

# Flora

## ***A bright light on our forest floor – Thismia rodwayi (fairy lanterns)***

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*Thismia rodwayi* (fairy lanterns) was a species of plant that we thought we might never get to see. It is Tasmania's only subterranean flowering plant and has seldom been recorded since European settlement.

It is not the sort of species that turns up during routine botanical surveys as its growth habit makes it so inconspicuous it is virtually

invisible! Recently the species was recorded by chance by Nick Fitzgerald and Sandy Tiffen on an Understorey Network field day in a proposed coupe on Archers Sugarloaf near Meander.

The common name ascribed to *Thismia rodwayi* is 'fairy lanterns'. This name aptly describes the appearance of the small orange and red fleshy flowers that barely penetrate the soil surface and are typically covered by leaf-litter. These brightly coloured flowers are 10-18 mm in length and have an obovate longitudinally striped floral tube (the 'lantern'), surmounted by six perianth lobes - the inner three arching inward and cohering at the top, and outer lobes spreading (Figure 1). The vegetative part of the plant is entirely subterranean and is colourless. The roots are about 1-1.5 mm thick and spread 4-15 cm. They give rise to erect flower stems (0.5-3 cm), which bear about six colourless bracts (these are the 'leaves'), which increase in size toward the terminal flower. The plant lacks chlorophyll and is therefore incapable of photosynthesis. It is considered a saprophyte, although this term is slightly misleading as it derives its energy from a fungus - the fungus being the true saprophyte.

As in most so-called saprophytic plants, the fungal hyphae exist inside some of the root cells of *Thismia* plants, and convert rotting material into sugars using specialised enzymes. The plant can obtain carbohydrates by digesting the fungi (which is known as an

endophyte). The fungus inside the cortex cells accumulates fat globules in hyphal bladders, which discharge their contents into their host cells, presumably due to a digestive action of the host. The fat globules appear to be converted into a polysaccharide, probably glycogen.

*Thismia rodwayi* was first recorded in Tasmania (near Hobart) in 1890 and at that time caused quite a stir amongst botanists around the world because it was one of the first species in the family to be found in temperate climates (most species are tropical and subtropical). Since that first collection, the species had only been found on five other occasions from the Mt Field area, the Little Denison River area, somewhere in the northeast and two further sites on the lower slopes of Mt Wellington (the most recent being in 2002).

*Thismia rodwayi* is listed as Rare on the *Tasmanian Threatened Species Protection Act*. Prompted by the chance discovery of the species in the Meander area, Forestry Tasmania and the Forest Practices Board conducted a joint survey (assisted by several keen volunteers) for the species within the proposed coupe, in the wider Meander area and a few likely sites elsewhere in Tasmania.

The focus of the surveys was the proposed coupe on Archers Sugarloaf because we were uncertain of the potential impacts of the proposed harvesting and regeneration activities on the species. Searching for the species



Figure 2 Searching for *Thismia rodwayi* (not clear on this image but there are in fact three flowers within the excavated leaf litter).

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involves getting down and dirty on the forest floor - scratching through the leaf litter and upper soil layer with the hands to gently

remove the leaf litter to expose the protruding *Thismia* flowers (Figure 2). We found the species to be locally abundant in parts of the proposed coupe (Figure 3), usually associated with damper forest types (dominated by *Eucalyptus obliqua* with an understorey of *Bedfordia salicina*, *Pomaderris apetala*, *Coprosma quadrifida*, *Pultenaea juniperina*, *Pteridium esculentum* and *Blechnum nudum*). The apparently suitable habitat occupied about a third of the proposed coupe. Recognising that this forest type is also common in the wider Meander area, and to provide context for the management of the species within the proposed coupe, further surveys were conducted in the area (Figure 4). Again, we met with surprising success, finding the species at seven out of thirteen sites, all in wet sclerophyll forest dominated by *E. obliqua* or *E. delegatensis*.

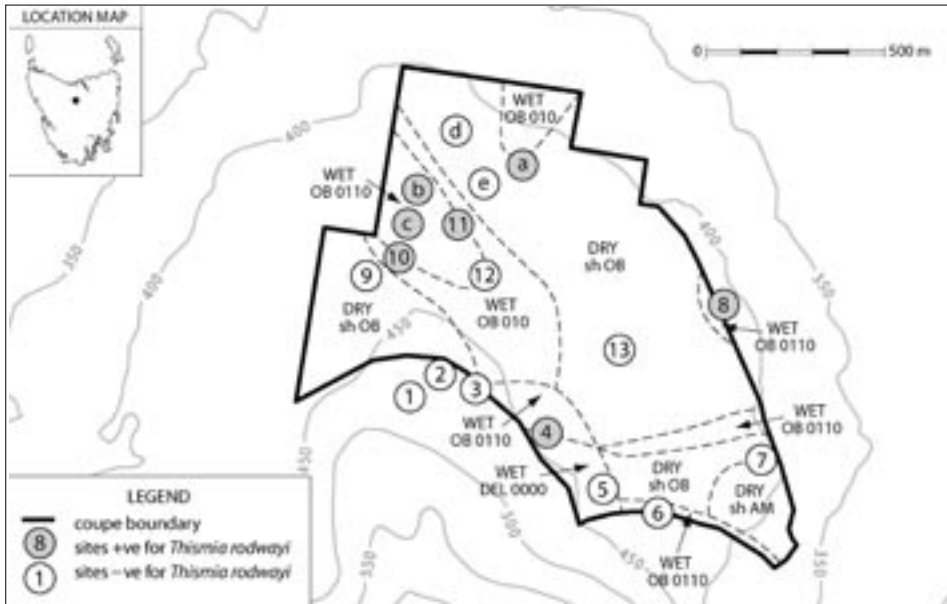


Figure 3 Coupe HU302D with sites searched for *Thismia rodwayi* and forest communities shown. The forest communities as mapped may contain localised areas of other communities. Numbers and letters refer to sample sites.

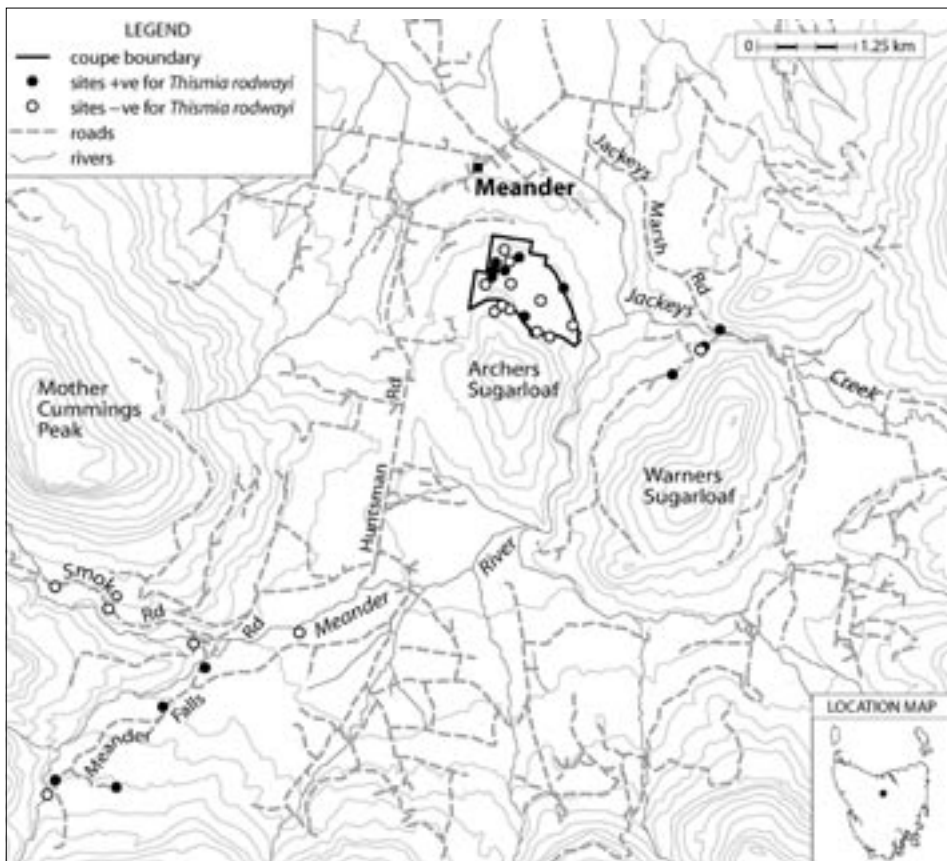


Figure 4 The Meander area, showing sites searched for *Thismia rodwayi*.

Routine botanical surveys will not detect *Thismia rodwayi* due to its cryptic habit – so we contacted several leaf litter invertebrate researchers to see if they had come across this distinctive species. A positive response came from terrestrial snail specialist Kevin Bonham who recalled seeing the species in the Franklin area in the 1980s – further searches confirmed the area supported the species.

We now had part of the “bigger picture” to begin to formulate management prescriptions for the species in areas proposed for logging (see Figure 5 for a distribution map). Almost all the sites supporting the species occurred in regrowth wet sclerophyll forest, usually dominated by *E. obliqua* – regrowth usually had resulted from burning (most sites in southern Tasmania have suffered the ravages of

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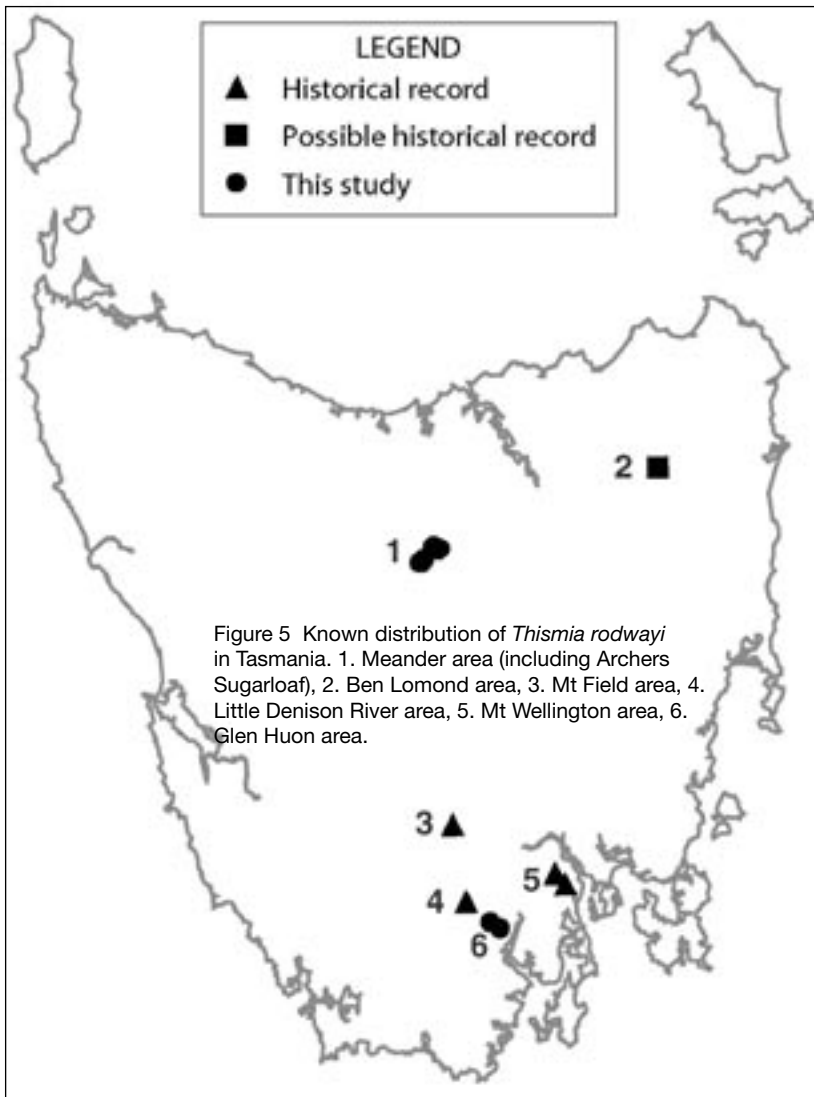


Figure 5 Known distribution of *Thismia rodwayi* in Tasmania. 1. Meander area (including Archers Sugarloaf), 2. Ben Lomond area, 3. Mt Field area, 4. Little Denison River area, 5. Mt Wellington area, 6. Glen Huon area.

The forest types supporting *Thismia rodwayi* are perhaps the most widespread and well reserved forest types in Tasmania – but they are also the ones subject to intensive production forestry activities. Searching for *T. rodwayi* in all coupes is simply not practical because its appearance is probably governed by seasonal conditions (both current and preceding) affecting soil and leaf litter microclimates and it only appears to flower for a few weeks over late spring to early summer.

We still know precious little about *Thismia rodwayi* – most of the information on the habitat and distribution has been anecdotal, and little is known of its reproductive biology and life cycle. Pollination and dispersal agents, flowering interval and germination conditions are largely speculative. As such, the species remains listed as Rare, and we try to find out more about this unique little plant. If anyone “stumbles” across the species, please forward details to the Forest Practices Board Botany section (or the Tasmanian Herbarium or the Threatened Species Unit of DPIWE) so the site can be investigated.

### Further reading

Roberts, N., Wapstra, M., Duncan, F., Woolley, A., Morley, J. and Fitzgerald, N. (2003). Shedding some light on *Thismia rodwayi* F. Muell. (fairy lanterns) in Tasmania: distribution, habitat and conservation status. *Papers and Proceedings of the Royal Society of Tasmania* 137: 1-12.

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(see back page for a plant from a different order that occupies a similar niche in Canada.)

the 1969 fires but also probably previous severe fire events) and from logging activities (some sites supporting the species were small remnants of relatively undisturbed forest within or adjacent to logged areas, often associated with streams).

Through a consultative approach between the Forest Practices Board, the local Forestry Tasmania District (Mersey) and the Threatened Species Unit (DPIWE), management prescriptions have

been developed for *Thismia* within the proposed coupe on Archers Sugarloaf. The majority of the sites will be protected in sites excluded from roading and logging activities, and the coupe will be resurveyed after logging and regeneration is complete to determine the impact of such activities on the species. Further surveys for the species are planned for this December in the Franklin area to allow broader management prescriptions to be developed for forest supporting the species.

### Postscript

Further searching for *Thismia rodwayi* took place in mid-December in the Huon and Mersey Districts. With the willing and able assistance of Huon District staff (Kerri Spicer, Steven Reeve, Peter Garth, Shane Burgess, Amy Hallam (work experience student), Charlie Fisher (work experience student), staff of the Threatened Species Unit (DPIWE) and some volunteers, we located three new sites for the species over two days. Monitoring of the known locations in a current coupe and surrounding areas in the Meander area also occurred (with thanks to Tony Allwright who managed to find this elusive plant at the first site he searched!) The species could not be located at some of the known sites in the Meander area but was abundant at others (including one site with over 20 plants in a 2 x 2 m area).