



Prostanthera junonis

B.J. Conn

Common name(s): Somersby Mintbush

Prostanthera junonis has been previously known as *Prostanthera* sp "8" and *Prostanthera* sp "Somersby". The species name "*junonis*" was published by Conn (1997).

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 with the accompanying "Threatened Species Information" sheet.

Survey

P. junonis is an inconspicuous plant when not flowering and is very difficult to detect and identify vegetatively. An initial assessment of habitat suitability of the particular site should be made based on the information presented in the Recovery Plan. If suitable habitat is or likely to be present, a targeted survey for the plant should be conducted. Targeted survey for *P. junonis* should be conducted over several days (2-3) spread evenly over the plant's main flowering period (October-mid December). Surveys outside of this period may detect occasional flowers, however should not be relied upon as a confident assessment of the plant's presence/absence and/or population size.

P. junonis flowers are similar in appearance to those of the more common species *Hemigenia purpurea* and the two species are frequently confused. Care should be taken to distinguish *H. purpurea* individuals from possible *P. junonis* individuals by examining the calyx, leaf shape, and leaf arrangement. The Recovery Plan for *P. junonis* explains the differences between the two species.

If the survey objective is to determine presence/absence, areas of potential habitat should be sampled using both a "random meander" method (Cropper 1993) and linear transects by a person(s) experienced in the identification of this and similar species. Meanders and transects should occur within both open and closed habitats, and dense thickets of vegetation (eg long unburnt patches of *Banksia ericifolia*) should not be excluded. Any report prepared should map the location(s) of the meanders and transects. The representative coverage of transects and meanders will be dependent on the size of the site, however, parallel transects spaced at 20m apart are generally recommended.

If a known population is being surveyed, reference should be made to the Recovery Plan, and the recovery plan coordinator should be contacted. Depending on the survey's objective, repeated seasonal surveys may be undertaken in May, August, November and January in order to ensure that seasonal variation in flowering phenology of the local population is sampled. Results from

each season's survey should be presented separately and an estimate of the total size of the local population made and compared with any previous studies.

The Recovery Plan describes criteria for determining the constitution of a 'local population' and the definition of a 'subpopulation'. Descriptions of *P. junonis* occurrences should be consistent with these definitions. The assessment of significance in relation to a particular development should attempt to determine the extent of the 'local population' by conducting a search of comparable habitat within a 1km radius of the occurrence of the species on the development site. Any report prepared should map the location(s) of these searches and any constraints in undertaking this requirement (eg. refused access to private land).

If a new population is discovered, the surveyor should take a GPS reading of the location, make an accurate population count, map the location of the plants in a site sketch, and complete and lodge an Atlas of NSW Wildlife Flora Record Card with the recovery plan coordinator. More detailed mapping of the location of the population at a site may be required, depending on the nature and scale of the development. If the size of a population is estimated using statistical extrapolation, the method used to derive the population estimate should be fully detailed.

Life cycle of the species

The biology of *P. junonis* is described in the Recovery Plan and summarised in the species profile. The lifecycle of *P. junonis* is likely to be disrupted should any of the following occur:

Habitat loss - Development in or adjacent to *P. junonis* habitat should seek to avoid direct and indirect (eg shading, erosion) impacts on the species which may result in the destruction of individuals.

Consideration should be given to siting development envelopes in areas where *P. junonis* individuals do not or are unlikely to occur, or occur in relatively low numbers for the population. Depending on the size of the site and nature of development, a buffer zone of between 20-50m is generally recommended to protect individuals at a site from habitat degradation, and allow the population areas of habitat in which to expand. The nature and size of buffer zones will depend on a range of factors, including the nature of the proposed development, the topography of the site and the position of *P. junonis*, and other measures proposed for controlling run-off, access, and exotic species plantings.

The significance of a particular action which physically destroys *P. junonis* plants and/or known habitat will require (i) an analysis of the proportion of the particular population/sub-population that is proposed to be destroyed; (ii) an understanding of the size and extent of the 'local population' (iii) whether the removal of those plants potentially compromises the long term viability of the remaining population/ sub-population (eg. opportunities for external recruitment, fragmentation, cumulative impact on the population/ sub-population); and (iv) a discussion of how the seedbank will or may be affected. That is, whether the seedbank will be permanently or temporarily destroyed.

Fire - NPWS (2000) suggests that *P. junonis* may be killed by fire, however, the exact fire response of *P. junonis* is unknown. Development that is proposed in areas of *P. junonis* habitat should consider the ability of the site to support an appropriate fire regime in any areas of remaining native vegetation. Fire management guidelines for *P. junonis* are included in the Recovery Plan for *P. junonis*.

Fuel reduction zones associated with a particular development proposal should be in addition to rather than being incorporated into any proposed buffer zones to protect *P. junonis* from habitat degradation.

Seedbank disturbance - There have been no studies which document the fecundity (quantity of seed produced) of *P. junonis*. Soil erosion and siltation as a consequence of adjacent development are two specific processes that are likely to disrupt the lifecycle of *P. junonis* through disturbance to the seedbank by increased runoff (Payne 1997). Other forms of disturbance which remove and/or frequently disturb the soil (eg. track construction, vegetation clearance) may also negatively impact on the species' seedbank.

Fragmentation - There is insufficient information on the breeding system of *P. junonis* to understand in detail the consequences of fragmentation within and among the populations of *P. junonis*. Fragmentation can lead to the break-down of essential ecological processes within ecosystems, with consequences for species such as reduced reproductive success and a subsequent decline in the rate of recruitment. Therefore, if there are components of *P. junonis* habitat which are critical to the species' lifecycle (eg. a pollen vector) then it will be important to ensure that these processes remain intact. In the absence of specific information, development in *P. junonis* habitat should seek to maintain the connectivity of proximate areas of native vegetation both within and between the populations.

Threatening processes

“High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition” is listed in the NSW *Threatened Species Conservation Act*

1995 as a key threatening process which may affect *P. junonis*.

Other identified threats to *P. junonis* include habitat loss (in particular development and vegetation clearance), habitat modification as a consequence of development adjacent to bushland (in particular, unrestricted vehicle access, increased shading from buildings, intensified runoff, soil erosion and sedimentation, and increased weed invasion), and fire control activities (in particular, frequent hazard reduction activities, track construction). The exclusion of fire from isolated occurrences of *P. junonis* may present a threat in the long term as many of the component species of *P. junonis* habitat require fire for regeneration. In addition, areas of *E. haemastoma/B. ericifolia* woodland that have been left unburnt for several decades appear to support only small populations of *P. junonis*, which is likely to be shaded-out by the dense *Banksia* thickets.

Viable local population of the species

In the absence of more comprehensive studies on the species' breeding system, the minimum size of a viable local population of *P. junonis* is unknown. Tierney (1994) suggests that fruit set in *P. junonis* can result from both outcrossing and self reproductive strategies, however these results need to be replicated and augmented in additional populations. *P. junonis* is also stoloniferous which means that individual plants in a population may be clonal, effectively reducing the apparent size of any given population (Tierney 1994, Conn 1997).

It should be assumed that a particular population is viable regardless of its size until further assessment indicates otherwise.

On the basis of current information, it is anticipated that any development which results in the complete

destruction of a viable local population, or causes a viable local population to become non-viable, will have a significant impact on the species.

Significant area of habitat

The current distribution shows that *P. junonis* has an extremely narrow extent of occurrence (c.4700ha) and a total area of occupancy of just 41.75ha. Given this narrow distribution, all currently known areas of habitat for the plant are considered significant.

Isolation/fragmentation

Nine discrete populations of *P. junonis* have been identified and described in the Recovery Plan for *P. junonis* (NPWS 2000). Several populations are isolated from continuous areas of native vegetation as a consequence of vegetation clearance for agricultural or other land uses on the Somersby Plateau. Where continuity of habitat exists between populations, this should be maintained and enhanced as far as possible to facilitate exchange of genetic material.

Within each 'local population', there may be several "sub-populations" (see NPWS 2000) between which there is suitable habitat to encourage expansion of and interchange between these components. Smaller, isolated sub-populations are likely to require intensive management as they are more vulnerable than sub-populations which occur in larger, continuous and connected vegetation remnants. Management of *P. junonis* should aim to maintain the continuity of habitat (ie. native vegetation) between sub-populations. In doing so, this will prevent the creation of new isolated populations and sub-populations which are at greater risk of local extinction.

Regional distribution of the habitat

P. junonis occurs on the Somersby Plateau, which in a broad sense consists of three elongated smaller plateaus divided by Mooney Mooney Creek, Popran Creek and their tributaries (Hawkins *et al* 1984). Significant areas of the Somersby Plateau have been cleared for agriculture and industry, however, there remains areas of native vegetation in NPWS protected areas, Crown Land, areas zoned for Scenic Protection/Water Supply, and remnant vegetation on private land. *P. junonis* is currently restricted to the eastern part of the Somersby Plateau, however there is suitable habitat in remaining areas of native vegetation across the whole of the plateau which have not been comprehensively surveyed. It should not be assumed that *P. junonis* is present in other areas of the Somersby Plateau until further survey has been completed.

Limit of known distribution

P. junonis occurs within a north-south range of approximately 19km on the Somersby Plateau in the Gosford and Wyong local government areas. Within this range, there are nine populations. The northern limit for the species is an outlier occurring at Barnes Road, Kulnurra. The remaining eight populations occur over a greatly reduced range of 10km, with the southern limit at Wiseman's Ferry Road, north-west of Kariong, western limit at Reservoir Road and eastern limit at Reeves Road, Somersby. It is likely that additional sub-populations will be identified within the current distributional limits on the Somersby plateau, however further survey is required to determine whether there are populations which occur outside of the current distribution.

Adequacy of representation in conservation reserves

There are two populations which occur in NPWS protected areas (Brisbane Water National Park), in the west of the species distribution. One population occurs in a Crown Reserve for Recreation and Preservation of Flora and Fauna in the south of the species distribution. Not strictly categorised as “conservation reserves”, two populations in the south and west of the species distribution respectively are on land that is zoned either Scenic Protection or Special Purposes - Water Supply, offering some degree of security. The four other populations (northern,

southern and eastern limits) occur on land that is zoned Industrial, Agricultural or Highway Protection.

While the largest population of the species occurs in Brisbane Water National Park, populations in conservation reserves or other similar protected areas are not representative of the species distribution as a whole. *P. junonis* is therefore not considered to be adequately represented in conservation reserves or other similar protected areas in the region

Critical habitat

Critical habitat has not been declared for *P. junonis*.

For further information contact

Threatened Species Unit, Central Directorate, NSW NPWS, PO Box 1967, Hurstville NSW 2220. Phone (02) 9585 6678 or visit our website www.npws.nsw.gov.au.

References

- Conn, B.J. (1997) Four rare and/or threatened new species of *Prostanthera* Section *Prostanthera* (Lamiaceae) from New South Wales. *Telopea* 7(3): 231-244
- Cropper, S.C. (1993) *Management of Endangered Plants*. CSIRO Australia, Melbourne.
- Hawkins, C.A., Haddad, N.I., Scott, L.A., Morrison, J.A., Catt, C.B.J. and Daines, D.G. (1984) *A study of regional lands on the Hunter Plateau in relation to regional planning*. Department of Agriculture, Sydney. Unpublished Report.
- NPWS (2000) Somersby Mintbush (*Prostanthera junonis*) Recovery Plan. NSW NPWS, Hurstville.
- Tierney, D.A. (1994) *The reproductive ecology and rarity of Prostanthera sp. Somersby*. Unpublished report, Diploma of Natural Resources, University of New England.

IMPORTANT DISCLAIMER

The NSW National Parks and Wildlife Service and the editor expressly disclaim all liability and responsibility to any person, whether a purchaser or reader of this document or not, in respect of anything done or omitted to be done by any person in reliance upon the contents of this document although every effort has been made to ensure that the information presented in this document is accurate and up to date.