

THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

The Minister's delegate approved this conservation advice on 01/10/2015

Conservation Advice

Zieria granulata

Illawarra zieria

Conservation Status

Zieria granulata (Illawarra zieria) is listed as Endangered the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act). The species is eligible for listing as Endangered as, prior to the commencement of the EPBC Act, it was listed as Endangered under Schedule 1 of the *Endangered Species Protection Act 1992* (Cwlth).

The main factors that are the cause of the species being eligible for listing in the Endangered category are its restricted extent of occurrence, habitat fragmented by clearing and predicted continuing declines in habitat extent and quality, area of occupancy, and number of locations (NSW DEC, 2005).

Description

The Illawarra zieria is an erect and bushy shrub to 6 m high (Harden, 2002; Mills and Jakeman, 1993; Fairley and Moore, 2000; Society for Growing Australian Plants, 2000; Armstrong, 2002; NSW DEC, 2005). Plants are densely covered with glandular tubercles (small wart-like growths) (NSW DEC 2005) that give a strong aroma when crushed (NSW OEH, 2015). Its leaves consist of three narrow leaflets that are dull green above, pale green below, 19.5 to 42.5 mm long, and have downward curved margins (NSW OEH, 2015). Its small white flowers are 3.5-4.5 mm in diameter (Armstrong, 2002; NSW NPWS, 2002a) and grow in dense many-flowered clusters (NSW DEH, 2015). The fruit is a dry, light brown capsule containing dark reddish brown seeds to 2 mm long (NSW OEH, 2015).

Distribution

The species is restricted to the Illawarra region of New South Wales where it is recorded from a number of sites. The species primarily occupies the coastal lowlands between Oak Flats and Toolijooa, in the local government areas of Shellharbour and Kiama. This is a range of approximately 22 km (NSW DEH, 2015). Within this range, a relatively large population occurs in the Dunmore Hills area within a *Melaleuca armillaris* shrubland (Gaia Research, 2009).

The preferred habitat is dry, rocky ridges and outcrops with shallow volcanic soil, but the species is sometimes also found on the moist slopes of the Illawarra escarpment (Mills and Jakeman 1993). On the majority of sites, soils are derived from Permian Gerringong Volcanics, mostly on Bumbo Laterite (Mills and Jakeman, 1993; Armstrong, 2002; NSW NPWS, 2002a). Other sites are on Budgong Sandstone, talus and alluvium (Robinson, M. 1999 in Armstrong, 2002), as well as Bass Point Sandstone, Blow Hole Latite, Bong Bong Basalt, Illawarra Coal Measures, Irwins Ck Breccia, Saddleback Agglomerate and Saddleback Latite (Robinson, 1999 in NSW NPWS, 2002a). The altitudinal range is from near sea level to 500 m above sea level with most sites below 200 m. Much of the natural habitat of the species has been cleared for agriculture and many sub-populations now occupy road verges and paddock edges (Mills and Jakeman, 1993).

The species grows amongst subtropical rainforest and paperbark scrub and is also associated with *Melaleuca armillaris* and *Dodonaea viscosa* in *Eucalyptus tereticornis* woodland (Harden, 2002; Mills and Jakeman, 1993; Armstrong, 2002; NSW NPWS, 2002a). Other associated native species include *Acacia mearnsii*, *Cheilanthes sieberi*, *Commersonia fraseri*, *Hibbertia*

scandens, *Hibiscus heterophyllus*, *Indigofera australis*, *Leptospermum laevigatum*, *Leucopogon juniperinus*, *Notelaea venosa*, *Pittosporum undulatum* and *Pteridium esculentum* (Mills and Jakeman, 1993).

NSW DEC (2005) note that flowering:

- was observed in individuals less than 1 m tall.
- was most common for individuals between 1 and 2 m tall, and.
- was typically more prolific for individuals greater than 2 m tall (Robinson, 1999).

However, the age at which Illawarra zieria is capable of flowering and producing seed is not known.

NSW DEC (2005) also notes that the Illawarra zieria has been observed to respond to physical disturbance (including grazing and slashing) by coppicing (making new growth) from the base of damaged stems. However, the age at which plants are capable of coppicing in response to disturbance is not known. It also notes that some form of occasional disturbance may be required to break seed dormancy and encourage seedling recruitment (NSW DEC, 2005).

Threats

Known threats

The main threat to the species is loss and fragmentation of habitat, primarily as a result of agricultural clearing, quarrying, residential and hobby farm development and road construction (NSW DEH, 2005). The majority of plants occur on freehold land that is zoned for extractive industry or rural land uses (NSW DEC, 2005).

Other identified threats include habitat damage from:

- livestock grazing and livestock trampling,
- vegetation slashing,
- herbicide spraying,
- roadside and dry stone wall maintenance activities,
- weed invasion (weeds include African olive, lantana, Kikuyu and giant Parramatta grass.
- rubbish dumping (NSW DEC, 2005; NSW OEH, 2015), and
- frequent fire (Armstrong, 2002; NSW NPWS, 2002a; NSW OEH, 2015).

Potential threats that may arise as an indirect a result of quarrying activities or residential development (NSW DEC, 2005) include:

- altered hydrology,
- dust,
- altered soil pH and nutrients.

Conservation and Management Actions

Prevent habitat loss from clearing

- Protect areas of known occurrence and potential habitat from clearing and further habitat fragmentation (NSW OEH, 2015).
- Raise awareness of property managers and landholders of the species, its location and its threats.
- Negotiate with landholders for protection of populations on private land (NSW OEH, 2015), including through legislative protection such as conservation agreements and covenants.

Prevent habitat damage from livestock grazing and trampling:

- Raise awareness of property managers and landholders of the species, its known and potential locations, and its threats, to prevent any inadvertent action that may damage sites or plants and to provide for protection work by managers (eg fencing, buffers).
- Negotiate with landholders for protection of populations on private land (NSW OEH, 2015).
- Install fencing/signage to exclude livestock and machinery (NSW OEH, 2015).

Prevent habitat damage from roadside and dry stone wall maintenance activities, including vegetation slashing.

- Ensure slashing of the species does not occur.
- Install on-site markers to alert maintenance staff to the presence of a threatened species (NSW OEH, 2015).
- Ensure sites and potential habitat are marked on maps used for planning road maintenance work (NSW OEH, 2015).

Protect populations from weed invasion and herbicide spraying.

- Control threatening weeds where necessary (NSW OEH, 2015).
- Avoid spraying weeds close to zieria plants to ensure they are not impacted by poison (NSW OEH, 2015).

Protect populations from rubbish dumping

- Limit vehicle access to known sites of occurrence to deter rubbish dumping (NSW OEH, 2015).
- Raise awareness and education of residential neighbours and the local community about the damaging impact of illegal dumping of rubbish and implement compliance.

Prevent damage from frequent fire and inappropriate bushfire hazard reduction activities NSW DEC (2005) notes that there have been no recorded observations of the effects of fire frequency, intensity or seasonality on the species or its seedbank. There is therefore limited knowledge of the fire ecology of the species. The Illawarra zieria appears to be incapable of suckering and therefore is unlikely to survive fire that destroys the above-ground parts of the plant. In the absence of further information, NSW DEC (2005) recommends fire intervals adapted from NPWS (2002b) to add three productive years to the minimum fire interval to allow for seed production and the building of soil seed bank.

- Include fire hazard management planning within site specific plans of management for sites on public land (NSW OEH, 2015).
- Protect known sites from fire. Ensure that personnel planning and undertaking hazard reduction burns are able to identify the species and are aware of its habitat (NSW OEH, 2015).
- Avoid mechanical clearance of firebreaks through sites known to have the species NSW DEC (2005).
- Apply appropriate fire management practices (NSW OEH, 2015).

Undertake Habitat Restoration

- Restore degraded habitat using bush regeneration techniques (NSW OEH, 2015).
- Raise awareness of property managers and landholders of the species and its threats, and negotiate to encourage the potential for restoration of habitat and connectivity of site locations (NSW OEH, 2015), including the installation of fencing/signage to exclude livestock and machinery (NSW OEH, 2015).
- Where appropriate, include Illawarra zieria seeds or tubestock in rehabilitation programs of relevant communities (e.g., the NSW endangered ecological community *Melaleuca armillaris* Tall Shrubland in the Sydney Basin Bioregion)(Gaia Research, 2009).

Ex-situ conservation

- Assess the need and feasibility of, establishing an ex-situ collection of Illawarra zieria seed as a contingency measure to protect against the loss of genetic material that may result from unexpected local extinctions (NSW OEH, 2015).
- In undertaking the above, high priority sites for seed collection include sites near the species' distributional limits, sites containing unusual habitat for the species, site that form populations with low numbers of individuals (NSW OEH, 2015).

Stakeholder Engagement

- Raise awareness of property managers of the species and its threats, to prevent any inadvertent action that may damage sites or plants, and to provide for protection work by managers (e.g., fencing, buffers).
- Ensure that when local planning documents are developed, they take account of threatened species locations and needs, including the Illawarra zieria (NSW OEH, 2015) so that awareness of, and levels of protection, are appropriate for the species.
- Raise awareness and education of residential neighbours and the local community about the damaging impact of illegal dumping of rubbish.

Survey, Monitoring, Information and Research priorities

NSW DEC (2005) note that at the time of writing, many sites had not been surveyed for over ten years and some of these sites may have been lost, or experienced significant changes since last surveyed. A new systematic survey is required for all previously known locations and potential habitat. NSW DEC (2005) note that access to accurate location records (i.e. to within 100 m) is required to ensure that the impact of managed bush fire hazard reduction activities on the species is minimised.

- Systematically survey all known and potential locations of the Illawarra zieria individuals, and map known sites and potential habitat for new sites (NSW OEH, 2015).
- Continue to update and implement site specific plans of management for sites on public land including new information (NSW OEH, 2015).
- Ensure the information on site locations and potential habitat is accessible to land managers.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
- Quantify rates of recruitment and survival under different disturbance and management regimes, including fire and grazing
- Determine (from the species' response to grazing and/or other physical damage) minimum disturbance intervals.
- Investigate the generation length for the species, in particular determine the age at which the Illawarra zieria is capable of flowering and producing seed, and the age at which it is typically most productive.
- Investigate and determine the optimal fire regimes and practices and those regimes that are inappropriate for long-term survival and recruitment of the species to enable appropriate fire management for the species (NSW OEH, 2015).
- Investigate options for linking, enhancing or establishing additional populations.

References and information sources cited in the advice

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