 2. Numerous plants of *Phebalium ralstonii*, the Vulnerable *Westringia davidii* and the Rare *Acacia subtilinervis* were killed by this fire. Whilst the community is likely to regenerate adequately from an occasional fire, frequent burning could be detrimental.

Currently all sites are in a virtually weed-free condition and providing the above threats are controlled the shrub communities should persist for the foreseeable future.

Reservation

One population comprising approximately 300-400 plants (Site 6 - Jingera Rock) is in Egan Peaks Nature Reserve.

Cultivation

The relatively large, pendulous terminal clusters of yellow and green flowers are horticulturally appealing. It is likely that cultivated specimens would develop a denser more compact habit when grown in more favourable conditions than those that prevail in the wild. The species should have an ability to tolerate shallow stony soils and seasonally dry conditions but is not particularly tolerant of cold conditions, such as those experienced in Canberra. Seed of this species is difficult to germinate but plants can be propagated with moderate success from cuttings. A total of 34 plants from 6 individuals are in cultivation at the Australian National Botanic Gardens, Canberra (M. Richardson, pers. comm.).

Recommendations Summary

Sites 1-4 and 6-11 have been nominated for inclusion on the Register of the National Estate by J.D.B. and another 4 sites have been nominated independently by D. Albrecht. Most of these are now on the Register. Some of the best sites, e.g. Sites 2, 3 and 4 should be declared as flora reserves or nature reserves to give the species more adequate formal protection. Once such action is taken then it is likely that the conservation status of the species will be changed to Rare.

The New South Wales National Parks and Wildlife Service should eliminate feral goats from Egan Peaks Nature Reserve and other sites should be periodically monitored to detect any threats.

SITE DETAILS

Site 1 - Nullica State Forest Shrub Community - Central Site

(= Site 1 for *Westringia davidii*)

Latitude and Longitude: 36° 57' 52", 149° 46' 14".

Altitude: 250-370 m.

Location: Rock outcrop on hillside 1.5 km directly north-west of 'Ocean View' homestead, 10 km directly west-south-west of Pambula. The nominated site encompassing this and Site 2 is bounded by straight lines joining the Pambula 1:25,000 map sheet 8824-11-S grid reference points 461052-47450470-476055-461059-461052. (See map page 143).

Land Status: Nullica State Forest.

Area: ca. 15 ha.

Population: An estimated 250-300 mature plants and a few seedlings.

Habitat

Soil: Skeletal humus-rich brown loam.

Substrate: Ignimbrite with extensively exposed sheets of rock.

Topography: Extensive outcropping of rock on steep lower slopes of hillside overlooking a creek in hilly terrain.

Aspect: Northerly.

Vegetation: Shrub community dominated by *Kunzea ambigua*, *Melaleuca armillaris* and *Acacia subtilinervis*. Other associated shrub species include *Platysace lanceolata*, *Beyeria lasiocarpa*, *Lasiopetalum ferrugineum*, *Lepidosperma concavum*, *Dodonaea multijuga*, *Olearia iodochroa* and *Westringia davidii*.

Threat: See summary section.

Recommendation: This site is now on the Register of the National Estate. It also supports populations of 800-1000 mature plants and several hundred seedlings of the nationally Vulnerable *Westringia davidii* and 100-150 mature plants and numerous seedlings of the Rare *Acacia subtilinervis*.

Survey Date: 20/7/86.

Voucher Specimen: J.D.B. and D. Albrecht No. 1990.

Site 2 - Nullica State Forest Shrub Community - East Site

(= Site 2 for *Westringia davidii*)

Latitude and Longitude: 36° 58' 00", 149° 46' 40".

Altitude: 220-300 m.

Location: Rock outcrops on hillsides surrounding the junction of two small creeks 800 m directly north-west of 'Ocean View' homestead, 10 km directly west-south-west of Pambula. The nominated site encompassing this and Site 1 is bounded by straight lines joining the Pambula 1:25,000 map sheet 8824-11-S grid reference points 461052-47450470-476055-461059-461052. (See map page 143).

Land Status: Nullica State Forest.

Area: ca. 10 ha.

Population: An estimated 200-300 mature plants and a few seedlings.

Habitat

Soil: Skeletal brown loam.

Substrate: Extensively exposed ignimbrite rock and small boulders.

Topography: Outcropping rock on adjacent, moderately steep hillsides in hilly terrain.

Aspect: Predominantly westerly and northerly but occasionally easterly.

Vegetation: Shrub community dominated by *Kunzea ambigua*, *Melaleuca armillaris*, *Allocasuarina littoralis* and *Acacia subtilinervis*. The sub-shrub layer includes *Lasiopetalum ferrugineum*, *Lepidosperma concavum*, *Boronia rigens* and *Westringia davidii*.



Looking south-east to part of the shrub community forming Site 2. This site also contains the nationally Vulnerable species *Westringia davidii* and the Rare *Acacia subtilinervis* (the taller light-green shrubs in this photo).

Threat: See summary section.

Recommendation: This site is now on the Register of the National Estate. It also supports populations of 200 mature plants and numerous seedlings of the nationally Vulnerable *Westringia davidii*, 250-300 mature plants and numerous seedlings of the Rare *Acacia subtilinervis* and is the site of a highly disjunct southern occurrence of *Boronia rigens*.

Survey Date: 20/7/86.

Voucher Specimen: J.D.B. and D. Albrecht No. 1984 .

Site 3 - Box Range Shrub Community Site A

(= Site 3 for *Westringia davidii*)

Latitude and Longitude: 36° 56' 42", 149° 46' 04".

Altitude: 220-320 m.

Location: Rock outcrop, platform and associated cliffs at head of east-running creek at the south-east corner of Box Range Farm property, 9 km directly west-south-west of Pambula. The nominated site is bounded by straight lines joining the Pambula 1:25,000 map sheet 8824-11-S grid reference points 46500720 - 46320762 - 46330775 - 46600770 - 46550750 - 46620740 - 46500720. (See map page 144).



Looking south-south-west to the southern half of Site 3. The northern half is hidden by the hill in the foreground.

Land Status: Private freehold.

Area: ca. 8 ha.

Population: An estimated 150 mature plants and a few seedlings.

Habitat

Soil: Skeletal humus-rich black loam.

Substrate: Rhyolite, extensively exposed.

Topography: Extensive rock platform and adjacent rock outcropping on upper slopes of a hillside. The outcrop is bisected by a deep gorge and drops away to sheer cliffs on the lower side.

Aspect: North-east to south-east.

Vegetation: Shrub community including *Kunzea ambigua*, *Melaleuca armillaris*, *Platysace lanceolata*, *Lepidosperma urophorum*, *L. laterale*, *Plectranthus parviflorus*, *Westringia davidii*, *Acacia subtilinervis* and *Pseudanthus divaracatissimus*. The site is surrounded by *Eucalyptus agglomerata* - *E. globoidea* - *E. sieberi* - *Allocasuarina littoralis* open-forest.

Threat: See summary section.

Recommendation: This site is now included on the Register of the National Estate. This site also supports populations of about 100 mature plants of the nationally Vulnerable *Westringia davidii*, about 20 mature plants of the Rare *Pseudanthus divaracatissimus* and several hundred mature plants of the Rare *Acacia subtilinervis*.

Survey Dates: 14/7/86 and 21/9/87.

Voucher Specimen: Collected by D. Albrecht and M. Parris.

Site 4 - Box Range Shrub Community Site C

(= Site 4 for *Westringia davidii* and Site 1 for *Zieria* sp. 15)

Latitude and Longitude: 36° 56' 28", 149° 45' 47"

Altitude: 270- 310 m.

Location: Rocky slopes near head of small creek on the southern part of Box Range Farm property. The nominated site is bounded by straight lines joining the Pambula 1:25,000 map sheet 8824-11-S grid reference points 45920785-46050825-46180820-46280790-46220778-46130788-46050778-45920785.

Phebalium ralstonii is confined to the upper eastern section of the nominated site. (See map page 144).

Land Status: Private freehold.

Area: ca. 1 ha.

Population: ca. 50 mature plants.

Habitat

Soil: Shallow humus-rich dark brown loam.

Substrate: Rhyolite, extensively exposed.

Topography: Rock outcrop on mid slope of moderately steep hillside.

Aspect: North.

Vegetation: Shrub community dominated by *Kunzea ambigua*, *Melaleuca armillaris* and *Acacia subtilinervis* but also including *Platysace lanceolata*, *Plectranthus parviflorus* and *Westringia davidii*.

Threat: See summary section.

Recommendation: This site has now been included on the Register of the National Estate. The site also supports populations of about 50 mature plants and numerous seedlings of the nationally Vulnerable species *Westringia davidii* and a few hundred plants of the Rare *Acacia subtilinervis*. The only known population (about 40 plants) of the Endangered species *Zieria* sp. 15 occurs on the western part of the nominated site.

Survey Dates: 14/7/86 and 21/9/87.

Voucher Specimen: Not collected.

Site 5 - Ocean View

(= Site 5 for *Westringia davidii*)

Latitude and Longitude: 36° 58' 30", 149° 46' 53"

Altitude: 310-360 m.

Location: Rock outcrop 600 m direct south-south-west of 'Ocean View' homestead. The site is centred on the Pambula 1:25,000 map sheet 8824-11-S grid reference point 47600420. (See map page 143).

Land Status: Private freehold.

Area: ca. 2 ha.

Population: About 30 mature plants with a few seedlings.

Habitat

Soil: Skeletal loam.

Substrate: Rhyolite, extensively exposed.

Topography: Rock outcrop on lower slopes of moderately steep hillside.

Aspect: North-east.

Vegetation: Shrub community dominated by *Kunzea ambigua* and *Acacia subtilinervis* but also including *Stypana glauca*, *Melaleuca armillaris*, *Plectranthus parviflorus*, *Lomandra confertifolia*, *Persoonia linearis*, *Platysace lanceolata*, *Dodonaea triquetra*, *Westringia davidii*, *Acacia myrtifolia* and *Lasiopetalum ferrugineum*. The site is

surrounded by *Eucalyptus sieberi* - *E. agglomerata* - *Allocasuarina littoralis* open-forest.

Threat: See summary section.

Recommendations: See summary section. This site also supports a population of about 100 mature plants of the nationally Vulnerable *Westringia davidii*.

Survey Date: 1/8/86.

Voucher Specimen: J.D.B. and M. Parris No. 2025.

Site 6 - Jingera Rock

Latitude and Longitude: 36 59' 36", 149° 40' 20".

Altitude: 370-540 m.

Location: Western and northern slopes of Jingera Rock, 5 km north-east of Burragate. The nominated site is defined as that area above the 360 m contour level and is bounded on the south and east sides by straight lines joining the Wyndham 1:25,000 map sheet 8824-111-S grid reference points 37250200-38130213-38400283. (See map page 145).



Looking south-west from the Burragate Fire Trail to Jingera Rock.

Land Status: Egan Peaks Nature Reserve.

Area: ca. 25 ha.

Population: An estimated 300-400 mature plants. Seedlings rare.

Habitat

Soil: Skeletal humus-rich brown loam.

Substrate: Extensively exposed rhyolite.

Topography: Growing in drainage lines and on rock ledges of extremely steep rock outcrop on northern end of mountain range.

Aspect: Westerly and northerly.

Vegetation: Shrub community including *Beyeria lasiocarpa*, *Eriostemon trachyphyllus*, *Hakea macraeana*, *Pomaderris costata*, *Acacia rubida*, *Melaleuca armillaris*, *Kunzea ambigua* and *Prostanthera phyllicifolia*.



Pockets of shrub community supporting *P. ralstonii* on the steep north-western slopes of Jingera Rock.

Threats: At the time of the survey feral goats were occupying the site. Thus, despite being within a nature reserve, *P. ralstonii* must be considered to be at some risk through browsing and general habitat degradation by these animals.

Recommendations: The New South Wales National Parks and Wildlife Service should eliminate feral goats from the site. This site has been nominated for highlighting on the Register of the National Estate. Within this area there are also populations of 50-100 plants of the nationally Rare *Pomaderris virgata*, 150-200 plants of the Vulnerable *Pomaderris costata* and more than 1000 plants of the Rare *Dodonaea rhombifolia*.

Survey Date: 18/7/86.

Voucher Specimen: J.D.B. and D. Albrecht No. 1969.

Site 7 - Old Hut Creek Phebalium Site 2

Latitude and Longitude: 37° 02' 30", 149° 46' 23".

Altitude: 170-230 m.

Location: Steep slopes either side of Old Hut Creek between 50 and 400 m upstream from its junction with the eastern boundary of Nullica State Forest. The nominated site is bounded by straight lines joining the Eden 1:25,000 map sheet 8823-1-N grid reference points 46609685-46509710-46909710-47009685-46609685. (See map page 146).

Land Status: Nullica State Forest.

Area: 6 ha.

Population: 300 mature plants and a few seedlings.

Habitat

Soil: Skeletal loam.

Substrate: Frequently exposed rhyolite.

Topography: Steep slopes of outcropping rock above creek.

Aspect: North-east and south-east.

Vegetation: Shrub community dominated by *Kunzea ambigua* and *Melaleuca armillaris* but including *Allocasuarina littoralis*, *Crowea exalata*, *Helichrysum obcordatum*, *Dodonaea truncatiales*, *Logania albiflora*, *Bursaria spinosa*, *Pultenaea retusa*, *Pimelea axiflora*, *Lomandra longifolia*, *Prostanthera phyllicifolia*, *Notelaea venosa*, *Olearia ramulosa*, *Lepidosperma urophorum* and *Pomaderris* sp.. The site is surrounded by *Eucalyptus muelleriana* - *E. smithii* - *E. sieberi* open-forest.

Threat: See summary section.

Recommendation: This site has been nominated for inclusion on the Register of the National Estate. See also summary section.

Survey Date: 11/11/88.

Voucher Specimen: J.D.B., M. Parris and N. Fisher No. 2446.

Site 8 - Nullica State Forest Shrub Community - West Site

Latitude and Longitude: 36° 57' 43", 149° 45' 20".

Altitude: 330-370 m.

Location: Rocky slope along gully 2.8 km direct west-north-west of 'Ocean View' homestead, 11.5 km directly west-south-west of Pambula. The nominated site is bounded by straight lines joining the Pambula 1:25,000 map sheet 8824-11-S grid reference points 452055-455055-455059-452059-452055. (See map page 143).

Land Status: Nullica State Forest.

Area: ca. 2 ha.

Population: 85 mature plants and occasional seedlings.

Habitat

Soil: Shallow brown sandy loam with much broken rock.

Substrate: Ignimbrite, frequently exposed.

Topography: Outcropping rock along lower slopes of spur overlooking a small creek in hilly terrain.

Aspect: Westerly.

Vegetation: *Eucalyptus sieberi* - *E. agglomerata* - *Allocasuarina littoralis* open-forest with a sparse shrub understorey including *Lasiopetalum ferrugineum*, *Pomaderris ledifolia*, *Lomandra confertifolia*, *Dampiera stricta*, *Lomatia ilicifolia*, *Pultenaea villifera*, *Oxylobium ilicifolium*, *Platysace lanceolata*, *Prostanthera incana* and *Lepidosperma urophorum*.



Open-forest habitat of *P. ralstonii* at Site 8. This is an atypical site for the species which normally occurs in shrub communities.

Threat: See summary section.

Recommendations: This site is now included on the Register of the National Estate.

Survey Date: 1/8/86.

Voucher Specimen: J.D.B. and M. Parris No. 2022.

Site 9 - Nethercote Falls

Latitude and Longitude: 36° 59' 27", 149° 49' 12".

Altitude: 120-150 m.

Location: The nominated site includes the rocky hillsides on both sides of the Yowaka River immediately below Nethercote Falls, 8 km direct south-west of Pambula. *Phebalium ralstonii* is concentrated above the 120 m contour level on the southern hilltop whose summit corresponds with the Pambula 1:25,000 map sheet 8824-11-S grid reference point 51030235. (See map page 147).

Land Status: Nullica State Forest.

Area: ca. 2 ha.

Population: ca. 50 mature plants.

Habitat

Soil: Skeletal humus-rich loam.

Substrate: Rhyolite, frequently exposed.

Topography: Crest and gentle slopes of hill in hilly terrain.

Aspect: All aspects but predominantly north-west.

Vegetation: *Allocasuarina littoralis* woodland and shrub community including *Kunzea ambigua*, *Hakea macraeana*, *Persoonia linearis*, *Lepidosperma urophorum*, *Zieria fraseri*, *Pomaderris ledifolia*, *Xanthosia pilosa*, *Acacia subtilinervis* and *Pseudanthus divaracatissimus*.



Looking south-east across part of the shrub community and *Allocasuarina* woodland which supports *P. ralstonii* at Site 9.

Threat: See summary section.

Recommendation: This site is within a larger area around Nethercote Falls which is now included on the Register of the National Estate. This area also supports populations of several hundred mature plants of the nationally Rare *Acacia subtilinervis*, about 30 plants of the Rare *Pseudanthus divaracatissimus* and a disjunct population of 150 plants of *Zieria fraseri* subsp. *compacta*.

Survey Date: 3/8/86.

Voucher Specimen: J.D.B., D. Albrecht and M. Parris No. 2043.

Site 10 - Box Range Shrub Community - Site B

Latitude and Longitude: 36° 56' 27", 149° 46' 00".

Altitude: 190-300 m.

Location: Rock outcrop along a gully on the southern part of Box Range Farm property, 9 km direct west-south-west of Pambula. The nominated site is bounded by straight lines joining the Pambula 1:25,000 map sheet 8824-11-S grid reference points 46330782-46350842-46480842-46450782-46330782. (See map page 143).



Looking south-south-east towards the lower northern section of Site 10. The taller light green canopies dominating the shrub community are those of the Rare species *Acacia subtilinervis*.

Land Status: Private freehold.

Area: 5 ha.

Population: 150 mature plants. Seedlings rare.

Habitat

Soil: Shallow humus-rich black loam.

Substrate: Rhyolite, extensively exposed.

Topography: Rock outcrop along a ridge and adjacent steep slopes above a small creek in hilly terrain.

Aspect: Northerly to westerly.

Vegetation: Shrub community dominated by *Acacia subtilinervis* and *Kunzea ambigua* with an open sub-shrub layer including *Platysace lanceolata*, *Lepidosperma urophorum*, *L. laterale*, *Dodonaea truncate* and *Lomandra confertifolia*. The site is surrounded by *Eucalyptus agglomerata* - *E. globoidea* - *E. muelleriana* - *Allocasuarina littoralis* open-forest.

Threat: See summary section.

Recommendations: This site has now been included on the Register of the National Estate. The site also supports a stand of a few hundred mature plants of the nationally Rare species *Acacia subtilinervis*. See also summary section.

Survey Dates: 14/7/86 and 21/9/87.

Voucher Specimen: J.D.B., D. Albrecht and M. Parris No. 1944.

Site 11 - Nullica State Forest Pseudanthus Site

Latitude and Longitude: 37° 02' 15", 149° 45' 00".

Altitude: 310-440 m.

Location: Rock outcrop near head of small tributary to Old Hut Creek, 13.5 km direct west of Eden. The nominated site is bounded by straight lines joining the Burragate 1:25,000 map sheet 8823-IV-N and the Eden 1:25,000 map sheet 8823-1-N grid reference points 446971-444975-444977-449974-449969-446971. (See map pages 146 and 148).

Land Status: Nullica State Forest.

Area: ca. 8 ha.

Population: 50 mature plants.

Habitat

Soil: Skeletal loam.

Substrate: Rhyolite, extensively exposed.

Topography: Outcropping rock on steep hillsides on both sides of and near the head of a small creek in hilly terrain.

Aspect: North-east and south-east.

Vegetation: Shrub community dominated by *Kunzea ambigua* but also including *Melaleuca armillaris*, *Callitris rhomboidea*, *Platysace lanceolata*, *Pultenaea retusa*, *Allocasuarina littoralis* and *Pseudanthus divaracatissimus*. The site is surrounded by *Eucalyptus sieberi* open-forest.

Threat: See summary section.

Recommendation: This site has been nominated for inclusion on the Register of the National Estate. The site also supports a relatively large population of 100 plants of the nationally Rare species *Pseudanthus divaracatissimus*.

Survey Date: 11/11/88.

Voucher Specimen: J.D.B., M. Parris and N. Fisher No. 2451.

Site 12 - North of Back Creek Pyrophyllite Mine

Latitude and Longitude: 36° 58' 48", 149° 46' 37".

Altitude: 380-420 m.

Location: Gully head immediately north of the Back Creek Pyrophyllite Mine, about 10 km direct south-west of Pambula. The site is centred on the Pambula 1:25,000 map sheet 8824-11-S grid reference point 47230370. (See map page 143).



Looking west from the Lochiel-Back Creek road to Site 12. *Phebalium ralstonii* grows in the shrub community on the rock outcrop at the head of the gully.

Land Status: Nullica State Forest.

Area ca. 1 ha.

Population: 60 mature plants.

Habitat

Soil: Shallow, humus-rich dark-brown loam.

Substrate: Porophyllite, extensively exposed.

Topography: Rock outcrop on steep hillside at head of gully in hilly terrain. The outcrop drops away to sheer cliffs along its eastern edge.

Aspect: East.

Vegetation: Margins of *Eucalyptus agglomerata* open-forest and a shrub community including *Kunzea ambigua*, *Hakea macraeana*, *Melaleuca armillaris*, *Acacia longifolia*, *Lasiopetalum ferrugineum* and *Helichrysum obcordatum*.

Threats: A potential threat would be a northward expansion of the phyrophillite mine immediately to the south. See also summary section.

Recommendations: See summary section.

Survey Date: 20/7/86.

Voucher Specimen: J.D.B. and D. Albrecht No. 1981.

Site 13 - Sugarloaf Mountain

(Information provided by M. Parris and N. Fisher)

Latitude and Longitude: 37° 02' 00", 149° 45' 00".

Altitude: 500-620 m.

Location: Summit and adjacent south-eastern upper slopes of Sugarloaf Mountain, about 13.5 km direct west of Eden. The site is centred on the Eden 1:25,000 map sheet 8823-1-N grid reference point 44659785. (See map pages 146 and 148).

Land Status: Nullica State Forest.

Area: ca. 4 ha.

Population: Count not made.

Habitat

Soil: Skeletal loam.

Substrate: Rhyolite, extensively exposed.

Topography: Rock outcrop on the summit and steep upper slopes of mountain in hilly terrain.

Aspect: South-east.

Vegetation: Shrub community including *Melaleuca armillaris*, *Platysace lanceolata*, *Notelaea venosa*, *Leptospermum scoparium*, *L. attenuatum*, *Boronia muelleri*, *Leucopogon microphyllus*, *Epacris impressa*, *Xanthorrhoea australis*, *Pultenaea retusa*, *Crocea exalata* and *Hibbertia monogyna*.

Threat: See summary section.

Recommendations: See summary section.

Survey Date: 4/9/88.

Voucher Specimen: M. Parris and N. Fisher No. 9526.

Additional Sites

The following sites supporting *P. ralstonii* were surveyed independently by D. Albrecht (pers. comm. and unpublished report) and were thus not re-surveyed by J.D.B. The best four of these sites (as indicated below) were nominated independently by D. Albrecht (pers. comm.) for inclusion on the Register of the National Estate and are now included on the Register.

Albrechts Rock Outcrop Number	Grid Reference for Centrepont of Site	Nominated for Register of National Estate
1	Pambula Sheet 8824-11-S: 489977	Yes
3	Pambula Sheet 8824-11-S: 464046	No
4	Pambula Sheet 8824-11-S: 46350340	No
5	Eden Sheet 8823-1-N: 47309930	Yes
6	Eden Sheet 8823-1-N: 46759957	No
7	Eden Sheet 8823-1-N: 47359915	Yes
8	Eden Sheet 8823-1-N: 46759825	Yes

Pambula 1:25,000
map sheet 8824-11-S

Phebalium ralstonii
Nullica State Forest
Shrub Community -
West Site (Site 8)

Nullica State Forest Shrub
Community Sites.

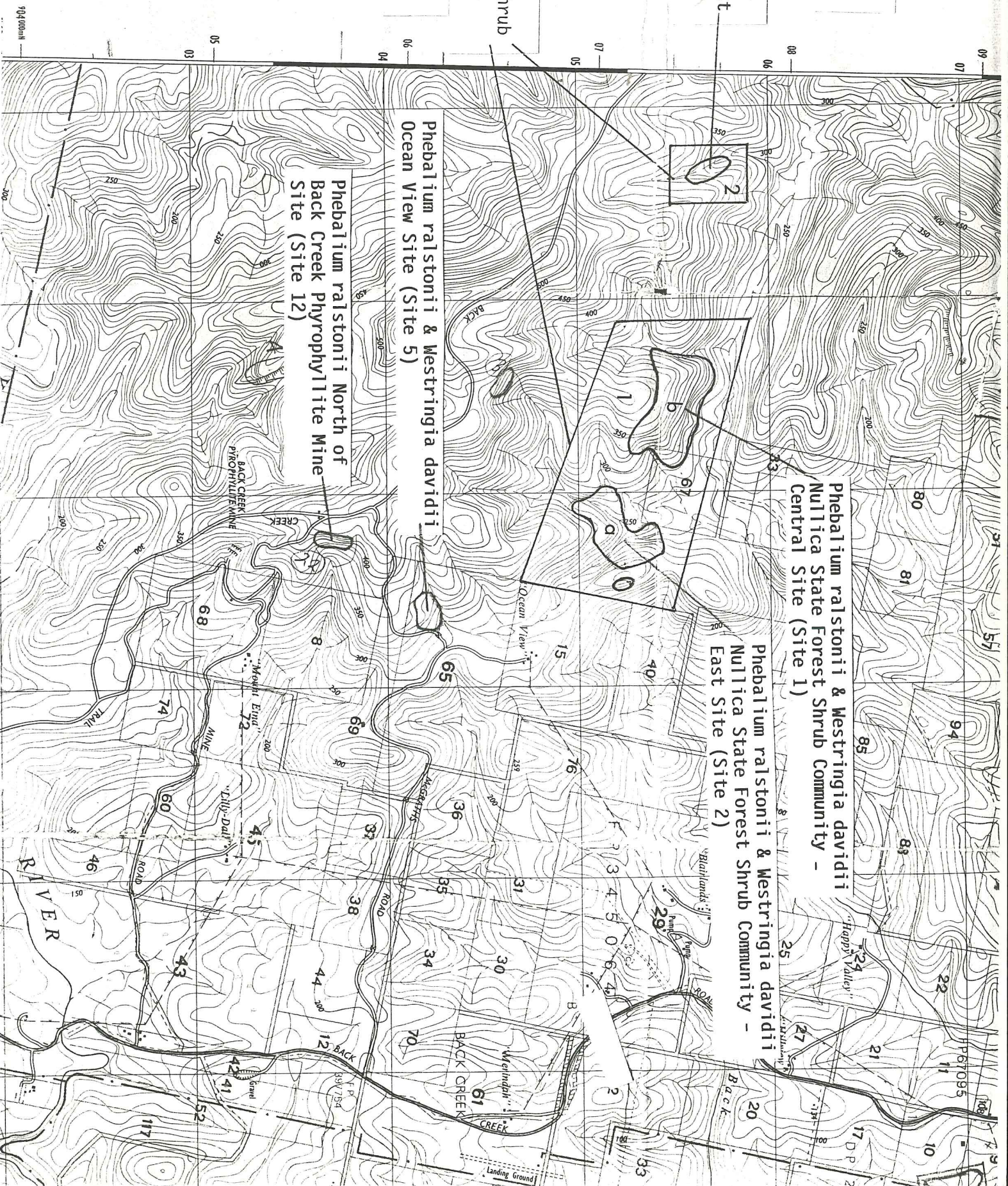
 = areas of shrub
community

Phebalium ralstonii & Westringia davidii
Nullica State Forest Shrub Community -
Central Site (Site 1)

Phebalium ralstonii & Westringia davidii
Nullica State Forest Shrub Community -
East Site (Site 2)

Phebalium ralstonii & Westringia davidii
Ocean View Site (Site 5)

Phebalium ralstonii North of
Back Creek Phytophylite Mine
Site (Site 12)



WYNDHAM 11km

100

str

| fr | |

11



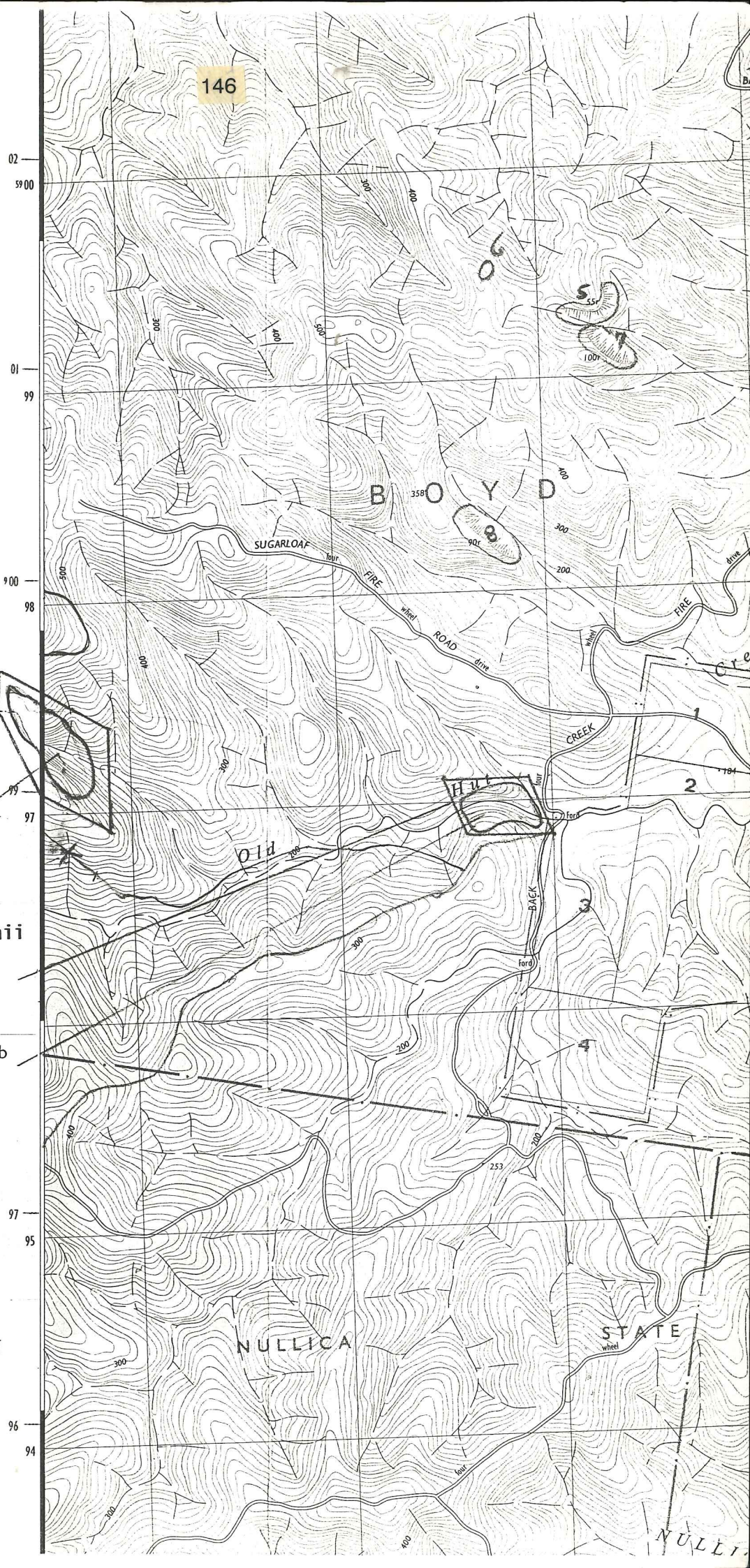
146

Phebalium ralstonii
Nullica State Forest
Pseudanthus Site
(Site 11)

Phebalium ralstonii
Old Hut Creek
Phebalium Site 2
(Site 7)

O = area of shrub
community.

Eden 1:25000
map sheet 8823-1-N





Zieria sp.7(sp."0")
Lochiel Site
(Site 1)

Pambula 1:25,000
map sheet 8824-11-S

0 = are occupied by
Zieria sp. nov.

Extent of shrub community

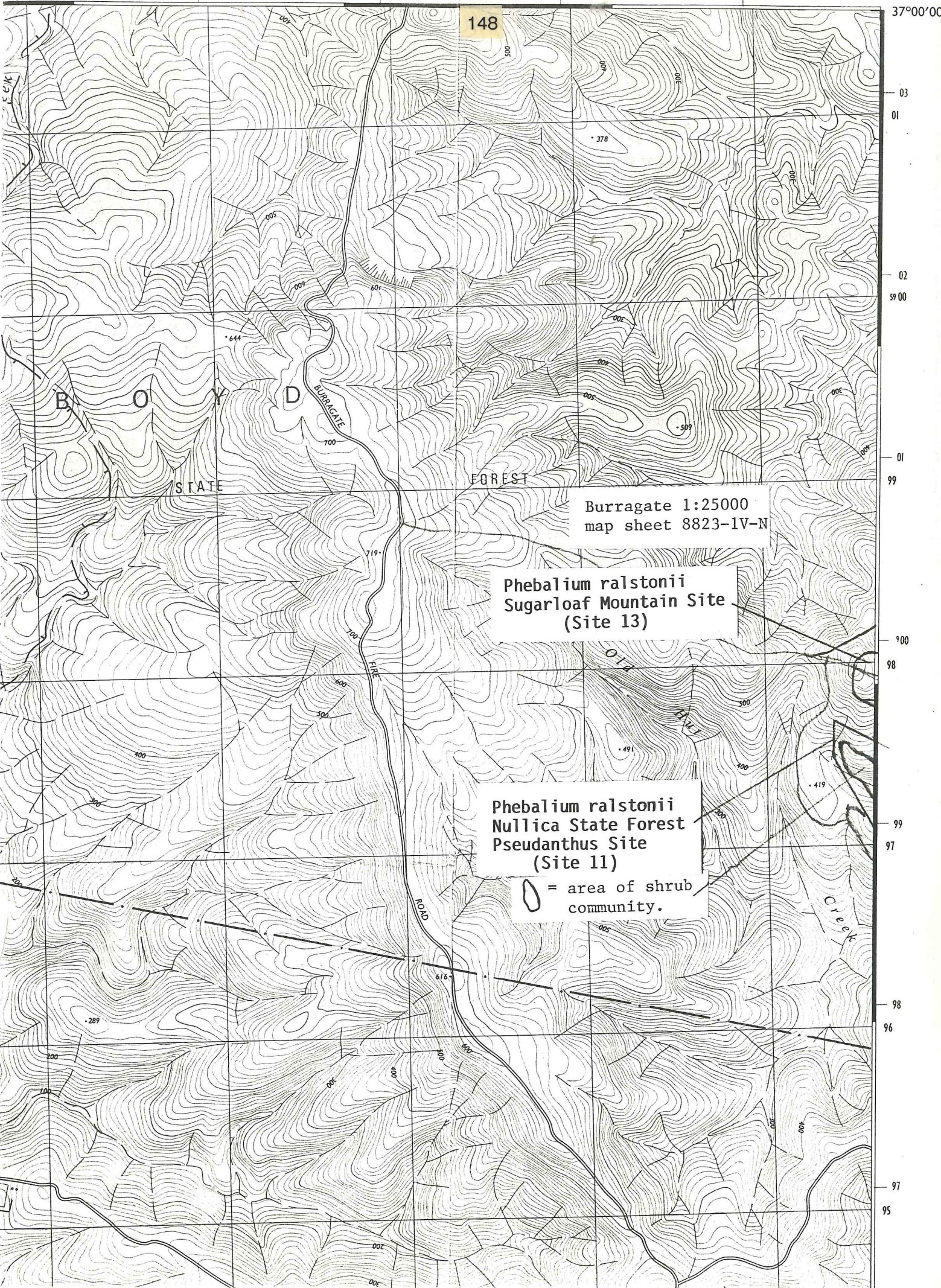
Phebalium ralstonii
Nethercote Falls Site
(Site 9)

NETHERCOTE 3.9km

NETHERCOTE 2.7km

50'

Kilometres 1 0.75 0.5 0.25 0



148

Burragate 1:25000
map sheet 8823-1V-N

Phebalium ralstonii
Sugarloaf Mountain Site
(Site 13)

Phebalium ralstonii
Nullica State Forest
Pseudanthus Site
(Site 11)

○ = area of shrub
community.