

Illuminating the dark of the forest floor: managing ‘fairy lanterns’

Thismia rodwayi in wood production forests in Tasmania



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In-situ photo showing *Thismia* with leaf litter removed. The white plant parts are beneath the soil–leaf litter interface with the coloured flower protruding into the litter (rarely emerging above it). Photo: H & A Wapstra

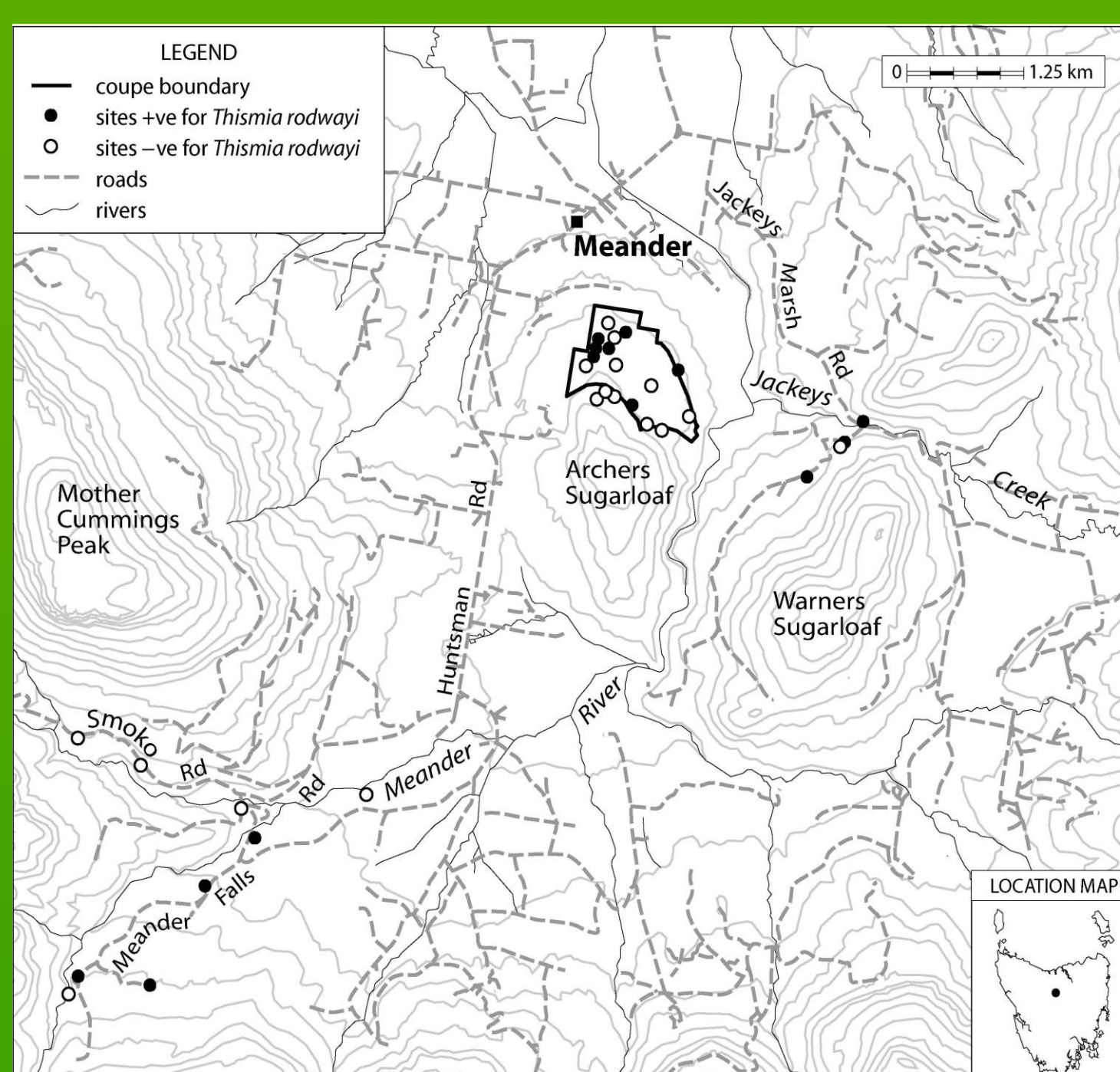
Results

The species is now known from about 25 sites in five disparate areas of the State.

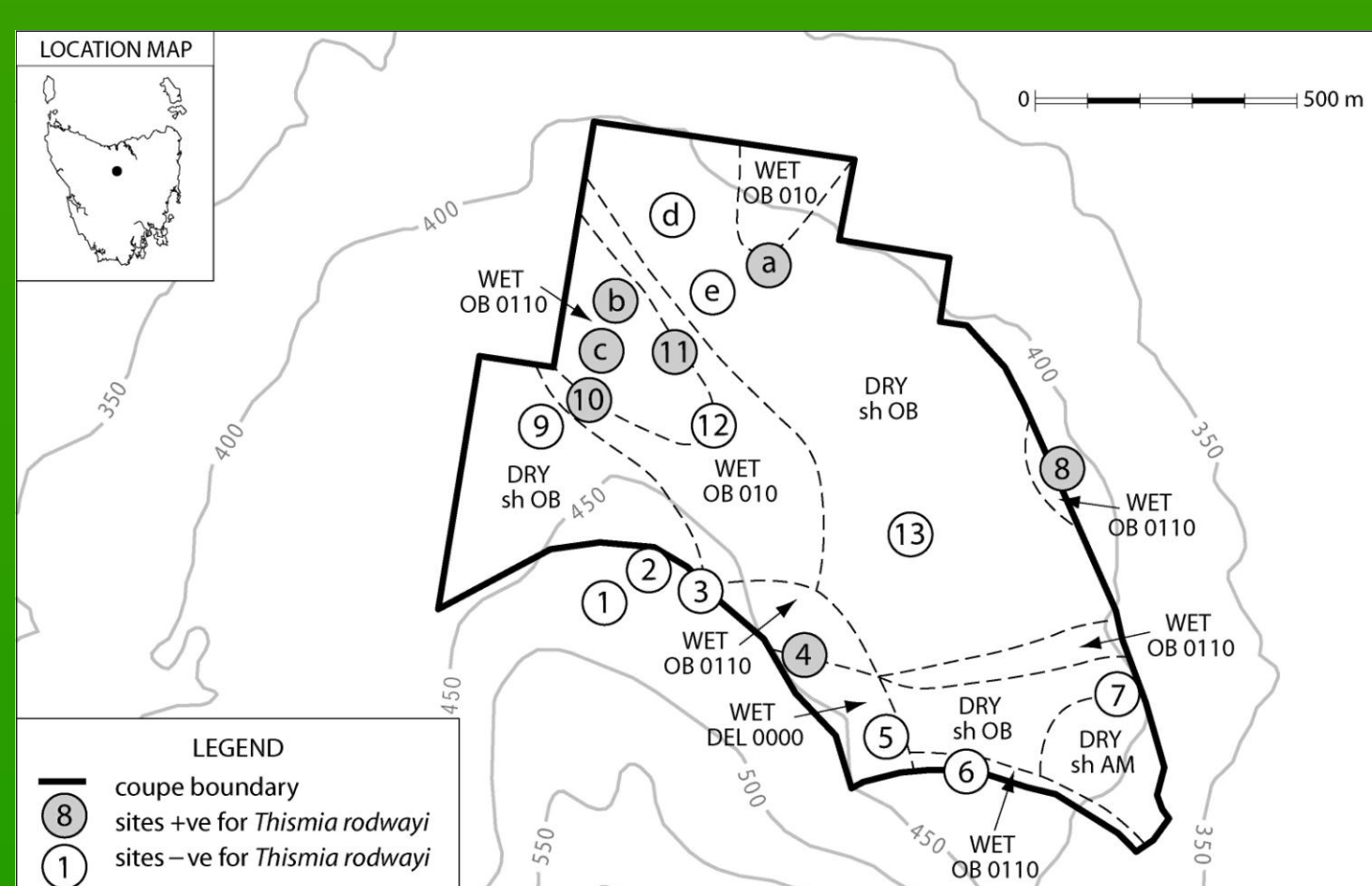
Thismia was recorded from 12 sites in the Meander area, populations varying from 1 to 25 plants. It was recorded from 5 sites in southern Tasmania. *Thismia* can be locally common (20 flowers/m²) but is usually sporadic (1 flower/20 m²).

Thismia is strongly associated with wet eucalypt forests with a dense shrub layer dominated by *Pomaderris apetala* (dogwood), *Bedfordia salicina* (blanketleaf) and/or *Olearia argophylla* (musk). It extends into damp sclerophyll forest on some sites where these shrubs co-occur with drier forest species. Most sites are in mature regrowth forest resulting from either logging and/or wildfire.

Thismia occurs in several reserves including Mt Field National Park, Jackeys Creek and Meander Falls Forest Reserves and one private land reserve. Most other sites are on State forest managed by Forestry Tasmania.



Distribution of *Thismia rodwayi* in the Meander area. The upper centre of the map shows coupe HU302D (more detailed maps shown below and below right)



Distribution of *Thismia rodwayi* in coupe HU302D showing forest types, topography and coupe boundary. Management prescriptions were developed by consultation, taking into account the habitat, distribution and ecology of the species.

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Thismia rodwayi – a rare plant (in every sense of the word)

Thismia rodwayi F.Muell. occurs in Tasmania, Victoria, New South Wales, southern Queensland and New Zealand. It is a member of family Burmanniaceae (c. 120 species worldwide; mainly tropical/subtropical).

Its vegetative parts are entirely subterranean and colourless. The roots are 1–1.5 mm thick and spread 4– 5 cm, giving rise to erect flower stems with colourless bracts. The crimson and orange flowers are 10–18 mm in length, with the striped floral tube (the ‘lantern’) being surmounted by six perianth lobes. *Thismia* flowers in spring to early summer.

Thismia lacks chlorophyll and is therefore incapable of photosynthesis. It has many attributes of a saprophyte, but derives its energy from a fungus – the fungus being the true saprophyte.

Prior to the current study, *Thismia rodwayi* was known from only four records in Tasmania. It is listed as a Rare species on the Tasmanian *Threatened Species Protection Act* 1995.

Background to current study

A flower of *Thismia* was found in 2002 in a proposed State forest coupe (HU302D) near Meander, in northern Tasmania. The extent, abundance and habitat of the species in the coupe and nearby areas were assessed to develop management prescriptions, as required by Tasmania’s forest practices system.

Methods

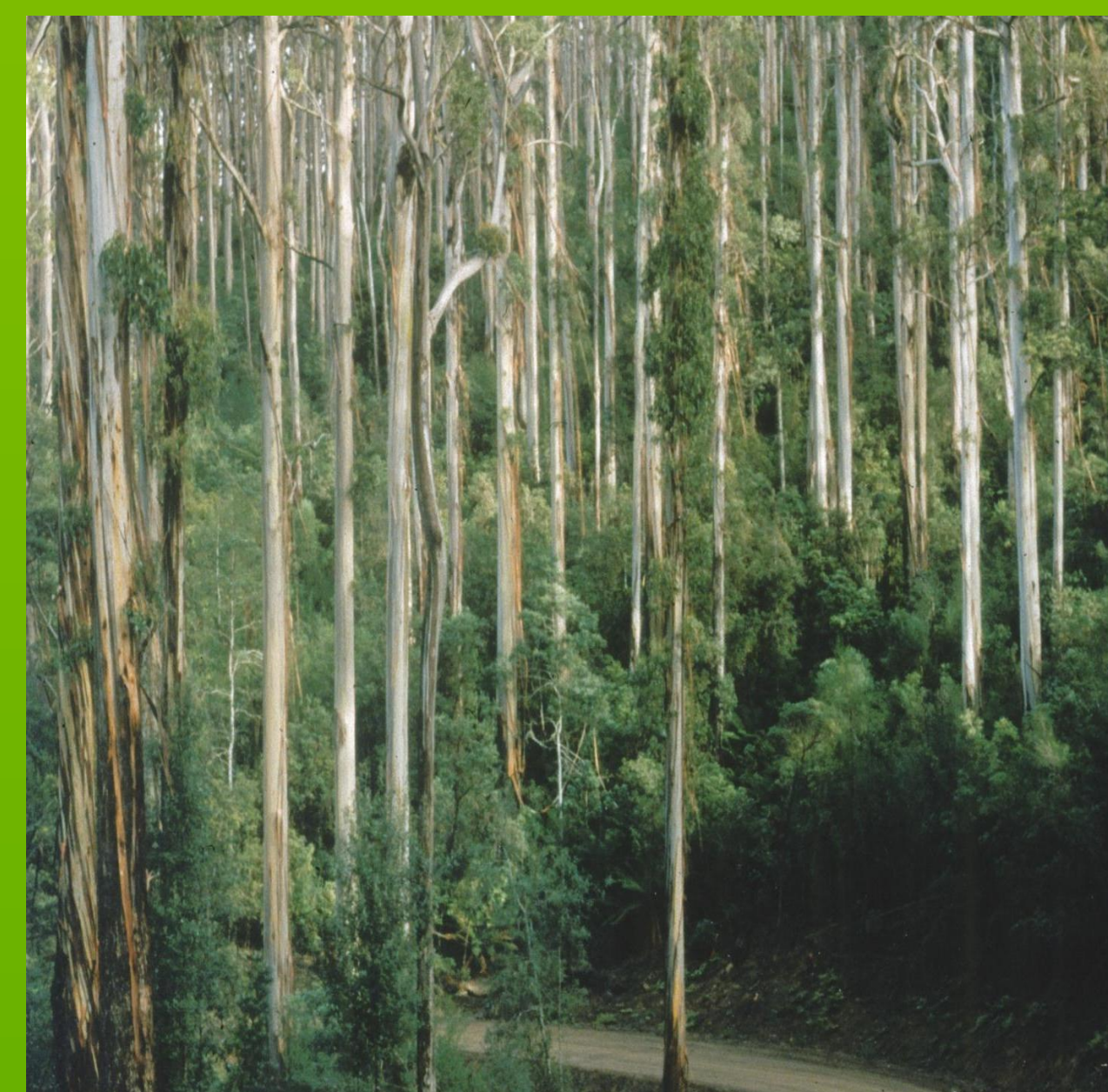
Intensive sampling was undertaken in September to December (flowering period), by careful excavation of leaf litter and the upper soil profile. Sites in HU302D were located by stratified random sampling in all forest types. Outside the coupe, sampling was undertaken in more prospective habitats.

Potential habitats in the vicinity of previous records elsewhere in Tasmania were also surveyed to assess broader habitat and conservation issues.

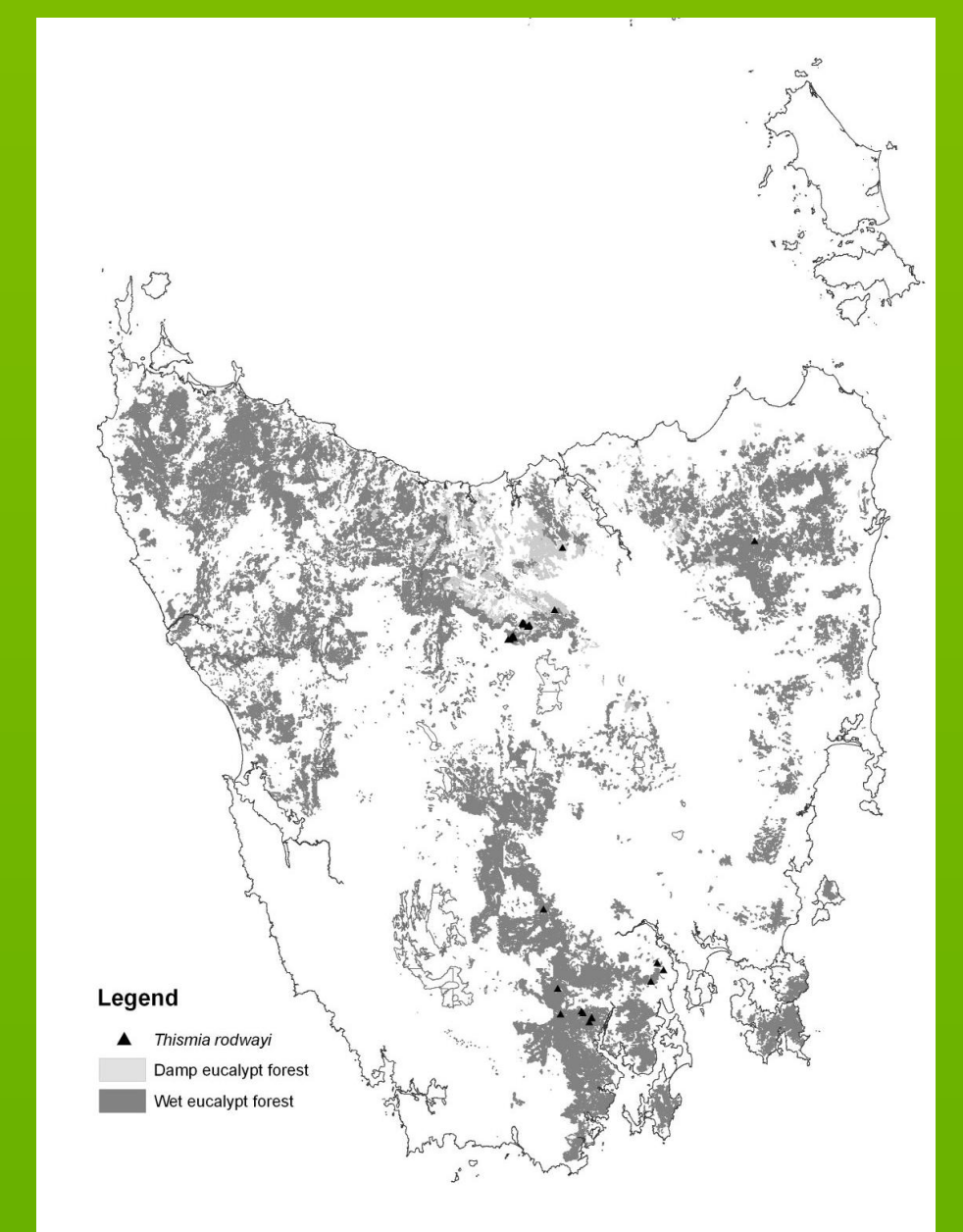
Most sites containing *Thismia* were re-sampled in 2003 and 2004. These included sites excluded from logging in HU302D, and one site where logging was undertaken to assess its effect on the species.



Searching for *Thismia rodwayi*. Note the dense cover of litter (excavated) and size of flowers (arrowed).



Typical habitat of *Thismia rodwayi*: mature regrowth wet sclerophyll forest dominated by one or more species of eucalypt with a dense understorey of broad-leaved shrubs.



Records of *Thismia rodwayi* showing its disjunct distribution across the State. Distribution of favoured wet and damp forest habitat is indicated.

Management of *Thismia rodwayi* in Tasmanian production forests

The Tasmanian *Forest Practices Code* requires that specialists from the Forest Practices Authority and Tasmania’s conservation department (Primary Industries, Water & Environment) consult about management of threatened flora in wood production forests.

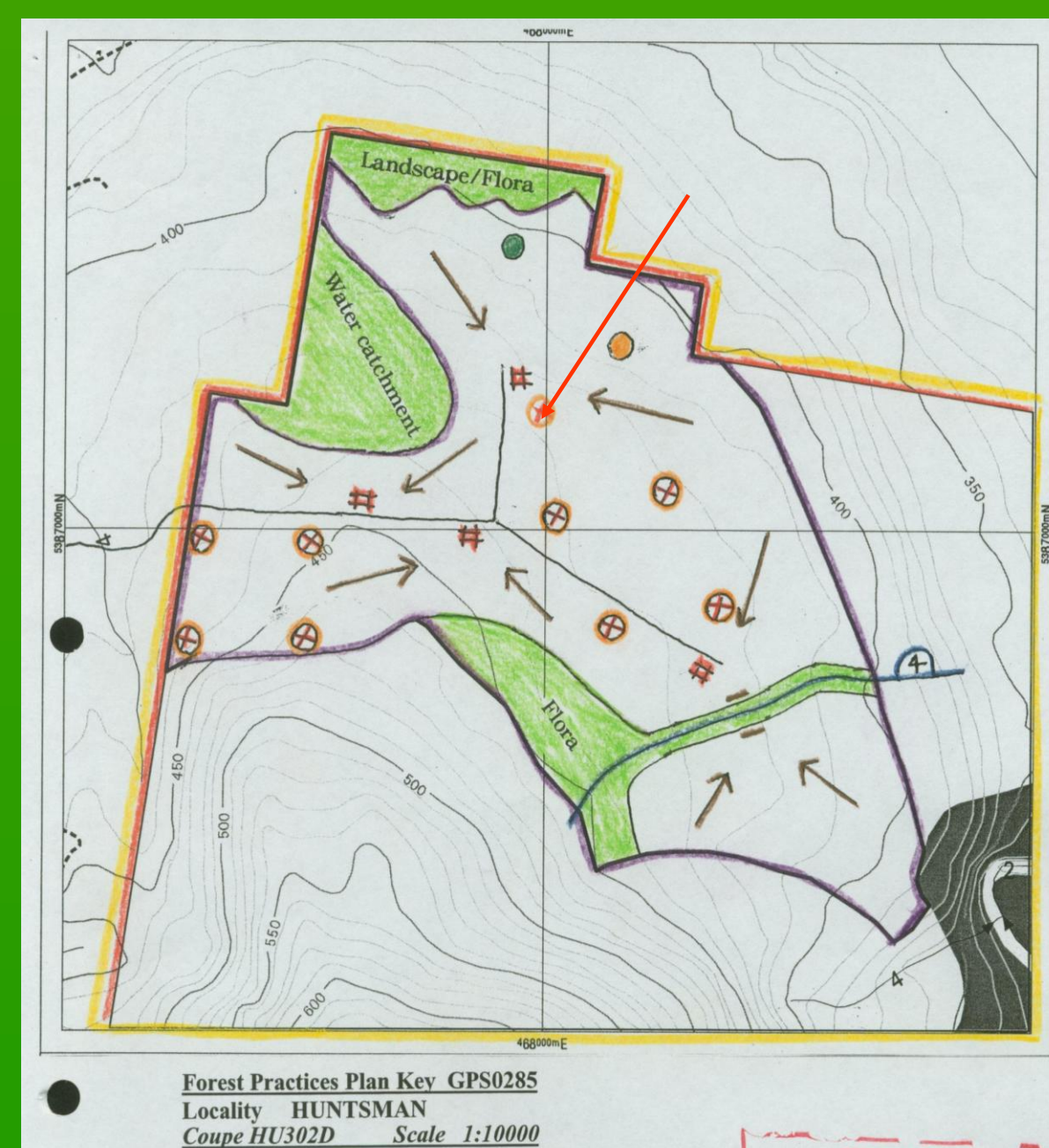
It is not practical to survey for *Thismia* prior to forestry operations because of its cryptic and ephemeral habit. Its preferred wet forest habitat is widespread and well reserved, and the exclusion of forestry operations from all potentially suitable sites is not feasible. In addition, some disturbances (e.g. selective logging and fire) do not appear to be detrimental to the species in the longer term.

Coupes close to known *Thismia* sites may warrant surveys and development of prescriptions to retain habitat – these prescriptions are incorporated into Forest Practices Plans. Potential habitat in other areas is maintained by consideration of land use at a landscape level, including presence of wet eucalypt forest in:

- formal reserves (e.g. National Parks);
- informal reserves (e.g. streamside reserves); and
- wood production areas (taking account of subsequent management – e.g. native forest regeneration or plantation establishment).



Harvesting in wet sclerophyll forest typical of that inhabited by *Thismia rodwayi*. Coupe HU302D was subject to a mixture of native forest silviculture techniques including advanced growth retention and seed tree retention.



Map from Forest Practices Plan for coupe HU302D. Green areas show where logging is excluded from most *Thismia* sites, as well as areas reserved for landscape and water supply. One *Thismia* site (red arrow) has been logged to assess the species’ ability to recover from disturbance.

Ongoing research

We know very little about their biology, ecology, distribution and habitat of many of our threatened plants. With cryptic and ephemeral species like *Thismia* we know even less because our ability to improve our knowledge is hampered by the logistics of finding enough material to work on.

The following are some of the research directions being pursued:

- Annual monitoring of populations, including logged sites;
- Reproductive biology – pollination / dispersal mechanisms;
- Genetic relationships between populations;
- Further studies of distribution and ecology.

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 & Proceedings of the Royal Society of Tasmania* 137: 55–66.

Wapstra, M., French, B., Davies, N., O’Reilly-Wapstra and Peters, D. (2005). A bright light of the dark forest floor: observations on fairy lanterns *Thismia rodwayi* F. Muell. (Burmanniaceae) in Tasmanian Forests. *The Tasmanian Naturalist* 127: 2–18.

Acknowledgements

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