National

Recovery Plan

Pultenaea sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland Endangered Ecological Community

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Disclaimer

This recovery plan sets out the actions necessary to stop the decline of, and support the recovery of, the listed threatened species or ecological community. The Australian Government is committed to acting in accordance with the plan and to implementing the plan as it applies to Commonwealth areas.

The plan has been developed with the involvement and cooperation of a broad range of stakeholders, but the making or adoption of this plan does not necessarily indicate the commitment of individual stakeholders to undertaking any specific actions. The attainment of objectives and the provision of funds may be subject to budgetary and other constraints affecting the parties involved. Proposed actions may be subject to modification over the life of the plan due to changes in knowledge.

Recovery Plan for *Pultenaea* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland Endangered Ecological Community

Foreword

This document constitutes the formal National and NSW State Recovery Plan for *Pultenaea* sp. Genowlan Point (Allen 29 Nov. 1997) and the State Recovery Plan for the Genowlan Point *Allocasuarina nana* Heathland Endangered Ecological Community. It considers the conservation requirements of the species and endangered ecological community across their known range. It identifies the future actions to be taken to ensure the long-term viability in nature of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland, and the parties who will carry out these actions.

Pultenaea sp. Genowlan Point is listed as endangered on Schedule 1 of the NSW *Threatened Species Conservation Act 1995* and critically endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. It is a small shrub in the family Fabaceae, and is endemic to the Greater Blue Mountains area of NSW. It is known from only one small site on the tip of Genowlan Point on Genowlan Mountain in the Capertee Valley. The total population comprises approximately 13 individuals.

Genowlan Point *Allocasuarina nana* Heathland is listed as an endangered ecological community (EEC) on Part 3 of Schedule 1 of the NSW *Threatened Species Conservation Act 1995*. It is not listed under the *Environment Protection and Biodiversity Conservation Act 1999*. It is a community of dwarf heathland occupying about 10 hectares on Genowlan Mountain. It is in close proximity to *P.* sp. Genowlan Point, and shares many of the same threats to its survival. As such, this recovery plan will address the conservation requirements of the species and the EEC.

The overall objective of this recovery plan is to ensure the long-term survival of *P.* sp. Genowlan Point and the Genowlan Point *Allocasuarina nana* Heathland in the wild by promoting *in situ* conservation. Specific recovery objectives include:

- to conserve the species and EEC by upgrading the protection afforded to sites where they are known to occur;
- to identify and manage threats to the persistence of the species and EEC;
- to raise awareness of the species and EEC and involve the community, agency staff and local landowners in the recovery program; and
- to conduct research that will assist future management of this species and EEC.

It is intended that this recovery plan will be implemented over a five-year period. The actions in this plan will be primarily undertaken by Office of Environment and Heritage.

Acknowledgments

Many people have contributed to the development of this recovery plan. The following persons and their respective agencies/organisations are thanked for their assistance in its preparation:

- Jan Allen (OEH – Botanic Gardens Trust) and Haydn Washington for discovering *P.* sp. Genowlan Point, and both for maintaining enthusiasm for its protection;
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- Deborah Stevenson, Lyn Raffan, Nick Corkish, Martin Bremner, Ann Goeth and other staff of the Metropolitan Biodiversity Conservation Section, OEH;
- Jon Guyver (Department of Lands NSW);
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1 Introduction

This plan combines the recovery plans for *Pultenaea* sp. Genowlan Point and the Genowlan Point *Allocasuarina nana* Heathland Endangered Ecological Community (EEC). *P.* sp. Genowlan Point is a small shrub belonging to the Fabaceae family. The Genowlan Point *Allocasuarina nana* Heathland EEC is a dwarf, closed heath dominated by *Allocasuarina nana* and is structurally distinct from other heaths found in the greater Blue Mountains. They are located in close proximity and are only found on the northern tip of Genowlan Mountain, an isolated mesa in the Capertee Valley, Greater Blue Mountains. *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland are subject to the same threats to their survival in the wild and therefore have the same or very similar conservation requirements. A number of threatening processes operate at Genowlan Mountain, the key ones being grazing by feral goats and disturbance associated with visitation by off-road vehicles along a fire trail.

This document constitutes the formal National and State Recovery Plan for *P.* sp. Genowlan Point and State Recovery Plan for the Genowlan Point *Allocasuarina nana* Heathland. As such, the document considers their requirements across the known range. The recovery plan describes their conservation status and summarises current biological and ecological knowledge of the species and community, documents past and current management actions undertaken, and details a program for the next five years to promote their recovery. The attainment of the objectives of this recovery plan are subject to budgetary and other constraints affecting the parties involved.

This plan has been prepared by the NSW Office of Environment and Heritage (OEH). The information in this recovery plan was accurate to the best available knowledge on the date it was approved.

2 Legislative Context

2.1 Legal status

Pultenaea sp. Genowlan Point (NSW 417813) is listed as an endangered species on Schedule 1 of the NSW *Threatened Species Conservation Act 1995* (TSC Act) and as a critically endangered species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Genowlan Point *Allocasuarina nana* Heathland is listed as an endangered ecological community on Part 3 of Schedule 1 of the TSC Act. It is not currently listed under the EPBC Act.

2.2 Responsibilities under the *Threatened Species Conservation Act 1995*

2.2.1 Recovery plan preparation, exhibition and implementation

The TSC Act and the NSW *Threatened Species Conservation Amendment Act 2002* (hereafter referred to jointly as the TSC Act) provide a legislative framework to protect and encourage the recovery of endangered and vulnerable species, endangered populations and endangered ecological communities in NSW. Under this legislation, the Chief Exectuive of OEH must prepare a Threatened Species Priorities Action Statement, which outlines a strategy for the recovery of each listed threatened species in NSW. The strategy for any particular species may include the requirement for a recovery plan to be prepared, however this is no longer a mandatory requirement for every threatened species. The TSC Act includes specific requirements for both the matters to be addressed by recovery plans and the process for preparing recovery plans. This recovery plan satisfies these provisions.

The TSC Act requires that a government agency must not undertake actions inconsistent with a recovery plan. The actions identified in this plan for the recovery of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland in NSW are primarily the responsibility of OEH. Other public authorities may have statutory responsibilities relevant to the conservation and protection of *Pultenaea* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland. Public authorities with core legislative responsibilities relevant to the protection and management of the species and community and their habitat are listed in Appendix 3.

The TSC Act requires that public authorities take any appropriate measures available to implement the actions in a recovery plan for which they have agreed to be responsible. The affected public authorities are also required by the Act to report on the measures that they have

taken to implement those actions. In addition, the Act specifies that public authorities must not make decisions that are inconsistent with the provisions of the plan.

Public authorities that have agreed to undertake the actions that are contained within this plan, or have statutory responsibilities in relation to the species and EEC are:

- the NSW Office of Environment and Heritage Botanic Gardens Trust;
- the NSW Department of Lands;
- the NSW Rural Fire Service.

Consequently, the actions outlined for each of these public authorities must be implemented as described in Section 9 of this plan.

Additional public authorities may have responsibilities if the species is located in other areas in the future.

2.2.2 Consultation with Aboriginal people

Local Aboriginal Land Councils, Elders and other groups representing Aboriginal people in the Genowlan Mountain area have been identified and consulted during the preparation of the recovery plan. OEH will consider the role and interests of these Aboriginal communities in the implementation of the actions identified in this plan.

2.2.3 Critical habitat

The TSC Act makes provision for the identification and declaration of critical habitat for species, populations and ecological communities listed as endangered.

To date, critical habitat has not been declared for *P.* sp. Genowlan Point or Genowlan Point *Allocasuarina nana* Heathland under the TSC Act.

2.2.4 Key threatening processes

A key threatening process is a process listed under the TSC Act or the EPBC Act that threatens, or has the capability to threaten, the survival or evolutionary development of species, populations, or endangered ecological communities. Five key threatening processes under the TSC Act are relevant to *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland:

- Competition and habitat degradation by feral goats;
- Infection of native plants by *Phytophthora cinnamomi*;
- Anthropogenic climate change;
- Ecological consequences of high frequency fires; and
- Alteration of habitat following subsidence due to longwall mining.

2.2.5 Licensing

Any activity not requiring development consent under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) or the NSW *Native Vegetation Act 2003* (NV Act) that is likely to impact on *P.* sp. Genowlan Point or Genowlan Point *Allocasuarina nana* Heathland, or damage their habitat, requires a licence from OEH under the provisions of the TSC Act or NSW *National Parks and Wildlife Act 1974* (NPW Act) as a defence against prosecution. If the impact is likely to be significant, a Species Impact Statement is required.

2.2.6 Other conservation measures

The TSC Act includes provision for other measures that may be taken to conserve *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland and their habitat, including the making of a Stop Work Order or Joint Management Agreement.

2.3 *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legislative framework for the protection of threatened species across Australia.

As *P.* sp. Genowlan Point is listed nationally under the EPBC Act, any person proposing to undertake actions likely to have a significant impact on this species should refer the action to the relevant Commonwealth Minister for consideration. The Minister will then decide whether the action requires EPBC Act approval. This is in addition to any state or local government approval required.

Administrative guidelines are available from the Australian Government Department of Sustainability, Environment, Water, Population and Communities to assist proponents in determining whether their action is likely to have a significant impact. These can be found at: http://www.environment.gov.au/epbc/publications/nes-guidelines.html

Other legislation relevant for the conservation and recovery of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland is listed in Appendix 4.

3 Description and Taxonomy

3.1 Taxonomy

The genus *Pultenaea* belongs to the Faboideae subfamily of the family Fabaceae. Commonly known as Bush Peas, it is an endemic southern Australian genus, which has recently been revised (de Kok and West 2002; 2003; 2004). *Pultenaea* sp. Genowlan Point (Figure 1) is an undescribed taxon and the subject of ongoing research. The revised edition of the Flora of NSW Volume 2 (Harden 2002) includes *P.* sp. Genowlan Point under the description of the *Pultenaea glabra* Benth. species complex as a geographic variant. However, it differs from this species in a number of morphological characters and both the NSW and Commonwealth Scientific Committees accept Weston's contention (Harden 2002) that it warrants recognition as a separate species.

P. sp. Genowlan Point can be distinguished from *P. glabra* on the basis of the following characteristics:

- its shorter height;
- the nature of the inflorescence, which terminates in a leafy shoot as opposed to a bud;
- the size of the leaves and bracteoles subtending the flowers, which are noticeably smaller than other foliage in *P. glabra*;
- the deep red keel, which is yellow to orange in *P. glabra*; and
- the surface of the calyx, which is hairy rather than smooth.

3.2 Description

P. sp. Genowlan Point is a small erect shrub less than 1 m in height. It has smooth stems and linear to narrow obovate leaves, 1–2 cm long and 1–2 mm wide, which are arranged alternately along the stem. Stipules are present at the leaf bases. The leaves have tapered, downward-pointing tips and margins that roll upwards. Leaf surfaces are generally the same colour, but the lower surface may appear darker. Inflorescences are terminal or subterminal, dense, leafy and auxotelic (growing into a leafy shoot). The flower subtends the leaves and their bracteoles are indistinguishable from other leaves and bracteoles. The yellow pea flowers have a distinct deep red keel petal and are around 10 mm long with short pedicels (0.5–1 mm) (Figure 1). The pedicels bear bracteoles attached to the base of a toothed calyx tube, which is covered with appressed hairs. The fruit is a turgid pod about 5 mm long.

The Genowlan Point *Allocasuarina nana* Heathland Endangered Ecological Community is a dense, low heathland found only on the northern tip of the Genowlan Mountain mesa. The primary species for this community is the dwarf she-oak *Allocasuarina nana*, with scattered taller eucalypts and cypress pine (DEC 2005).

Figure 1: *Pultenaea.* sp. Genowlan Point

This heath is distinct from other heaths in the Greater Blue Mountains by the presence of *Xanthorrhoea johnsonii*, *Micromyrtus sessilis*, *Pseudanthus divaricatissimus*, *Callitris muelleri* and *Isopogon prostratus* (NSW Scientific Committee 1998).

The characteristic assemblage of vascular plant species in the community as defined by the NSW Scientific Committee (1998) is: *Acacia ulicifolia*, *Allocasuarina nana*, *Astroloma humifusum*, *Austrodanthonia tenuior*, *Austrostipa pubescens*, *Banksia conferta* subsp. *penicillata*, *Boronia microphylla*, *Boronia rigens*, *Bossiaea*

heterophylla, Brachyloma daphnoides, Callitris muelleri, Caustis flexuosa, Cryptandra amara, Dampiera purpurea, Dampiera stricta, Eucalyptus sparsifolia, Eucalyptus stricta, Goodenia bellidifolia, Harmogia densifolia, Hibbertia serpyllifolia, Isopogon prostratus, Isopogon anethifolius, Lepidosperma viscidum, Leptospermum arachnoides, Leptospermum parvifolium, Leptospermum trinervium, Leucopogon muticus, Leucochrysum albicans, Lomandra glauca, Logania albiflora, Micromyrtus sessilis, Ochrosperma oligomerum, Patersonia sericea, Persoonia myrtilloides, Phyllota squarrosa, Pimelea linifolia subsp. linifolia, Platysace lanceolata, Pseudanthus divaricatissimus, Pultenaea procumbens, Rhytidosporum procumbens, Xanthorrhoea johnsonii, and *Zieria laevigata*.

4 Distribution and Habitat

In this recovery plan, discrete groups of *P.* sp. Genowlan Point plants that are not separated from other discrete groups by more than one kilometre are considered to be a single population. This is consistent with the definition given by Keith *et al.* (1997). Following this definition, only one population of *P.* sp. Genowlan Point can be identified. Likewise, the Genowlan Mountain mesa is the only known location of the Genowlan Point *Allocasuarina nana* Heathland EEC.

4.1 Distribution

P. sp. Genowlan Point is endemic to the Greater Blue Mountains area of NSW, where it had been recorded from a single population on the north-west facing tip of Genowlan Point on the Genowlan Mountain mesa in the Capertee Valley (Figure 2). Surveys along north- and west-facing ridges and cliff lines on the divide between the Capertee and Wolgan Valleys have failed to find other populations of the species (Washington pers. comm.). The current extent of occurrence is estimated to be only 250 m^2.

4.2 Land tenure

The population of *Pultenaea* sp. Genowlan Point and the Genowlan Point *Allocasuarina nana* Heathland occur entirely on Crown land. Genowlan Mountain is in the City of Lithgow Local Government Area and within the area of responsibility of the Hawkesbury/Nepean Catchment Management Authority. The land is classified as Vacant Crown Land and is managed by the NSW Department of Lands.

4.3 Landform, geology and soil

Pultenaea sp. Genowlan Point is mainly found on steep, well-drained stony soil immediately adjacent to a cliff edge on the Genowlan Mountain mesa. It is less common on flatter areas (Washington 2002). Genowlan Point *Allocasuarina nana* Heathland occurs further back from the point on sandy soils. Genowlan Mountain consists of Narrabeen-Triassic sandstone capping with softer underlying beds of sandy soils. These sandy soils have a low water holding capacity (Commission of Inquiry 1993). Genowlan Mountain has a large concentration of pagodas (beehive-shaped rock formations) set back slightly from the cliffs. Beneath these rock formations are large caves with rock overhangs and moist gullies.

4.4 Climate and altitude

Climate statistics are available for the Capertee Valley but are variable and highly influenced by topography. Statistics for the nearby town of Glen Davis are in Table 1 (Bureau of Meteorology 2005).

Station	Mean temps (°C)	Mean annual rainfall (mm)
Glen Davis	16.5 – 30.3 (Jan) 2.0 – 15.4 (June)	634

Table 1 Glen Davis climate statistics

As Genowlan Mountain is approximately 1,000 metres above sea level, and higher in elevation than Glen Davis, the average annual rainfall is greater, at 840 mm (DEC 2005). Whilst rainfall is reasonably well distributed through the year, there is a peak in summer to early autumn and the lowest rainfall months are in winter and spring.

4.5 Associated vegetation

The vegetation on Mt Airly and Genowlan Mountain comprises several vegetation communities ranging from open forest to rocky heath (DEC 2005). *Pultenaea* sp. Genowlan Point is situated on the very edge of Genowlan Point, and is associated with an unclassified sparse heath assemblage. This assemblage has species that overlap with the vegetation classifications of Pagoda Rock Sparse Shrubland and the Sandstone Plateaux Tea Tree – Dwarf Sheoak – Banksia Rocky Heath as described in

DEC (2005). These vegetation classifications are part of Blue Mountains Heath as described by Trindall *et al.* (2004, cited in DEC 2005) and the State vegetation formation of Sydney Montane Heath, as described by Keith (2004).

The plants associated with *P.* sp. Genowlan Point on the tip of Genowlan Point include: *Acacia obtusifolia, Astrotricha obovata, Callitris rhomboidea, Calytrix tetragona, Comesperma ericium, Entolasia stricta, Eucalyptus sparsifolia, Hibbertia obtusifolia, Isopogon dawsonii, Lepidosperma urophorum, Leptospermum trinervium, L. polygalifolium, Leucopogon muticus, Monotoca scoparia, Persoonia longifolia, Philotheca myoporoides, Platysace lanceolata, Pseudanthus divaricatissimus, Xanthorrhoea johnsonii, Xanthosia pilosa,* and *Ziera laevigata* (Washington 2002).

Genowlan Point *Allocasuarina nana* Heathland (Figure 3) is part of the Blue Mountains Heath Community as described by Tindall *et al.* (2004, cited in DEC 2005) and falls within the State classification of Sydney Montane Heath (Keith 2004).

Figure 3. Genowlan Point *Allocasuarina nana* Heathland

4.5 Habitat critical to survival

Habitat critical to survival of *Pultenaea* sp. Genowlan Point is defined as the area of occupancy of the known population; the area of occupancy of any further populations discovered; and potential habitat identified during this recovery plan. This area cannot be mapped until the population is surveyed, and the potential habitat identified.

5 Biology and Ecology

As a newly discovered species in 1997, very little is known of the biology and ecology of *P.* sp. Genowlan Point and the following is largely based on observations in the field or on *P. glabra* – a closely related species.

5.1 Life history

P. glabra is sensitive to fire, with adults killed in fire and recruitment occurring from a persistent soil stored seed bank (NPWS 2002). *P. glabra* flowers from August to November, and fruits mature from November to January.

The flowers of *P.* sp. Genowlan Point are likely to be insect pollinated (Fairley and Moore 2000), perhaps by bees, and under good conditions should flower and set seed every year. Seed germination will not occur in the absence of fire as the hard-coated seed requires heat to break seed dormancy. The seeds are dispersed by ants (NPWS 2002).

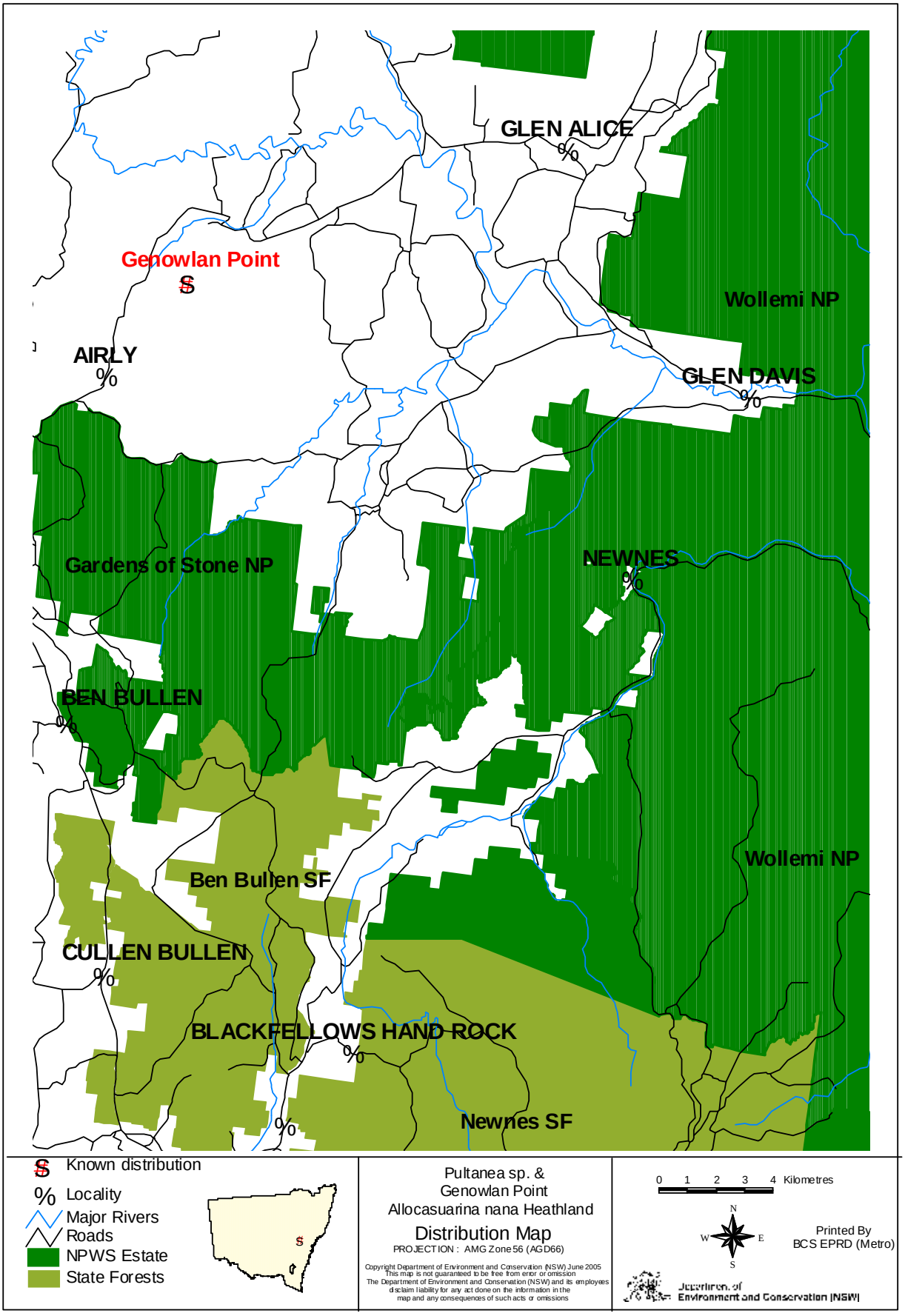

Figure 2. The known distribution of *Pultenaea* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* heathland.

Although *P*. sp. Genowlan Point flowered in 2004, no seed was set, and there was no sign of flowers in 2005 and 2006 (Washington 2005; J. Allen, OEH, pers. comm.). This may indicate that the plants are under stress from drought and grazing, rather than having a sporadic flowering pattern.

It is unknown at what stage *P*. sp. Genowlan Point reaches maturity. The longevity of the species is also unknown.

5.2 Status and population structure

The *P*. sp. Genowlan Point population was initially thought to comprise 6 plants. In 1999, a more thorough count of the population revealed that there were 62 plants. Annual systematic surveys of the *P*. sp. Genowlan Point population since 2002 (Washington 2002; 2003; 2004 and 2005; J. Allen, OEH, pers. comm.) have recorded an alarming decline (see Table 2).

Year	No of plants
2002	84
2003	66
2004	57
2005	39
2006	13
2007	7
2008	19
2009	No count
2010	15

Table 2. Counts of *Pultenaea*. sp. Genowlan Point individuals between 2002 and 2010. No counts were conducted in 2009.

Data for the heights of the plants encountered exists for the years 2002-2006 (Table 3). This shows that between 2002 and 2005, there has been some limited recruitment into the population with between 2 to 12% of the population in any one year comprising seedlings (≤ 50 mm in height). 2006 was marked by an absence of any obvious recruitment in 2006. Iformal observations for the years 2007-2010 also strongly indicate a lack of recruitment (J. Allan, personal communication).

Height class	No of Individuals				
(mm)	2002	2003	2004	2005	2006
≤ 50	9	5	3	3	
51-100	7	5	4	0	
101-200	18	15	17	8	
201-500	34	27	20	11	3
501-750	12	10	10	3	7
751-1000	4	4	3	6	3
Total	**84**	**66**	**57**	**39**	**13**

Table 3. Counts of *Pultenaea*. sp. Genowlan Point individuals of different heights, between 2002 and 2006.

6 Ability of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland to Recover

The actions in this recovery plan are focused at protecting and maintaining the known population and discovering and protecting any new populations. Natural regeneration and dispersal will be encouraged through habitat management, including ensuring protection from predation and site degradation.

The consequence of not implementing this recovery program is to maintain the high risk of extinction in the wild over the next 10 to 20 years for both the species and EEC. Without the co-operation of land managers and planners *P*. sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland are likely to continue to be adversely impacted by threats as described in Section 7.1.

6.1 Rarity

P. sp. Genowlan Point is considered to be an endangered species due to its extremely low numbers existing in only one population. It is unknown if the number of populations is likely to have been decreased through loss or modification of habitat within other areas where it may have occurred.

Genowlan Point *Allocasuarina nana* Heathland has been classified as an endangered ecological community because of its limited size and threats to its survival.

6.2 Viability

The viability of a species can be broadly defined as the ability of that species to be self-replacing

in nature. There is currently little information as to the viability of the *P.* sp. Genowlan Point population. In the absence of a detailed assessment demonstrating otherwise (and including consideration of the potential *P.* sp. Genowlan Point soil seedbank), it should be assumed that the *P.* sp. Genowlan Point population will only remain viable with active management.

6.3 Likelihood of recovery

"Recovery" is defined in the TSC Act as "to promote the species to a position of viability in nature", by ensuring its continued and long-term survival in the wild. The performance goal of this plan is to at least maintain, and if possible improve, the current conservation status of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland and prevent their decline. The actions in this recovery plan are focused on protecting and maintaining the known population and community *in situ*. The likelihood of achieving this recovery objective is high provided these actions are implemented, reviewed and amended as required.

7 Management Considerations

The management and conservation of *Pultenaea* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland requires the development of a recovery program that considers:

- the factors that threaten the survival of the species;
- limits to current knowledge;
- the social, economic and organisational parameters that may affect the success or otherwise of the program;
- any special knowledge or interests that Aboriginal people may have in the species and EEC, or the measures in the plan; and
- the economic factors that may influence the plan's implementation.

This section discusses these issues as well as community awareness of the species and the consideration of a translocation and *ex situ* conservation program.

7.1 Current threats

Drought

It is difficult to quantify the impact that drought has had on this species and community. Individual mortality or decline in health may be the result of drought in combination with other factors (such as trampling or grazing). Spring and summer over the years 2002–2004 were hot and dry, with decent rainfall only falling in 2005 (Washington 2005). The lack of rain would have stressed the plants, which is known to increase the rate of insect herbivory (Koricheva *et al.* 1998). Heavy borer infestations and beetle attack were noted on *P.* sp. Genowlan Point in 2004, but had largely disappeared in 2005.

Feral Goats

Goats seem to be the main threat to *P.* sp Genowlan Point and remain a threat to Genowlan Point *Allocasuarina nana* Heathland. There have been regular sightings of goats in the vicinity of the *Pultenaea*, especially in 2004 and 2005 (Washington 2005). Evidence of goats on Genowlan Point are tracks and droppings, especially around the water sources (seepages and tyre ruts in the road that have filled with water) (Washington 2005). Prior to 2002, grazing was noted on approximately one third of the *P.* sp. Genowlan Point population. A goat cull was attempted by NPWS in conjunction with the then DLWC on 23 April 2001 but was unsuccessful as no goats were sighted. The plants seemed relatively intact in 2002, but in 2003, 41% of plants had suffered from the effects of grazing. This had worsened in 2004 and 2005, with clear evidence of goats in and around the area (Washington 2005).

Inappropriate fire regimes

Little is known about how *P.* sp Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland, including the soil seed bank, are affected by fire frequency, fire intensity or seasonality. Plants that germinate in response to an initial disturbance, such as fire, need to develop to a stage where they are capable of producing seed and/or coppice. It can thus be reasonably assumed that local extinctions of the species occur where fires are too frequent or other disturbances destroy the above-ground parts of plants and prevent seed production.

Burning trials are therefore required before the response to fire is fully understood. These trials will not be undertaken until more information is known about the ecology and structure of the known population and community. In the interim, a cautious approach to fire management

should be followed and fire excluded from the known sites until sufficient baseline information has been gathered.

P. sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland are listed on the *Threatened Species Hazard Reduction List of the NSW Rural Fire Service's Bush Fire Environmental Assessment Code* (TSHRL). Currently the TSHRL requires that no fires occur in the vicinity of *P*. sp. Genowlan Point. For the Genowlan Point *Allocasuarina nana* Heathland, the TSHRL recommends that fire should not occur more frequently than every 20 years.

Roads and trampling

The road through the EEC to Genowlan Point was accepted to be the major threat to both *P*. sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland by the NSW Scientific Committee in their final determinations. There has been evidence of four wheel drive vehicles running over *P*. sp Genowlan Point, and heavy trampling associated with foot traffic. The plants occur on the tip of Genowlan Point where most people will visit for the view, and are thus in danger of trampling. The installation of a gate across the road has stopped four wheel drive vehicles accessing the points and causing damage to the plants, but the risk of foot traffic, although diminished, remains. In 2005, orange flagging tape was tied to some of the smaller, more vulnerable plants to try and make them more conspicuous in an effort to alleviate this (Washington 2005). A follow up survey in 2006 revealed that the impact from four wheel drive vehicles and foot traffic was minimal, and that the plants had mainly suffered from the drought as well as grazing.

The gate, however, has not stopped four wheel drive vehicles from driving through the Genowlan Point *Allocasuarina nana* Heathland. The gate was installed beyond the EEC to restrict access to Genowlan Point and therefore *P*. sp. Genowlan Point. Although a substantial reduction has been noted in the effects of trampling and driving over the *Pultenaea* (Washington 2004), the EEC is still threatened by vehicles that may be forced onto the vegetation community to let other vehicles pass. Also, the threat of the vehicles driving over, or parking on, the EEC remains.

Heavy vehicle access through the EEC could also lead to the introduction of the soil fungus *Phytophthora cinnamomi* and weed species, as well as providing access to the EEC and threatened species by walkers and campers who may trample the plants. Roads also act as access for feral animals, such as goats, foxes, cats and dogs. These pests could significantly impact on the flora and fauna of the community. Roads also act as drainage lines, and ruts in the road can fill with water after rain, creating an artificial water source that will provide water for native and introduced species.

7.2 Potential threats

Mining

A potential threat to *P*. sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland is habitat alteration following subsidence due to longwall mining. In particular, such habitat alteration could arise from mining activities in the Airly Coal Project, an underground mine owned by Centennial Coal Company, who took over the lease from Novacoal in 1997. A 21-year mining lease was granted on 14 April 1993 to mine seam coal that runs under both Mt Airly and Mt Genowlan. There were, however, provisions in the consent to ensure that the pagoda rock formations on Mt Airly and Genowlan Mountain would be afforded protection. Environmental Protection Zones were specified as part of the consent, and these cover the periphery of Mount Airly and Genowlan Mountain (Commission of Inquiry 1993). Monitoring will be carried out to ensure that the clifflines and rock formations are not damaged by the mining activities. Since many of the *P*. sp. Genowlan Point plants occur on or near the cliffline, these are at the greatest danger of disappearing with rock falls caused by vibrations from mining activities, or by cracking and destabilisation caused by subsidence.

Alteration of habitat following subsidence due to longwall mining is listed as a key threatening process (KTP) in NSW under the TSC Act. Longwall mining is an underground coal mining technique in which a portion of a coal seam is removed. This can cause the land above the mined-out coal seam to destabilise and collapse, leading to habitat alterations. The NSW Scientific Committee has identified longwall mining as a KTP for the Genowlan Point *Allocasuarina nana* Heathland, but not for *P*. sp. Genowlan Point. Future monitoring for such potential subsidence of land and habitat

alteration is of particular importance for both the heathland and *P.* sp. Genowlan Point.

Infection by *Phytophthora cinnamomi*

"Infection of native plants by *Phytophthora cinnamomi"* is listed as a KTP for many threatened species, populations and ecological communities under both the TSC Act and EPBC Act. For further information about this KTP see the NSW Scientific Committee Determination Advice 02/27 (NSW Scientific Committee 2002) and the Commonwealth *Threat abatement plan for dieback caused by the root-rot fungus* (Environment Australia 2001).

The distribution of *Phytophthora cinnamomi* is in the area of occurrence of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland. Both *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland have been listed by the Scientific Committee as a species and ecological community that are under threat from *Phytophthora cinnamomi*. Although there is no published evidence regarding the susceptibility of *P.* sp. Genowlan Point or Genowlan Point *Allocasuarina nana* Heathland to *Phytophthora cinnamomi* dieback, it can be considered a potential threat due to the growing potential for spread of the pathogen because of increasing human activities in the area.

Climate change

"Human-induced climate change" is listed as a KTP under both the TSC Act and EPBC Act. For further information about this KTP see the NSW Scientific Committee Determination Advice 00/24 (NSW Scientific Committee 2000) and the relevant Commonwealth listing advice (TSSC 2001).There is evidence that modification of the environment by humans may result in future climate change, which includes changes to the frequency of occurrence of extreme events such as droughts and fires. In the case of *P.* sp. Genowlan Point, an increase in temperature or periods of drought may already be adversely impacting upon the population. The conditions in the 2003 and 2004 seasons were particularly hot and dry and seven of the nine seedlings growing on the western edge of the point that were subjected to hot and dry winds consequently died (Washington 2004). Seedlings may be more vulnerable to changing conditions than adult plants.

7.3 Limits to current knowledge

As outlined in Section 5, there is little understanding of the reproductive biology and population ecology of *Pultenaea* sp. Genowlan Point. Greater understanding of a number of aspects will assist in the effective management of this endangered species, particularly if we are to conserve the species in the long term. In addition, increased understanding will assist consent and determining authorities in making informed judgements as to its conservation requirements.

Systematic survey targeted in areas of likely habitat (windy, dry exposed sites) of the species is required to obtain further information on its distribution and conservation status and better understanding of its habitat characteristics.

There is also limited knowledge of Genowlan Point *Allocasuarina nana* Heathland. Since its listing as an endangered ecological community, there have been no known studies of this community.

More research into *P.* sp. Genowlan Point and the Genowlan Point *Allocasuarina nana* Heathland needs to be done.

7.4 Translocation

Translocation is often raised as a possible method of conserving threatened flora. The process, benefits and costs of translocation have been reviewed by Vallee *et al.* (2004).

Translocation requires long-term commitment, is expensive and often prone to failure. Many attempts at translocating threatened flora have failed for reasons that include the unsuitability of recipient sites, poor information in relation to the species biology, ecology, and genetic variation, and a lack of ongoing commitment to site maintenance and monitoring. Given the high cost and risk associated with the technique, translocation should only be considered as a last resort when all other management options are deemed inappropriate or have failed.

Translocation is not currently considered necessary for the survival of *Pultenaea* sp. Genowlan Point as the *in situ* conservation measures proposed in this recovery plan are expected to meet the conservation needs of the species.

7.5 Community awareness

An increased awareness of *P.* sp. Genowlan Point and the Genowlan Point *Allocasuarina nana* Heathland is required to ensure that the species is appropriately considered in statutory environmental planning and impact assessment processes, and to facilitate the implementation of threat abatement works. The target groups for awareness raising initiatives are:

- public authorities;
- mine operators;
- affected private landowners;
- four wheel drive enthusiasts; and
- the general community.

Public authorities with consent, determining or environmental planning responsibilities under the EP&A Act require an understanding of the species, particularly its known location, habitat requirements and sensitivity to impacts. Initiatives to assist these authorities in meeting their statutory obligations regarding the conservation of *P.* sp. Genowlan Point habitat include:

- preparation and distribution of a species profile and environmental impact assessment guidelines (Appendix 1); and
- inclusion of the site location on the OEH Atlas of NSW Wildlife.

The general community is an important target audience for awareness-raising initiatives. These initiatives aim to enhance the social benefits of the recovery program and include:

- preparation of press releases to highlight the implementation of key recovery actions; and
- involvement of community members in the implementation of recovery actions.

The community awareness program should highlight that Genowlan Point is the only known location of this species and EEC, and therefore the significance of the site.

8 Previous Recovery Actions

8.1 Preparation and implementation of a recovery plan

There have been no previous recovery plans written for *Pultenaea* sp. Genowlan Point or the Genowlan Point *Allocasuarina nana* Heathland Endangered Ecological Community. However a number of actions have been undertaken prior to and during the preparation of this plan.

8.2 Restricting vehicle access to Genowlan Point

In response to concerns about four wheel drive vehicles running over *P.* sp. Genowlan Point, the Department of Lands erected a gate to restrict vehicular access to Genowlan Point. The position of the gate, however, does not restrict vehicular access to the EEC, as this would have limited the ability of vehicles to change direction on a loop track. The gate was installed in October 2003 and since then it has been noted that there has been a substantial decrease in the level of damage to the plants that was previously caused by vehicular activity.

8.3 Survey, research and monitoring

Genowlan Point has been surveyed annually between 2002 and 2010, except for 2009. Individuals were identified, ranging from 20 mm seedlings to 1 m adults. Plants, where possible, were marked with gold crimp tags. Where the plants were too small for the use of these tags, smaller silver tags were used and attached by wire.

Other areas in the vicinity of the *P.* sp. Genowlan Point population were surveyed for additional populations in 2008. None has been found to date (Washington pers. comm.).

8.4 Threatened species data collation and audit

OEH has conducted a literature review, and an audit of Royal Botanic Gardens (RBG), NSW Herbarium, NSW NPWS Atlas of Wildlife, Forests NSW and other records prior to the preparation of this recovery plan.

8.5 Profile and environmental impact assessment guidelines

A species profile and environmental impact assessment guidelines have been prepared for *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland (Appendix 1). The aim of these documents is to assist the assessment of potential impacts on the species and community during the preparation and review of assessments under parts 4 and 5 of the EP&A Act and part 6 of the TSC Act.

8.6 Establishment of a recovery team

A recovery team has not been established for *Pultenaea* sp. Genowlan Point or Genowlan Point *Allocasuarina nana* Heathland. However, consultation has occurred with members of a recovery plan reference group, comprising representatives of relevant public authorities that will be responsible for the planning and/or management of this species and scientists who have special knowledge of the species.

8.7 Community awareness initiatives

A sign has been erected by the Department of Lands on Genowlan Mountain that informs people of the presence of the endangered species. This includes the reasons for the gate, and the significance of *P.* sp. Genowlan Point. The DoL has agreed to liaise with the adjoining landholder and four wheel drive clubs regarding the reason for the installation of the gate.

8.8 *In situ* and *ex situ* protection

Currently, there are no formal conservation measures in place for *Pultenaea* sp. Genowlan Point or Genowlan Point *Allocasuarina nana* Heathland.

The RBG, Mount Tomah, took cuttings of *P.* sp. Genowlan Point in May 1998 in an attempt to establish an *ex situ* population. The cultivation plan for *P.* sp. Genowlan Point is the same for *P. parviflora*. Twelve cuttings were treated with Clonex Purple propagating gel and placed in a pot. Three of these cuttings survived and were transplanted into a garden bed. Of these three, only one survived for some years, but had died by 2009.

8.9 Plans of Management

There are no plans of management for Genowlan Mountain.

9 Proposed Recovery Objectives, Actions and Performance Criteria

The overall objective of this recovery plan is to prevent the extinction of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland through maintaining self-sustaining populations in the wild in the long term.

Specific objectives of the recovery plan for the species are listed below. For each of these objectives a number of recovery actions have been developed, each with a performance criterion.

Objective 1: Co-ordinate the recovery of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland

A co-ordinated approach is essential to oversee and assist in the implementation of the actions outlined in this recovery plan in a timely, cost-effective and efficient manner. Some of the tasks undertaken during the coordination of this plan (e.g. liaison with other public authorities) will overlap with other identified actions.

Species with similar management requirements may benefit from the *P.* sp. Genowlan Point recovery program. Such species may be subject to a recovery plan in the future and by integrating recovery actions, limited resources can provide better conservation benefits for a range of threatened species.

Action 1.1: OEH will co-ordinate the implementation of the actions outlined in this recovery plan and will integrate recovery actions for the *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland recovery plan with those of other threatened species, populations and communities, where appropriate.

Performance Criterion 1.1: *Recovery actions coordinated for the life of the plan and, where practicable, recovery actions are integrated with those of other threatened species, endangered populations or endangered ecological communities.*

Objective 2: Conduct surveys and monitoring

Action 2.1: OEH will identify potential habitat.

Performance Criterion 2.1*: Potential habitat for* P. *sp. Genowlan Point and Genowlan Point* Allocasuarina nana *Heathland is identified.*

Action 2.2: OEH will co-ordinate surveys within identified potential habitat to determine whether additional populations of *P.* sp. Genowlan Point and the Genowlan Point *Allocasuarina nana* Heathland community can be identified.

The currently known distribution of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland is very limited, the species and community are known from one

locality. However, it is possible that further populations may occur within the vicinity.

This survey effort will be carried out during the flowering season for *P.* sp. Genowlan Point (Sept–November) over a number of seasons to attempt to account for temporal changes in the distribution of the species. Any new population of *P.* sp. Genowlan Point and or discovery of Genowlan Point *Allocasuarina nana* Heathland will be confirmed by specimens collected and forwarded for identification to the Botanic Gardens Trust. Collection of specimens will be co-ordinated by OEH.

Performance Criterion 2.2: *Surveys of potential habitat are undertaken within three years .*

Action 2.3: OEH will census the known *P.* sp. Genowlan Point population and Genowlan Point *Allocasuarina nana* Heathland community site, then annually monitor these sites, and any additional populations/sites discovered. This will include at least an assessment of the health of *P.* sp. Genowlan Point plants and the size of all individuals present.

Performance Criterion 2.3: *A census of the species and of the ecological community are conducted in year 1 and monitoring conducted at least annually for the life of this recovery plan.*

Objective 3: Conserve *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland using land-use and conservation planning mechanisms

P. sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland occur on Vacant Crown Land that is not managed primarily for conservation purposes. These actions aim to increase the legislative protection afforded to these sites through a combination of the following mechanisms:

- conservation agreements and covenants under the NPW Act and *Conveyancing Act 1919*;
- environmental planning instruments under Part 3 of the EP&A Act and development standards;
- classification of land as community land under the LG Act and subsequent consideration of the species in plans of management for such land;
- environmental impact assessment under the EP&A Act; and
- consideration of a critical habitat declaration under the TSC Act.

Action 3.1: If *P.* sp. Genowlan Point is found on private property, OEH will promote the protection of the species through the implementation of appropriate protective measures.

This may involve zoning for environmental protection, or an appropriate notation on Lithgow Council's Section 149 Certificates for the parcel of land on which *P.* sp. Genowlan Point is known to occur. OEH will notify Council if the species is found on private property.

Performance Criterion 3.1*: Implementation of appropriate protective measures if* P. *sp. Genowlan Point is found on private land.*

Action 3.2: Lithgow Council will refer to this recovery plan and its objectives and any future advice from the OEH regarding the distribution, habitat, biology and ecology of, and threats to, the species or endangered ecological community when preparing or reviewing any relevant local environment plans (LEPs) and development control plans (DCPs).

Performance Criterion 3.2: *Each relevant LEP and DCP is prepared or reviewed in accordance with this recovery plan.*

Action 3.3: OEH will liaise with the DoL regarding reviews of the status of Crown land on which populations of *P.* sp. Genowlan Point and the EEC occur, with a view to reserving them primarily for environmental protection.

Such reviews should include land assessment in accordance with Part 3 of the *Crown Lands Act 1989* and consideration of the preparation of a plan of management for the reserve.

Performance Criterion 3.3: *The DoL has reviewed the current reservations of Crown lands supporting P.* sp. Genowlan Point *populations and the EEC, with a view to reserving it primarily for environmental protection, within 3 years of adoption of this recovery plan.*

Action 3.4: OEH will consider the need for declaration of critical habitat under the TSC Act

by the fifth year of implementation of this recovery plan.

Performance Criterion 3.4: *A submission regarding declaration of critical habitat under the TSC Act prepared by the fifth year of implementation of this recovery plan, if required.*

Objective 4: Promote research into the ecology and biology of *P.* sp. Genowlan Point and ecological processes of Genowlan Point *Allocasuarina nana* Heathland, in order to provide information to assist future management decisions

Very little is known about the genetic diversity, biology and ecology of *P.* sp. Genowlan Point, or the ecological processes driving Genowlan Point *Allocasuarina nana* Heathland. Therefore, a program of research to provide information for use in the management of the species and ecological community is appropriate.

Action 4.1: OEH will promote research into the biology and ecology of *P.* sp. Genowlan Point.

A program of biological and ecological investigation is required to enable informed management strategies to be formulated for the species. This program will be co-ordinated and facilitated by OEH. Research institutions (including the Botanic Gardens Trust within OEH and universities) will be encouraged to participate in research into the species consistent with the priorities outlined below.

Fecundity

Monitoring of fecundity will help managers understand the implications of fire regimes and other land management practices on the long-term viability of plants. How many plants set fruit and how much fruit is produced may be directly related to disturbance factors.

Population dynamics

Monitoring a tagged population will provide some insight into the population dynamics of *P.* sp. Genowlan Point. Data collected will assist in understanding the following aspects of the biology of *P.* sp. Genowlan Point:

- how frequently individual plants flower and produce fruit;
- whether recruitment occurs outside of times of disturbance; and
- the rate of seedling mortality.

Breeding System

Like all *Pultenaea*, *P.* sp. Genowlan Point is pollinated by insects (Fairley and Moore 2000), possibly bees. It is important to know the breeding system employed by a sexually reproducing species for two reasons: it may indicate any problems the population is facing if the pollinator is missing, and it will indicate what management options are appropriate (e.g. if a disturbance, for example fire, is required for the species to reproduce).

Response to fire

Fire is an important factor in the ecology of many plant communities and may be a factor that influences flowering and seed production. Research into appropriate fire regimes for both *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland is important for their long-term survival. As there is only one small population of *P.* sp. Genowlan Point and one currently known occurrence of Genowlan Point *Allocasuarina nana* Heathland, a cautious experimental approach to investigate fire response will be used. No trials into fire response will be undertaken until the known population and community are secure and sufficient knowledge about their structure and stability has been obtained. When the response to fire of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland is known and aspects of the biology of *P.* sp. Genowlan Point are better understood, decisions about fire management can be made.

Performance Criterion 4.1: *Increased knowledge of the biology and ecology of P. sp. Genowlan Point and Genowlan Point Allocasuarina nana Heathland is available for formulation of management strategies for the species within 5 years.*

Objective 5: Minimise impact of threats to *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland

Action 5.1: OEH will liaise with the DoL and Lithgow Council regarding the preparation and implementation of site-specific protection measures for the *P.* sp. Genowlan Point

population and Genowlan Point *Allocasuarina nana* Heathland community on Crown land in the first year of the recovery plan. These measures should include (but not be restricted to): erecting tree guards, considering fencing the site of *P.* sp. Genowlan Point (to reduce grazing by goats and trampling by people), monitoring for subsidence of land, control of feral goats, and possible re-alignment of the current track away from the EEC.

If *P.* sp. Genowlan Point or Genowlan Point *Allocasuarina nana* Heathland is located on other tenures, OEH will encourage landholders to prepare site management statements for those sites. These statements will detail the specific threat abatement measures required at those sites. Consideration will be given to whether conservation agreements are appropriate to freehold sites.

Planning and implementation of such measures should occur with reference to this recovery plan and any future advice provided by OEH regarding the biology and ecology of *P.* sp. Genowlan Point and the Genowlan Point *Allocasuarina nana* Heathland community and threats to the species and community. Site-specific information to be incorporated into these plans should be guided by the outline in Appendix ?2.

Performance Criterion 5.1*: Site management statements prepared and implementation started for the known sites within 1 year of the adoption of this recovery plan.*

Action 5.2: OEH and the NSW Rural Fire Service (RFS) will review the conditions for *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland in the *Threatened Species Hazard Reduction List of the Bush Fire Environmental Assessment Code*.

OEH and RFS will use available biological and ecological information, including any new locations, to reassess the immediate and cumulative impact of bush fire hazard reduction works on *P. sp. Genowlan Point* and Genowlan Point *Allocasuarina nana* Heathland, and to reassess the adequacy of the mitigative conditions in the Threatened Species Hazard Reduction List.

OEH and RFS will also use available biological and ecological information to reassess the impacts of wildfires on *P. sp. Genowlan Point* and Genowlan Point *Allocasuarina nana* Heathland, and, if appropriate, develop preferred mitigative measures to minimise the potential impact of wildfires and/or wildfire suppression operations.

If appropriate, measures for the protection of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland are to be included in relevant Bush Fire Risk Management Plans and Operation Maps (pursuant to section 52 of the RF Act).

Performance Criterion 5.2: *Bush Fire Risk Management Plans and Operations Maps include measures (as appropriate) for the protection of* P. *sp. Genowlan Point and Genowlan Point* Allocasuarina nana *Heathland and the mitigative conditions for the species and endangered ecological community on the Threatened Species Hazard Reduction List are reviewed by year 5 or as relevant information becomes available.*

Action 5.3: If the species or EEC is found on private property, OEH will encourage and assist land-holders to seek funding for, and carry out, appropriate threat abatement measures for *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland.

Performance Criterion 5.3**:** *Funding secured and threat abatement measures implemented for relevant sites in accordance with site management statements within 2 years of site discovery, subject to landholder approval.*

Objective 6: Provide public authorities and the community with information that assists in conserving *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland

The prompt and effective distribution of information on Genowlan Point *Allocasuarina nana* Heathland and *P.* sp. Genowlan Point and its habitat is important in raising the awareness of the species and EEC with public authorities and the community and ensuring that their conservation requirements are appropriately considered in land-use planning decisions.

Action 6.1: All relevant authorities will notify OEH of new sites and populations of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland located through both targeted survey (e.g. for environmental

assessment purposes) and other incidental sightings.

Performance Criterion 6.1: *New information gathered from relevant public authorities and groups sent to OEH.*

Action 6.2: If a new population of the species or site for the EEC is verified, OEH will ensure that all survey data are collated and sent to the Atlas of NSW Wildlife Coordinator for entry into the NSW Wildlife Atlas, and will ensure that any verified new records are entered with precise georeferences (better than or equal to 100 metres). All relevant data will then be made available to Lithgow Council and the DoL for use in environmental planning and assessment, and to the RFS for incorporation in the relevant bush fire datasets.

Performance Criterion 6.2: *Precise location records from the Atlas of NSW Wildlife for* P. *sp. Genowlan Point and Genowlan Point* Allocasuarina nana *Heathland are made available to relevant authorities within four months of verification.*

Action 6.3: OEH will update the species profile and environmental impact assessment guidelines for the species and community to incorporate information acquired during the implementation of this recovery plan. These guidelines and this recovery plan will be provided to Consent and Determining Authorities.

Performance Criterion 6.3: *Species profile and environmental impact assessment guidelines for the species and community updated within 5 years and made publicly available.*

Action 6.4: Public authorities will: inform the OEH of decisions that may affect Genowlan Point *Allocasuarina nana* Heathland or *P*. sp. Genowlan Point or its habitat; and provide to the OEH any relevant data.

Public authorities will inform OEH if planning or development decisions are made that may affect Genowlan Point *Allocasuarina nana* Heathland or *P*. sp. Genowlan Point or its habitat. This includes information on decisions that protect habitat, as well as those that lead to a reduction in habitat and/or individuals.

The RFS will implement this action, with respect to bush fire hazard reduction, by ensuring that there is adequate access by the OEH to temporal and spatial data from the Bushfire Risk Information Management System.

Performance Criterion 6.4: *OEH informed of all decisions that affect Genowlan Point* Allocasuarina nana *Heathland or* P. *sp. Genowlan Point or its habitat.*

Action 6.5: OEH and Lithgow Council will raise the general awareness of, and encourage community involvement in, the recovery program.

OEH will distribute information about the *P*. sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland recovery program to any affected land-holders, public authorities, community groups and interested individuals. This may include general media releases about the recovery program. The significance of Genowlan Point for the species and EEC will be highlighted.

Performance Criterion 6.5*: Media releases used to raise community awareness in relation to the recovery program, and encourage community involvement in the implementation of recovery actions as appropriate*.

Objective 7: *Ex situ* conservation of *P.* sp. Genowlan Point

P. sp. Genowlan Point is currently known from only one small population so an *ex situ* program was trialled to safeguard against possible catastrophe causing extinction of the extant population. Mount Tomah Botanic Gardens houses the species but there have been problems maintaining this *ex situ* collection, as drought has affected the plants, only one plant survived for several years, and had also died by 2010 (see Section 8.8).

Action 7.1: A suitable institution, such as the Australian National Botanic Gardens, in consultation with OEH will undertake a program to determine the most appropriate method of *ex situ* storage of *P*. sp. Genowlan Point. The method used will be determined using the results from the population census (Action 2.1) and the previous *ex situ* trial.

OEH will co-ordinate establishment and maintenance of an *ex situ* collection that contains cuttings from as many remaining healthy individuals as possible and considers the best care for cuttings maintained at a suitable botanic garden.

Performance Criterion 7.1*: A representative* ex situ *collection of* P. *sp. Genowlan Point is established and maintained at a suitable botanic garden.*

10 Implementation

Appendix 3 outlines the Public Authority Statutory responsibilities in relation to this species and ecological community. Table 4 outlines the costs and parties responsible for implementation of recovery actions specified in this recovery plan.

11 Social and Economic Consequences

11.1 Social consequences

The small negative social impact envisaged after the implementation of the recovery plan is the closed vehicular access to the point of Genowlan Mountain. A gate has already been installed (see Section 5.1) restricting access and, to date, this has not been a major issue with members of the community. The gate was positioned to minimise the negative social effects by allowing vehicular access through the EEC, which is a loop road for vehicles to turn around. The Point is still accessible by foot. It is anticipated that there will not be a significant adverse social impact associated with the implementation of this recovery plan and that the overall benefits to society of implementation of the recovery plan will outweigh any specific costs. Continued liaison with the local community, affected landholders and public authorities will address and minimise any unforeseen negative social impacts arising from the implementation of this plan.

It is expected that the implementation of recovery actions (including site monitoring and surveys) will provide benefits to the environment and/or enhance the general well being of the community and individuals involved.

11.2 Roles and interests of Indigenous people

Pultenaea sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland occur in the areas of the Bathurst Aboriginal Land Council, and in the area of interest to the Gundungurra Tribal Council Aboriginal Corporation and Blue Mountains Aboriginal Cultural Resource Centre. Implementation of recovery actions under this plan will include consideration of the role and interests of Aboriginal communities in the region.

11.3 Economic consequences

The total cost of implementing the recovery actions will be $133,440 over the five-year period covered by this plan.

The improved environmental impact assessment resulting from mechanisms established in this recovery plan will assist consent and determining authorities to better meet their statutory responsibilities. The production of this recovery plan will decrease the costs associated with collating available information on Genowlan Point *Allocasuarina nana* Heathland and *P.* sp. Genowlan Point when undertaking impact assessments.

Substantial economic consequences may result where the species' and community's conservation requirements prevent or restrict the use of land that is currently identified for coal extraction. This is likely to be minimal, given the rugged and remote location of the known population and community. These consequences will be identified and addressed by statutory environmental impact assessment processes.

11.4 Cultural Issues

There are no known cultural issues associated with *P.* sp. Genowlan Point or Genowlan Point *Allocasuarina nana* Heathland.

12 Biodiversity Benefits

The conservation and study of *Pultenaea* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland will benefit other threatened species that share the same habitat, particularly the rare *Pseudanthus divaricatissimus* and *Xanthorrhoea johnsonii*, which is at its southern-most limit on Genowlan Mountain. Fauna that will benefit are the endangered Glossy Black Cockatoo and the vulnerable Grey Falcon, as well as other animals that utilise that habitat. Also, conservation of *P.* sp. Genowlan Point will help conserve the impressive pagodas, a geological formation that is prominent on Genowlan Mountain.

Increased awareness of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland resulting from the implementation of this recovery plan will raise the profile in the community of all threatened species

13 Preparation Details

This recovery plan was prepared by Lyn Raffan and Ann Goeth of the Office of Environment and Heritage (NSW), Metropolitan Branch, Biodiversity Conservation Section, with the advice and assistance of those acknowledged at the front of this plan. This recovery plan was prepared in accordance with the requirements of the NSW TSC Act and the Commonwealth EPBC Act. The plan was prepared in consultation with the Department of Lands, the government agency responsible for managing the only known site for the population, as well as specialists in the taxonomy, biology and ecology of the species.

14 Review Date

This recovery plan will be reviewed by OEH within five years of the date of its publication.

15 References

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16 Abbreviations Used in this Document

BFEAC	Bush Fire Environmental Assessment Code
BFHRC	Bush Fire Hazard Reduction Certificate
BGT	Botanic Gardens Trust
DCP	Development Control Plan
DoL	Department of Lands
EEC	Endangered Ecological Community
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPI	environmental planning instruments
KTP	Key Threatening Process
LEP	Local Environmental Plan
LG Act	NSW *Local Government Act 1993*
NPW Act	NSW *National Parks and Wildlife Act 1974*
NPWS	NSW National Parks and Wildlife Service
NV Act	NSW *Native Vegetation Act 2003*
OEH	Office of Environment and Heritage (NSW)
RBG	Royal Botanic Gardens
RF Act	*Rural Fires Act 1997*
RFS	Rural Fire Service
SEPP	State Environmental Planning Policy
TSHRL	Threatened Species Hazard Reduction List
TSC Act	NSW *Threatened Species Conservation Act 1995*

Table 4 Estimated costs, funding source and responsible parties for implementing the actions identified in the Recovery Plan.

Action No.	Description	Responsible party[1]	Priority[2]	Fund source[3]	Estimated cost/yr[4]					Total Cost
					Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	
					2010/11	2011/12	2012/13	2013/14	2014/15	
1.1	Co-ordinate recovery program	OEH	1	In-kind	$8340	$8340	$8340	$8340	$8340	$ 41700
2.1	Identify potential habitat	OEH, BGT	1	Unsecured	-	$4170	-	-	-	$ 4170
2.2	Survey potential habitat	OEH	1	Unsecured	-	-	$8340	-	-	$ 8340
2.3	Census and monitor the species and EEC	OEH	1	Unsecured	$ 8340	$4170	$4170	$4170	$4170	$ 25020
3.1	Private land protective measures	OEH, landholders	3	#	-	-	-	-	-	-
3.2	Refer to this plan when preparing LEPs or DCPs	Lithgow Council	1	#	-	-	-	-	-	-
3.3	Review status of Crown lands	OEH, DoL	1	#	-	-	-	-	-	-
3.4	Recommendation of critical habitat under TSC Act	OEH	2	Unsecured	-	-	-	-	$4170	$ 4170
4.1	Promote research	OEH, Research institutes	2	Unsecured	$8340	$8340	$4170	-	-	$ 20850
5.1	Prepare and implement site management statements	OEH, DoL, Lithgow Council	1	Unsecured	$4170	$4170	?	?	?	$ 8340
5.2	Fire protection activities	OEH, RFS	1	#	-	-	-	$8340	-	$ 8340
5.3	OEH to encourage landholder to conserve species and EEC	OEH, landholders	3	#	-	-	-	-	-	-
6.1	Authorities to notify OEH of new populations	Lithgow Council, DoL	3	#	-	-	-	-	-	-
6.2	Update NSW Atlas and make available to authorities	OEH	3	#	-	-	-	-	-	-
6.3	Update species & environmental assessment guidelines	OEH	3	#	-	-	-	-	-	-
6.4	Public authorities to inform OEH of decisions	Lithgow Council, DoL, RFS	2	#	-	-	-	-	-	-
6.5	Raising awareness of the species and EEC	OEH, Lithgow Council	3	Unsecured	-	-	$4170	-	-	$ 4170
7.1	Undertake *ex situ* program	OEH, BGT	1	Unsecured	-	$4170	$4170	-	-	$ 8340
	Total cost			Unsecured						$ 91740
				In-kind						$ 41700
				TOTAL						$133440

EEC : Endangered Ecological Community; **OEH** : Office of Environment and Heritage; **DoL**: Department of Lands; **BGT**: Botanic Gardens Trust; **RFS**: Rural Fire Service; **LEP**: Local environmental plan; **DCP**: Development control plan.

Priority ratings are: 1 - Action critical to meeting plan objectives, **2** - Action contributing to meeting plan objectives, **3** – Desirable but not essential action at this time.

In kind funds represent the salary component of permanent staff and recurrent resources. Salary for in-kind contributions is calculated at $350 per day, which includes officer salary and on-costs, provision of office space, vehicles, administration support and staff management. **Unsecured** funds will be sought from sources including OEH annual provisions for the implementation of threatened species programs, Environmental Trust, industry sponsors, the NSW State Biodiversity Program, Threatened Species Appeal and OEH annual provisions for implementation of threatened species programs.

- No direct cost (either cost of action is negligible or action is a statutory responsibility of the responsible party)

Appendix 1: *P.* sp. Genowlan Point Species Profile & Environmental Impact Assessment Guidelines

The information provided in the species profile and the environmental impact assessment guidelines is the best available at the time of publication of this recovery plan. They will be updated periodically as new information becomes available. Consent and determining authorities, developers and EIA consultants should ensure that they obtain the most recent information by contacting the Biodiversity Conservation Section of the relevant region of the Metropolitan Branch of the Department of Environment and Climate Change.

THREATENED SPECIES INFORMATION

Pultenaea *sp. Genowlan Point*

Common name: **Genowlan Pultenaea**

Family: **Fabaceae**

Conservation status

Pultenaea sp. Genowlan Point is listed as endangered on Schedule 1 of the NSW *Threatened Species Conservation Act 1995* (TSC Act) and critically endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

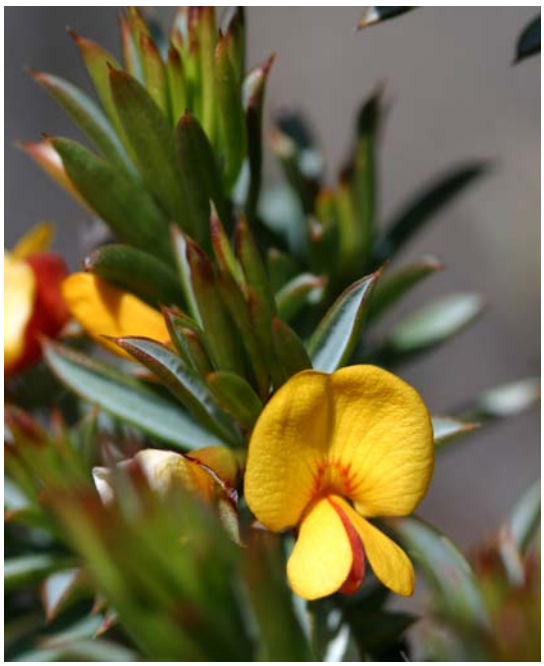

Photo: Simon Nally © OEH

Description

P. sp. Genowlan Point is a small erect shrub less than 1 m in height. It has smooth stems and linear to narrow obovate leaves, 1–2 cm long and 1–2 mm wide, which are arranged alternately along the stem. Stipules are present at the leaf bases. The leaves have tapered, downward-pointing tips and margins that roll upwards. Leaf surfaces are generally the same colour, but the lower surface may appear darker. Inflorescences are terminal or subterminal, dense, leafy and auxotelic (growing into a leafy shoot). The flower subtends the leaves and their bracteoles are indistinguishable from other leaves and bracteoles. The yellow pea flowers have a distinct deep red keel petal and are around 10 mm long with short pedicels (0.5–1 mm). The pedicels bear bracteoles attached to the base of a toothed calyx tube, which is covered with appressed hairs. The fruit is a turgid pod about 5 mm long.

Pultenaea sp. Genowlan Point is an undescribed taxon and the subject of ongoing research. The revised edition of the Flora of NSW Volume 2 (Harden 2002) includes *P.* sp. Genowlan Point under the description of the *Pultenaea glabra* Benth. species complex as a geographic variant. However, it differs

from this species in a number of morphological characters and both the NSW and Commonwealth Scientific Committees accept Weston's contention (Harden 2002) that it warrants recognition as a separate species.

P. sp. Genowlan Point can be distinguished from *P. glabra* on the basis of the following characteristics:

- its shorter height;
- the nature of the inflorescence, which terminates in a leafy shoot as opposed to a bud;
- the size of the leaves and bracteoles subtending the flowers, which are noticeably smaller than other foliage in *P. glabra*;
- the deep red keel, which is yellow to orange in *P. glabra*; and
- the surface of the calyx, which is hairy rather than smooth.

Distribution

P. sp. Genowlan Point is endemic to the Greater Blue Mountains area of NSW, where it had been recorded from a single population on the north-west facing tip of Genowlan Point on the Genowlan Mountain mesa in the Capertee Valley. Surveys along north- and west-facing ridges and clifflines on the divide between the Capertee and Wolgan Valleys have failed to find other populations of the species (Washington pers. comm.).

Recorded occurrences in conservation reserves

P. sp. Genowlan Point has not been recorded from conservation reserves. The extant population occurs on Crown land.

Habitat

Pultenaea sp. Genowlan Point is mainly found on steep, well-drained stony soil immediately adjacent to a cliff edge on a the Genowlan Mountain mesa. It is less common on flatter areas (Washington 2002). Genowlan Mountain has a large concentration of pagodas (beehive-shaped rock formations) set back slightly from the cliffs. Beneath these rock formations are large caves with rock overhangs and moist gullies.

Genowlan Mountain is approximately 1,000 m above sea level and the average annual rainfall is 840 mm (DEC 2005). Whilst rainfall is reasonably well distributed through the year, there is a peak in summer to early autumn and the lowest rainfall months are in winter and spring.

The vegetation on Mt Airly and Genowlan Mountain comprises several vegetation communities ranging from open forest to rocky heath (DEC 2005). *Pultenaea* sp. Genowlan Point is associated with an unclassified sparse heath assemblage. This assemblage has species that overlap with the vegetation classifications of Pagoda Rock Sparse Shrubland and the Sandstone Plateaux Tea Tree – Dwarf Sheoak – Banksia Rocky Heath as described in DEC (2005). These vegetation classifications are part of Blue Mountains Heath as described by Trindall *et al.* (2004, cited in DEC 2005) and the State vegetation formation of Sydney Montane Heath, as described by Keith (2004).

The plants associated with *P.* sp. Genowlan Point on the tip of Genowlan Point include:
Acacia obtusifolia, Astrotricha obovata, Callitris rhomboidea, Calytrix tetragona, Comesperma ericium, Entolasia stricta, Eucalyptus sparsifolia, Hibertia obtusifolia, Isopogon dawsonii, Lepidosperma urophorum, Leptospermum trinervium, L. polygalifolium, Leucopogon muticus, Monotoca scoparia, Persoonia longifolia, Philotheca myoporoides, Platysace lanceolata, Pseudanthus divaricatissimus, Xanthorrhoea johnsonii, Xanthosia pilosa, and *Ziera laevigata* (Washington 2002).

Ecology

As a newly discovered species in 1997, very little is known of the biology and ecology of *P.* sp. Genowlan Point and the following is largely based on observations

in the field or on *P. glabra* – a closely related species.

P. glabra is sensitive to fire, with adults killed and recruitment occurring from a persistent soil stored seed bank (NPWS 2002). *P. glabra* flowers from August to November and fruits mature from November to January.

The flowers of *P.* sp. Genowlan Point are likely to be insect pollinated (Fairley and Moore 2000), perhaps by bees, and under good conditions should flower and set seed every year. Seed germination will not occur in the absence of fire as the hard-coated seed requires heat to break seed dormancy. The seeds are dispersed by ants (NPWS 2002).

It is unknown at what stage *P.* sp. Genowlan Point reaches maturity. The longevity of the species is also unknown.

Threats

Drought

It is hard to quantify the impact that drought has had on this species. Individual mortality or decline in health may be the result of drought or of other factors (such as trampling or grazing). Spring and summer over the years 2002–2004 were hot and dry, with decent rainfall only falling in 2005 (Washington 2005). The lack of rain would have stressed the plants, as it is known to increase the rate of insect herbivory (Koricheva *et al.* 1998). Heavy borer infestations and beetle attack were noted on *P.* sp. Genowlan Point in 2004, but had largely disappeared in 2005.

Goats

Goats seem to be the main threat to *P.* sp Genowlan Point. There have been regular sightings of goats in the vicinity of the *Pultenaea*, especially in 2004 and 2005 (Washington 2005). Evidence of goats on Genowlan Point are tracks and droppings, especially around the water sources (seepages and tyre ruts in the road that have filled with water) (Washington 2005). Prior to 2002, grazing was noted on approximately one third of the *P.* sp. Genowlan Point population. The plants seemed relatively intact in 2002, but in 2003, 41% of plants had suffered from the effects of grazing. This had worsened in 2004, with clear evidence of goats in and around the area (Washington 2005).

Fire

Little is known about how *P.* sp Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland, including the soil seed bank, are affected by fire frequency, fire intensity or seasonality. Plants that germinate in response to an initial disturbance, such as fire, need to develop to a stage where they are capable of producing seed and/or coppice. It can thus be reasonably assumed that local extinctions of the species occur where fires are too frequent or other disturbances destroy the above-ground parts of plants and prevent seed production.

Roads and trampling

The road to Genowlan Point was accepted to be the major threat to *P.* sp. Genowlan Point by the Scientific Committee in their final determinations. There has been evidence of four wheel drive vehicles running over *P.* sp Genowlan Point, and heavy trampling associated with foot traffic. The plants occur on the tip of Genowlan Point, where most people access for the view, and they are thus in danger of trampling. The installation of a gate across the road has stopped four wheel drive vehicles accessing the points and causing damage to the plants, but the risk of foot traffic, although diminished, remains.

Potential threats

Mining

A potential threat to *P.* sp. Genowlan Point is the Airly Coal Project, an underground mine. Airly Coal Mine is owned by Centennial Coal Company, who took over the lease from Novacoal in 1997. A 21-year mining lease was granted on 14 April 1993 to mine seam coal that runs under both Mt Airly and Mt Genowlan. There

were, however, provisions in the consent to ensure that the pagoda rock formations on Mt Airly and Genowlan Mountain would be afforded protection. Environmental Protection Zones were specified as part of the consent, and these cover the periphery of Mount Airly and Genowlan Mountain (Commission of Inquiry1993). Monitoring will be carried out to ensure that the clifflines and rock formations are not damaged by the mining activities. Since many of the *P*. sp. Genowlan Point plants occur on or near the cliffline, these are at the greatest danger of disappearing with rock falls caused by vibrations from mining activities, or by cracking and destabilisation caused by subsidence.

Longwall mining is listed as a key threatening process in NSW. In this underground coal mining technique a portion of an underground coal seam is removed. This can cause the land above the mined-out coal seam to destabilise and collapse, leading to habitat alterations. The Scientific Committee has not identified longwall mining as a specific key threatening process for *P*. sp. Genowlan Point or Genowlan Point *Allocasuarina nana* Heathland. However, future monitoring for such potential subsidence of land and habitat alteration is nevertheless important.

Infection by *Phytophthora cinnamomi*

"Infection of native plants by *Phytophthora cinnamomi"* is listed as a key threatening process for many threatened species, populations and ecological communities under both the TSC Act and the EPBC Act. For further information about this key threatening process see the NSW Scientific Committee Determination Advice 02/27 (NSW Scientific Committee 2002) and the Commonwealth *Threat abatement plan for dieback caused by the root-rot fungus* (Environment Australia 2001). The distribution of *Phytophthora cinnamomi* is in the area of occurrence of *P*. sp. Genowlan Point. *P*. sp. Genowlan Point has been listed by the Scientific Committee as a species that is under threat from *Phytophthora cinnamomi*. Although there is no published evidence regarding the susceptibility of *P*. sp. Genowlan Point to *Phytophthora cinnamomi* dieback, it can be considered a potential threat due to the growing potential for spread of the pathogen because of increasing human activities in the area.

Climate change

"Human-induced climate change" is listed as a key threatening process for many threatened species and ecological communities under both the TSC Act and the EPBC Act. For further information about this key threatening process see the NSW Scientific Committee Determination Advice 00/24 (NSW Scientific Committee 2000) and the relevant Commonwealth Threatened Species Scientific Committee listing advice. There is evidence that modification of the environment by humans may result in future climate change, which includes changes to the frequency of occurrence of extreme events such as droughts and fires. In the case of *P*. sp. Genowlan Point, an increase in temperature or periods of drought may already be adversely impacting upon the population. The conditions in the 2003 and 2004 seasons were particularly hot and dry and seven of the nine seedlings growing on the western edge of the point that were subjected to hot and dry winds consequently died (Washington 2004). Seedlings may be more vulnerable to changing conditions.

Recovery plans

A recovery plan has been prepared for *P*. sp. Genowlan Point and the Genowlan Point *Allocasuarina nana* heathland Endangered Ecological community (OEH 2011).

For further information contact

Biodiversity Conservation Section,
Metropolitan Branch,
Environment Protection and Regulation Division
Department of Environment & Conservation
PO Box 1967, Hurstville NSW 2220.
Telephone: 02 9585 6678.
Internet: www.environment.nsw.gov.au

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ENVIRONMENTAL IMPACT ASSESSMENT GUIDELINES

Pultenaea sp. Genowlan Point

Common name: **Genowlan Pultenaea**

Family: **Fabaceae**

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 OEH's *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (DEC 2006).

Survey

Surveys should be carried out during the flowering season for *Pultenaea* sp. Genowlan Point (Sept–November) over a number of seasons to attempt to account for temporal changes in the distribution of the species.

P. sp. Genowlan Point is mainly found on steep, well-drained stony soil immediately adjacent to a cliff edge on a the Genowlan Mountain mesa. It is less common on flatter areas (Washington 2002).

Genowlan Mountain is approximately 1,000 m above sea level and the average annual rainfall is 840 mm (DEC 2005). Whilst rainfall is reasonably well distributed through the year, there is a peak in summer to early autumn and the lowest rainfall months are in winter and spring.

The vegetation on Genowlan Mountain comprises several vegetation communities ranging from open forest to rocky heath (DEC 2005). *P.* sp. Genowlan Point is associated with an unclassified sparse heath assemblage. This assemblage has species that overlap with the vegetation classifications of Pagoda Rock Sparse Shrubland and the Sandstone Plateaux Tea Tree – Dwarf Sheoak – Banksia Rocky Heath as described in DEC (2005). These vegetation classifications are part of Blue Mountains Heath as described by Trindall *et al.* (2004, cited in DEC 2005) and the State vegetation formation of Sydney Montane Heath, as described by Keith (2004).

The plants associated with *P.* sp. Genowlan Point on the tip of Genowlan Point include: *Acacia obtusifolia, Astrotricha obovata, Callitris rhomboidea, Calytrix tetragona, Commesperma ericium, Entolasia stricta, Eucalyptus sparsifolia, Hibertia obtusifolia, Isopogon dawsonii, Lepidosperma urophorum, Leptospermum trinervium, L. polygalifolium, Leucopogon muticus, Monotoca scoparia, Persoonia longifolia, Philotheca myoporoides, Platysace lanceolata, Pseudanthus divaricatissimus, Xanthorrhoea johnsonii, Xanthosia pilosa,* and *Ziera laevigata* (Washington 2002).

Life cycle of the species

As a newly discovered species in 1997, very little is known of the biology and ecology of *P.* sp. Genowlan Point and the following is largely based on observations in the field or on *P. glabra* – a closely related species.

P. glabra is sensitive to fire, with adults killed and recruitment occurring from a persistent soil stored seed bank (NPWS 2002). *P. glabra* flowers from August to November and fruits mature from November to January.

The flowers of *P.* sp. Genowlan Point are likely to be insect pollinated (Fairley and Moore 2000), perhaps by bees, and under good conditions should flower and set seed every year. Seed germination will not occur in the absence of fire as the hard-coated seed requires heat to break seed dormancy. The seeds are dispersed by ants (NPWS 2002).

It is unknown at what stage *P*. sp. Genowlan Point reaches maturity. The longevity of the species is also unknown.

Proposals that are likely to impact upon the life cycle of the species include those that contribute to the following:

Loss of individuals

The significance of a particular activity that physically destroys individual plants will require an examination of the number of plants to be destroyed in relation to the size of the population and a discussion of how recruitment, gene flow and the overall health of the population will be affected. Translocation should not be considered as an appropriate means of compensating for the loss of individuals due to the uncertainty associated with the long-term survival of translocated plants.

Loss and fragmentation of habitat

As the breeding system of *P.* sp. Genowlan Point is not well understood, the effects of loss and fragmentation of its habitat are not known. Destruction of habitat may place a local population at risk of extinction.

Altered fire regimes

Little is known about how *P*. sp Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland, including the soil seed bank, are affected by fire frequency, fire intensity or seasonality. Plants that germinate in response to an initial disturbance, such as fire, need to develop to a stage where they are capable of producing seed and/or coppice. It can thus be reasonably assumed that local extinctions of the species occur where fires are too frequent or other disturbances destroy the above-ground parts of plants and prevent seed production.

Modification of habitat

Modification of habitat may occur in the event of subsidence due to mining activities, altered hydrological conditions, changes in soil pH and nutrient levels, weed invasion, potential introduction of plant pathogens and altered fire frequency. Increases in pedestrian traffic through sites may result in trampling, soil compaction, soil erosion and rubbish dumping.

Threatening processes

There are four key threatening processes listed in Schedule 3 of the NSW *Threatened Species Conservation Act 1995* (TSC Act) that are potentially relevant to P. sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland. These are*:*

- Alteration of habitat following subsidence due to longwall mining;
- Competition and habitat degradation by feral goats;
- Infection of native plants by *Phytophthora cinnamomi; and*
- Anthropogenic Climate Change.

Other threats relevant to this species include grazing by goats, drought and trampling. These are discussed in the Recovery Plan (OEH 2011).

Viable local population of the species

There is currently little information as to the viability of the *P.* sp. Genowlan Point population identified in this recovery plan. In the absence of a detailed assessment demonstrating otherwise (and including consideration of the potential *P.* sp. Genowlan Point soil seedbank), it should be assumed that the *P.* sp. Genowlan Point population will only remain viable with active management.

A significant area of habitat

Assessment of habitat significance for *P.* sp. Genowlan Point requires consideration of the following:

- number of *P.* sp. Genowlan Point plants present (including consideration of the soil seed bank);
- proportion of the local population present;
- location in relation to the current known distribution of the species;
- size, condition and connective importance of the habitat;
- uniqueness of habitat; and
- management potential including the likelihood of ameliorating any existing threatening processes.

OEH considers that any known viable population of *P.* sp. Genowlan Point occupies a significant area of habitat until such time as adequate and representative examples are conserved.

Regional distribution of the habitat

P. sp. Genowlan Point is endemic to the Greater Blue Mountains area of NSW, where it had been recorded from a single population on the north-west facing tip of Genowlan Point on the Genowlan Mountain mesa in the Capertee Valley. Surveys along north- and west-facing ridges and clifflines on the divide between the Capertee and Wolgan Valleys have failed to find other populations of the species (Washington pers. comm.).

Adequacy of representation in conservation reserves or other similar protected areas

P. sp. Genowlan Point is not represented in formal conservation reserves.

Critical habitat

Critical habitat has not been declared for *P.* sp. Genowlan Point

For further information contact

Biodiversity Conservation Section, Metropolitan Branch,
Environment Protection and Regulation Division,
Office of Environment and Heritage,
PO Box 1967,
Hurstville NSW 2220.
Telephone: 02 9585 6678.
Internet: www.environment.nsw.gov.au

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Appendix 2. Monitoring sheet for *P.* sp. Genowlan Point

Date ..... Recorder/s..... .....
Location .....

Number of pure adults: count: [ ] or estimate: [ ]
Lowest estimate =.....Best estimate =.....Upper estimate =.....
Number of hybrid adults: count: [ ] or estimate: [ ]
Lowest estimate =.....Best estimate =.....Upper estimate = ...
Number of seedlings: count: [ ] or estimate: [ ]
Lowest estimate =.....Best estimate =.....Upper estimate =.....
Area of Occupancy: .....accurate: [ ] or estimate: [ ]
Area of Occupancy of hybrids:…… accurate: [ ] or estimate: [ ]
Reproduction: Buds: [ ] Flowers: [ ] Fruit: [ ]

Habitat: ....
.....
Dominant associated species: ....
.....
Disturbance history: ....
.....
Predominant weed species and abundance: .....
.....
.....
Other threats: ....
.....
.....
.....
Previous threat abatement actions applied (and apparent success): ....
.....
.....
.....
Threat abatement actions required: .....
.....
.....
Timetable for implementation of actions and monitoring: .....
.....
.....
Detailed site map attached: Yes / No Photographs taken:……. .....
Notes.....
.....
.....
.....

Appendix 3 Public Authority responsibilities

Public authority	Relevant responsibilities
Office of Environment and Heritage	▪ Assessment of section 91 licence applications under the TSC Act ▪ Assessment of section 132C licence applications (eg for bushland regeneration activities) under the NPW Act ▪ Assessment of proposed activities on OEH estate ▪ Consideration of objectives and actions of a recovery plan when undertaking assessment of significance under section 5A of EP& A Act ▪ Advice to consent and determining authorities, with a possible concurrence role under the EP&A Act ▪ Preparation of priority action statements and co-ordination of implementation ▪ Preparation of plans of management for OEH estate
Relevant local governments	▪ Preparation of local environmental plans (LEPs) under Part 3 of EP&A Act. Consultation with OEH is required if the LEP will or may affect threatened species, populations, communities or their habitats. ▪ Assessment of development applications under Part 4 of EP&A Act ▪ Assessment of council works under Part 5 of EP&A Act ▪ Consideration of objectives and actions of a recovery plan when undertaking assessment of significance under section 5A of EP& A Act ▪ Consideration of conditions in Threatened Species Hazard Reduction List when issuing Bush Fire Hazard Reduction Certificates under *Rural Fires Act* 1997 ▪ Plans of management for community land must be prepared or amended to take into account council's obligations under a recovery plan.
Department of Planning	▪ Development of policy and strategies, including SEPPs, for land use planning and environmental assessment ▪ Assessment of major development applications ▪ Determination of certain development proposals under Part 4 of the EP&A Act ▪ Approval of certain activities under Part 5 of EP&A Act ▪ Consideration of objectives and actions of a recovery plan when undertaking assessment of significance under section 5A of EP& A Act
Department of Lands	▪ Environmental protection principles must be observed in relation to management of Crown land. ▪ Plans of management may be prepared for Crown land ▪ Approval of activities on Crown land under Part 5 of EP& A Act ▪ Consideration of objectives and actions of a recovery plan when undertaking assessment of significance under section 5A of EP& A Act
Rural Fire Service	▪ Consideration of impacts on threatened species, populations, communities and their habitats when exercising functions and when preparing Bush Fire Risk Management Plans and Plans of

	Operations ▪ Approval authority for works under Part 5 of EP& A Act ▪ Consideration of objectives and actions of a recovery plan when undertaking assessment of significance under section 5A of EP& A Act ▪ Consideration of conditions in Threatened Species Hazard Reduction List when issuing Bush Fire Hazard Reduction Certificates ▪ Consideration of objectives and actions of a recovery plan when undertaking assessment of significance under section 5A of EP& A Act
Other public authorities (eg Dept of Education and Training, RailCorp, Dept of Commerce)	▪ Appropriate management of public lands with known or potential habitat ▪ Approval authorities for activities under Part 5 of EP&A Act ▪ Consideration of objectives and actions of a recovery plan when undertaking assessment of significance under section 5A of EP&A Act

Appendix 4 Additional legislation relevant to the conservation and recovery of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland

Additional legislation relevant to the conservation and recovery of *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland in NSW includes the following:

- *National Parks and Wildlife Act 1974*;
- *Environmental Planning and Assessment Act 1979*;
- *Local Government Act 1993*;
- *Native Vegetation Act 2003*;
- *Rural Fires Act 1997*;
- *Rural Fires and Environmental Assessment Legislation Amendment Act 2002*; and
- *Crown Lands Act 1989.*

The most significant implications of the above legislation with regard to *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland are described below and the major existing obligations of public authorities in relation to the species and endangered ecological community are outlined in Appendix 3.

Environmental Planning & Assessment Act 1979

Consent and determining authorities are required to consider potential impacts on *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland and their habitat when considering development or activity proposals under parts 4 and 5 of the EP&A Act.

Part 3 of the EP&A Act provides for the preparation of environmental planning instruments (EPIs) and this presents opportunities to conserve important habitat for *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland at the landscape level. For example, important sites that contain *P.* sp. Genowlan Point or Genowlan Point *Allocasuarina nana* Heathland can be protected under an appropriate environmental zoning when councils prepare or review local environment plans (LEPs). This is a more effective means of providing for the conservation requirements of a species than through the assessment of individual development applications.

An action that does not require a consent or approval under the EP&A Act and which is likely to affect *P.* sp. Genowlan Point or Genowlan Point *Allocasuarina nana* Heathland, requires a licence to be issued by the Chief Executive of OEH under Section 91 of the TSC Act.

Rural Fires Act 1997

The *Rural Fires Act 1997* (RF Act) requires all parties involved in fire suppression and prevention to have regard to the principles of ecologically sustainable development when exercising their functions and when preparing plans of operation or Bush Fire Risk Management Plans. Within this, consideration must be given to the impact on threatened species and their habitats.

Under the RF Act, certain public authorities can authorise bush fire hazard reduction work (including prescribed burning and mechanical vegetation clearance) in habitat for a threatened species by issuing a Bush Fire Hazard Reduction Certificate (BFHRC). These certificates can only be issued for works that comply with the Bush Fire Environmental Assessment Code (BFEAC), and occur on land that is subject to a Bush Fire Risk Management Plan. The Threatened Species Hazard Reduction List (TSHRL) forms part of the BFEAC and contains specific conditions for sites that support threatened species. The specific conditions in the list

that relate to *P.* sp. Genowlan Point and Genowlan Point *Allocasuarina nana* Heathland are detailed in Section 7.1.

Where proposed bush fire hazard reduction activities do not meet the criteria necessary to allow a BFHRC to be issued, then an approval under parts 4 or 5 of the EP&A Act or s91 of the TSC Act is required.

Local Government Act 1993

The Local Government Act 1993 (LG Act) defines the powers, duties and functions of all local councils in NSW. Section 8(1) of the Act requires councils to properly manage, develop, protect, restore, enhance and conserve the environment of the area for which it is responsible, in a manner that is consistent with and promotes the principles of sustainable development. This includes the integration of biodiversity considerations into the decision-making process.

Chapter 6 of the Act requires councils to prepare plans of management for community land that take into account council's obligations under approved recovery plans.

Crown Lands Act 1989

Part 3 of the *Crown Lands Act 1989* sets out the process for assessing Crown land against prescribed land evaluation criteria. This leads to an assessment of the land's use for community or public purposes, environmental protection, nature conservation, water conservation, or other purposes. In identifying uses for Crown land, the Minister is to have regard to the views of any government department.

Under the Act, the Minister for Lands may place restrictions on the transfer or use of Crown land or impose a public positive covenant on Crown land for the purposes of protecting the environment or natural resources, and/or protecting other significant values of the land.