



# *Persoonia nutans* R. Br.

## Nodding Geebung

The following information is provided to assist authors of Species Impact Statements, development and activity proponents, and determining and consent authorities, who are required to prepare or review assessments of likely impacts on threatened species pursuant to the provisions of the *Environmental Planning and Assessment Act* 1979. These guidelines should be read in conjunction with the NPWS *Information Circular No. 2: Threatened Species Assessment under the EP&A Act: The '8 Part Test' of Significance* (November 1996) and the accompanying 'Threatened Species Information' profile.

### Survey

*Persoonia nutans* is most easily detected when in flower. Peak flowering is from December to January, with sporadic flowering all year round. Targeted survey should therefore be carried out over the summer months.

*Persoonia nutans* is an obligate seed regenerator and in the event of a fire all existing plants are killed and regeneration is dependent upon recruitment from a soil stored seed bank. Consequently, *P. nutans* populations are likely to be dynamic throughout the landscape, and fluctuations in space and time of above ground individuals will be a natural occurrence (DEC 2004). Therefore if survey occurs at a recently burnt (<3 years), or long unburnt site, then *P. nutans* may be present only in a soil stored seed bank or as young seedlings and may go undetected. In addition, given that the species appears to often occur as scattered individuals at low densities (NSW NPWS 1996), the species may be missed unless the subject of sufficient targeted survey.

Consequently, consent and determining authorities should assume, particularly in the north of the species range, that all potential habitat for the species supports the species, irrespective of whether or not

the species is detected during targeted survey. [Note: This recommendation (that all potential habitat should be assumed to support the species) does not automatically trigger significance (under the 8-part test) within potential habitat. Species presence is only one of a number of considerations when determining significance of impact.]

Reference should be made to DEC (2004) for additional detail on the potential habitat for *P. nutans*. Figures 1 and 2 identify potential habitat for *P. nutans* (based on soil and vegetation type) in the north and south of the species range respectively. Briefly, the species is confined to aeolian and alluvial sediments and is found primarily on the Agnes Banks and Berkshire Park soil landscapes. The species has been recorded from a range of vegetation communities including Agnes Banks Woodland, Castlereagh Scribbly Gum Woodland, and to a lesser extent Cooks River Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Shale Sandstone Transition Forest (DEC 2004).

Surveys should aim to determine presence of potential habitat, species presence, number of individuals, and area of suitable habitat.

### Life cycle of the species

Proposals which are likely to impact on the life cycle of the species, such that a local population is put at risk of extinction would include proposals that:

- result in total destruction of habitat;
- result in a partial destruction or modification of habitat (including changes to hydrology and nutrification of the soil substrate) which may result in changes to vegetation community structure;
- result in increased fragmentation of *P. nutans* habitat;
- result in a requirement for frequent (<10 year) hazard reduction activities (fire or slashing), preventing

- establishment of a soil stored seed bank;
- increase vehicular, bike, pedestrian, or other, access to habitat; or
  - increase rubbish dumping and associated weed invasion or arson (for example, through adjacent residential development).

### Threatening processes

Five key threatening processes currently listed under the *TSC Act 1995* (as of April 2004) are likely to, or potentially, threaten *P. nutans*.

- ‘*Clearing of native vegetation*’, has reduced and fragmented the habitat of *P. nutans*.
- ‘*High frequency fire resulting in the disruption of life cycle process in plants and animals and loss of vegetation structure and composition*’, is highly likely to threaten the persistence of *P. nutans* populations.
- ‘*Competition from feral honeybees *Apis mellifera L.**’ may also threaten *P. nutans* given that feral honeybees may reduce seed set in species of *Persoonia* due to inefficient transfer of pollen (Bernhardt and Weston 1996).
- ‘*Infection of native plants by *Phytophthora cinnamomi**’ and ‘*Anthropogenic climate change*’ may also affect *P. nutans*.

Additional details of the threats to *P. nutans* can be found in DEC 2004. In addition to the above listed KTPs, *P. nutans* is also threatened by habitat degradation due to disturbance associated with unrestricted access to *P. nutans* habitat.

### Viable local population

Very little information is available as to the viability of known populations of *P. nutans*. In the absence of such information, DEC considers that all populations should be considered viable.

It appears the species is capable of persisting at very small population sizes. Based on available information, 84% of all populations support less than 50

individuals, with only two populations supporting >500 plants (Table 1).

Table 1: Size class distribution for the 25 known extant populations of *Persoonia nutans*

Size class <sup>#</sup>	Number of populations*	% of total no. of popns
≤ 10	16	64
11 ≤ 50	5	20
51 ≤ 200	1	4
201 ≤ 500	1	4
≥501	2	8

<sup>#</sup>number of mature individuals

\*using lowest (pessimistic) estimate of population size

### A significant area of habitat

The estimated area of potential habitat for *P. nutans* (i.e. suitable vegetation community type and condition and suitable soil type) is currently 5300 ha in the north of the species range and 573 ha in the south of the species range (Figures 1 and 2). These values considerably overestimate the area occupied by *P. nutans* given that the species will not occupy all these areas at a particular point in time and some of this potential habitat may not be suitable habitat (e.g. may be subject to high fire frequency).

Given the relatively small and fragmented amount of habitat remaining in the south of the species distribution (Figure 2), any area of known habitat in the south should be considered as a significant area of habitat.

In the north of the species range, where *P. nutans* does not typically appear in discrete populations, but rather, occurs as scattered individuals throughout suitable habitat, it is more difficult to quantify what is a significant area of habitat.

Each case should be assessed individually, and the following factors will need to be considered when determining whether a site supports a significant area of *P. nutans* habitat:

- the area and condition of habitat on the site;
- the area, condition and security, of other, nearby, habitat;
- connectivity with other areas of habitat;
- the impact of the loss of that habitat on potential seed dispersal among *P.*

*nutans* populations, in particular among the four conservation reserves (Agnes Banks Nature Reserve (NR), Castlereagh NR, Windsor Downs NR, and the Regional Parklands within the east of the ADI site, St Marys).

### **Isolation/fragmentation**

Habitat fragmentation and isolation is a particularly strong threat to the persistence of *P. nutans*. Habitat fragmentation can potentially reduce the viability of remnant populations of *P. nutans* because the species is dependent upon recolonisation via seed dispersal in the event of local extinction due to frequent fire. Habitat fragmentation will reduce the chances of, or even prevent, recolonisation following local extinction.

As outlined in DEC (2004) such local extinctions are likely to occur, particularly within the north of the species range, given the high fire frequencies within the area. Indeed, given recent fire frequencies within Castlereagh Nature Reserve and Windsor Downs Nature Reserve, it is possible that *P. nutans* is now locally extinct within these reserves (DEC 2004).

In order to ensure the long-term viability of *P. nutans*, it is important that any further loss of the species' habitat does not increase fragmentation of existing habitat and in particular does not further decrease connectivity between the four conservation reserves (and any future conservation reserves) within the north of the species range.

### **Regional distribution of the habitat**

*Persoonia nutans* occurs within the Sydney Basin Bioregion and is restricted

### **For Further Information contact**

Threatened Species Unit, Metropolitan Branch, NSW DEC, PO Box 1967, Hurstville NSW 2220. Phone 02 9585 6678. [www.nationalparks.nsw.gov.au](http://www.nationalparks.nsw.gov.au)

### **References**

- Auld, T.D., Bradstock, R.A. & Keith, D.A. (1993) Fire as a Threat to Populations of Rare Plants. NSW National Parks and Wildlife Service, report to ANCA Endangered Species Program.
- Bernhardt, P & Weston, P. H. (1996) The Pollination Ecology of Persoonia in Eastern Australia. *Telopea* 6(4): 775-804.
- DEC (2004) Draft NSW and National Recovery Plan for *Persoonia nutans*. Department of Environment and Conservation, Hurstville NSW.

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to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. The species has a disjunct distribution, with the majority of populations (& 99% of known individuals) occurring in the north of the species range in the Agnes Banks, Londonderry, Castlereagh, Berkshire Park and Windsor Downs areas.

### **Limit of known distribution**

The current known distribution of *P. nutans* extends from Richmond in the north to Macquarie Fields in the south. The eastern most population occurs at Villawood and the western most at Grose Wold and Agnes Banks.

### **Adequacy of representation in conservation reserves or other similar protected areas**

*Persoonia nutans* is inadequately represented in conservation reserves, particularly within the south of the species range. Only 17.8% of potential habitat (see Figures 1 & 2) and only seven of the 25 known populations, occur within conservation reserves. The conservation reserves that support *P. nutans* occur within the north of the species range and include Agnes Banks Nature Reserve (NR), Windsor Downs NR, Castlereagh NR and the Regional Parklands within the ADI site (Figure 1). None of the southern populations occur within a formal conservation reserve, although, one of the southern populations (C1) is relatively protected within Simmos Beach Recreation Reserve (managed by Campbelltown City Council).

### **Critical habitat**

Critical habitat has not been declared for *Persoonia nutans*.

Keith, D. A. & Bradstock, R. A. (1994) Fire and Competition in Australian Heath: a conceptual model and field investigations. *J. Vegetation Science.* 5:347-54.

NSW NPWS (1996) Conservation Research Statement and Species Recovery Plan: *Persoonia nutans*. Report by NSW NPWS, Hurstville, prepared for the Australian Nature Conservation Agency, Endangered species project 308.

NSW NPWS (1999) Potential Habitat Mapping For Seven Endangered Species in the Georges River Catchment. Unpublished report by NSW National Parks and Wildlife Service, Hurstville.

NSW NPWS (2002) Native vegetation maps of the Cumberland Plain, western Sydney., NSW NSW National Parks and Wildlife Service, Hurstville NSW.

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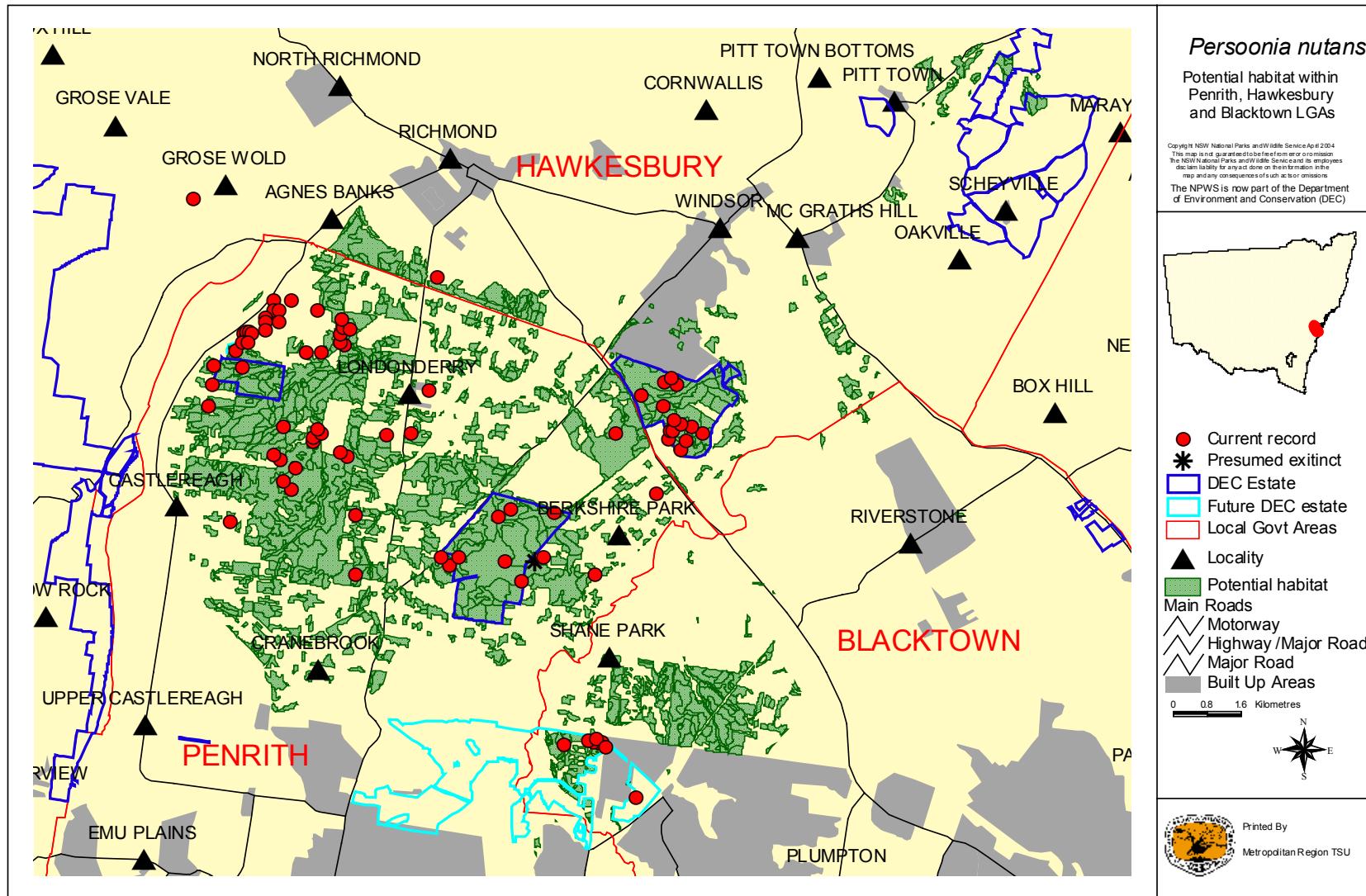


Figure 1. Potential habitat for *Persoonia nutans* within the north of the species distribution. The identified potential habitat represents those areas that possess suitable soil type (Agnes Banks or Berkshire Park soil formations) and also support suitable vegetation (see Table 4) as identified in NSW NPWS 2002a).

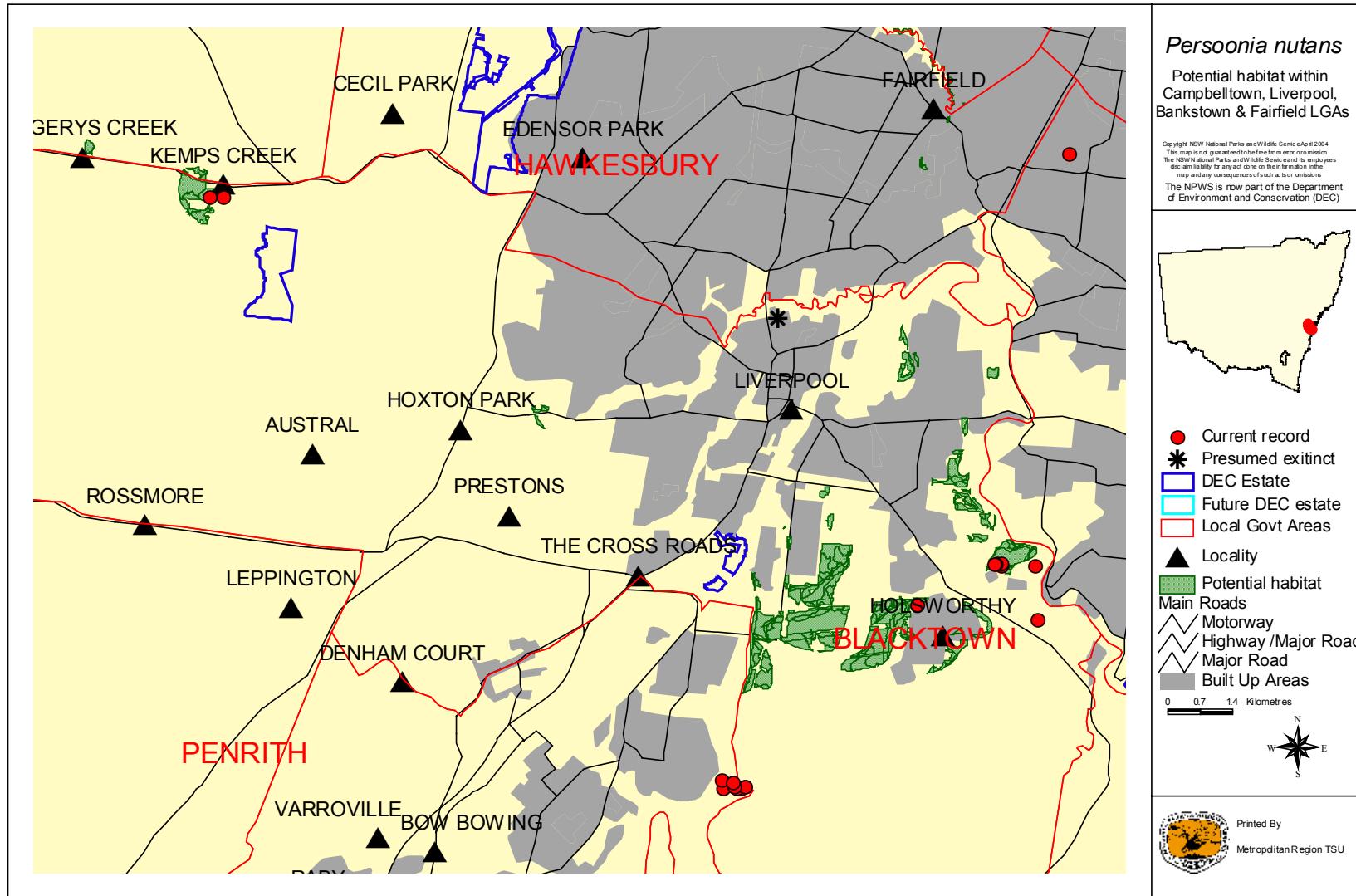


Figure 2. Potential habitat for *Persoonia nutans* within the south of the species distribution. The identified potential habitat represents those areas that possess suitable soil type (Agnes Banks or Berkshire Park soil formations) and also support suitable vegetation (see Table 4) as identified in NSW NPWS 2002.