

IVG Forest Conservation Report 2A

Validation of the ENGO proposed reserves for the conservation of priority flora species on public forest

March 2012

A report of the Independent Verification Group for the
Tasmanian Forest Agreement

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List of abbreviations:

CAR Reserve System	Comprehensive, Adequate and Representative Reserve System
DPIPWE	Department of Primary Industries, Parks, Water and Environment
ENGO	environment non government organisations
EPBC Act	<i>Environment Protection Biodiversity Conservation Act 1999</i>
FPA	Forest Practices Authority
IGA	Tasmanian Forests Intergovernmental Agreement between the Commonwealth of Australia and the State of Tasmania
IVG	Independent Verification Group
NVA	Natural Values Atlas, DPIPWE
RFA	Tasmanian Regional Forest Agreement 1997
TSP Act	<i>Threatened Species Protection Act 1995</i>
TSS	Threatened Species Section, DPIPWE

Glossary

Biodiversity: the variability among living organisms from all sources (including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part). This includes diversity within species and between species and diversity of ecosystems.

CAR Reserve: Comprehensive, Adequate and Representative reserve system, as defined in the Tasmanian Regional Forest Agreement 1997.

DPIPWE: Department of Primary Industries, Parks, Water and Environment, which includes the Resources Management and Conservation Division and the Threatened Species Section.

ENGO: environment non-government organisations which are signatories to the Statement of Principles, being The Wilderness Society, Australian Conservation Foundation, and Environment Tasmania.

EPBC Act: The *Environment Protection and Biodiversity Conservation Act 1999*, which relates to the protection of the environment and the conservation of biodiversity, and for related purposes.

Environment includes:

- (a) ecosystems and their constituent parts, including people and communities; and
- (b) natural and physical resources; and
- (c) the qualities and characteristics of locations, places and areas; and
- (d) heritage values of places; and
- (e) the social, economic and cultural aspects of a thing mentioned in a, b, c or d.

Forest Practices Authority (FPA): The independent statutory body responsible for administering the *Forest Practices Act 1985* through the development and management of the Forest Practices System.

Forest Practices System: The system established pursuant to the objective set out in schedule 7 of the *Forest Practices Act 1985*.

Forestry Tasmania: Responsible body for management of public land within the forest practices system.

FPAC: Forest Practices Advisory Council established under the *Forest Practices Act 1985*.

Independent Verification Group: a group of experts jointly nominated by, but independent of, both Governments and all other stakeholders and led by Professor Jonathan West to provide advice to the Prime Minister and the Tasmanian Premier on the results of an independent verification process to be undertaken in accordance with Terms of Reference jointly agreed by the Governments.

Habitat: the biophysical medium or media (a) occupied (continuously, periodically or occasionally) by an organism or group of organisms; or (b) once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced.

High Conservation Value (HCV) Forests: those forest areas identified as High Conservation value by the Signatories to the Statement of Principles.

Native forest: Any naturally occurring forest community containing the full complement of native species and habitats normally associated with that community, or having the potential to develop these characteristics. Native forests include mature, regrowth and regenerating forests.

Natural Values Atlas (NVA): A database administered by DPIPWE, with a web-based interface that allows observations of Tasmanian plants and animals to be viewed, recorded and analysed.

Private land: A land tenure arrangement where the land is permanently owned and not leased

Recovery Plans: wildlife management programs that delineate, justify and schedule management actions necessary to support the recovery of a threatened species or ecological community.

Reserve – formal: Publicly managed land tenures that can only be revoked with parliamentary approval.

Reserve – informal: Land protected through administrative instruments by public authorities.

Reserve – Private: Private land managed under secure arrangements, including proclamation under legislation, contractual agreements such as management agreements and covenants, and reserves set aside under independently certified forest management systems.

RFA: Regional Forest Agreements (RFAs) are 20-year plans, signed by the Australian and certain State governments, for the conservation and sustainable management of certain areas of Australia's native forests.

State forest: Forest on Public land which has been designated multiple-use forest by Parliament, under the *Forestry Act 1920*. This land, which includes purchased land, is managed by Forestry Tasmania.

Tasmanian Community Forest Agreement (TCFA): A supplement to the RFA (commonly referred to as the TCFA) signed in 2005 by the Commonwealth and Tasmanian governments, that resulted in additional protection of oldgrowth forests in Tasmania.

Threatened: When used in association with a species, population or community indicates that it is listed under the TSP Act 1995 or the EPBC Act 1999.

Threatened Species Section (TSS): A section of the Biodiversity Conservation Branch of the Resource Management and Conservation Division of the Department of Primary Industries Park, Water and Environment (DPIPWE).

TSP Act: The Tasmanian *Threatened Species Protection Act 1995*, an Act to provide for the protection and management of threatened native flora and fauna and to enable and promote the conservation of native flora and fauna.

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Summary

ENGO proposed reserves substantially improve the protection of a range of priority flora species (62 vascular flora species, 2 lichens). Three reserves (123, 23,212) are rated as extremely high, seven reserves as very high (252, 93,126, 193, 150, 14, and 198), 17 reserves as high (258, 208, 113, 239, 29, 115, 257, 163, 25, 58, 245, 211, 236, 33, 97, 78 & 54) and 11 as medium contribution for priority flora. The ten highest ranked ENGO-proposed reserves would make an outstanding contribution to the CAR Reserve system and the National Reserve System of Australia and will help to address deficiencies in the representation of threatened flora in the reserve system noted by Watson et al (2010).

ENGO proposed reserve 123 in Tasmania's east is outstanding in its high threatened flora values, capturing important populations of 12 priority threatened flora species. In addition a number of species of high conservation significance are known to occur in this proposed reserve (123) but have not been assessed in this analysis as they are not currently listed as threatened due to their recent description or insufficient knowledge of their extinction risk.

An additional 60 of the proposed ENGO reserves would make a significant contribution at the State and/or bioregional levels. Field verification will be required to determine the accuracy of locational information for these proposed ENGO reserves.

Two nationally listed species have 100% of their known distribution protected in ENGO reserves, and ten species have more than 40% improvement in their status (three nationally listed).

Management by reservation alone will not cater for the ecological requirements of all of Tasmania's priority flora species and reservation should be regarded as only one aspect of a comprehensive strategy for managing Tasmania's priority flora species. For many priority species reservation needs to be accompanied by a commitment to manage reserved areas to ensure that the balance of their natural values is maintained. In the most part this can be achieved through an appropriate disturbance regime (such as fire) for there are some species that are positively associated with disturbance

Note that this report does not cover palaeo-endemic species and threatened eucalypt species as these are covered in IVG FC 3B & 3C.

1. Introduction

This report (*Validation of the ENGO proposed reserves for the conservation of priority flora species on public forest*) outlines the contribution of the reserves proposed by the environmental non-government organisations under the Tasmanian Forest Agreement for the reservation and protection of priority flora species. It has been produced by the Independent Verification Group, with data and assistance from the Department of Primary Industries, Parks, Water and Environment and the Forest Practices Authority. It is a component of the Forest Conservation Assessment.

Tasmania has a complex legislative and policy framework for biodiversity conservation (Wapstra & Munks 2007). This framework delivers three primary approaches to achieve ecological sustainable forest management (State of Tasmania 2009).

These are:

- the development of a Comprehensive, Adequate and Representative (CAR) reserve system to securely protect conservation values;
- the maintenance of a permanent native forest estate; and
- the development of off-reserve management actions.

The CAR reserve system was developed during the Regional Forest Agreement (RFA) in 1997 to build on existing reserves. It is the primary landscape-level measure that contributes to the conservation of biodiversity in Tasmania. It is comprised of formal, informal and private reserves in all forest and non-forest types across Tasmania (Figure 1). Each type of reserve has a different level of protection (Authority 2007b):

- **formal reserves** are on publicly managed land and can only be revoked with parliamentary approval
- **informal reserves** are land protected through administrative instruments by public authorities and
- **private reserves** are areas of private land managed under secure arrangements, which includes proclamation under legislations, contractual agreements (e.g. conservation covenants) and reserves set aside under independently certified forest management systems.

2. Methods

This report has been compiled by the Independent Verification Group and has been assisted with data and information provision from the Department of Primary Industries, Parks, Water and Environment and Forest Practices Authority. It should be noted that the information presented is a broad overview of information considered relevant to the brief in the limited timeframe available. Whilst the Independent Verification Group has used its best endeavours to ensure accuracy, it does not warrant that the material is free of error.

2.1 Selection of priority species

In total 63 priority flora species were considered for the analysis of the contribution of the ENGO proposed reserves towards their protection on a statewide basis (41 species) and at bioregional level (an additional 27 species). The process to select these 63 species is detailed below.

Threatened taxa were selected from the revised RFA priority list, excluding taxa not relevant to the proposed reserves because of irrelevant tenure e.g. restricted to Bass Strait islands or restricted solely to private land, or fully formally reserved. Taxonomically dubious taxa, extinct taxa and those in process of being delisted were also excluded. Threatened eucalypts and palaeo-endemics were also excluded as these were dealt with in separate analyses (see Appendix 3 and IVG Forest Conservation Reports 3B & 3C) leaving an initial list of 175 vascular flora species and 19 lichen species

Weightings were allocated to each species dependent on State and National conservation status and Tasmanian endemic status for the Australian distribution according to formula below:

TSPA*	EPBC**	Endemicity	Weighting
e	CR	endemic	5
e	EN	endemic	4.5
e	EN	not endemic	4
v	EN	endemic	3.5
e		endemic	3.5
e	VU	endemic	3.5
e	VU	not endemic	3.5
v	VU	endemic	3
e		not endemic	3
v	VU	not endemic	2.5
v		endemic	2.5
r		endemic	2
r	VU	not endemic	2
v		not endemic	2
r		not endemic	1

Table 1. Weightings reflecting priority based on conservation status and endemicity in Tasmania (for the Australian distribution) of threatened flora species

* e = endangered; v = vulnerable; r = rare under the Threatened Species Protection Act (TSPA)

** CR = critically endangered; EN = endangered; VU = vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*(EPBC)

Scores for taxa were adjusted up by 0.5 if actions on public forest were proposed through the Project Prioritisation Protocol project (DPIPWE 2010 –view at <http://www.dpipwe.tas.gov.au/inter.nsf/Attachments/LJEM-87Y7U4?open>) for securing endangered and vulnerable species for fifty years. The proposed actions focussed on single subpopulations unless more populations were considered necessary to secure a species for the 50 year timeframe. Discretionary adjustments up or down were made using up-to-date knowledge of factors relating to the conservation status of taxa by botanists from the Threatened Species Section, DPIPWE.

The weighting is strongly aligned to the conservation status (extinction risk) and reflects to a large degree the importance of an improvement in the formal reservation status relative to the existing level of formal reservation for a species e.g. an improvement of 20% in formal reservation of a Critically Endangered species that is already 70% formally reserved would be more significant than an improvement of 20% for a vulnerable species that is already 30% formally reserved.

Observation data was downloaded from DPIPWE's Natural Values Atlas (NVA) in September 2011 and used to determine the taxa (out of 175 vascular flora taxa and 19 lichens) whose percentage of observations or 100x100 m grid cells with observations that fall into the ENGO proposed reserves (including current informal reserves earmarked for formal reservation) was 5% or greater. This meant the list was further reduced to a total of 62 vascular flora species and 2 lichen species. This was adjusted using the species weightings above x 0.2 leaving 39 priority vascular flora species and 2 lichens with an adjusted score greater than 5. Grid cells were used to overcome bias due to sampling frequency.

At each stage, the priority lists and results were checked for anomalies according to expertise of the TSS botanists. Anomalies were not detected for the 41 priority species, with the species placement in this group meeting the expectations of TSS botanists. A brief report is included for each of the 41 priority species, including their conservation status under State and Commonwealth legislation (Appendix 1).

The 194 species were assessed using occurrence in 100x100 m grid cells for proposed reserves in each bioregion. This revealed 31 species additional to the 41 priority species in which the proposed reserves improved the weighted percentage reservation by an adjusted score greater than 5.

2.2 Data input

Observation data in NVA was 'cleaned up' for these final priority list taxa to further refine the list. Outlying observations were marked as 'bad' in NVA because of poor location accuracy or identification issues and doubtful observations that could not be verified were identified so that the results of the analysis could be adjusted if necessary and a commentary on the quality of data made in the species reports. Four of the 31 species with a significant proposed improvement in the reservation status by bioregion were excluded due to inaccurate data or observations with poor location precision leaving 27 non-state but bioregional priority species (see Appendix 2).

Distributional records from the Tasmanian Herbarium have not been updated in the NVA since 2006. The Tasmanian Herbarium data for vascular plants has now been obtained from TMAG and is being prepared for input into NVA. In the meantime new herbarium records which have not yet been included in NVA for the 41 priority species (268 records) were

assessed against the proposed reserves, resulting in only 1 additional reserve for one of the priority species. Relevant new data was included in the final analysis.

2.3 Categorisation of reserves according to their importance for priority threatened flora

The proportion of 100 x 100 m grid cells occupied by each state priority species was adjusted according to the species importance weighting and summed for each reserve. Seven categories were used for this analysis. Natural splits in this data was used to create six categories relating to the weighted amount of improvement that each proposed reserve could contribute to the reservation of state priority flora species. Adjustments to the categorisation were made according to data quality and the contribution of species of bioregional significance. This resulted in an additional category (for proposed reserves containing observations of bioregional priority species in bioregions where there would be a significant improvement in the bioregion). However, data quality and the presence of bioregional priority species sufficiently reinforced the highest ranking contribution of reserve 123 to perhaps warrant placing this reserve into a category of its own.

In order to present the results quantitatively (and to better consider the contribution by species of bioregional significance in bioregions where the proposed reserves made a significant difference) to facilitate comparison with other values, weighted contributions for each reserve for each bioregional priority species in the bioregion where the contribution of the proposed reserve was significant were summed. A weighting (x 0.5) was applied to this figure and added to the state priority species score and reserves placed into categories according to natural breaks in the scores and taking consideration of adjustments to compensate for poor quality data (to a small extent). The robustness of the weightings was tested by comparison using weightings of 0.3, 0.4, 0.6 and 0.7. Reserves in the highest and lowest categories did not change and the different weightings affected only 1 or 2 categories in the 2nd and 3rd most important categories and few in the next 2 categories (6 categories in total, the 7th category with no improvement).

There are many different ways of categorising the importance of species and it was felt important that the results should match the expectations of experts, which it does particularly for the top 2 categories. For the state priority species (where the proposed reserves would make a significant improvement for a species at a state level) this approach has not included the importance of the proposed reserves in bioregions where the proposed reserves would make a significant improvement in a bioregion. However it is expected that the raw data (in particular the quality of the data) would be examined in making final decisions for a reserve and to this end a relevant profile including annotated distribution maps are provided for each of the 41 species for which the proposed reserve would make a significant improvement to the formal reservation on a state basis. For the additional 37 species for which the proposed reserves would make a significant improvement to the formal reservation in a bioregion, annotated maps have been provided.

The relevant data are presented in the file provided (flora categorisation.xlsx) with data presented in the various worksheets and the final allotment of reserves into importance categories in the last worksheet. A version is also presented by the 3 existing tenures of the proposed reserves. The tenure breakdown for all species considered in the analysis is included in the file provided as well as a version by the 3 existing tenures of the proposed reserves. A summary table and map are provided in the next section.

3. Proposed reserves that improve the formal reservation of priority flora species

ENGO proposed reserves substantially improve the protection of a range of priority flora species (62 vascular flora species, 2 lichens)(Table 2, 3 & Figure 1), although there is less benefit for listed threatened eucalypt species (Table 4). Three reserves (123, 23,212) are rated as extremely high, seven reserve as very high 252, 93,126, 193, 150, 14, and 198), 17 reserves as high and 11 medium. Together with other reserves in the extremely high and very high importance categories, the ten highest ranked ENGO-proposed reserves would make an outstanding contribution to the CAR Reserve system and the National Reserve System of Australia and will help to address deficiencies in the representation of threatened flora in the reserve system noted by Watson et al (2010). An additional 60 of the proposed reserves would make a significant contribution at the State and/or bioregional levels.

Two nationally listed species have 100% of their known distribution protected in ENGO reserves, and ten species have more than 40% improvement in their status (three nationally listed)(Table 2).

species	% improvement in reservation	TSPA	EPBC
<i>Boronia hemichiton</i>	100	e	VU
<i>Thynninorchis nothofagicola</i>	100	e	CR
<i>Asplenium trichomanes</i> subsp. <i>trichomanes</i>	78	v	
<i>Boronia hippopala</i>	68	v	VU
<i>Hibbertia calycina</i>	65	v	
<i>Prasophyllum stellatum</i>	60	e	CR
<i>Acacia pataczekii</i>	52	r	
<i>Euphrasia scabra</i>	45	e	
<i>Epacris limbata</i>	43	e	CR
<i>Micrantheum serpentinum</i>	43	r	
<i>Thismia rodwayi</i>	40	r	
<i>Pomaderris pilifera</i> subsp. <i>talpicutica</i>	40	e	

Table 2. Percentage improvement in reservation through proposed ENGO reserves for listed priority flora.

ENGO proposed reserve 123 in Tasmania's east is outstanding in its high threatened flora values, capturing important populations of 12 priority threatened flora species (Table 3). In addition a number of species of high conservation significance are known to occur in this proposed reserve but have not been assessed in this analysis as they are not currently listed as threatened due to their recent description or insufficient knowledge of their extinction risk.

Figure 1 Proposed reserves that improve the formal reservation of priority threatened flora species (excluding threatened eucalypts and palaeo-endemics) presented in 7 importance categories

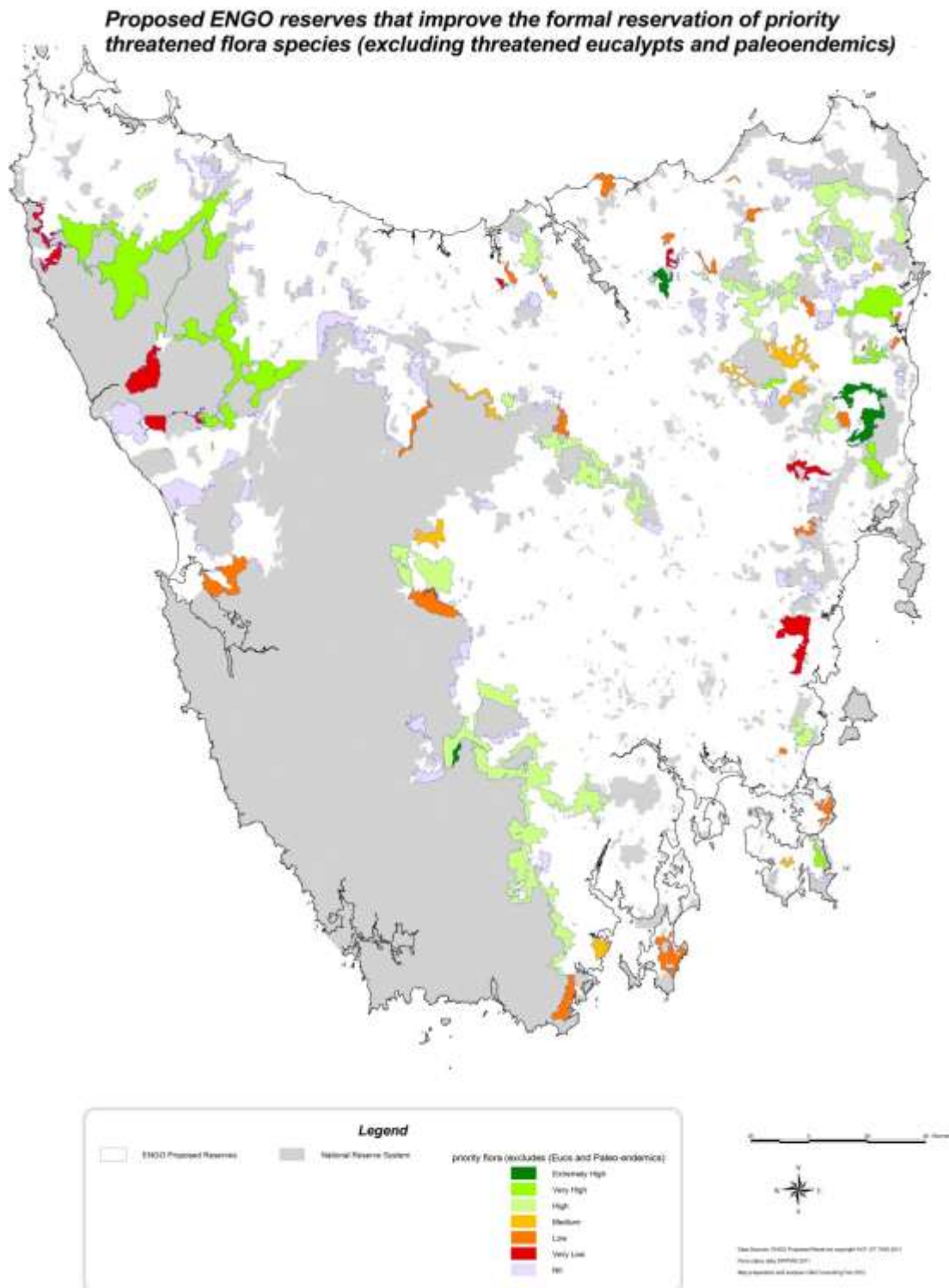


Table 3. Priority flora values in proposed ENGO reserves within each benefit category

Reserve number	Category	Score	Priority species -State	Priority species - Bioregion
123	Extremely High	6.7763	<i>Asplenium trichomanes</i> subsp. <i>trichomanes</i> <i>Boronia gunnii</i> <i>Boronia hippopala</i> <i>Epacris moscaliana</i> <i>Euphrasia scabra</i> <i>Hovea tasmanica</i> <i>Monotoca submutica</i> var. <i>autumnalis</i> <i>Stonesiella selaginoides</i>	<i>Acacia axillaris</i> <i>Baumea gunnii</i> <i>Pellaea calidirupium</i> <i>Plantago debilis</i>
23	Extremely High	5.5000	<i>Thynniorchis nothofagicola</i>	
212	Extremely High	4.5000	<i>Boronia hemichiton</i>	
252	Very High	3.2685	<i>Epacris curtisiae</i> <i>Erioderma solediatum</i> <i>Personia muelleri</i> subsp. <i>angustifolia</i> <i>Roccellinastrum neglectum</i>	<i>Caladenia pusilla</i> <i>Orthoceras strictum</i>
93	Very High	2.8762	<i>Epacris limbata</i> <i>Euphrasia collina</i> subsp. <i>deflexifolia</i>	<i>Caladenia caudata</i> <i>Pellaea calidirupium</i>
126	Very High	2.5465	<i>Corunastylis nuda</i> <i>Prasophyllum stellatum</i>	
193	Very High	2.3230	<i>Euphrasia collina</i> subsp. <i>deflexifolia</i> <i>Hibbertia calycina</i> <i>Hovea corrickiae</i> <i>Hovea tasmanica</i>	<i>Baumea gunnii</i> <i>Blechnum cartilagineum</i> <i>Plantago debilis</i>
150	Very High	2.2689	<i>Asplenium trichomanes</i> subsp. <i>trichomanes</i> <i>Euphrasia collina</i> subsp. <i>deflexifolia</i> <i>Thismia rodwayi</i>	<i>Pellaea calidirupium</i>
14	Very High	2.1141	<i>Cyathodes platystoma</i> <i>Euphrasia collina</i> subsp. <i>deflexifolia</i> <i>Euphrasia semipicta</i> <i>Thelymitra jonesii</i>	<i>Prasophyllum apoxychilum</i>
198	Very High	1.7634	<i>Epacris glabella</i> <i>Micrantheum serpentinum</i>	
258	High	1.2544	<i>Agrostis australiensis</i>	<i>Baumea gunnii</i> <i>Caladenia caudata</i> <i>Hypolepis muelleri</i> <i>Lobelia rhombifolia</i> <i>Orthoceras strictum</i> <i>Pterostylis atriola</i> <i>Stellaria multiflora</i>
208	High	0.9600	<i>Acacia pataczekii</i> <i>Barbarea australis</i>	<i>Blechnum cartilagineum</i>
113	High	0.8847	<i>Acacia pataczekii</i> <i>Euphrasia scabra</i>	<i>Baumea gunnii</i> <i>Cyphanthera tasmanica</i>
239	High	0.8601	<i>Epacris virgata</i> (Beaconsfield) <i>Spyridium obcordatum</i>	<i>Caladenia caudata</i>
29	High	0.7633	<i>Corunastylis nuda</i> <i>Odixia achlaena</i>	<i>Pterostylis atriola</i> <i>Spyridium parvifolium</i>

				<i>var. parvifolium</i>
115	High	0.7031	<i>Thismia rodwayi</i>	<i>Uncinia elegans</i> <i>Xerochrysum bicolor</i> <i>Stellaria multiflora</i>
257	High	0.6667	<i>Hypolepis distans</i>	
163	High	0.6667	<i>Pomaderris pilifera</i> subsp. <i>talpicutica</i>	
25	High	0.5547	<i>Asplenium hookerianum</i> <i>Cyathodes platystoma</i> <i>Monotoca submutica</i> var. <i>autumnalis</i> <i>Persoonia muelleri</i> subsp. <i>angustifolia</i> <i>Thismia rodwayi</i>	<i>Pentachondra ericifolia</i> <i>Stellaria multiflora</i>
58	High	0.5000	<i>Rhytidosporum inconspicuum</i>	
245	High	0.4182	<i>Pomaderris elachophylla</i> <i>Xerochrysum palustre</i>	
211	High	0.4100	<i>Isolepis habra</i>	
236	High	0.4100		<i>Gratiola pubescens</i> <i>Hypolepis muelleri</i>
33	High	0.3590	<i>Monotoca submutica</i> var. <i>autumnalis</i>	
97	High	0.3086	<i>Agrostis diemenica</i> <i>Hovea tasmanica</i>	<i>Acacia sicutiformis</i> <i>Baumea gunnii</i> <i>Stellaria multiflora</i>
78	High	0.3000		<i>Acacia axillaris</i>
54	High	0.3000		<i>Xerochrysum bicolor</i>
127	Medium	0.2077	<i>Monotoca submutica</i> var. <i>autumnalis</i>	<i>Caladenia congesta</i>
260	Medium	0.2061		<i>Deyeuxia brachyathera</i> <i>Hypolepis muelleri</i>
125	Medium	0.2015	<i>Monotoca submutica</i> var. <i>autumnalis</i> <i>Persoonia muelleri</i> subsp. <i>angustifolia</i> <i>Thismia rodwayi</i>	
137	Medium	0.2013	<i>Epacris moscaliana</i>	
188	Medium	0.2000		<i>Thelymitra holmesii</i>
3	Medium	0.1833	<i>Cyathea cunninghamii</i>	<i>Senecio velleioides</i>
12	Medium	0.1772	<i>Cyathodes platystoma</i>	
156	Medium	0.1600	<i>Acacia pataczekii</i>	
66	Medium	0.1582		<i>Pentachondra ericifolia</i> <i>Stellaria multiflora</i>
217	Medium	0.1500	<i>Corunastylis nuda</i>	
92	Medium	0.1384	<i>Epacris glabella</i> <i>Micrantheum serpentinum</i>	
5	Low	0.1257	<i>Cyathodes platystoma</i>	<i>Caladenia pusilla</i>
175	Low	0.1000	<i>Hibbertia calycina</i>	
154	Low	0.1000	<i>Hibbertia calycina</i>	
103	Low	0.0891	<i>Acacia pataczekii</i>	<i>Stellaria multiflora</i>
22	Low	0.0857	<i>Odixia achlaena</i>	
17	Low	0.0827	<i>Cyathodes platystoma</i>	
224	Low	0.0816	<i>Cyathea cunninghamii</i>	
214	Low	0.0808		<i>Austrodanthonia induta</i> <i>Desmodium gunnii</i>
174	Low	0.0682	<i>Hovea corrickiae</i>	<i>Desmodium gunnii</i>

				<i>Plantago debilis</i>
105	Low	0.0625	<i>Micrantheum serpentinum</i>	
44	Low	0.0613	<i>Pomaderris elachophylla</i>	
184	Low	0.0500		<i>Pentachondra ericifolia</i>
243	Low	0.0485		<i>Hypolepis muelleri</i>
68	Low	0.0450	<i>Euphrasia collina</i> subsp. <i>deflexifolia</i>	<i>Pentachondra ericifolia</i>
256	Low	0.0429	<i>Caladenia caudata</i>	
106	Low	0.0400		<i>Deyeuxia brachyathera</i>
233	Low	0.0400	<i>Blechnum cartilagineum</i>	
52	Low	0.0370	<i>Persoonia muelleri</i> subsp. <i>angustifolia</i>	
218	Low	0.0364		<i>Desmodium gunnii</i>
262	Low	0.0336		<i>Spyridium parvifolium</i> var. <i>parvifolium</i> <i>Thelymitra holmesii</i>
112	Low	0.0333		<i>Senecio velleioides</i>
2	Low	0.0333		<i>Deyeuxia minor</i> <i>Thelymitra holmesii</i>
203	Low	0.0333		<i>Senecio velleioides</i>
87	Very Low	0.0250	<i>Euphrasia collina</i> subsp. <i>deflexifolia</i>	<i>Cyphanthera tasmanica</i>
225	Very Low	0.0189	<i>Thismia rodwayi</i>	
244	Very Low	0.0172	<i>Epacris curtisiae</i>	
39	Very Low	0.0167		<i>Pellaea calidirupium</i>
147	Very Low	0.0118		<i>Plantago debilis</i>
102	Very Low	0.0111		<i>Senecio velleioides</i>
149	Very Low	0.0111		<i>Senecio velleioides</i>
195	Very Low	0.0047		<i>Spyridium parvifolium</i> var. <i>parvifolium</i>

Table4. Threatened eucalypt species values in proposed ENGO reserves

<i>species</i>	endemicity	TSPA listing	% improvement	Important reserves
<i>Eucalyptus barberi</i>	Endemic	rare	2%	29, 39
<i>Eucalyptus morrisbyi</i>	Endemic	endangered	No improvement	-
<i>Eucalyptus perriniana</i>		rare	4%	-
<i>Eucalyptus risdonii</i>	Endemic	rare	No improvement	-
<i>Eucalyptus gunni</i> ssp. <i>divaricata</i>	Endemic	endangered	7%	74 (needs field verification)

6. Discussion

While the results of the importance of the areas covered by the proposed ENGO reserves match the expectations of experts to a large degree, particularly for the top 2 benefit categories, final decisions may need to further consider data quality issues, whether the populations captured by the proposed reserves are viable (with respect to populations size) and whether an appropriate disturbance regime for the priority species would be compromised by reservation as some areas would need to be actively managed to ensure the persistence of the priority species (see Appendix 4). Field verification may be required to

obtain necessary information to support the decisions. The current reservation status of the species has not been considered directly in this analysis, only indirectly through weightings that take extinction risk into consideration (i.e. conservation status). Similarly the existing tenure of the proposed reserves has not been considered when assessing the benefit to the priority species by the proposed reserves e.g. comparing the benefit of formal reservation from informal reserves compared with unreserved areas, though the data is provided in accompanying files.

Note that this analysis did not include threatened eucalypts or palaeo-endemic species as these were dealt with in other reports and analyses for the IVG project (IVG Forest Conservation Reports 3B & 3C).

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Appendix 1: Species profiles and annotated distribution maps for threatened flora species with a significant benefit from the ENGO proposed reserves in Tasmania

(note that the analysis excluded threatened eucalypts and palaeoendemics)

Acacia pataczekii
Agrostis australiensis
Agrostis diemenica
Asplenium hookerianum
Asplenium trichomanes subsp. *trichomanes*
Barbarea australis
Boronia gunnii
Boronia hemichiton
Boronia hippopala
Corunastylis nuda
Cyathea cunninghamii
Cyathodes platystoma
Epacris curtisiae
Epacris glabella
Epacris limbata
Epacris moscaliana
Epacris virgata (Beaconsfield)
Erioderma solediatum
Euphrasia collina subsp. *deflexifolia*
Euphrasia scabra
Euphrasia semipicta
Hibbertia calycina
Hovea corrickiae
Hovea tasmanica
Hypolepis distans
Isolepis habra
Micrantheum serpentinum
Monotoca submutica var. *autumnalis*
Odixia achlaena
Persoonia muelleri subsp. *angustifolia*
Pomaderris elachophylla
Pomaderris pilifera subsp. *talpicutica*
Prasophyllum stellatum
Rhytidosporum inconspicuum
Roccellinastrum neglectum
Spyridium obcordatum
Stonesiella selaginoides
Thelymitra jonesii
Thismia rodwayi
Thynninorchis nothofagicola
Xerochrysum palustre

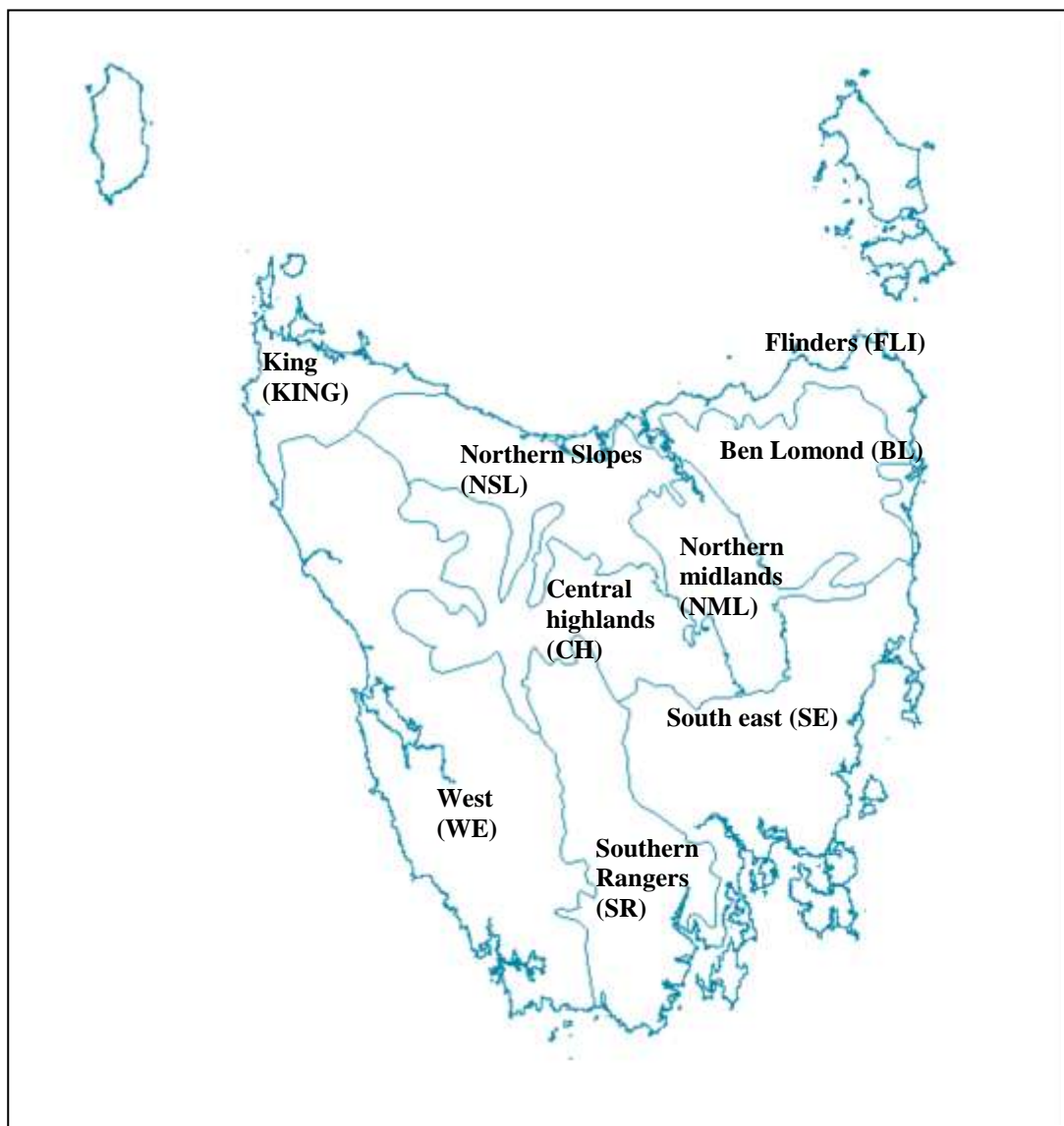
Explanatory notes:

The proposed reserve contribution - includes improving tenure of existing informal reserves as well as reserving currently unreserved land.

Species comments are sourced from the Listing Statements and Notesheets developed by DPIPWE (see www.dpipwe.tas.gov.au/threatenedspecieslists).

There has not been sufficient time for these corrections to be made to the Department of Primary Industries, Parks, Water & Environment's Natural Values Atlas so that corrected distribution maps could be included in this report. Distribution maps with hand-written notes and comments on the treatment of individual records for the purposes of this assessment have been attached and are provided for transparency reasons. If analysis highlighted that the proposed ENGO reserves are important for threatened flora protection and the data is considered or inaccurate then this is highlighted in the individual species profiles. Whilst these maps may not appear professional, they represent the most accurate distributional records currently available to February 2012, and there was insufficient time to redo the analysis using adjusted data.

Figure 2. Map of the nine interim biogeographical regions for Tasmania (IBRA 5)



Rank: 13

Species: *Acacia pataczekii*

Status: rare (TSP Act), endemic to Tasmania

Life form: shrub – small tree

Weighting: 2

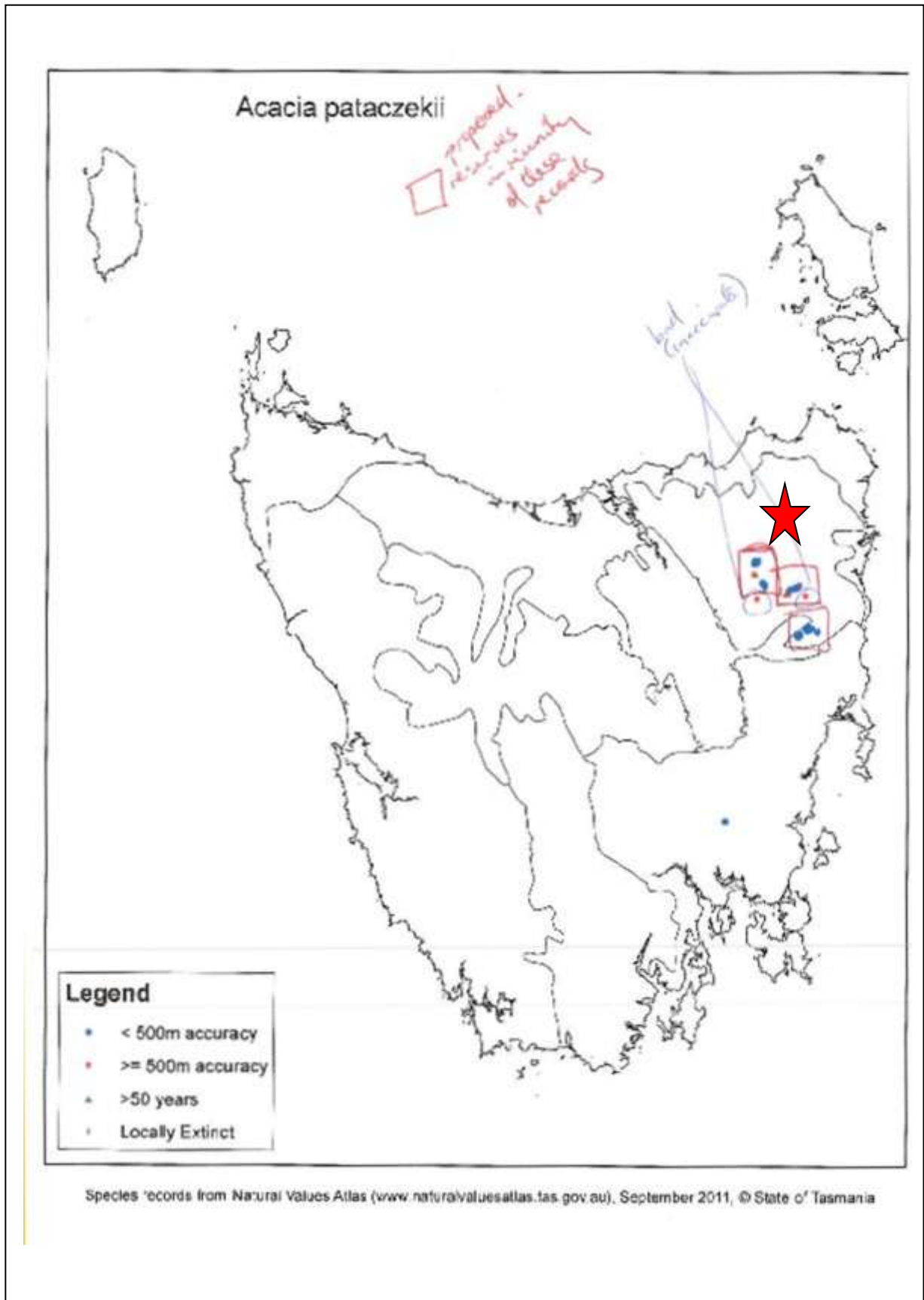
Proposed reserve contribution – state wide: 46% **bioregion:** BL – 47%

The distribution of this species covers <1/4 of the BL bioregion and a disjunct site in the SE bioregion. 4 proposed reserves, all in BL, contribute to the improvement in the conservation status on a state and bioregional basis.

Data quality: The removal of observations with poor location precision and historical observations is unlikely to significantly impact on the contribution of the proposed reserves.

Species comments: *Acacia pataczekii* is restricted to dry sclerophyll forest, predominantly in the north-east of the State.

Acacia pataczekii distribution map



Rank: 29

Species: *Agrostis australiensis*

Status: rare (TSP Act)

Life form: grass

Weighting: 2

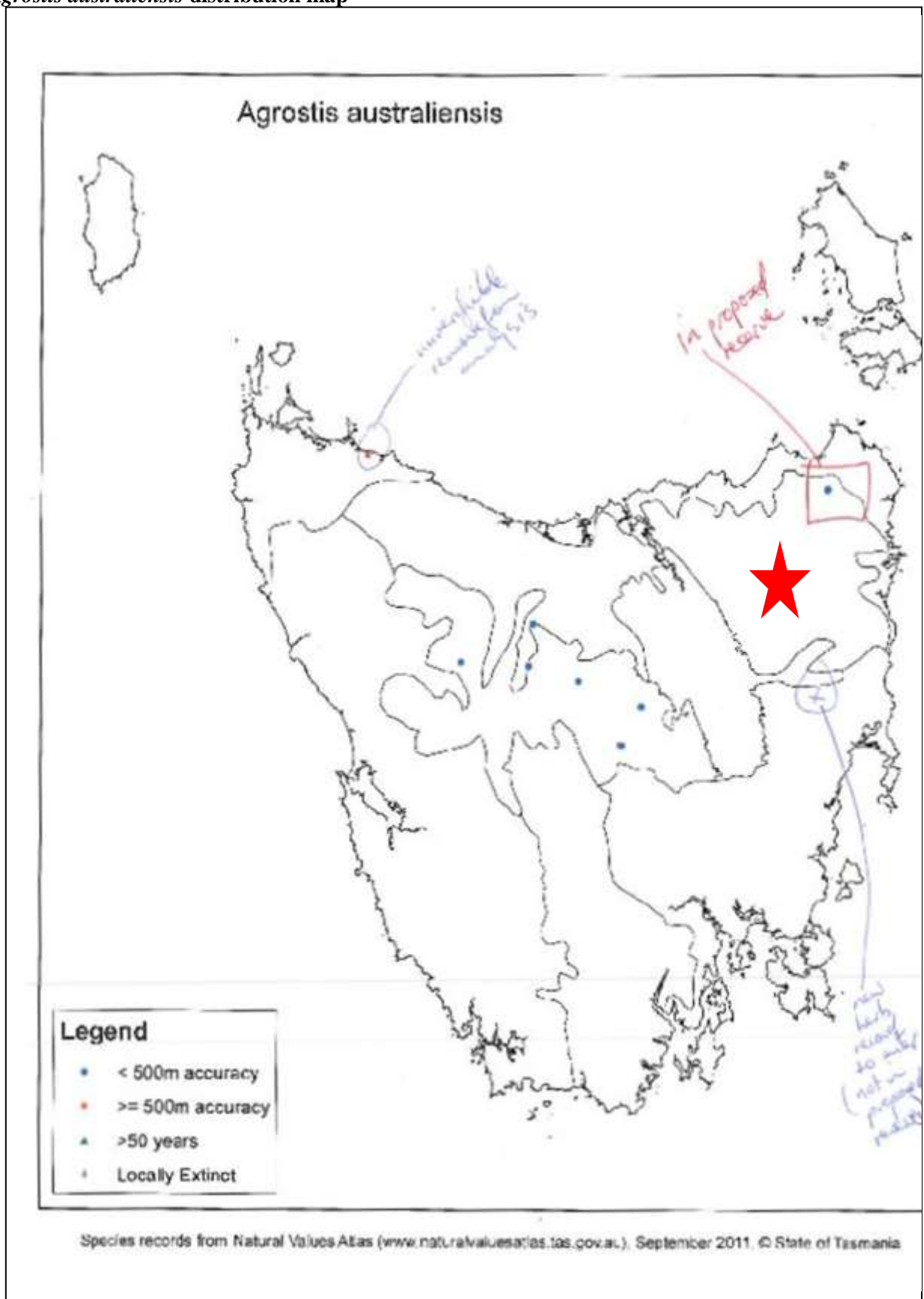
Proposed reserve contribution – state wide: 10% **bioregion:** BL: 40%

The known distribution of this species is scattered over 1/3 of the CH bioregion, and a disjunct site in the BL bioregion which is captured by the proposed reserves number 258. Another disjunct site from a new herbarium record occurs in the SE bioregion though does not fall in the proposed reserves.

Data quality: This species is not well known and is likely to be under recorded. The observation in the KING bioregion has poor location precision and should be removed from future analyses. The addition of the site in the SE bioregion will not impact to the contribution offered by the proposed reserves.

Species comments: On the mainland, this species occurs in Victoria and New South Wales. It is apparently uncommon in Tasmania; however this could be due to difficulty in identification.

Agrostis australiensis distribution map



Rank: 29

Species: *Agrostis diemenica*

Status: rare (TSP Act); endemic to Tasmania.

Life form: grass.

Weighting: 2

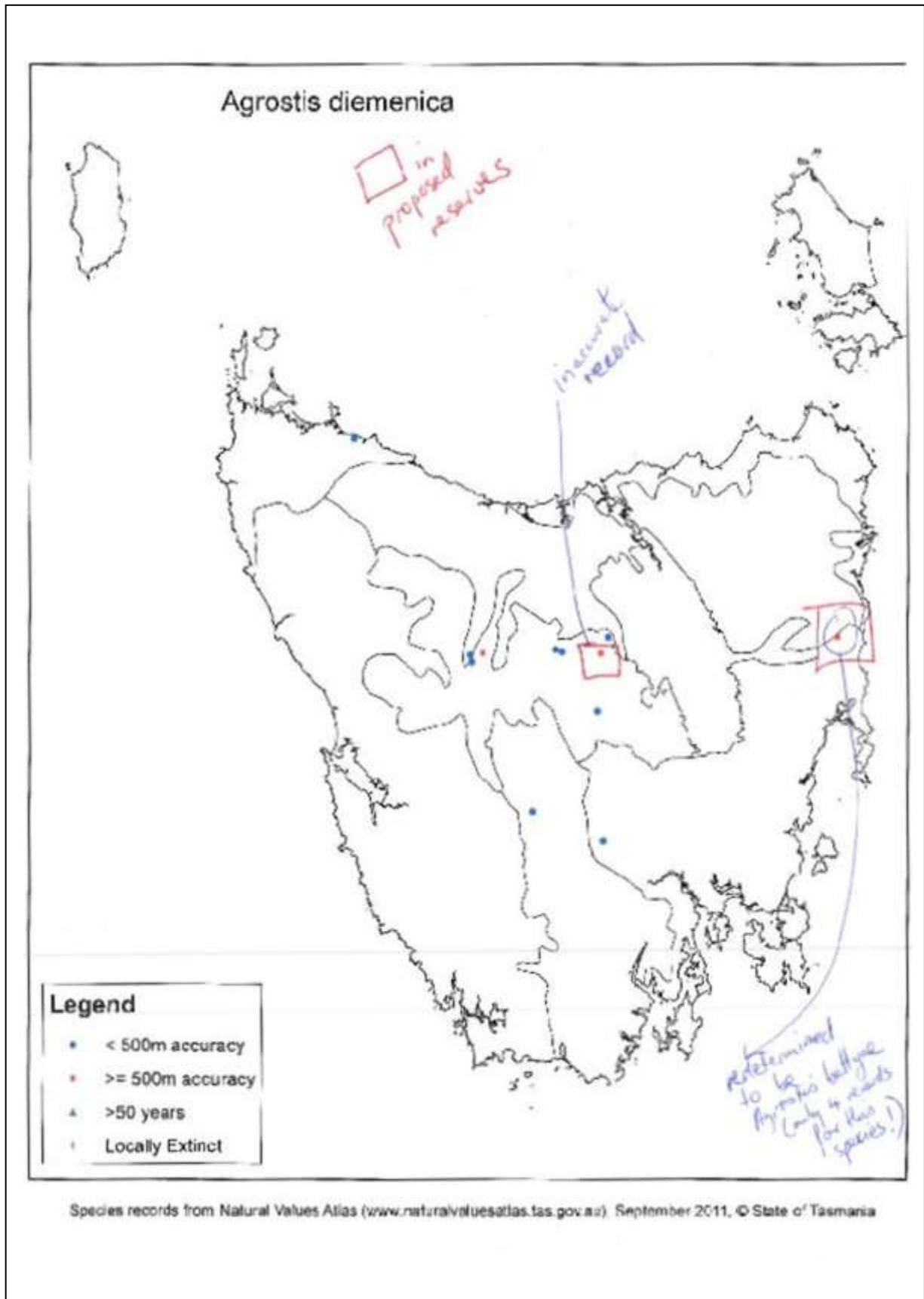
Proposed reserve contribution – state wide: 17% **bioregion:** CH: 14%; SE: 50%

The known distribution of this species is scattered over 1/3 of the CH bioregion, with single disjunct sites in the KING, SR and SE bioregions. Reserve 97 captures a site with poor location precision in the CH bioregion(=/- 2500m) bioregion.

Data quality: Poor. This species is not well known and is likely to be under recorded. The Dukes Marshes observation (reserve 123) in the SE bioregion has been redetermined to be *Agrostis bettyae*, a species known only from 3 other observations scattered across the same bioregion. This makes this observation highly significant from a conservation perspective though the species has not yet been considered for listing under the TSP Act. Removal of this observation from the analysis for *Agrostis diemenica* would significantly reduce the contribution of the proposed reserves for this species.

Species comments: *Agrostis diemenica* has been recorded from Crayfish Creek, Dukes Marsh, west of Meadowbank on the edges of lakes, marshes and streams.

Agrostis diemenica distribution map



Rank: 38

Species: *Asplenium hookerianum*

Status: endangered (TSP Act); Vulnerable (EPBC Act)

Life form: fern

Weighting: 4

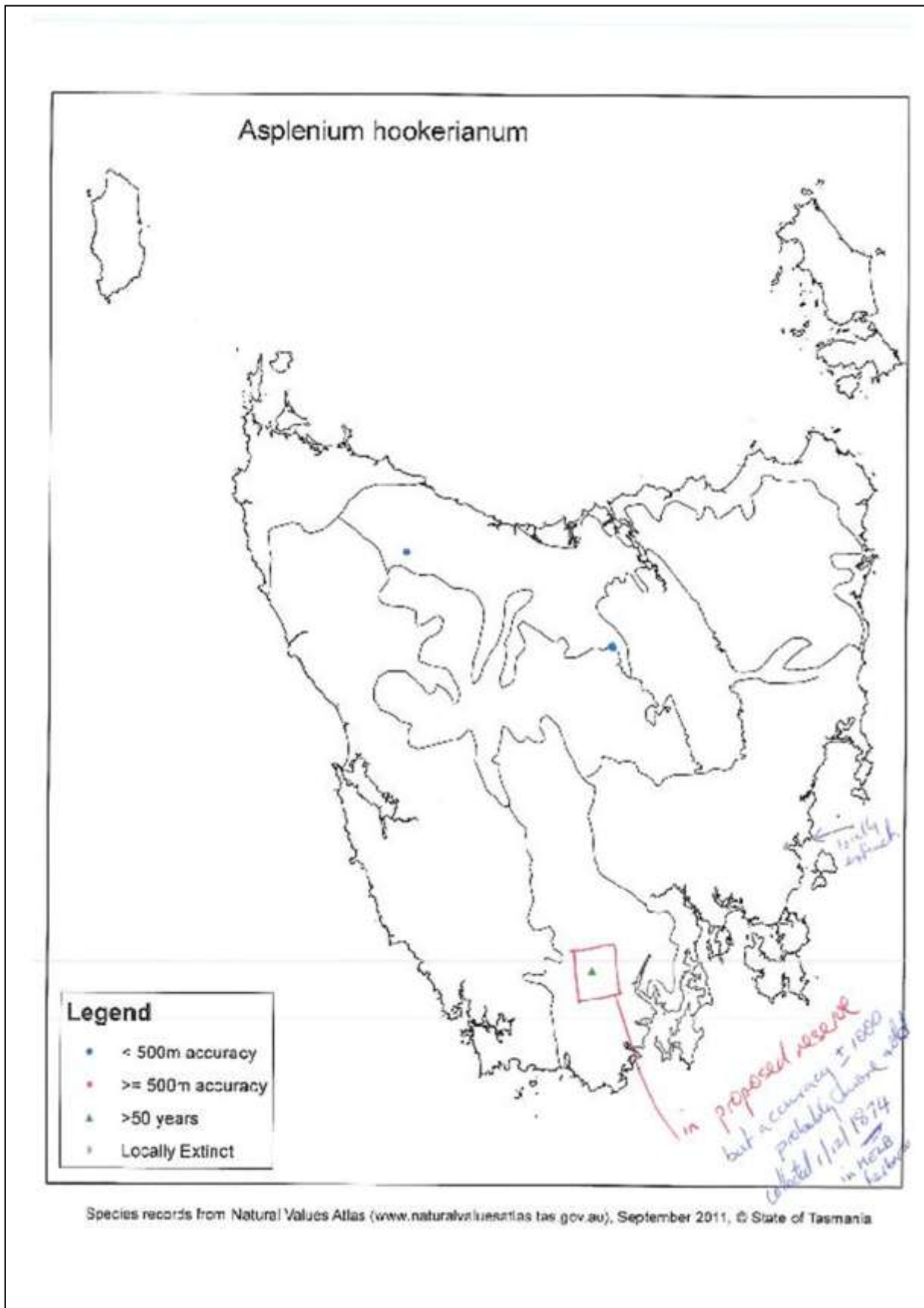
Proposed reserve contribution – state wide: 10% **bioregion:** SR: 100%

The status of the Picton River site that is potentially captured by proposed reserve 25 in the SR bioregion is uncertain. The species is also known from a disjunct site in the NSL bioregion, the boundary of NSL and CH, and a presumed extinct site in the SE bioregion

Data quality: Poor. The Picton River specimen is held in the Melbourne Herbarium. It was collected in 1874 and the observation has a poor location precision stated as +/- 1000m but is likely to be even less precise. Removal of the site from the analysis would result in no contribution by the proposed reserves for this species.

Species comments: *Asplenium hookerianum* has a disjunct distribution across Tasmania, being known from Hellyer Gorge in the northwest, Drys Bluff in the central north. The Hellyer Gorge and Drys Bluff subpopulations are known to support at least 200 plants, with good recruitment at the latter site, though it should be noted that the full extent of the species at the two sites has yet to be determined.

Asplenium hookerianum distribution map



Rank: 6

Species: *Asplenium trichomanes* subsp. *trichomanes*

Status: vulnerable (TSP Act)

Life form: fern

Weighting: 3

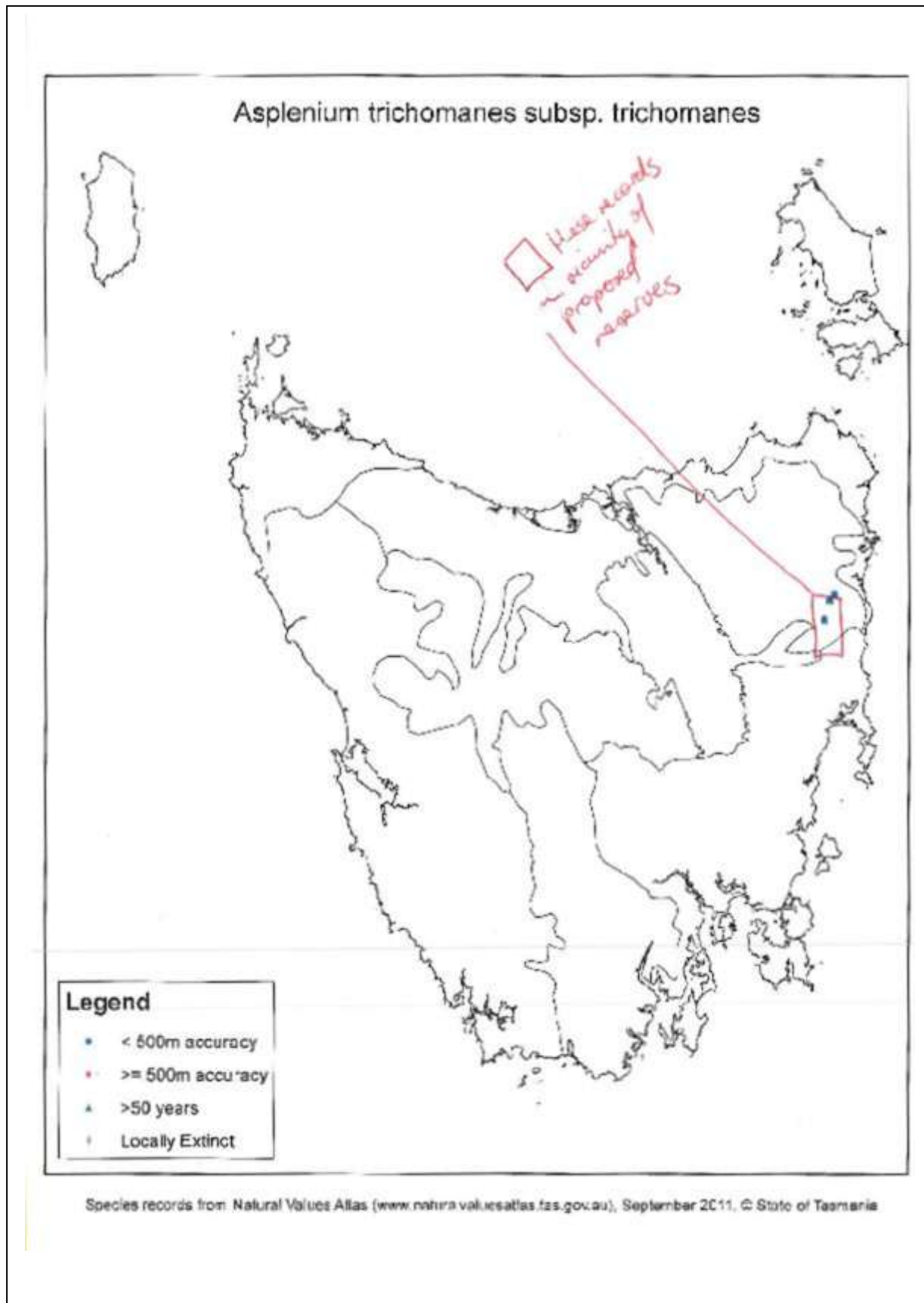
Proposed reserve contribution – state wide: 80% **bioregion:** BL – 80%

This species is restricted to 3 sites in the BL bioregion. Reserves 123 and 150 capture 181 of the 211 plants recorded in the latest surveys. The proposed reserves would fully reserve this species.

Data quality: Good.

Species comments: Within Tasmania, *Asplenium trichomanes* subsp. *trichomanes* has been recorded from three sites in the northeast: Mt Durham, Huntsmans Cap, and Valley Road on the northern flanks of the Fingal Tier. The linear extent of the sites is about 13km, the extent of occurrence 7 to 8 km², and the area of occupancy approximately 1 ha.

Asplenium trichomanes subsp. *trichomanes* distribution map



Rank: 18

Species: *Barbarea australis*

Status: endangered (TSP Act); Critically Endangered (EPBC Act); endemic to Tasmania.

Life form: herb

Weighting: 3

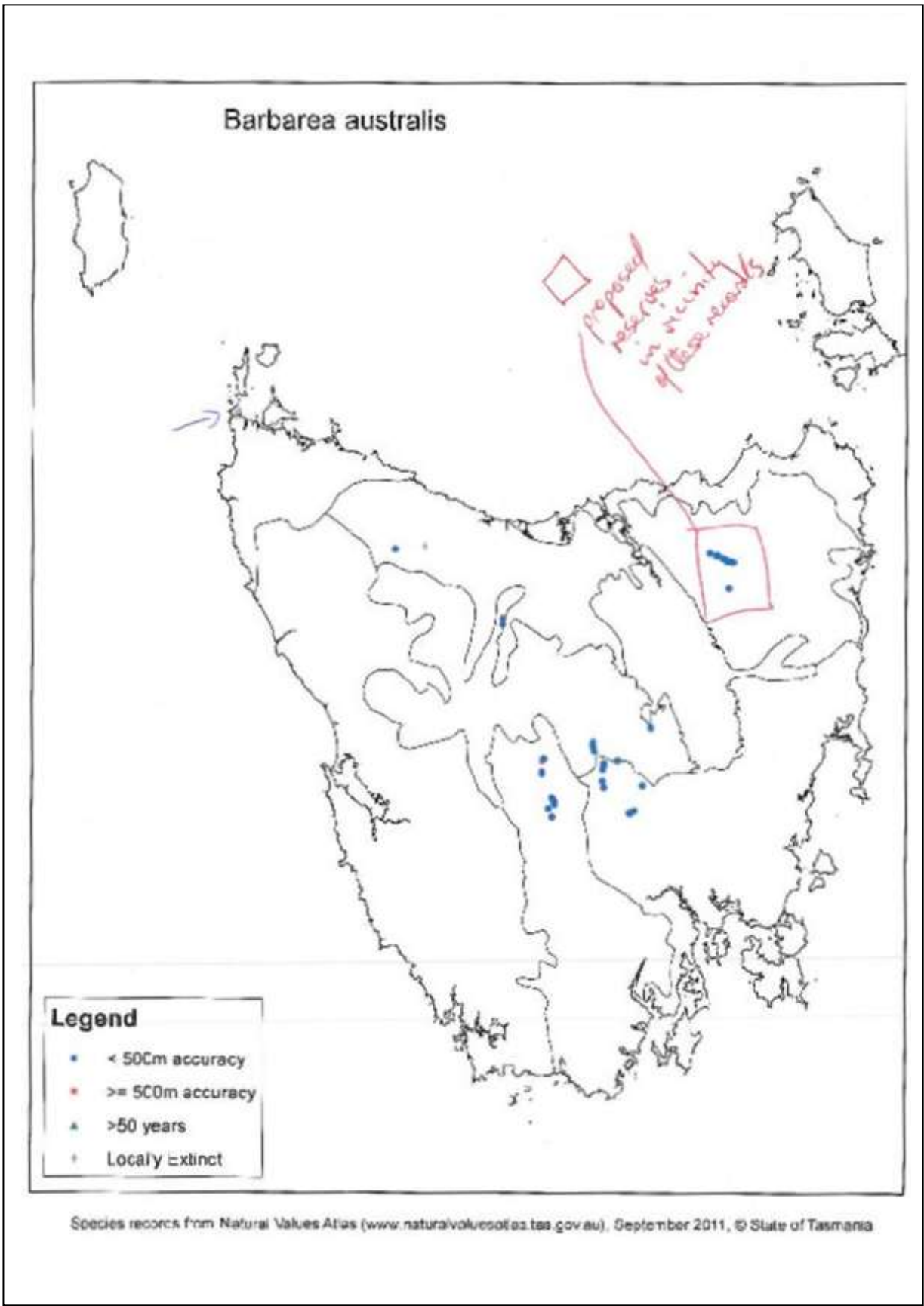
Proposed reserve contribution – state wide: 25% **bioregion:** BL – 75%

The core distribution straddles the SR, SE and CH bioregions, with a significant occurrence in the BL bioregion which is $\frac{3}{4}$ captured by reserves 208 and 211. The species is also known from the NSL bioregion and an occurrence in the KING bioregion which is presumed to be extinct.

Data quality: The location of specimen attributed from the KING bioregion is not certain but is presumed to be from Woolnorth. The species is presumed extinct from the Hampshire Hills sites. These uncertainties do not impact on the contributions of the proposed reserves.

Species comments: *Barbarea australis* is known from about 10 river systems extending from northern Tasmania to rivers flowing south from the Central Highlands. Based on extant subpopulations, the linear range of the species is about 170 km, extent of occurrence 13,045 km², and area of occupancy 0.2 km².

Barbarea australis distribution map



Rank: 23

Species: *Boronia gunnii*

Status: vulnerable (TSP Act); Vulnerable (EPBC Act); endemic to Tasmania.

Life form: Shrub

Weighting: 3.5

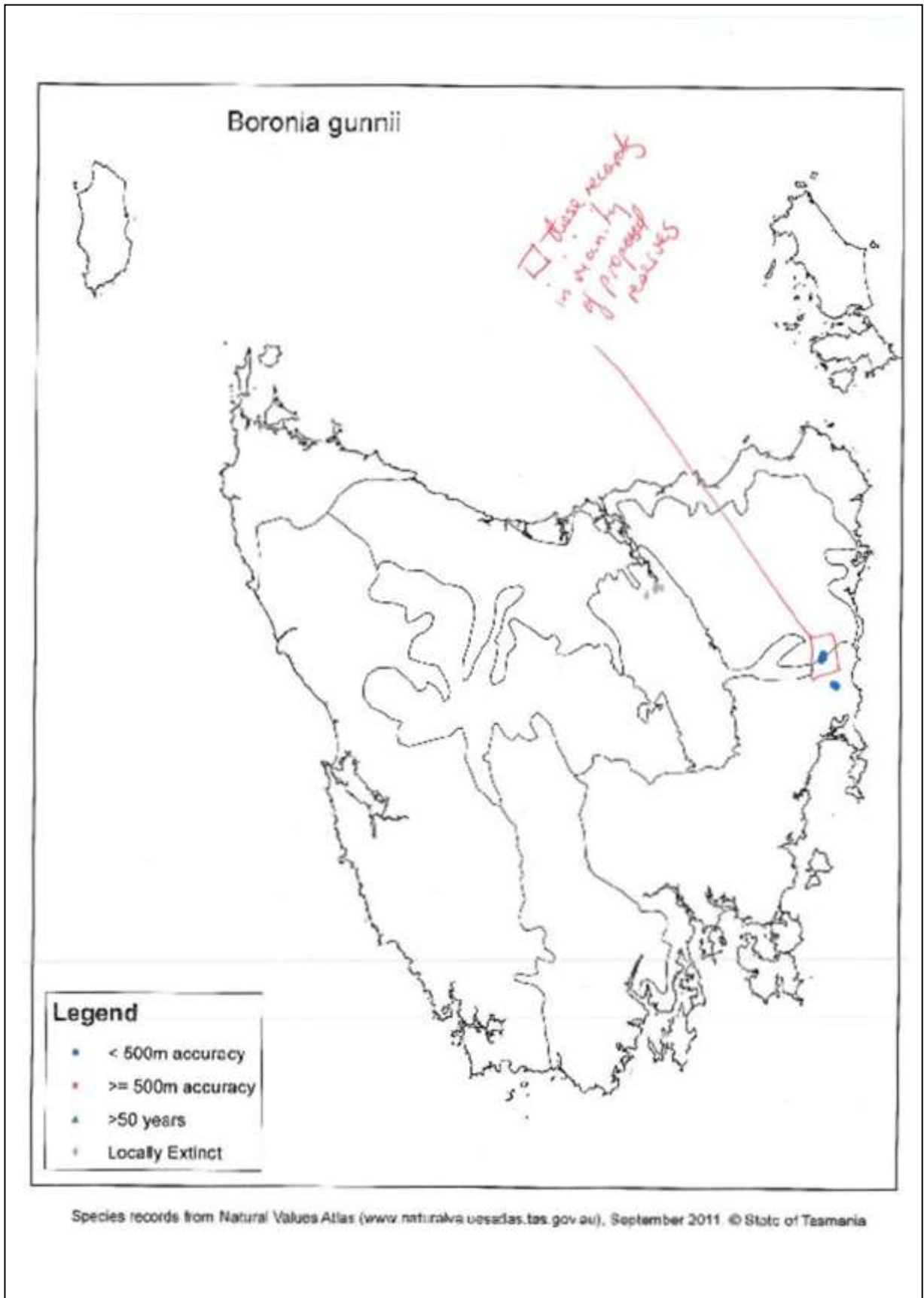
Proposed reserve contribution – state wide: 22% **bioregion:** BL - 54%

This species is known to be extant from sites straddling the border between the BL and SE bioregions (reserve 123 captures most observations from the BL bioregion) and sites about 13km SSE in the SE bioregion. It is presumed extinct from sites near Launceston

Data quality: Excluding the presumed extinct sites near Launceston would significantly increase the estimate of the contribution of the proposed reserves.

Species comments: *Boronia gunnii* is found along the upper St Pauls River, the Dukes River and the lower reaches of the Apsley River.

Boronia gunnii distribution map



Rank: 2

Species: *Boronia hemichiton*

Status: endangered (TSP Act); Vulnerable (EPBC Act); endemic to Tasmania

Life form: shrub

Weighting: 4.5

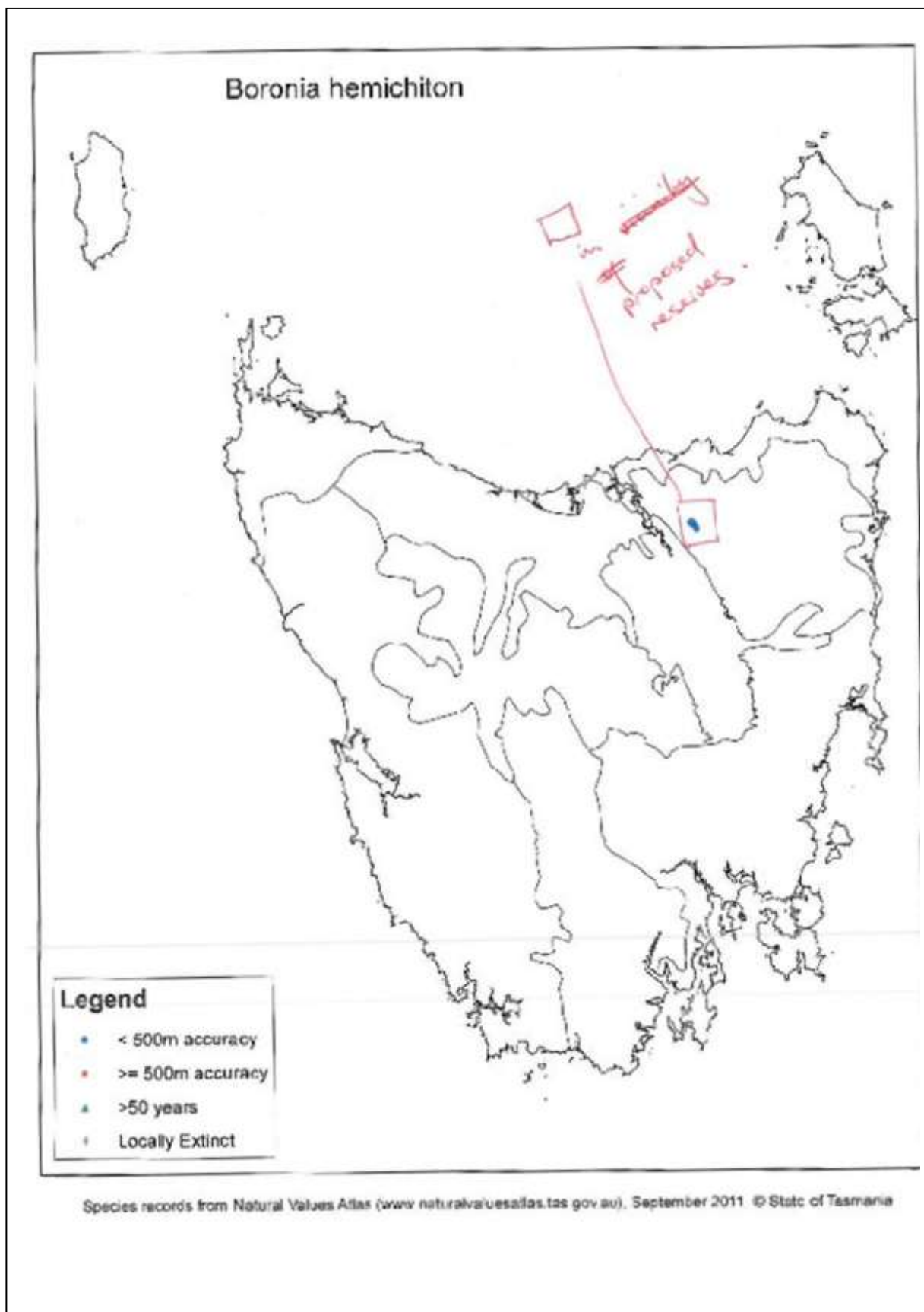
Proposed reserve contribution - state wide: 100% ; **bioregion:** BL: 100%

All observations of this species fall in reserve 212 in the BL bioregion. This reserve would result in this species being fully reserved.

Data quality: Good

Species comments: *Boronia hemichiton* is found only on the western flanks of Mt Arthur in northern Tasmania, with a linear extent of less than 4 km.

***Boronia hemichiton* distribution map**



Rank: 5

Species: *Boronia hippopala*

Status: vulnerable (TSP Act); Vulnerable (EPBC Act); endemic to Tasmania

Life form: shrub

Weighting: 3.5

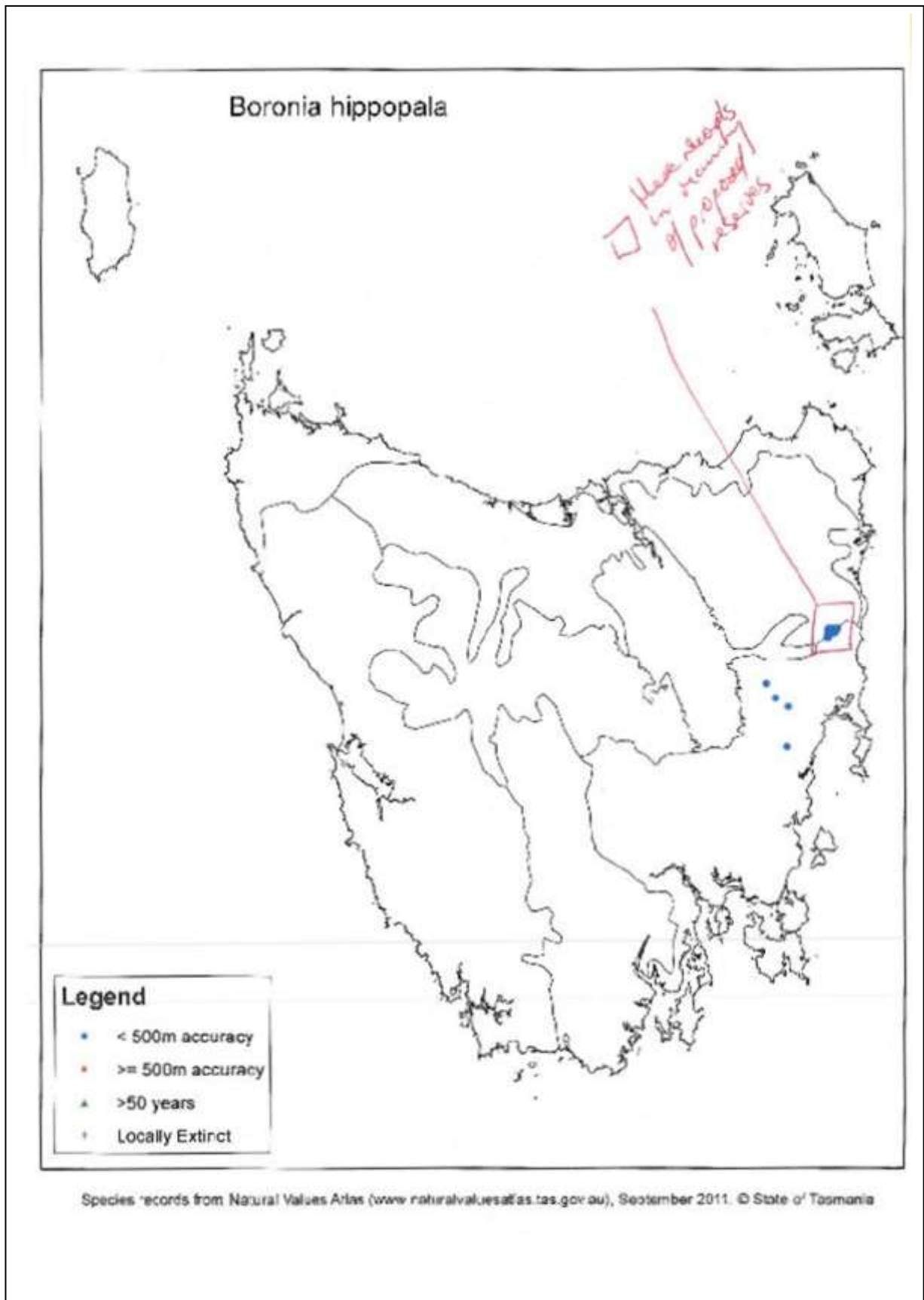
Proposed reserve contribution – state wide: 61% **bioregion:** BL – 61%; SE – 66%

This species straddles the border between the BL and SE bioregions (with most observations captured in reserve 123) and has been recorded in 4 separate locations to the SW in the northern 1/3 of the SE bioregion.

Data quality: Surveys south of the occurrence straddling the border between the BL and SE bioregions may reveal further occurrences.

Species comments: *Boronia hippopala* is known from a number of marshes in the Eastern Tiers at altitudes of 470–580 m asl, including the upper catchment of the St Pauls River and Flagstaff Marsh near Tooms Lake, with an outlying (morphologically atypical) population along the Elizabeth River.

***Boronia hippopala* distribution map**



Rank: 36

Species: *Corunastylis nuda*

Status: rare (TSP Act)

Life form: orchid

Weighting: 1

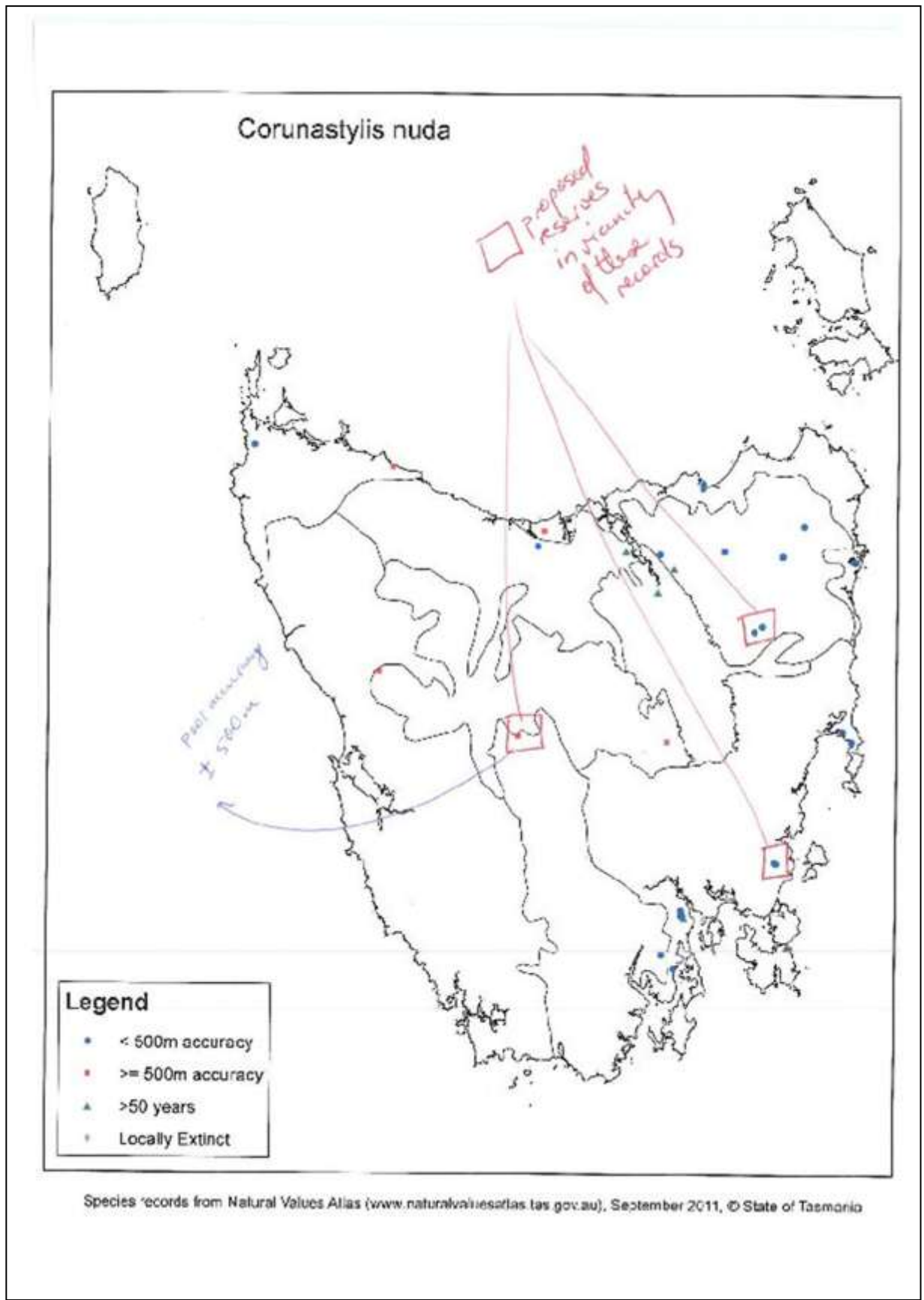
Proposed reserve contribution – state wide: 27% **bioregion:** SR: 50%; SE: 36%

This species has been recorded in all bioregions except for the WEST bioregion with most occurrences scattered across the BL, FLI and SE bioregions. Proposed reserves in the BL, SE and SR bioregions contribute to a significant improvement in the statewide reservation status using observation counts but not when grid cell counts (occurrence in 100x100m grid cells) were used.

Data quality: This species is likely to be unrecorded as it is a late flowerer and is difficult to detect because of its subdued coloration and diminutive nature. A number of new sites have been found in recent years and more sites are likely to be found with further survey. The SR site captured by reserve 66 is the reason behind its bioregional significance yet this observation has a poor location precision (+/- 500 m). The analysis using observation counts was influenced by the large number of observations recorded from Wielangta (reserves 129 and 126). This species may best be considered as having bioregional significance only for the contribution by the proposed reserves.

Species comments:

Corunastylis nuda distribution map



Rank: 41

Species: *Cyathea cunninghamii*

Status: endangered (TSP Act)

Life form: treefern

Weighting: 4

Proposed reserve contribution – state wide: 7% **bioregion:** SR: 20%; BL: 14%

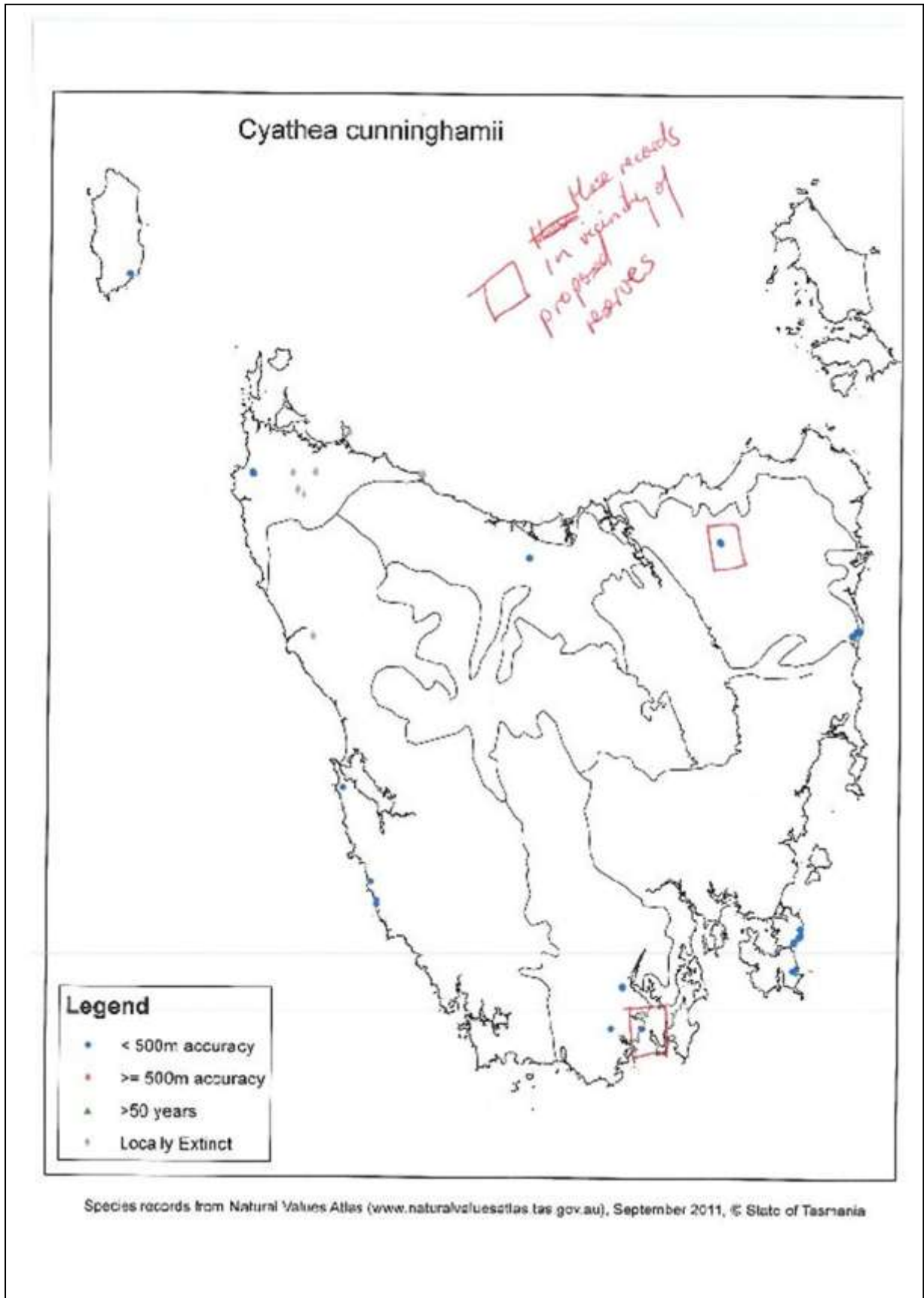
This species has been recorded from all the coastal bioregions (i.e. excluding CH and NML), and is now presumed extinct from many sites in the KING bioregion and 1 in the WEST bioregion.

Occurrences in proposed reserves in the BL and SE bioregions contribute to a significant improvement in the reservation status of the species at a statewide and bioregional basis. Reserve 3 in the SE bioregion includes the Dalco Creek population, the 2nd largest known for the species with 50 mature plants in 2005 (a decline from 200 plants recorded in 1991).

Data quality: Good. Declines have been noted at a number of sites.

Species comments: *Cyathea cunninghamii* is thought to be extant at fifteen sites in Tasmania, the largest stands being at Lower Marsh Creek and Dalco Creek. The linear extent of the known extant sites in Tasmania is 480 km, with an extent of occurrence of about 70,000 km² (which includes large areas of unsuitable habitat), and an area of occupancy of 20–25 ha. The extant subpopulations of *Cyathea cunninghamii* in Tasmania are thought to contain about 250 mature plants

Cyathea cunninghamii distribution map



Rank: 24

Species: *Cyathodes platystoma*

Status: rare (TSP Act); endemic to Tasmania

Life form: Small tree

Weighting: 1.5

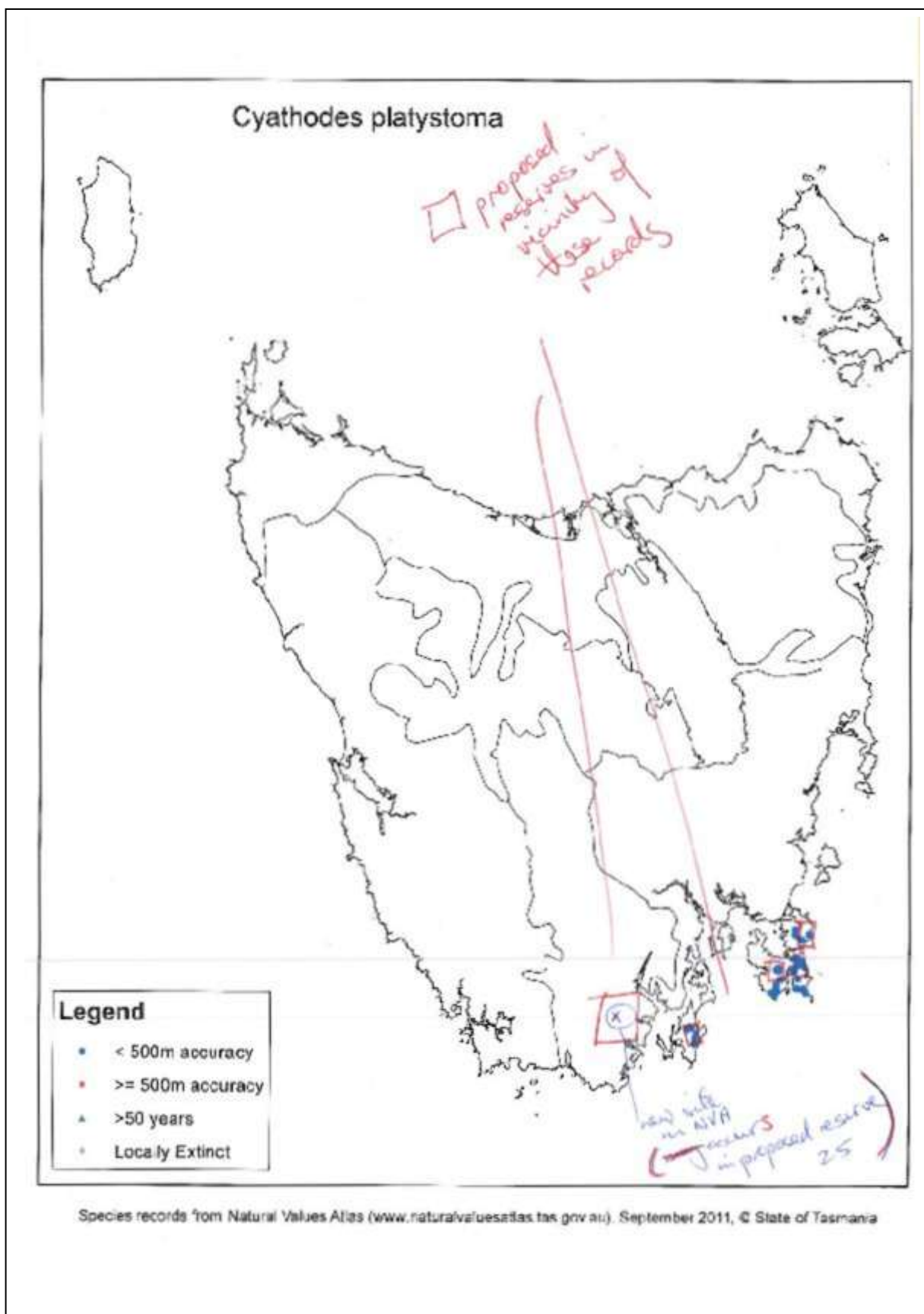
Proposed reserve contribution – state wide: 42% **bioregion:** NSL:35%; SR:56%

This species is restricted to the Forestier and Tasman peninsulas in the SE bioregions, and South Bruny, and new sites at Esperance in the SR bioregion. Reserves in all of these areas contribute to the state and bioregional significance of the contribution of the proposed reserves.

Data quality: Good. This species is more widespread and abundant than was known when the species was listed on the TSP Act in 2008.

Species comments: *Cyathodes platystoma* occupies moderate to well-drained sites from sea-level to about 600 m. While the species extends over approximately 750 square kilometres, the estimated area of potential habitat for *Cyathodes platystoma* is approximately 19,656 ha based on vegetation type and broad environmental variables. The population size is estimated to be greater than 5,700 mature individuals in 15 subpopulations, with 90% of mature individuals in only 4 subpopulations.

Cyathodes platystoma distribution map



Rank: 34

Species: *Epacris curtisiae*

Status: rare (TSP Act); endemic to Tasmania.

Life form: Shrub

Weighting: 1.5

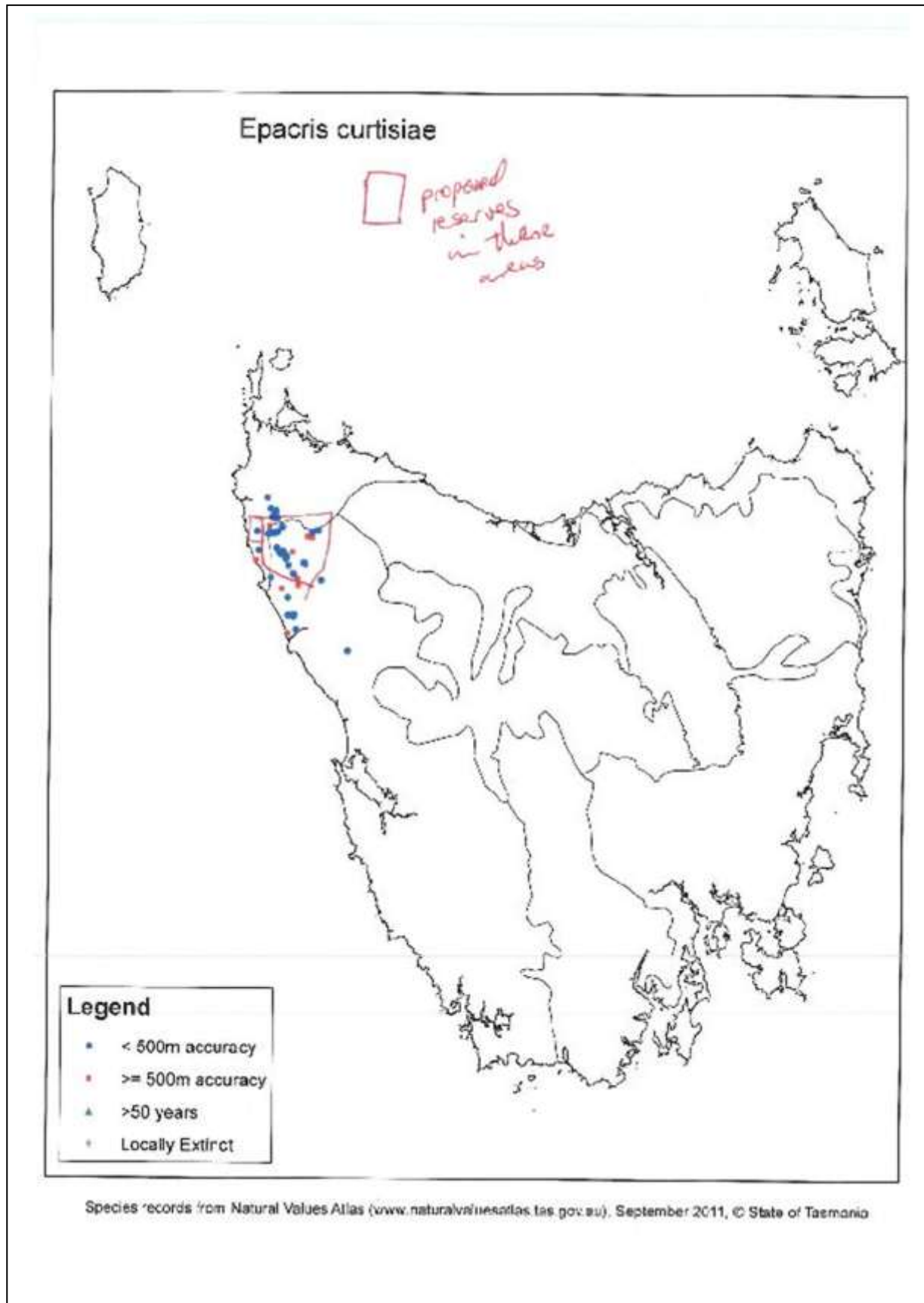
Proposed reserve contribution – state wide: 22% **bioregion:** KING: 47%; WE:16%

This species occurs in the northern part of the WEST bioregion, extending into the southern part of the KING bioregion. Many sites of the species occurs in proposed reserve 252 and one observation occurs in proposed reserve 244 with these contributing to the state and bioregional significance of the contribution of the proposed reserves.

Data quality: This species is most likely under recorded and though tends to be abundant where found, this not reflected in existing data.

Species comments: Key sites include Dempster Plains and in buttongrass moorland around the Nelson Bay River (as far south as Mt Balfour and from the coast to just east of the Frankland River). There are approximately 27 populations of *Epacris curtisiae* with 1000s of individuals in total.

Epacris curtisiae distribution map



Rank: 16

Species: *Epacris glabella*

Status: endangered (TSP Act); Endangered (EPBC Act); endemic to Tasmania.

Life form: shrub

Weighting: 4.5

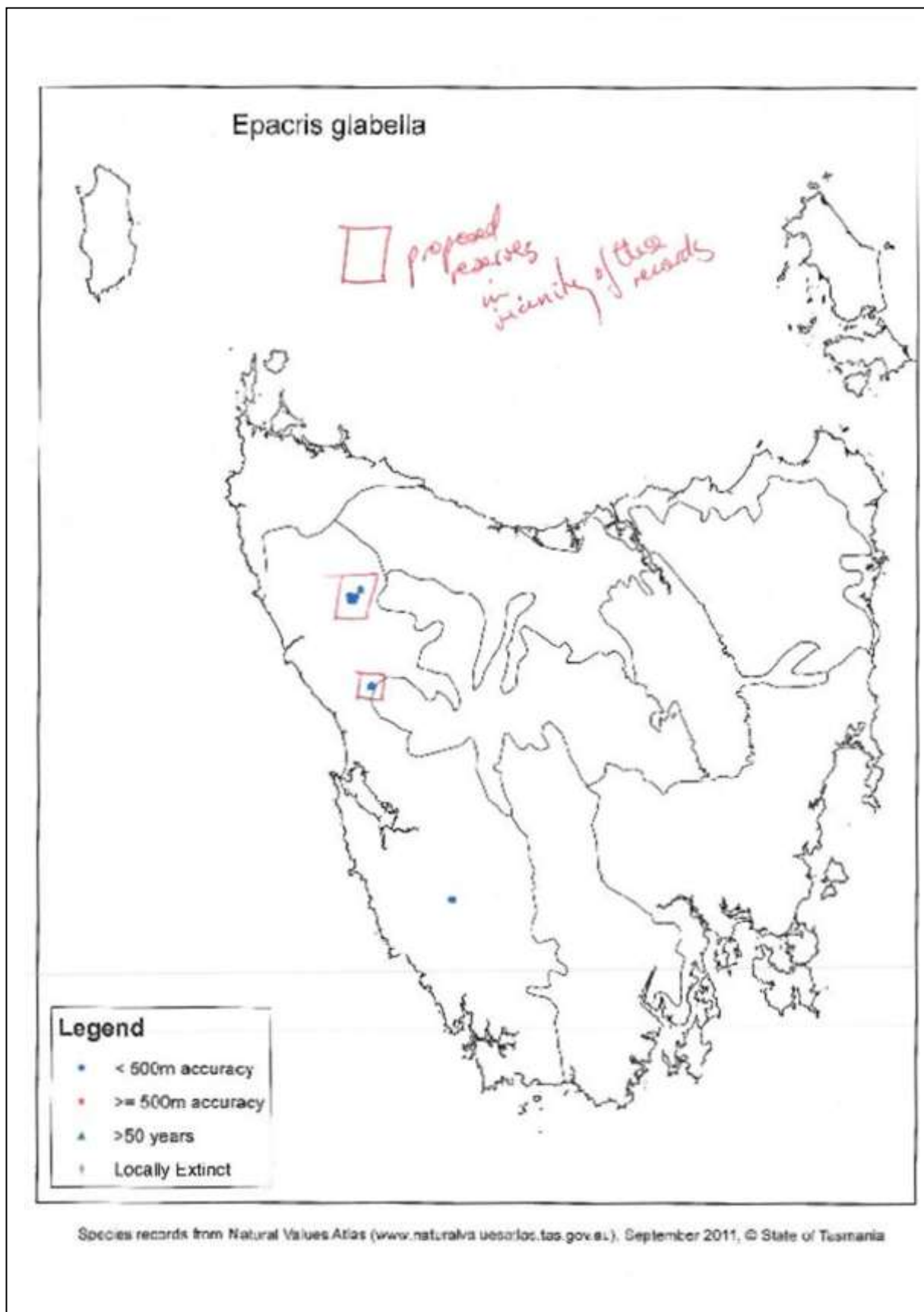
Proposed reserve contribution – state wide: 20% **bioregion:** WE - 20%

This species is known from 3 disjunct locations in the WEST bioregion. Many observations of the species occur in proposed reserve 198 and one observation occurs in proposed reserve 92, from the 2 northern most occurrences. These are responsible for the state and bioregional significance of the contribution of the proposed reserves.

Data quality: Good. This species is restricted to serpentine outcrops in the western part of the state and as such the extent of occurrence of the species is unlikely to be increased significantly with further survey. Formal reservation that excludes mining would be beneficial for the species given its restricted habitat.

Species comments: *Epacris glabella* occurs in the state's northwest near Savage River and Renison Bell, with an outlying population along the upper reaches of the Gordon River. There are six known populations over a geographic range of 150 km, with a total of about 200,000 individuals.

***Epacris glabella* distribution map**



Rank: 4

Species: *Epacris limbata*

Status: endangered (TSP Act); Critically Endangered (EPBC Act); endemic to Tasmania

Life form: shrub

Weighting: 5.5

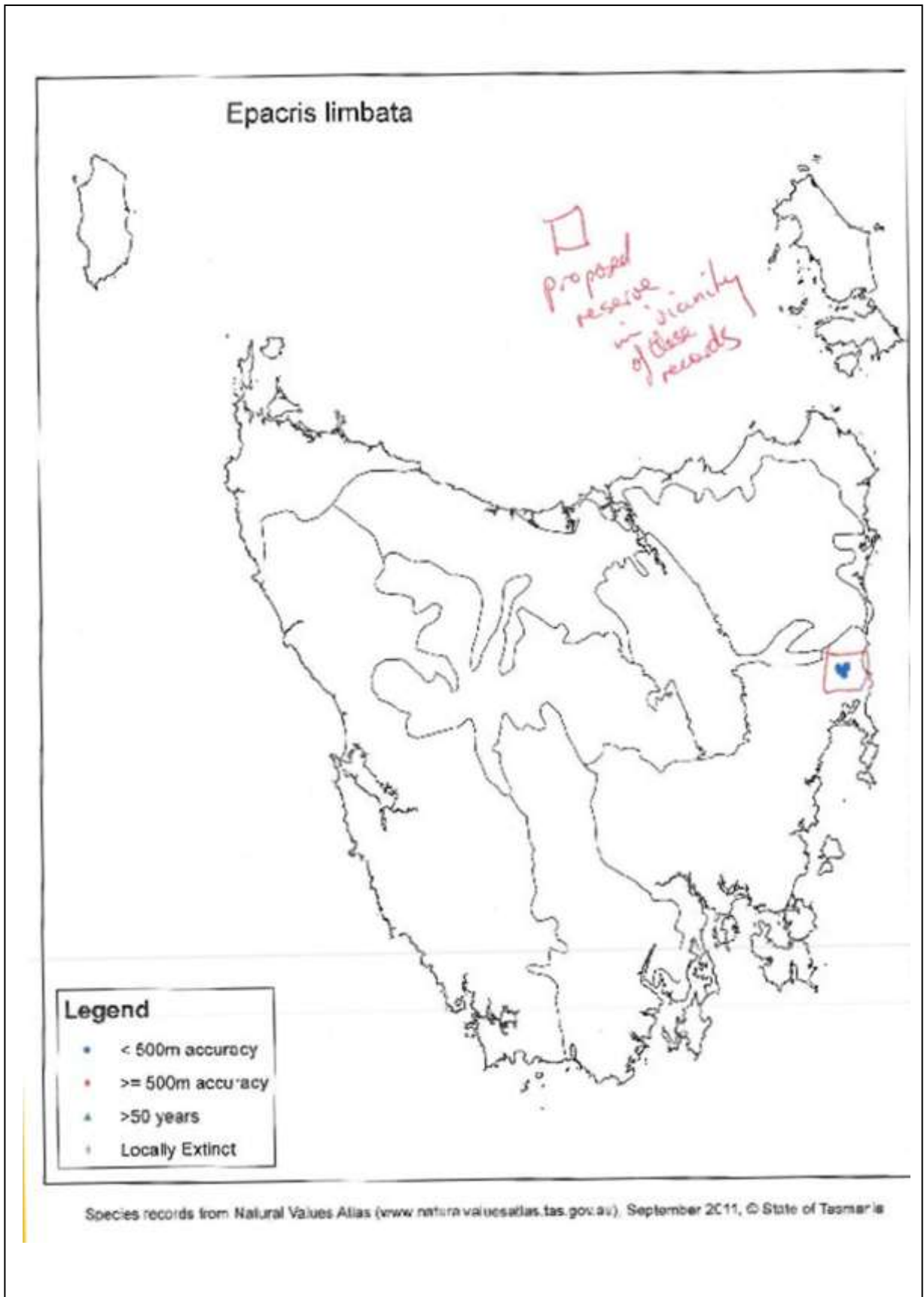
Proposed reserve contribution – state wide: 51% **bioregion:** SE - 43%

This species is known from 1 location in the northern section of the SE bioregion with occurrences in reserve 93 contributing to the state and bioregional significance of the contribution of the proposed reserves.

Data quality: Good

Species comments: *Epacris limbata* has a small linear range of only 5kms, occurring within the foothills of the Eastern Tiers west of Bicheno. There are five populations, with about 70,000 individuals.

***Epacris limbata* distribution map**



Rank: 21

Species: *Epacris moscaliana*

Status: rare (TSP Act); endemic to Tasmania

Life form: shrub

Weighting: 2

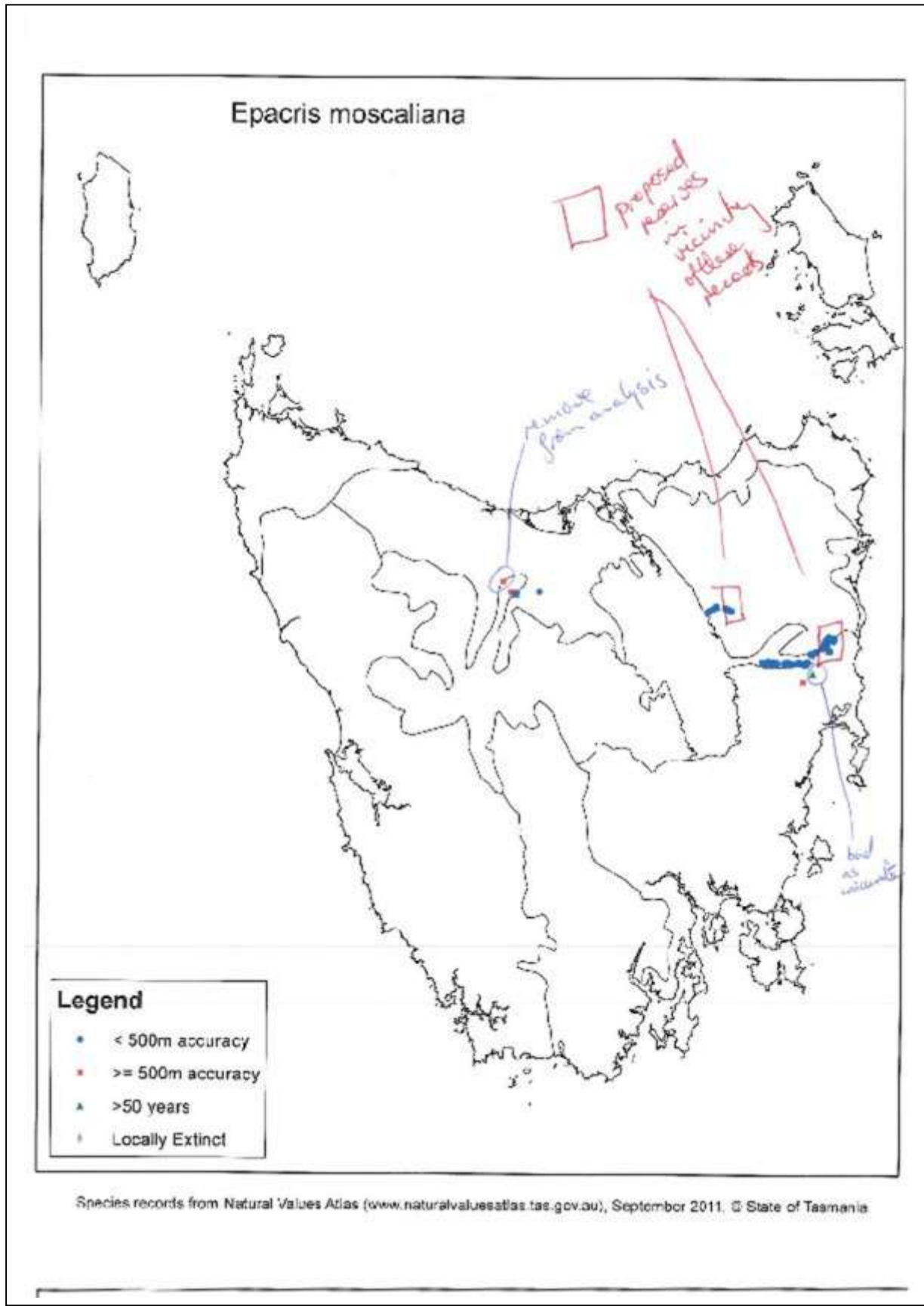
Proposed reserve contribution – state wide: 33% **bioregion:** BL: 35%; SE: 60%

The main occurrence of this species occurs in an arm of the NML bioregion which extends along the boundary between the SE and BL bioregions, with many observations captured in proposed reserve 123 along the boundary between the SE and BL bioregions. Another occurrence is found in the BL bioregion with proposed reserve 137 capturing the eastern most observations in this location. Another location straddles the CH and NSL bioregions. Observations from proposed reserves 123 and 137 are responsible for the state and bioregional significance (for BL and SE) of the contribution of the proposed reserves.

Data quality: This is a recently described species from a group of species which are taxonomically complex. Some outlying observations (not in proposed reserves) have poor location precision and should be removed from future analyses though this will not impact significantly on the estimate of the contribution of the proposed reserves for the species.

Species comments: *Epacris moscaliana* is known from the headwaters of the St Pauls, Dukes and Coal Rivers in the Eastern Tiers, and also occurs along the mid to upper reaches of the St Pauls River, Swan River, Nile River and Mersey River. The linear range of the species is 160 km, extent of occurrence 2700 km² and area of occupancy 15 to 25 ha. The total population size is estimated to be between 50,000 and 70,000 mature individuals. The Dukes Marshes and Gog Range subpopulations are by far the largest, each with over 20,000 individuals recorded.

Epacris moscaliana distribution map



Rank: 22

Species: *Epacris virgata* (Beaconsfield)

Status: vulnerable (TSP Act); Endangered (EPBC Act); endemic to Tasmania.

Life form: Shrub

Weighting: 3.5

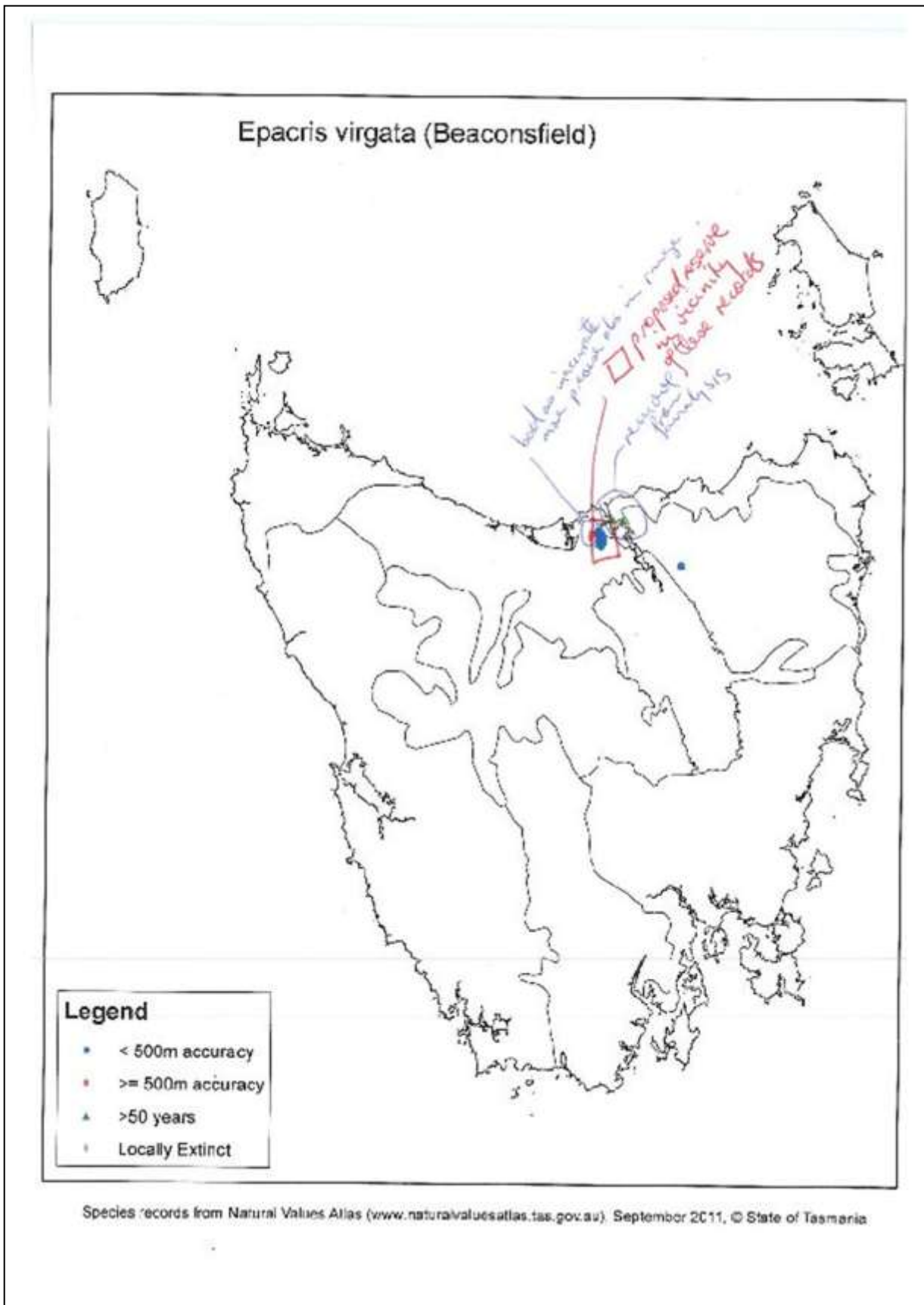
Proposed reserve contribution – state wide: 15% **bioregion:** NSL: 17%

Proposed reserve 239 captures observations in the main occurrence of this species in the NSL bioregion, contributing to the state and bioregional significance of the proposed reserves. The smaller Pipers River occurrence is found in the BL bioregion.

Data quality: This entity is from a group of species which are taxonomically complex and the identity of the Pipers River occurrence is still uncertain. Some slightly outlying observations in the Dazzler Range have poor location precision and should be removed from future analyses along with historical observation that just extend into the Flinders bioregion. Removal of these observations are not likely to impact greatly on the estimate of the contribution of the proposed reserves for the species.

Species comments: *Epacris virgata* (Beaconsfield) is restricted to a small area of undulating terrain in the foothills of the Dazzler Range near Beaconsfield, where it occurs on serpentinite in dry sclerophyll forest; the elevation range is 40–80 m. An outlying population occurs on dolerite near Pipers River east of the Tamar. The linear range of the species is 44 km. There are two populations, the first near Beaconsfield with more than 1,700,000 plants in an area of 150 to 170 ha, and the second at Pipers River with about 3000 plants in an area of less than 1 ha.

Epacris virgata (Beaconsfield) distribution map



Rank: 19

Species: *Erioderma solediatum*

Status: endangered (TSP Act)

Life form: Lichen

Weighting: 3

Proposed reserve contribution – state wide: 25% **bioregion:** WE – 25%

Proposed reserve 252 includes 1 of only 4 observations of this species spread across 3 locations, all in the northern part of the WEST bioregion. This observation is the eastern most of the 4 and is responsible for the state and bioregional significance of the proposed reserves.

Data quality comments: Most lichen data, as for this species, has a poor location precision of +/- 1000m.

Species comments: *Erioderma solediatum* is known from Queensland, New South Wales and Tasmania. It is also found in New Zealand. The distribution of this species in Tasmania is restricted to the cool temperate rainforests of the far north west. This species is not known from any reserve.

Erioderma soledatum distribution map



Rank: 27

Species: *Euphrasia collina* subsp. *deflexifolia*

Status: rare (TSP Act); endemic to Tasmania.

Life form: herb

Weighting: 2

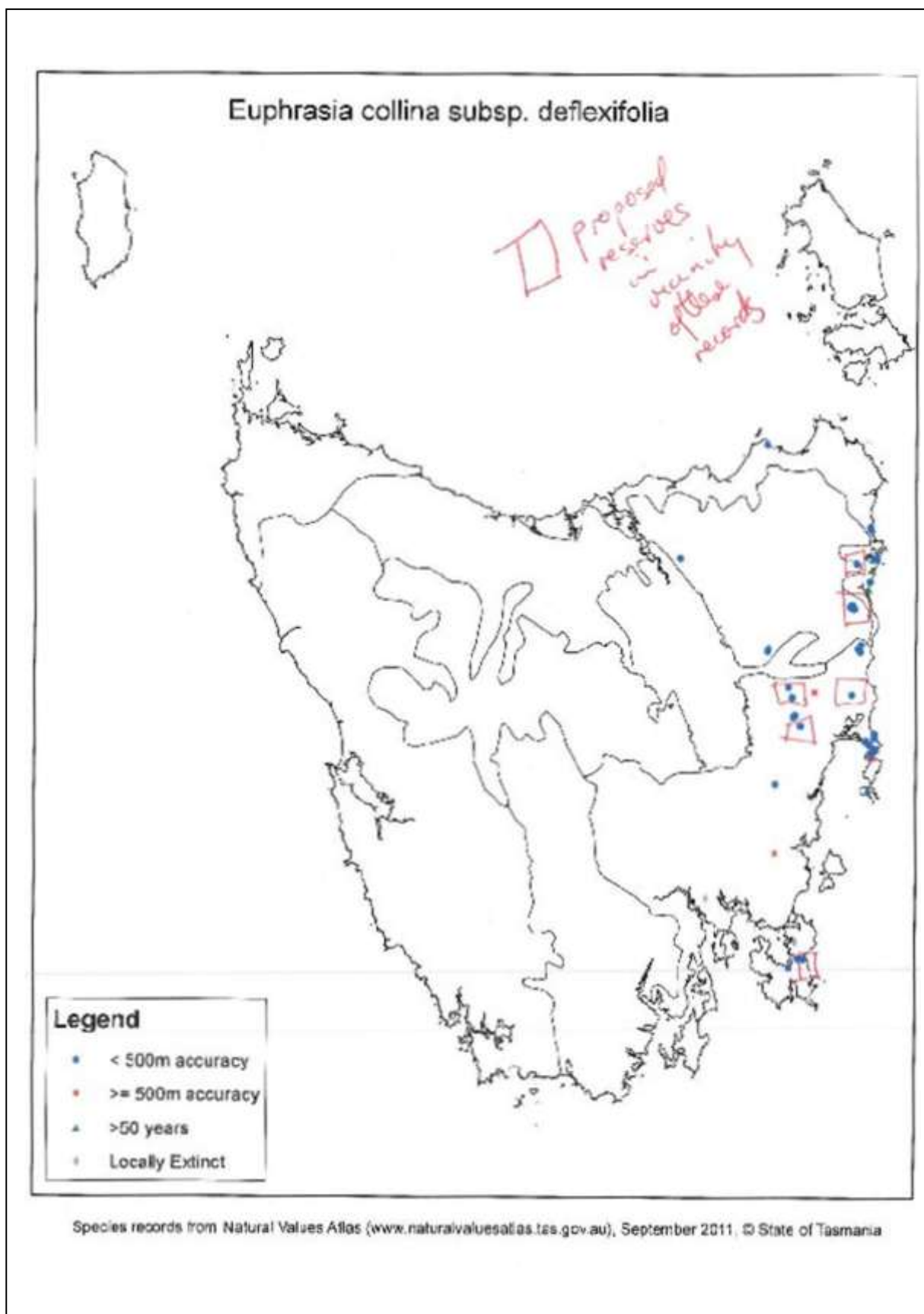
Proposed reserve contribution – state wide: 28% **bioregion:** BL: 82%

The main distribution of this short lived taxon is scattered along the east coast from Freycinet to the Gardens in the SE, BL and FLI bioregions with more inland occurrences in the SE (mainly) and BL bioregions. Proposed reserve 150 captures many observations and is largely responsible for the significance of the proposed reserves for the BL bioregion for this taxon. Together with proposed reserve 193 (BL/FLI), and proposed reserves 14,68,87 and 93 (SE), which each capture 1 or 2 observations of the species, these reserves are responsible for the state significance of the proposed reserves for the species. Disjunct sites on the north coast (FLI), near Launceston (BL) and Hobart (SE) have not been seen in recent years suggestive of a large decline in the extent of occurrence of this species.

Data quality: Observations used for this analysis include observations for *Euphrasia collina* subsp. *gunnii* and *Euphrasia collina* subsp. *tasmanica* as the taxonomic split into 3 entities cannot be justified using available information (all based on morphological traits). The entity is variable with the occurrence on the Tasman Peninsula diverging the most morphologically. However, the Tasman Peninsula observation attributed to reserve 14 is from the old 'Eaglehawk Neck tip', known to be on private land that has been cleared though this site is very close to the boundary with State forest. Removal of this observation is unlikely to have a significant impact and would be more than compensated for if observations from disjunct sites that have not been able to be confirmed in recent years were to be removed from the analysis.

Species comments: This species of *Euphrasia* occurs in open woodland or heath in the east of the State. Approximately ten populations of this species have been confirmed in recent years, with the number of individuals in each population ranging from a few plants to the low thousands.

Euphrasia collina subsp. *deflexifolia* distribution map



Rank: 7

Species: *Euphrasia scabra*

Status: endangered (TSP Act)

Life form: herb

Weighting: 4.5

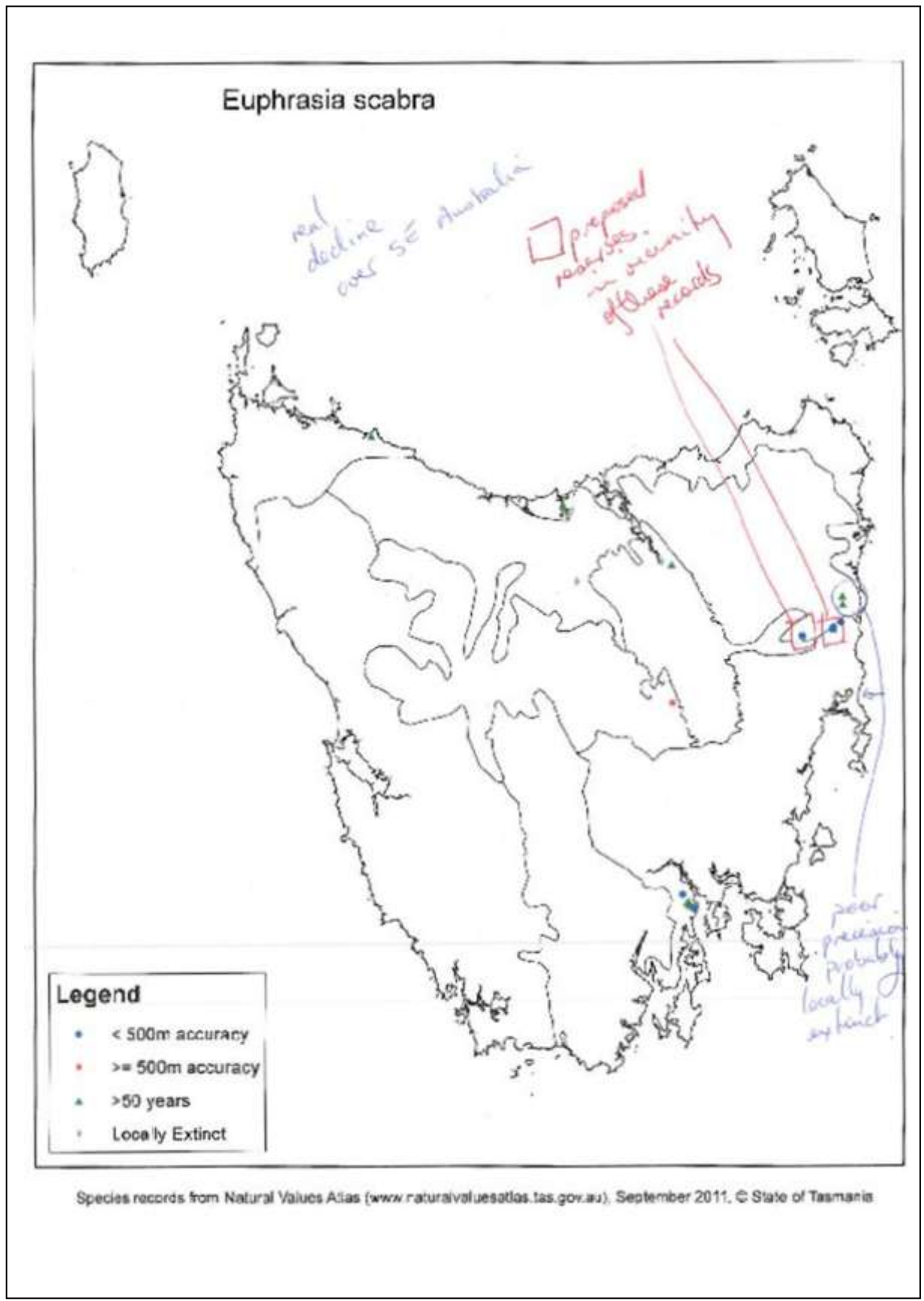
Proposed reserve contribution – state wide: 30% **bioregion:** BL: 50%; SE 47%

The known extant distribution of this species is from the area straddling the BL and SE bioregions and 2 small subpopulations near Hobart. Proposed reserve 123 captures the largest and probably only viable remaining Tasmanian subpopulation of this species at Dukes Marshes. Together with reserve 113 containing the small population at Hockeys Marsh (though no plants have been seen at this site for several years), these 2 proposed reserves are responsible for the state significance of the proposed reserves for the species and the bioregional significance for the BL and SE bioregions. This species has suffered a large decline in range, not only in Tasmania but in SE Australia. The decline can perhaps be attributed to a lack of seed dormancy in this annual species so that if appropriate disturbance is not experienced to bury seed to prevent immediate germination, a soil stored seed bank will not be formed. Frequent flooding events at Dukes Marshes helping to maintain suitable open conditions (along with browsing) appear to provide the appropriate disturbance regime for the species.

Data quality: The significance of the proposed reserves would be much greater if presumed extinct sites at other locations, sites only known from observations prior to 50 years ago and the site near Lake Sorell (that cannot be relocated) were to be excluded from the analysis. It is unknown whether the species will re-emerge at the Hockeys Marsh site (proposed reserve 113) over time.

Species comments: Tasmania, *Euphrasia scabra* is known to occur in the Eastern Tiers near Fingal, near Lake Sorell and near Hobart, occupying approximately 5 hectares in total.

Euphrasia scabra distribution map



Rank: 11

Species: *Euphrasia semipicta*

Status: endangered (TSP Act); Endangered (EPBC Act); endemic to Tasmania.

Life form: herb

Weighting: 5

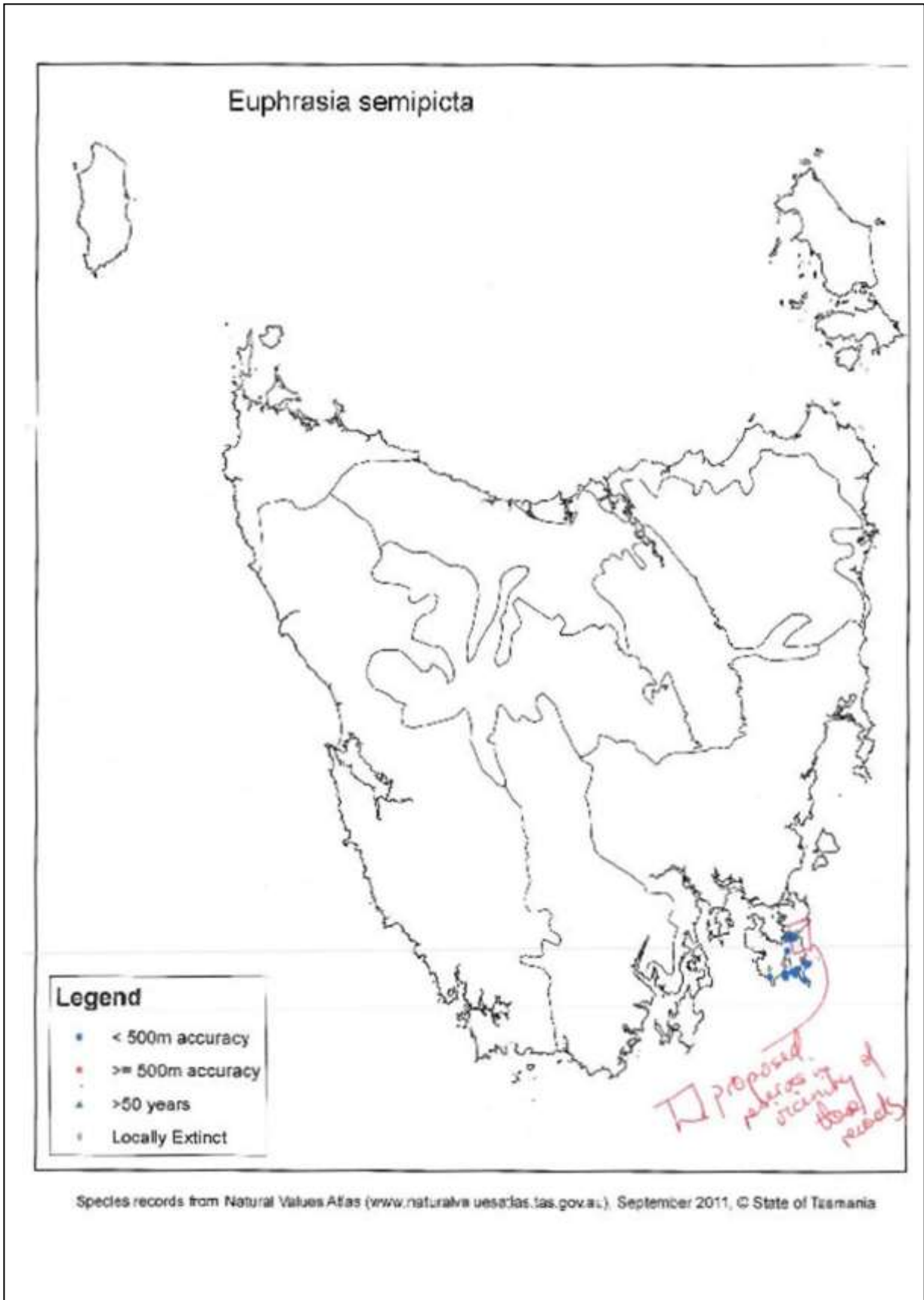
Proposed reserve contribution – state wide: 18% **bioregion:** 23%

This species is restricted to the Tasman Peninsula in the SE bioregion. Proposed reserve 14 captures a whole subpopulation and a significant portion of another and is responsible for the state and bioregional significance of the species.

Data quality: This short lived species has a metapopulation structure with patches (or whole subpopulations) appearing then becoming confined to the soil seed store, dependent on disturbance induced openness and climatic conditions affecting water availability influencing germination and seedling survival. The species is variable, likely to be a result of its origin from hybridisation between species from different sections of the genus. Three types are known and would qualify for subspecies status, with proposed reserve 14 capturing observations of type 1 (part of the only known population) and type 3 (whole of only known population), the most morphologically diverse types despite their close proximity to one another. Some of the Tasman Peninsula observations of this species from the old 'Eaglehawk Neck tip' (close to the boundary with State forest) are attributed to reserve 14 though are known to fall on private land that has been cleared. Removal of these observations is unlikely to impact significantly on the results of the analysis and would be more than compensated for by removal of presumed extinct sites.

Species comments: *Euphrasia semipicta* occurs in coastal heathy woodland and heath, particularly along animal, walking and vehicular tracks. Five populations of this species have been confirmed in recent years, with the number of individuals in each population ranging from a few plants to the low thousands.

Euphrasia semipicta distribution map



Rank: 9

Species: *Hibbertia calycina*

Status: vulnerable (TSP Act)

Life form: shrub

Weighting: 2.5

Proposed reserve contribution – state wide: 64% **bioregion:** BL:17%; FLI: 79%

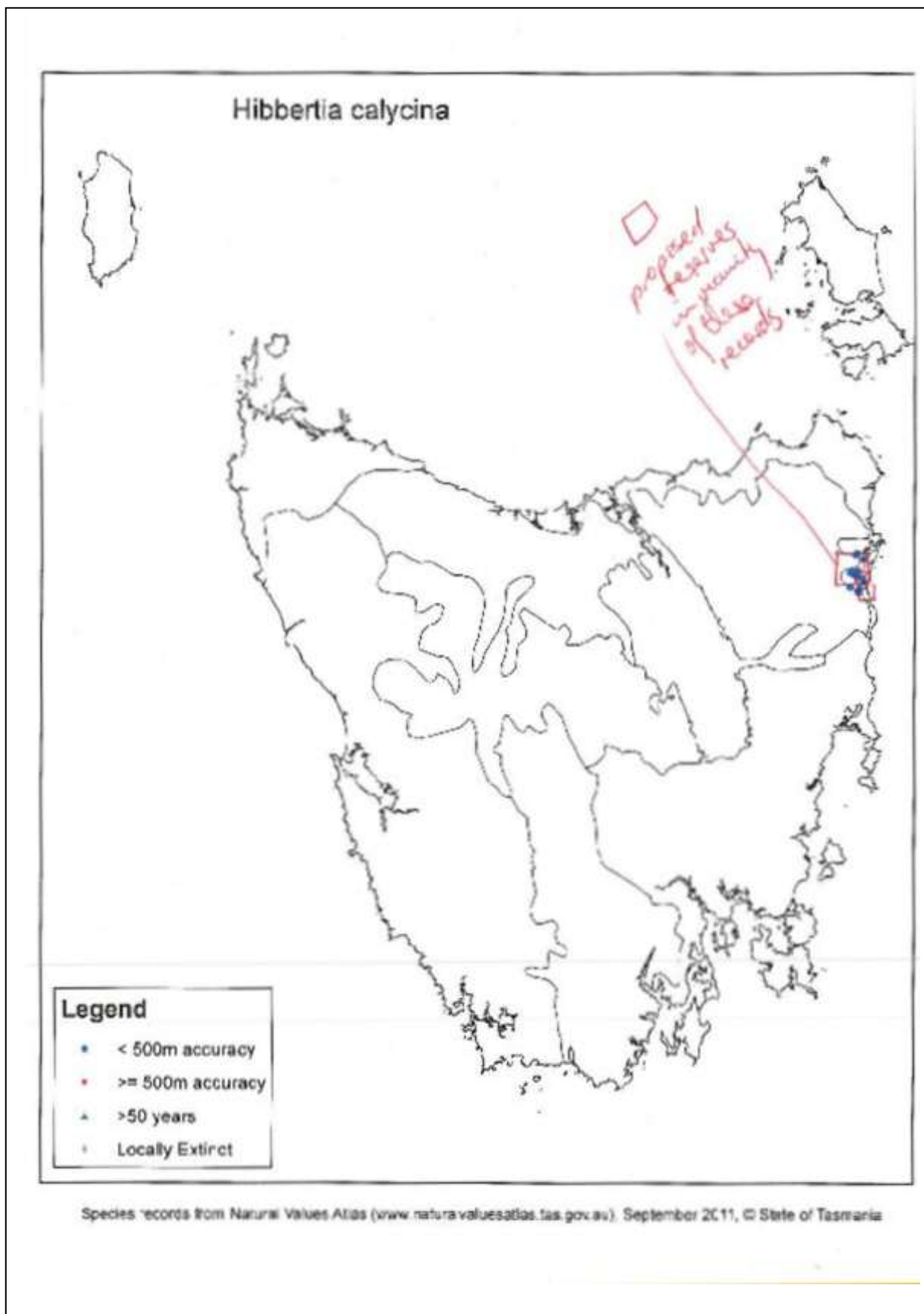
The main distribution of this species occurs in the FLI bioregion and extends into the BL bioregion.

The bulk of the distribution is captured by proposed reserve 193 and together with 1 or 2 observations from proposed reserves 154 and 175 is responsible for the state significance and bioregional significance of the FLI and BL bioregions for this species

Data quality: Good

Species comments: In Tasmania the distribution of *Hibbertia calycina* is extremely limited, found only in the northeast near Scamander and St Helens.

Hibbertia calycina distribution map



Rank: 29

Species:

Rank: 30

Species: *Hovea corrickiae*

Status: rare (TSP Act)

Life form: shrub

Weighting: 1

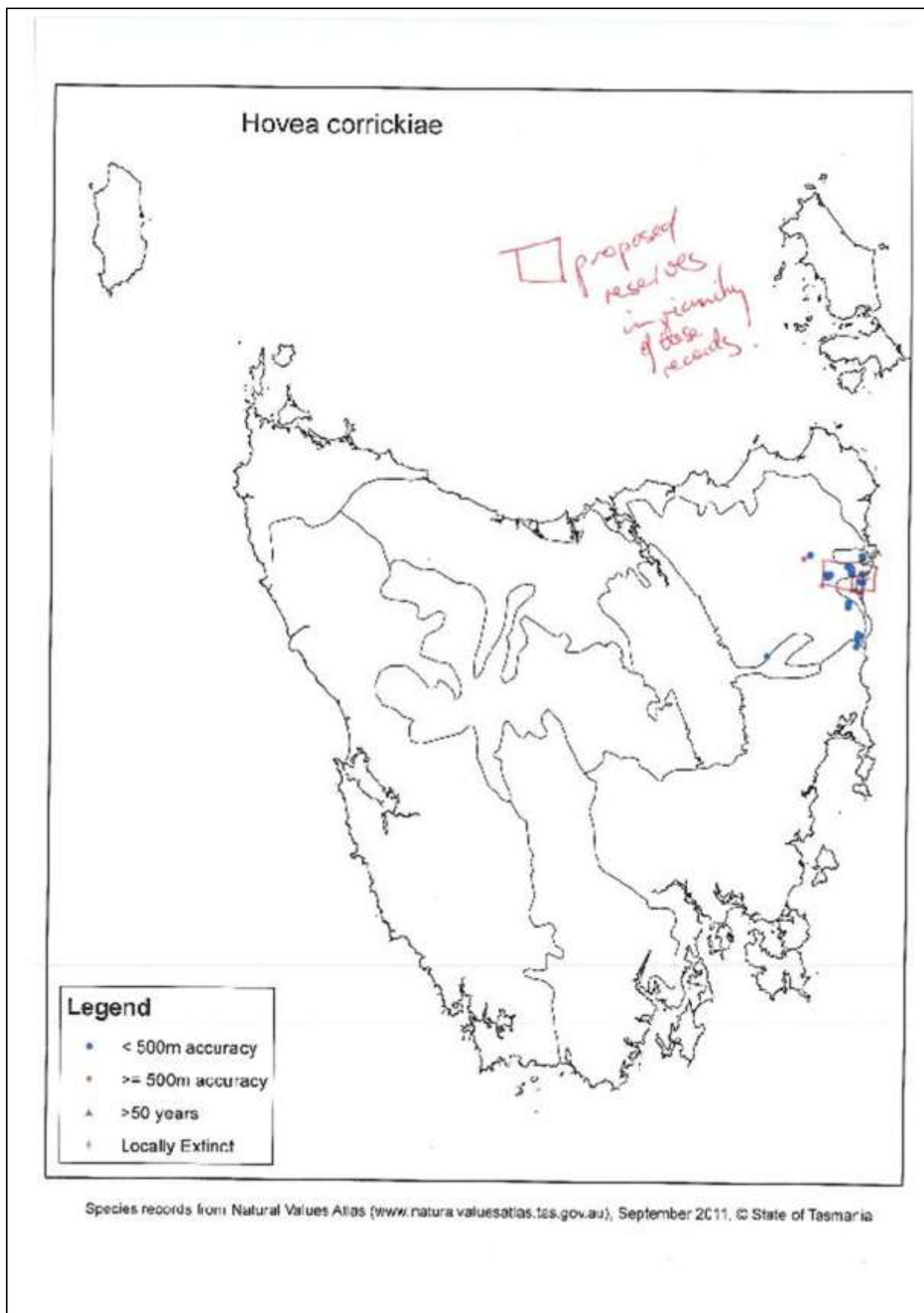
Proposed reserve contribution – state wide: 38% **bioregion:** BL: 44%

The main distribution of this species straddles the FLI and BL bioregions on the East Coast, just extending into the SE bioregion. Proposed reserve 193 captures the bulk of observations and is responsible for the bioregional significance for the BL bioregion. In addition, a single observation captured by reserve 174 contributes to the state significance of the proposed reserves for this species. An outlying occurrence occurs in the Castle Cary Forest Reserve.

Data quality: While perhaps under recorded, it is unlikely that new observations would significantly alter the known distribution of the species.

Species comments: In Tasmania, *Hovea corrickiae* is found in rocky sites, along riparian zones with wet sclerophyll understorey shrubs and in open forest. There are only small, scattered populations in the north-east of the State occupying less than 8 hectares in total. The largest population is found at German Town with approximately 500 individuals. The second largest and most dense population occurs at St Colombia Falls on the Georges River.

***Hovea corrickiae* distribution map**



Rank: 35

Species: *Hovea tasmanica*

Status: rare (TSP Act); endemic to Tasmania.

Life form: shrub – small tree.

Weighting: 2

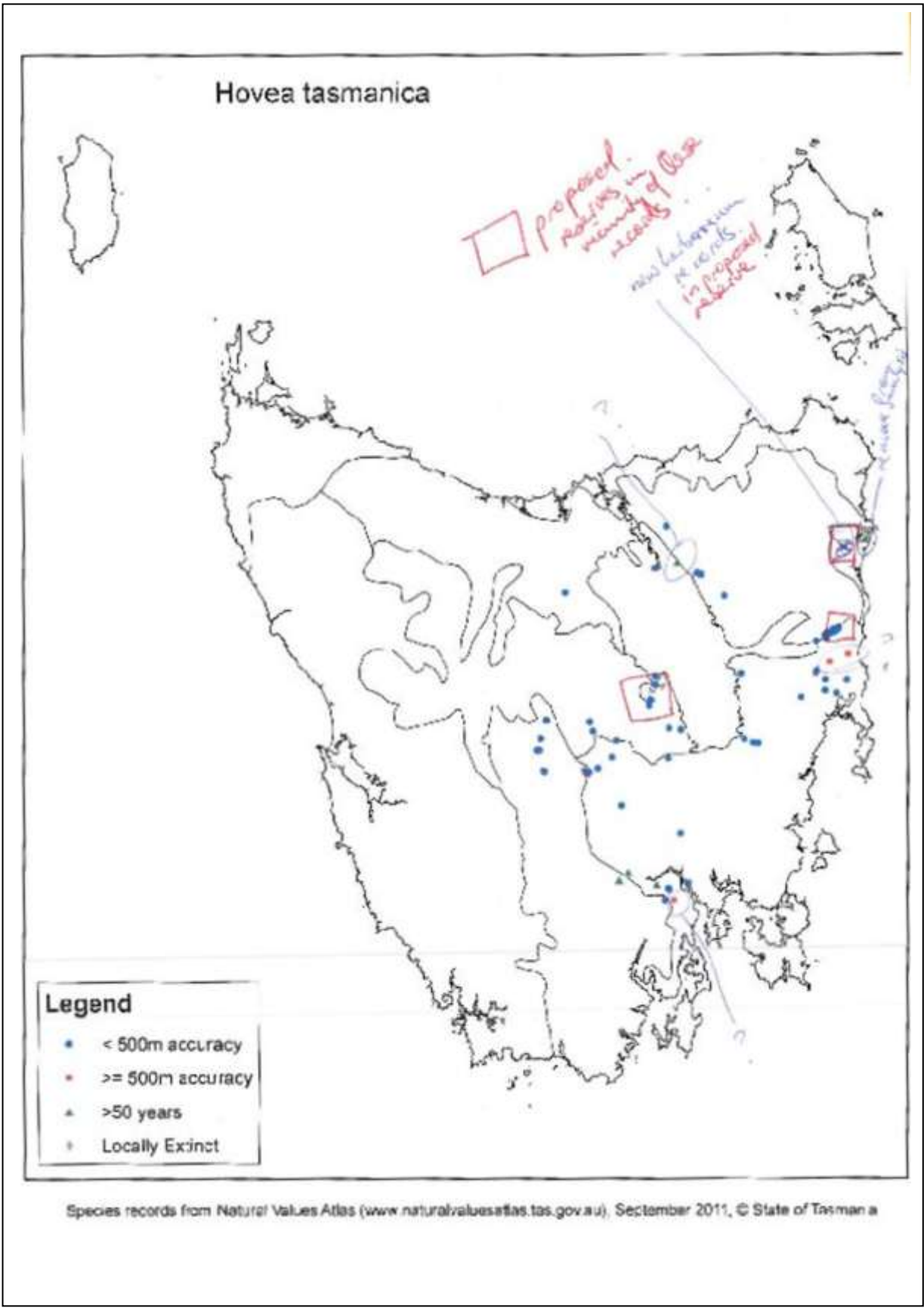
Proposed reserve contribution – state wide: 14% **bioregion:** NML: 14%; SE: 14%; BL:23%

This species has been recorded from all except the 2 western bioregions with observations in proposed reserves in the BL, SE, CH and NML bioregions contributing to the state significance for the species. The observations in proposed reserves 193 and 123 are responsible for the significance of the BL bioregion with additional observations from proposed reserve 123 responsible for the significance of the SE bioregion. The significance of the NML bioregion for this species is due to only 1 observation in proposed reserve 97, the only state or bioregional priority species observation to be captured by the proposed reserves in this bioregion.

Data quality: This species is probably under recorded within its currently known range. A number of imprecise and historical observations should be removed from future analyses (including the only observation from the FLI bioregion). The impact of removing these observations is likely to be limited given the relatively number of recorded sites for this priority species.

Species comments: *Hovea tasmanica* occurs in central and north-eastern regions. The number of populations is estimated at 15, the largest occurs in a gorge below Shannon and contains 100s of individuals. The majority of the populations are small, containing approximately 20 individuals.

Hovea tasmanica distribution map



Rank: 17

Species: *Hypolepis distans*

Status: endangered (TSP Act); Endangered (EPBC Act)

Life form: fern

Weighting: 5

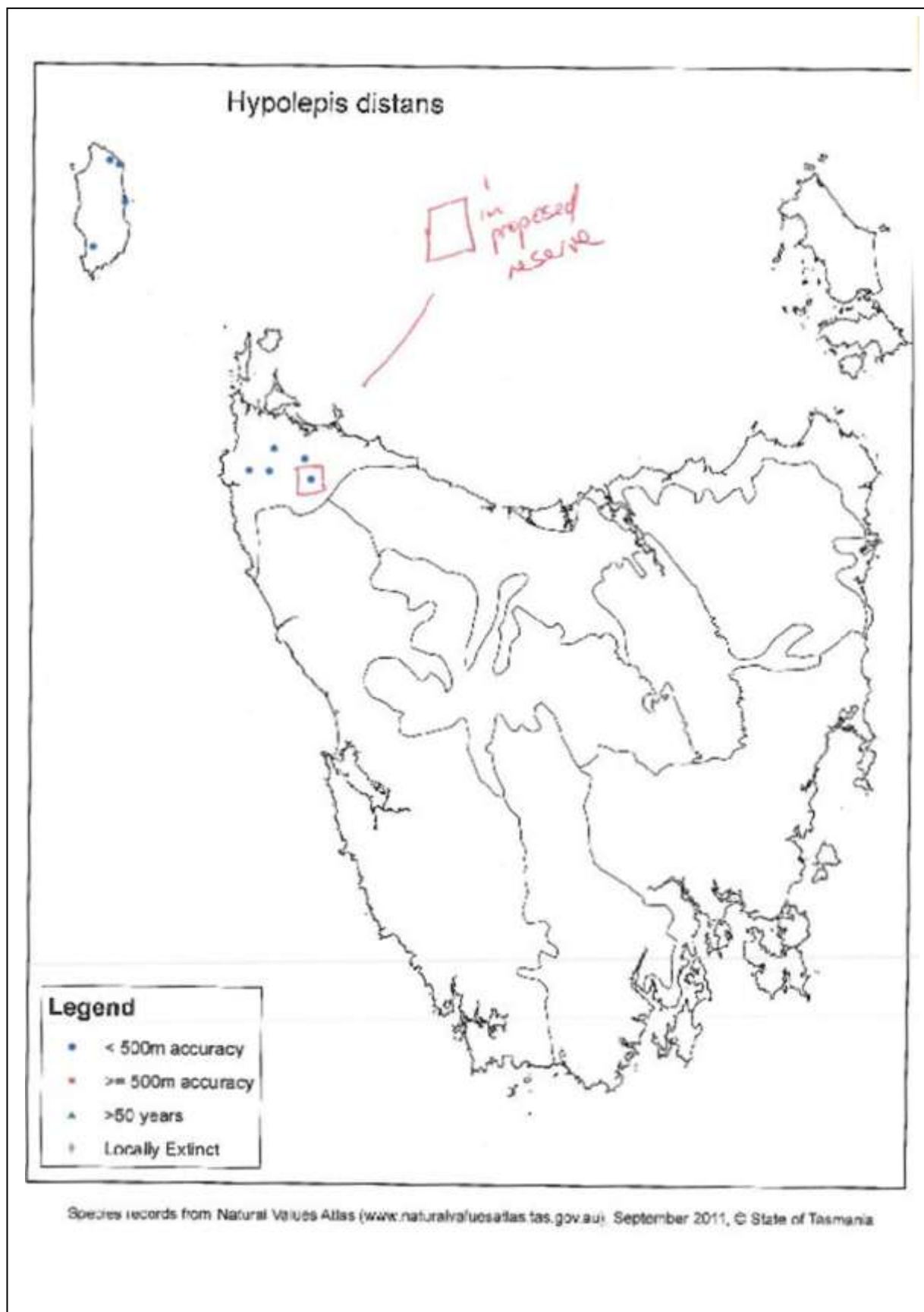
Proposed reserve contribution – state wide: 14% **bioregion:** KING – 14%

This species is restricted to the KING bioregion with proposed reserve 257 capturing observations of a population of ~ 100 plants occupying less than 0.2 ha. This proposed reserve is responsible for the state and bioregional significance for the species.

Data quality: Good.

Species comments: *Hypolepis distans* occurs in Tasmania and New Zealand. The linear range of the known extant sites in Tasmania is 175 km, the extent of occurrence 4,300 km² (including extensive areas of unsuitable habitat) and the area of occupancy 2.5–3 ha. There are seven confirmed *Hypolepis distans* subpopulations in Tasmania, with the total number of mature individuals estimated to be in the order of 500–1,000

Hypolepis distans distribution map



Rank: 40

Species: *Isolepis habra*

Status: rare (TSP Act)

Life form: sedge

Weighting: 1

Proposed reserve contribution – state wide: 25% **bioregion:** BL: 20%

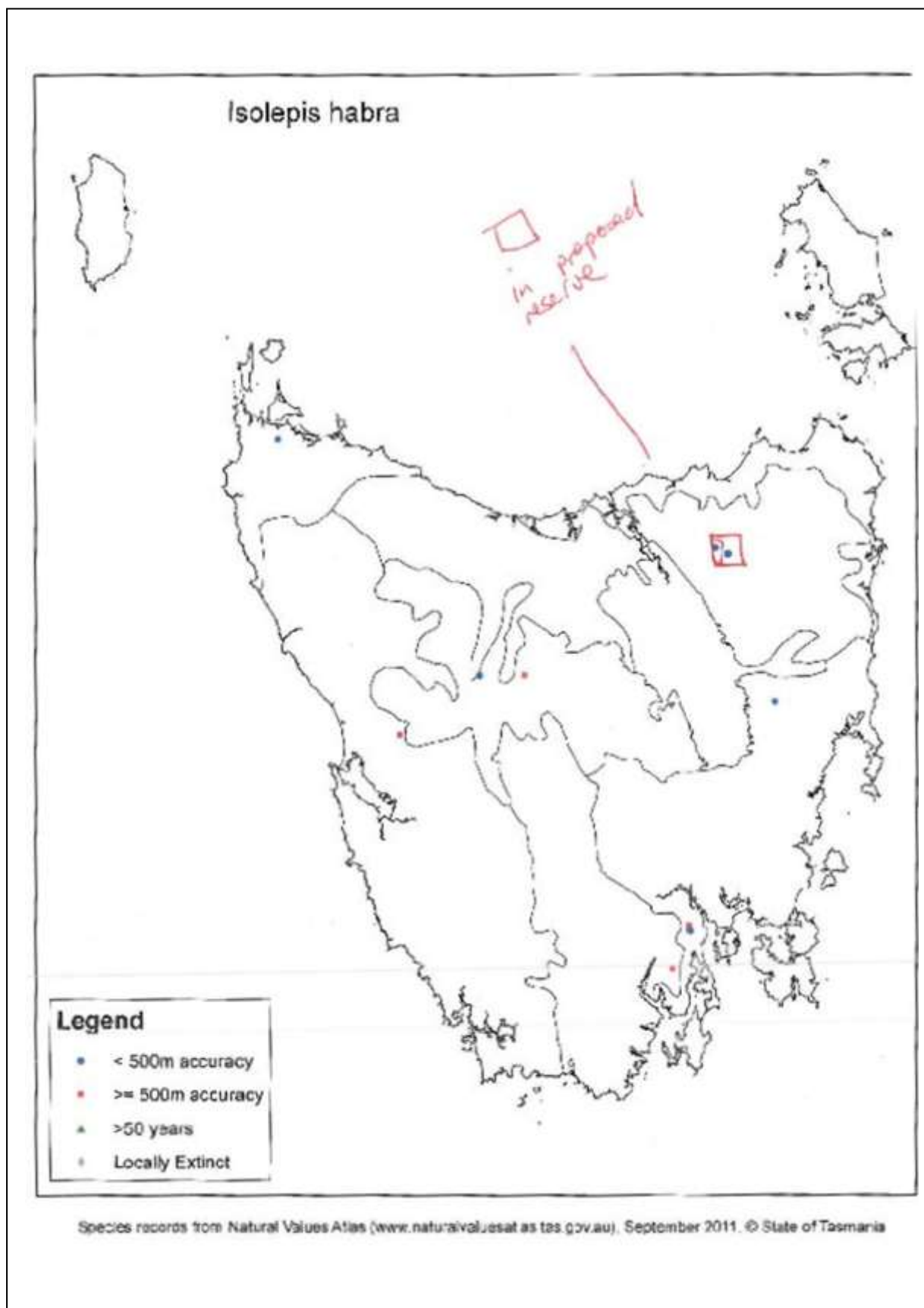
This species has been recorded from 9 scattered locations across the state (absent from the NSL, NML and FLI bioregions) from only 13 observations in total, several with poor location precision.

Observations in proposed reserve 211 in the BL bioregion are responsible for the state and bioregional significance of the proposed reserves for the species.

Data quality: This species is not well known and its distribution is not well understood. The observations in proposed reserve 211 are not supported by a herbarium specimen and cannot be verified.

Species comments: On the mainland this species occurs in Victoria and New South Wales. In Tasmania, the distribution of *Isolepis habra* is limited to wet montane and riparian habitats on Mt Wellington and near sea level in various parts of the State

Isolepis habra distribution map



Rank: 15

Species: *Micrantheum serpentinum*

Status: rare (TSP Act); endemic to Tasmania.

Life form: shrub

Weighting: 2

Proposed reserve contribution – state wide: 49% **bioregion:** WE – 49%

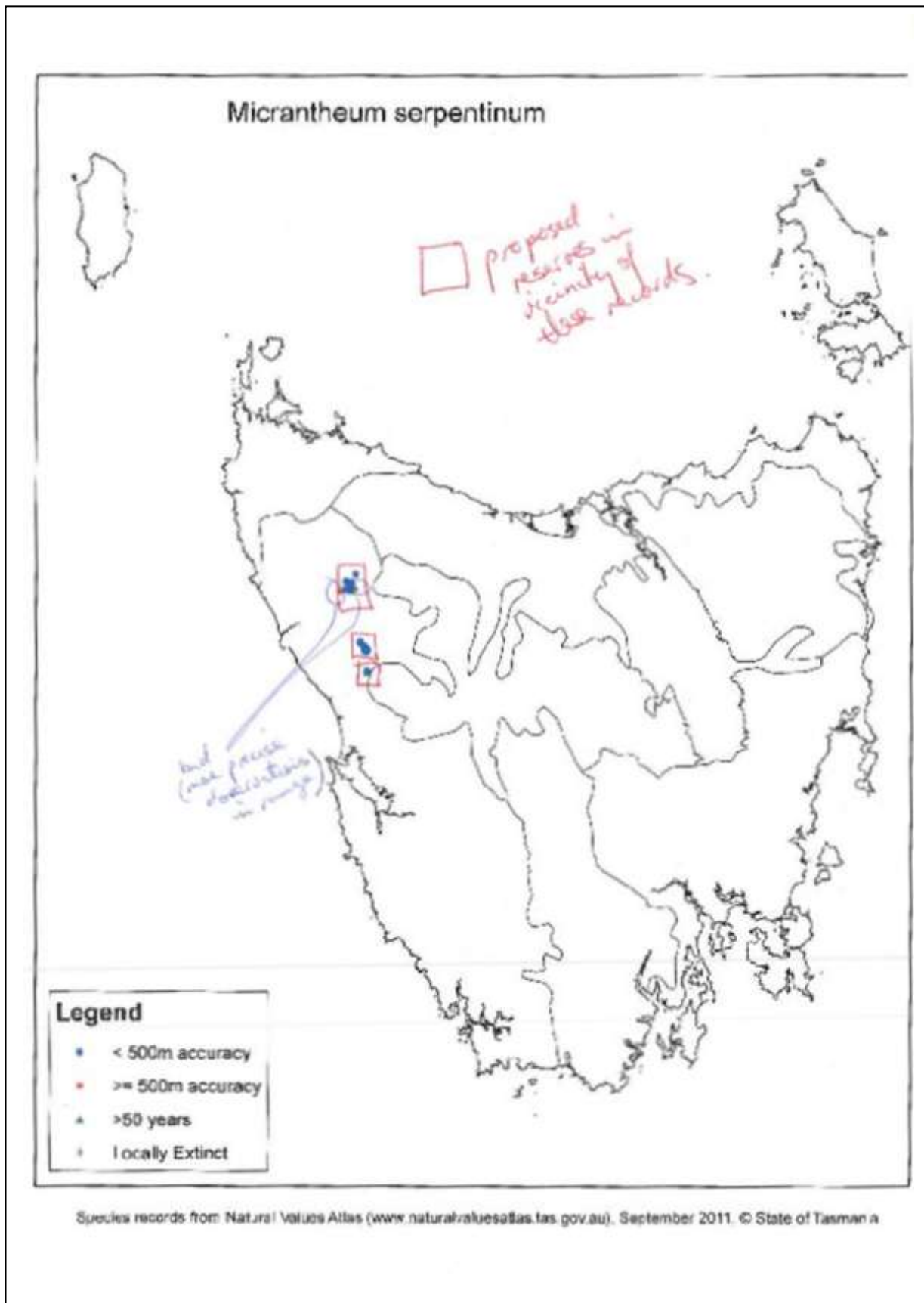
This species is known from 3 locations in the northern part of the WEST bioregion. The proposed reserves include observations from each location. Many observations in proposed reserve 198, together with 2 observations from proposed reserve 105 and a single imprecise observation for reserve 92 are responsible for the for the state and bioregional significance of the proposed reserves for the species.

Data quality: The removal of some slightly outlying historical and imprecise observations is justified given more precise observations in their range though the exclusion of these observations is only expected to alter the impact of the proposed reserves slightly. This species is restricted to serpentine outcrops in the western part of the state and as such the extent of occurrence of the species is unlikely to be increased significantly with further survey. As the species is described as locally abundant, further survey is likely to expand the area occupied at each location to some extent. Formal reservation that excludes mining would be beneficial for the species given its restricted habitat.

Species comments: *Micrantheum serpentinum* is known from estimated 8 to 9 populations.

Populations occur from near Queenstown in the south to near Waratah in the north. The area of extent of this species is approximately 245 km² and area of occupancy is estimated to be approximately 50 ha.

Micrantheum serpentinum distribution map



Rank: 20

Species: *Monotoca submutica* var. *autumnalis*

Status: rare (TSP Act); endemic to Tasmania

Life form: shrub

Weighting: 2

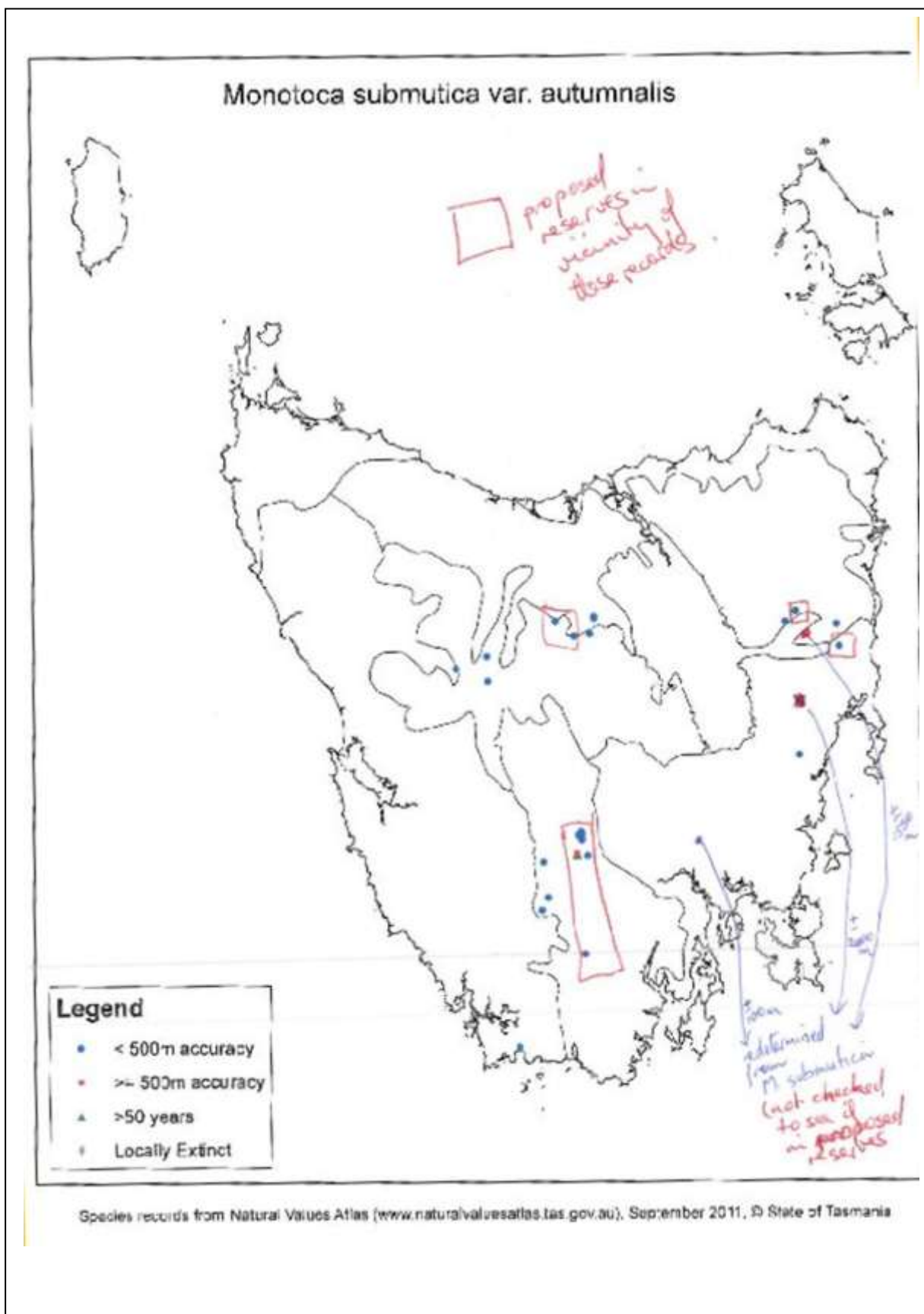
Proposed reserve contribution – state wide: 35% **bioregion:** BL – 75%

This species has been recorded in all but 3 or 4 bioregions (KING, NML, FLI and possibly WEST bioregions), with observations in proposed reserves 33, 127, 123 and 23 responsible for the state significance and significance of the proposed reserves for the CH, NSL, BL and SE bioregions

Data quality: Three new sites (2 in the SE bioregion and 1 in the BL bioregion) for this species have come to light with herbarium records that have recently been allocated to this subspecies, having previously been identified only to species level. It is not known whether these locations occur in the proposed reserves, though the observations for 2 of these locations are imprecise. This species is likely to be under-recorded.

Species comments: *Monotoca submutica* var. *autumnalis* is common in heath around the western and central mountains.

Monotoca submutica var. *autumnalis* distribution map



Rank: 25

Species: *Odixia achlaena*

Status: rare (TSP Act); endemic to Tasmania.

Life form: shrub

Weighting: 2

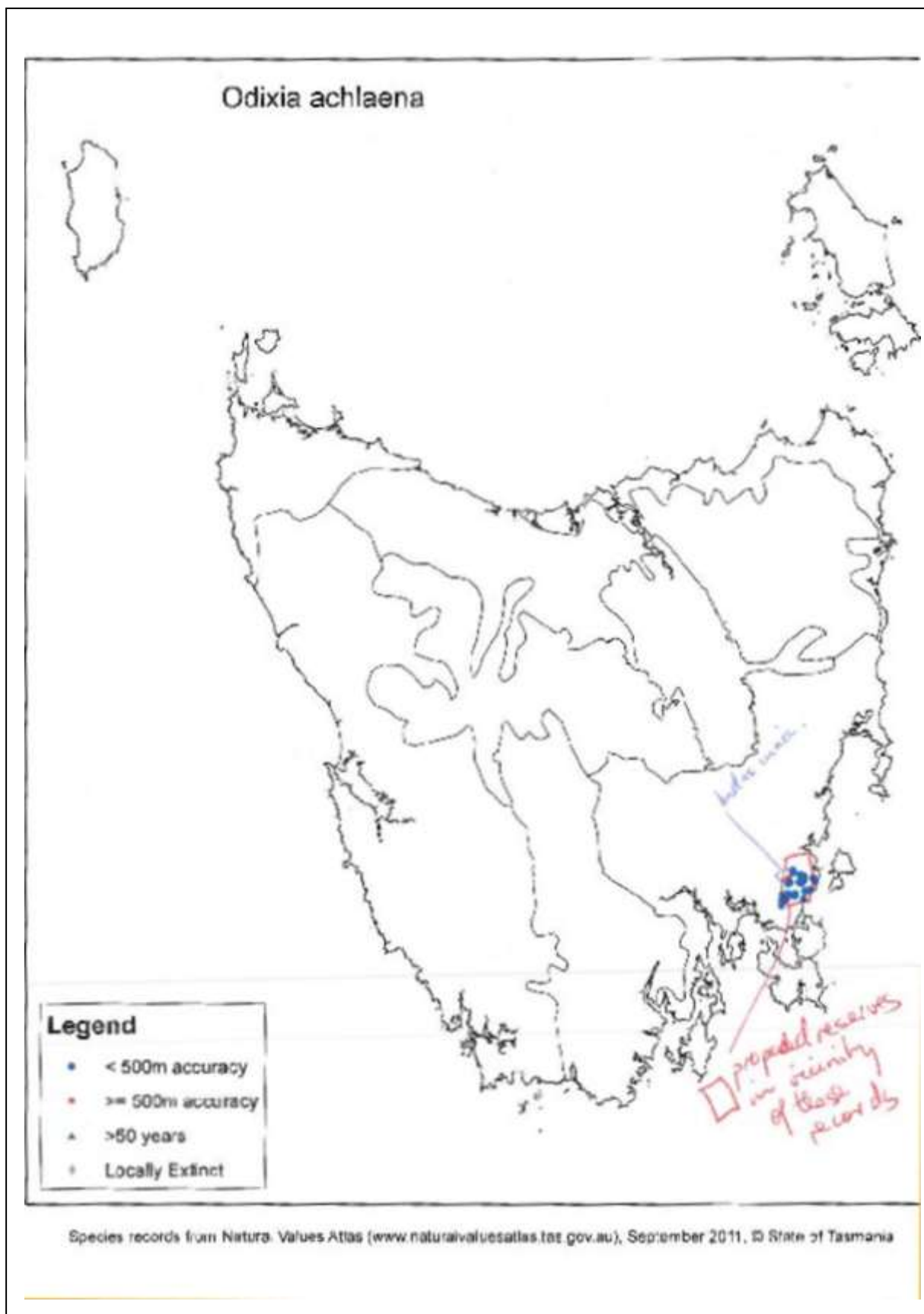
Proposed reserve contribution – state wide: 28% **bioregion:** SE: 26%

The distribution of this species is restricted to a small area in the SE bioregion with observations in reserves 29 and 22 responsible for the state and bioregional significance of the proposed reserves for the species.

Data quality: While further survey is not expected to significantly increase the known extent of occurrence of this species, it is locally abundant and further survey may increase the estimate of the area of occupancy of this species.

Species comments: There is estimated to be greater than 5 populations with 1000s of individuals covering a geographical range of 25 kilometres.

Odixia achlaena distribution map



Rank: 39

Species: *Persoonia muelleri* subsp. *angustifolia*

Status: rare (TSP Act); endemic to Tasmania.

Life form: Shrub – small tree

Weighting: 2

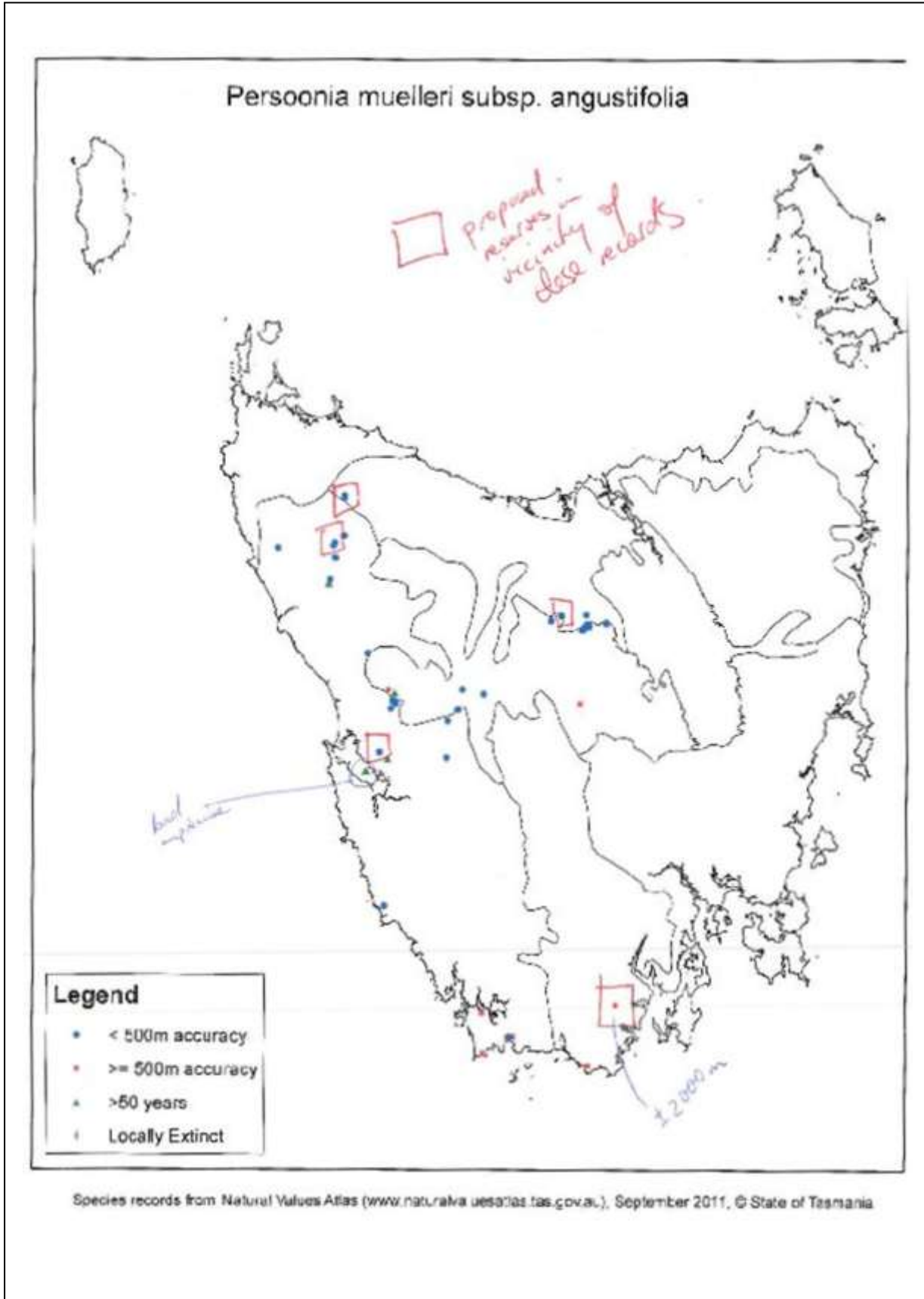
Proposed reserve contribution – state wide: 15% **bioregion:** NSL: 75%; SR: 50%; WE: 13%

This species predominantly occurs in the WEST and CH bioregions and just extends into the NSL bioregion. A single imprecise observation in proposed reserve 25 is responsible for the significance of the proposed reserves for the SR bioregion. Observations in proposed reserve 252 which straddles the WEST and NSL bioregion, and single observations in proposed reserves 52 (WEST) and 125 (straddling the CH and NSL slopes) contribute to the state significance of the proposed reserves and are responsible for the significance of the proposed reserves for the WEST and NSL bioregions for the species.

Data quality: While this species is likely to be under recorded, it is described as uncommon where it is found. While removal of some historical observations which are imprecise is justified as more precise observations occur within their range, their removal is not expected to significantly alter the results of the analysis given the relatively large number of recorded sites for the species.

Species comments: *Persoonia muelleri* subsp. *angustifolia* and can be found predominantly in the west of the State. This species grows in rainforest to dense scrub and perhaps, sub-alpine heath in a variety of sedimentary and metamorphic substrata. It typically is found at the ecotone between dry scrub and rainforest, particularly where high light levels occur on the ground due to a shorter and more open scrub. Found from 50 to 700 metres altitude.

Persoonia muelleri subsp. *angustifolia* distribution map



Rank: 31

Species: *Pomaderris elachophylla*

Status: Vulnerable (TSPAct)

Life form: Shrub – small tree

Weighting: 3

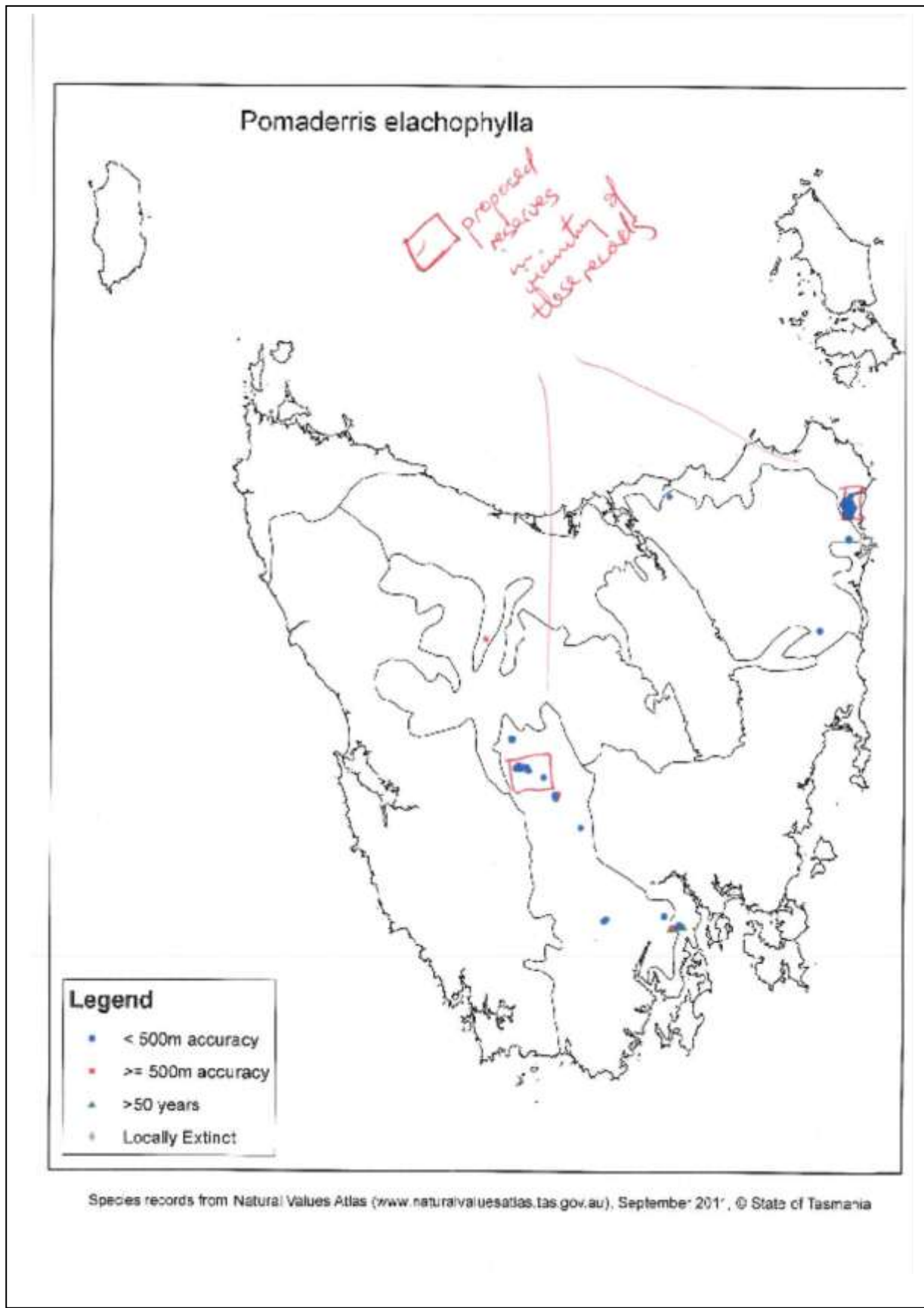
Proposed reserve contribution – state wide: 16% **bioregion:** BL: 18%; FLI: 16%

The distribution of this species occurs predominantly in the SR bioregion (where observations are captured by proposed reserve 44), just extending into the SE bioregion and a restricted area in the FLI bioregion (where observations are captured by proposed reserve 245). Outlying sites occur in the BL bioregion, and an imprecise location falling in the NSL bioregion. Observations in the above-mentioned proposed reserves are responsible for the state significance and the significance for the SR and FLI bioregions of the proposed reserves for the species.

Data quality: The presence of outlying sites suggests that additional locations of the species may be found with further survey.

Species comments: In Tasmania, *Pomaderris elachophylla* is confined to widely separated locations throughout the State.

***Pomaderris elachophylla* distribution map**



Rank: 10

Species: *Pomaderris pilifera* subsp. *talpicutica*

Life form: Small shrub

Status: endangered (TSP Act); endemic to Tasmania.

Weighting: 4

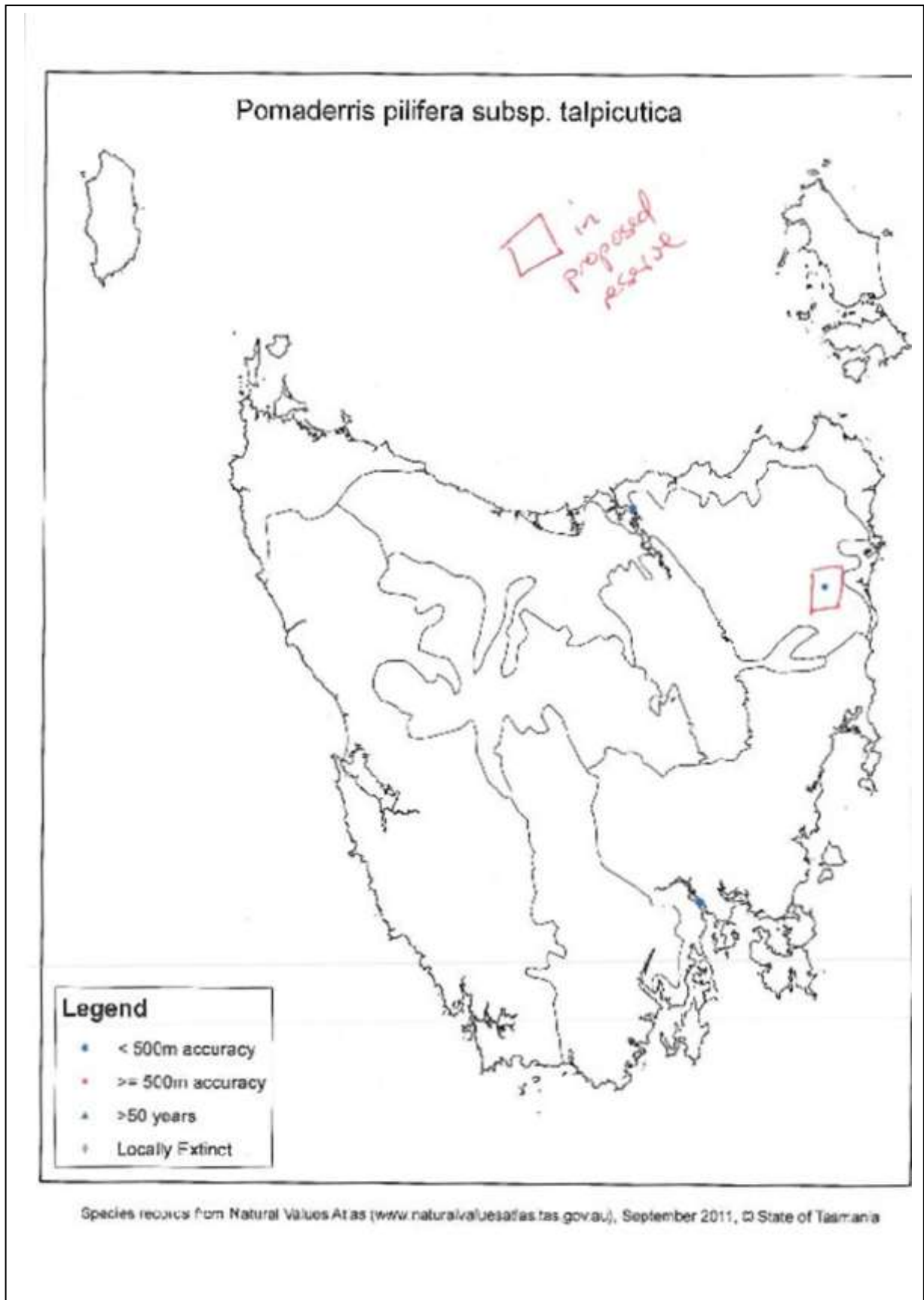
Proposed reserve contribution – state wide: 25% **bioregion:** BL - 100%

Reserve 163 in the BL bioregion captures observations of a single plant which has tentatively been ascribed to the taxon. This observation is responsible for the state and bioregional significance of the proposed reserves for this species.

Data quality: Poor. The identity of the single plant in proposed reserve 163 ascribed to the taxon is uncertain due to its poor health which may have influenced its morphology. Although, this is a recently described and listed species, it seems unlikely that the species will be found at many more locations with further survey.

Species comments: *Pomaderris pilifera* subsp. *talpicutica* is known from two small subpopulations, in the Government Hills east of Risdon in the south of the State, and close to the East Tamar Highway in the north. A third location east of Mathinna consists of a single plant in poor condition that has only been tentatively ascribed to the taxon. The linear range of the taxon is approximately 190 km, the extent of occurrence 7600 km² and area of occupancy less than 0.1 ha.

Pomaderris pilifera subsp. *talpicutica* distribution map



Rank: 3

Species: *Prasophyllum stellatum*

Status: endangered (TSP Act); Critically Endangered (EPBC Act); endemic to Tasmania

Life form: orchid

Weighting: 5

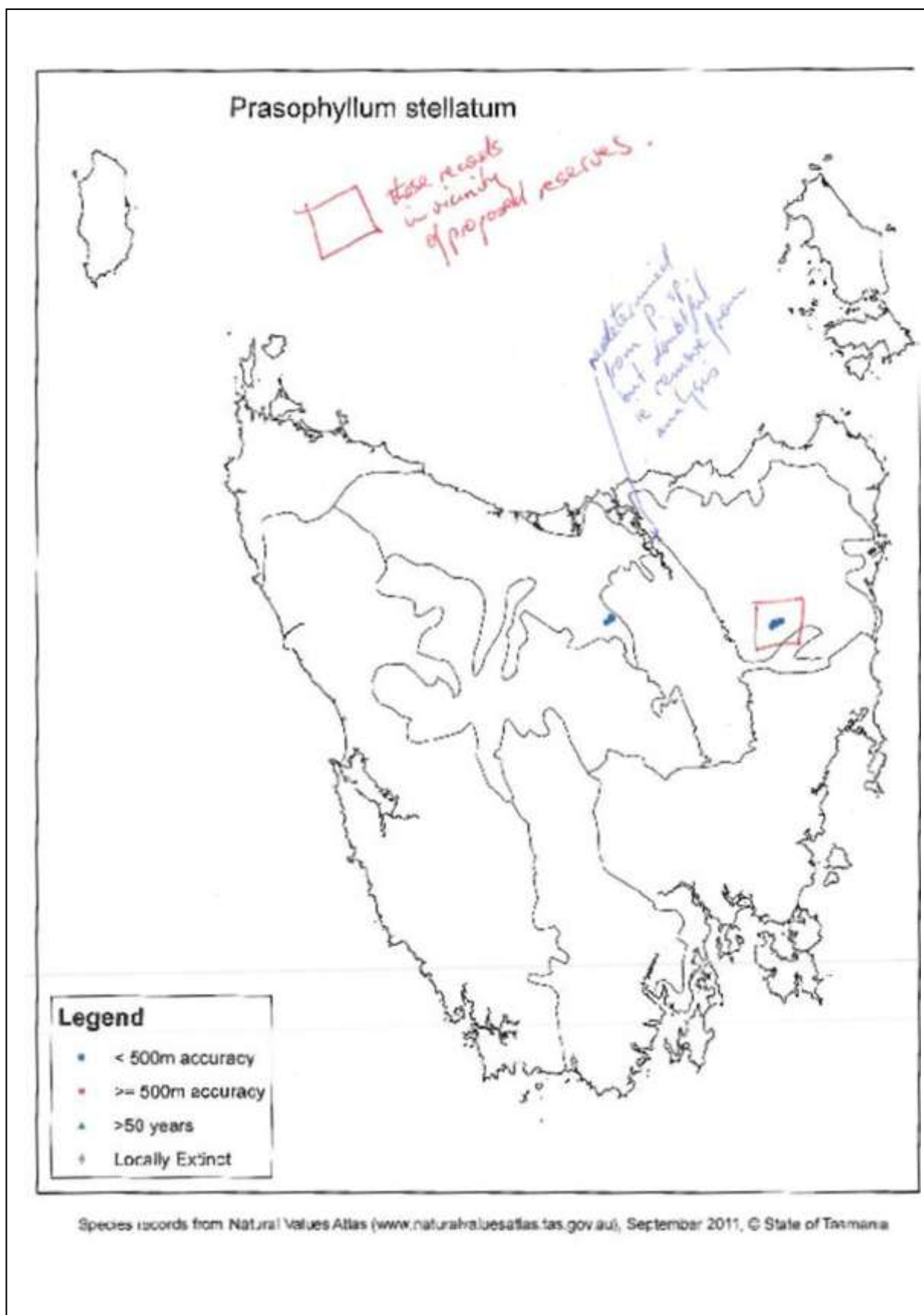
Proposed reserve contribution – state wide: 50% **bioregion:** BL – 68%

This species is known from 2 locations, the core occurrence in the BL bioregion for which observations are captured in proposed reserve 126, this proposed reserve being responsible for the state and bioregional significance of the proposed reserves for the state; and another occurrence in the NSL bioregion.

Data quality: Good. This species belongs to a complex within the genus in which species are difficult to identify. Plants in the NSL bioregion are slightly different but have been ascribed to this taxon. A doubtful and imprecise observation at a 3rd site (near Launceston in the BL bioregion) has been removed from the analysis.

Species comments: *Prasophyllum stellatum* has a disjunct distribution, occurring in the Storys Creek area, on the southern slopes of Ben Lomond, and at Cluan Tiers. The species has an estimated extent of occurrence of 180 km² and area of occupancy of 94 ha.

Prasophyllum stellatum distribution map



Rank: 26

Species: *Rhytidosporum inconspicuum*

Status: endangered (TSP Act)

Life form: shrub

Weighting: 4

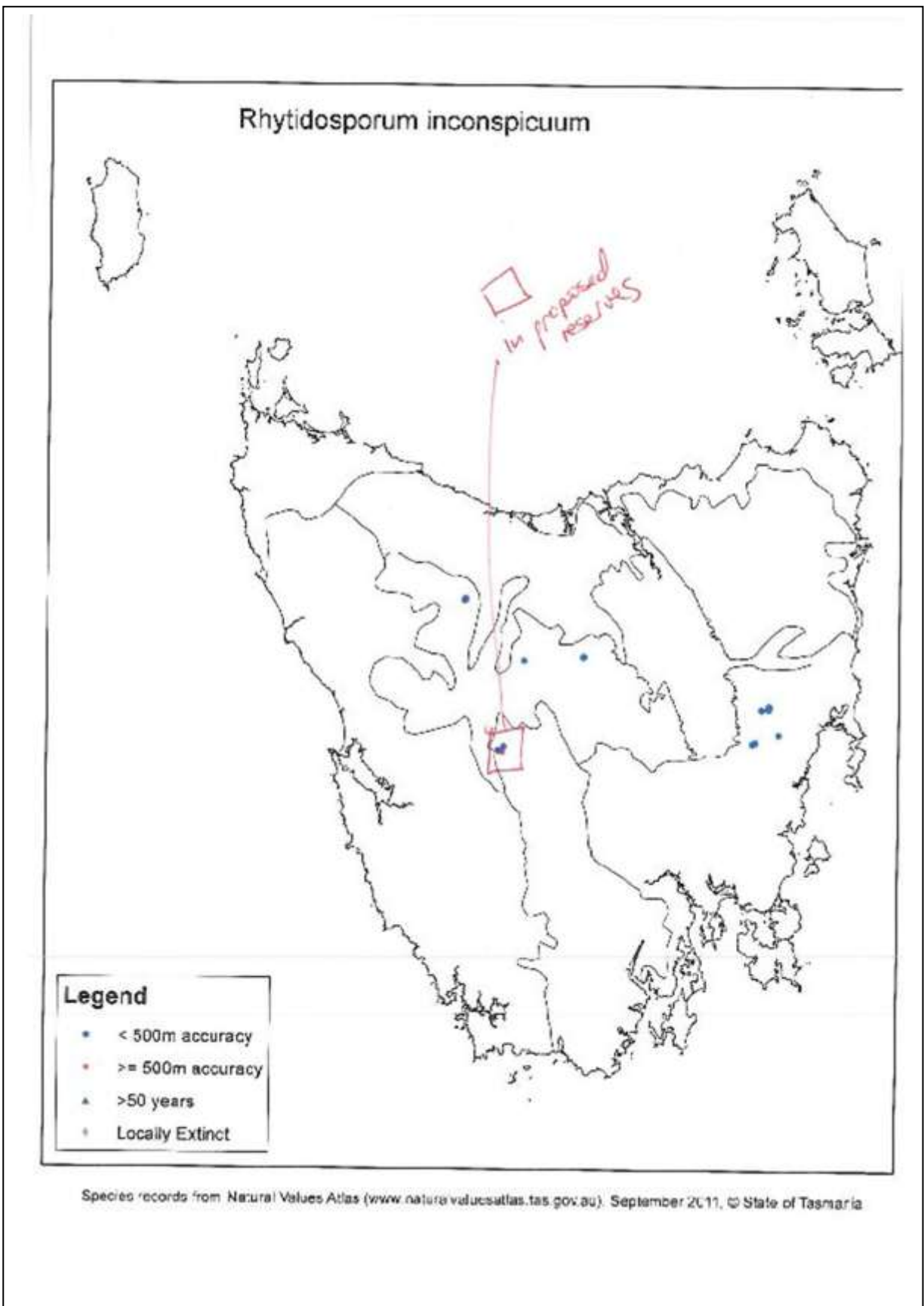
Proposed reserve contribution – state wide: 50% **bioregion:** WE: 50%

This species is known from SR bioregion for which observations are captured in proposed reserve 58, this proposed reserve being responsible for the state and bioregional significance of the proposed reserves for the species; and occurrences in the CH and SE bioregions.

Data quality: This species is likely to be under recorded on account of its inconspicuous appearance.

Species comments: In Tasmania the species is known to occur in montane open grassy heath at Middlesex Plains, Lake Tyre, King William Plains and Breona. The linear range of the species in Tasmania is 168 km, the extent of occurrence about 6,400 km² and the area of occupancy less than 1 ha. *Rhytidosporum inconspicuum* has been recorded in Tasmania from ten sites. Estimates of plant numbers are available for only five of these, with a total of about 350 plants.

***Rhytidosporum inconspicuum* distribution map**



Rank: 8

Species: *Roccellinastrum neglectum*

Status: endangered (TSP Act)

Life form: lichen

Weighting: 4

Proposed reserve contribution – state wide: 50% **bioregion:**

Proposed reserve 252 includes 1 of only 2 observations of this species, both occurring in the northern part of the WEST bioregion. This observation in the proposed reserve is the western most of the 2 and is responsible for the state and bioregional significance of the proposed reserves.

Data quality comments: Most lichen data, as for this species, has a poor location precision of +/- 1000m.

Species comments: *Roccellinastrum neglectum* occurs in New Zealand and Tasmania. It is currently known only from the cool temperate rainforests of the Savage River Pipeline Road in the north west of Tasmania.

***Roccellinastrum neglectum* distribution map**



Rank:37

Species: *Spyridium obcordatum*

Status: vulnerable (TSP Act); Vulnerable (EPBC Act); Endemic to Tasmania

Life form: shrub

Weighting: 3

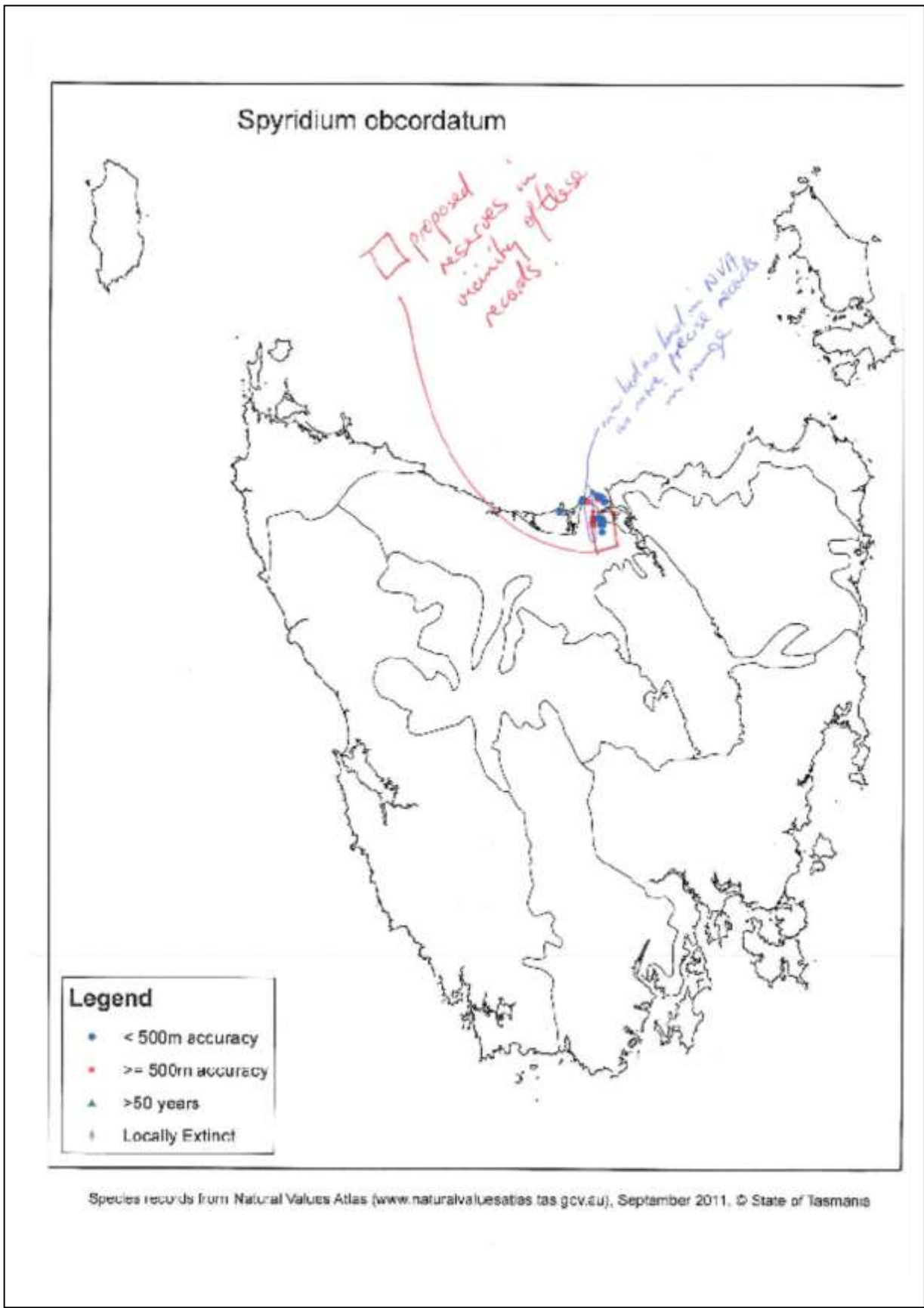
Proposed reserve contribution – state wide: 9% **bioregion:** NSL: 14%

The core occurrence of this species occurs in slightly inland foothill areas in the NSL bioregion for which observations are captured in proposed reserve 239, this proposed reserve being responsible for the state and bioregional significance of the proposed reserves for the species; and nearby coastal lowland areas in the FLI bioregion.

Data quality: The distribution of this species is restricted and it is unlikely that further survey will significantly extend the extent of occurrence of the species. The removal of some slightly outlying historical and imprecise observations is justified given more precise observations in their range. The exclusion of these observations is expected to benefit the impact of the proposed reserves to some extent.

Species comments: *Spyridium obcordatum* is restricted to approximately 280 square kilometres in the north of the state on hills to the east of the Dazzler Range near Beaconsfield, and in coastal areas from Greens Beach to Hawley Beach at Port Sorell. It is estimated to occupy approximately 20 hectares in total. *Spyridium obcordatum* is known from 9 populations. The total number of plants is estimated at approximately 55,000 mature individuals. The largest population mostly occurs within the Andersons Creek Forest Reserve and was estimated to contain more than 26,000 individuals in 1996.

Spyridium obcordatum distribution map



Rank: 14

Species: *Stonesiella selaginoides*

Status: endangered (TSP Act), Endangered (EPBC Act), Endemic to Tasmania.

Life form: shrub

Weighting: 4.5

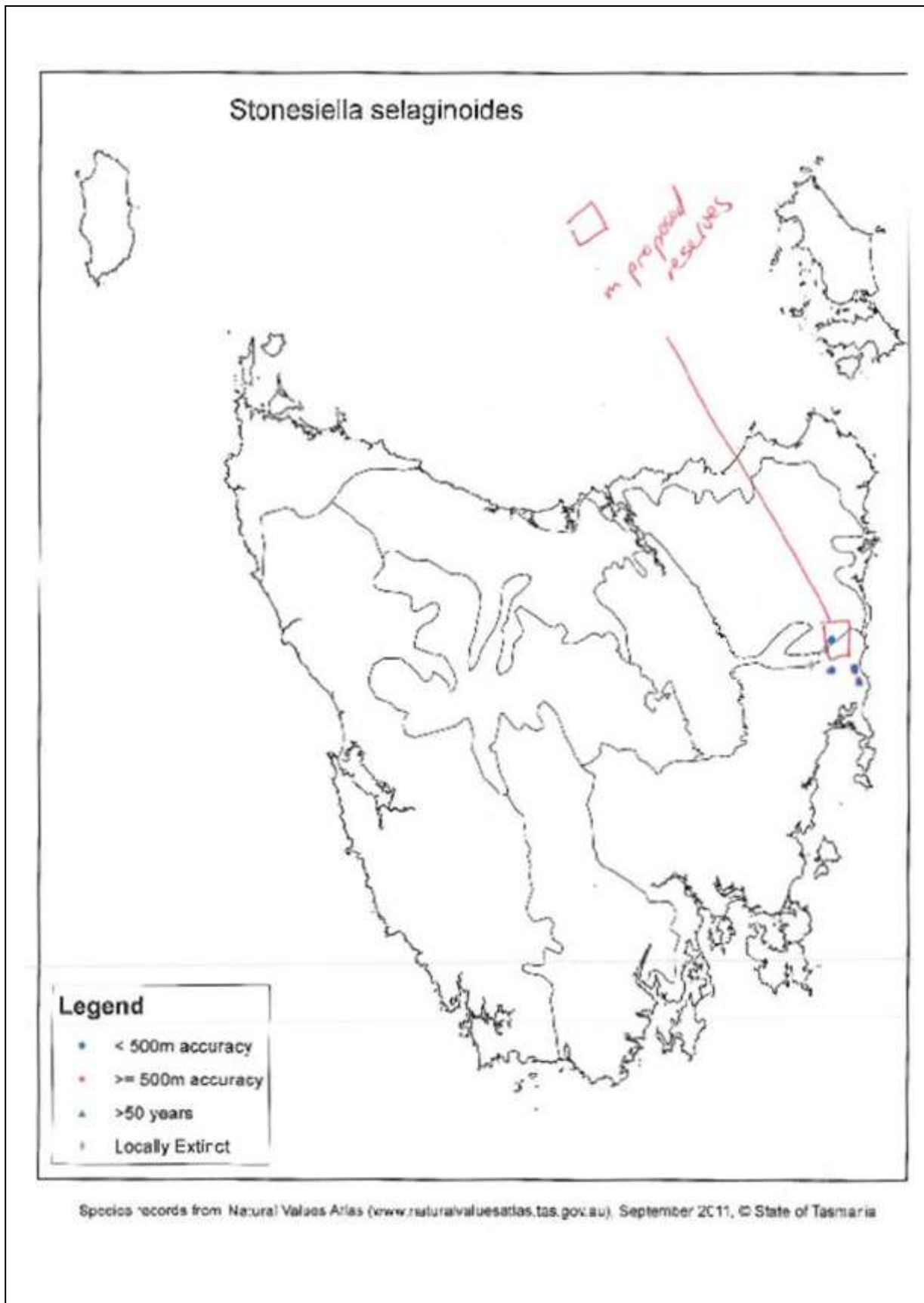
Proposed reserve contribution – state wide: 23% **bioregion:** BL – 100%

This species has a restricted distribution and is known from 2 or 3 extant sites in the SE bioregion (1 small subpopulation was seen to decline with plants not seen since 1996), and another site in the BL bioregion (close to the SE boundary), with 100 of the total estimated 2600 to 2700 plants of the species. Observations in the BL bioregion are captured by proposed reserve 123 which is responsible for the state and bioregional significance of the proposed reserves for the species.

Data quality: Good. The removal of presumed extinct sites from the analysis would increase the benefit of the proposed reserves for the species.

Species comments: *Stonesiella selaginoides* occurs in the central East Coast region. The species has a linear range of 24 km, an extent of occurrence of 126 km², and an area of occupancy of about 3 to 4 ha.

Stonesiella selaginoides distribution map



Rank: 12

Species: *Thelymitra jonesii*

Status: endangered (TSP Act); Critically Endangered (EPBC Act); endemic to Tasmania.

Life form: orchid

Weighting: 5

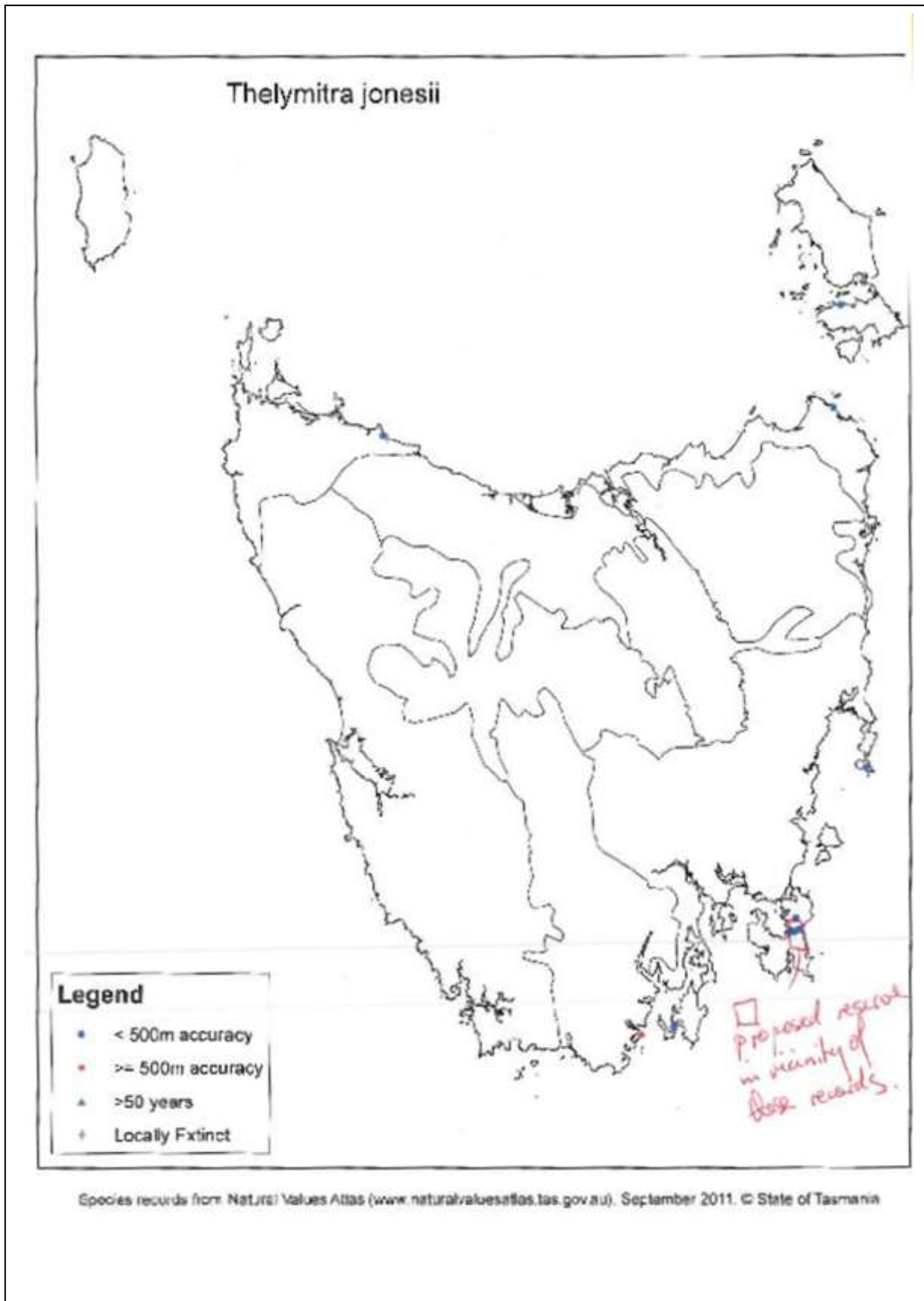
Proposed reserve contribution – state wide: 9% **bioregion:** NSL: 44%

This species has a widespread but disjunct coastal distribution, with occurrences recorded in the KING, FLI (Northeast tip and Cape Barren Island), SR, and SE (Schouten Island, South Bruny Island and the Tasman Peninsula) bioregions. Some observations in the SE bioregion are captured by proposed reserve 14 which is responsible for the state and bioregional significance of the proposed reserves for the species.

Data quality: The disjunct occurrences, brief identification window and spasmodic emergence (which is dependent on suitable disturbance such as fire and climatic conditions) indicate that further occurrences will be found over time. The number of plants reported per site is small though the occurrence captured by proposed reserve 14 is the largest reported with 32 plants seen in 2001.

Species comments: *Thelymitra jonesii* is known from seven populations. Only two populations have been observed in recent years. Populations are characteristically small, the largest with about 32 plants. The Sisters Beach population, now destroyed by housing, previously had 3 or 4 plants only. The total number of mature individuals is estimated to be less than 60.

Thelymitra jonesii distribution map



Rank: 28

Species: *Thismia rodwayi*

Status: rare (TSP Act)

Life form: herb

Weighting: 1

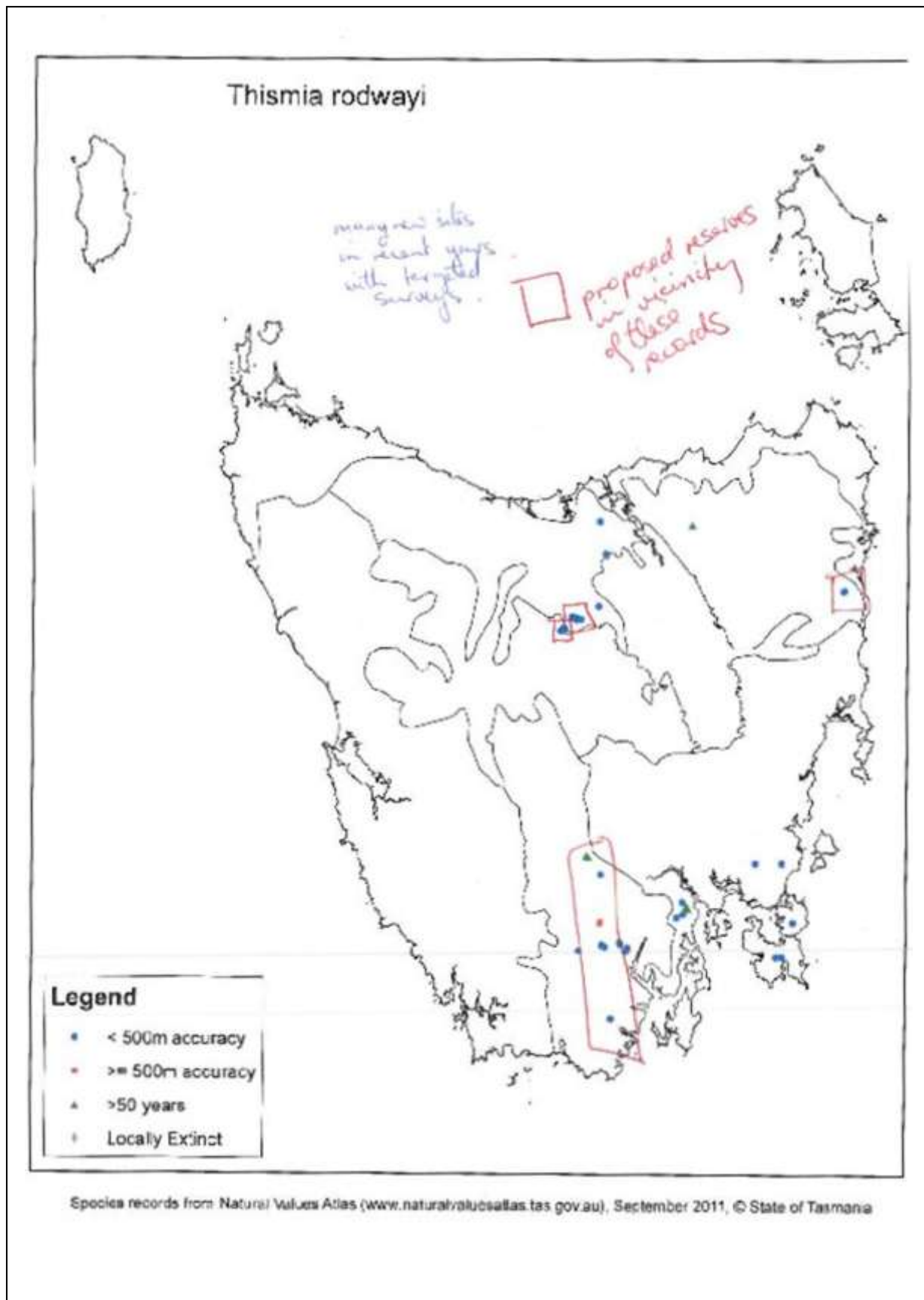
Proposed reserve contribution – state wide: 35% **bioregion:** NSL: 81%; BL: 67%

This species been recorded in a number of sites in the SR, SE and NSL bioregions and 2 sites in the BL bioregion (one historical). Observations of the species fall in proposed reserves 115 and 125 in the NSL bioregion, 150 and 225 (an imprecise 1960 observation) in the BL bioregion (these reserves responsible for the significance of the proposed reserves for these 2 bioregions) as well as proposed reserves 25 and 23 in the SR bioregion; all of which contribute to the state significance of the proposed reserves for the species.

Data quality: This species is under recorded due to its saprophytic nature and brief identification window. Potential habitat for the species is widespread and dedicated surveys have resulted in many new locations for the species in recent years.

Species comments: In Tasmania, the species is known from several disjunct localities: Mt Arthur, Mt Wellington, Mt Field, Little Denison River, Meander, Cluan Tier, Black Sugarloaf, Hastings Caves, and Franklin- Glen Huon. The species has a linear extent of c. 237 km and extent of occurrence of c. 10,390 km² (with an area of occupancy of < 20 ha).

Thismia rodwayi distribution map



Rank: 1

Species: *Thynninorchis nothofagicola*

Status: endangered (TSP Act), Critically Endangered (EPBC Act), Endemic to Tasmania.

Life form: orchid

Weighting: 5.5

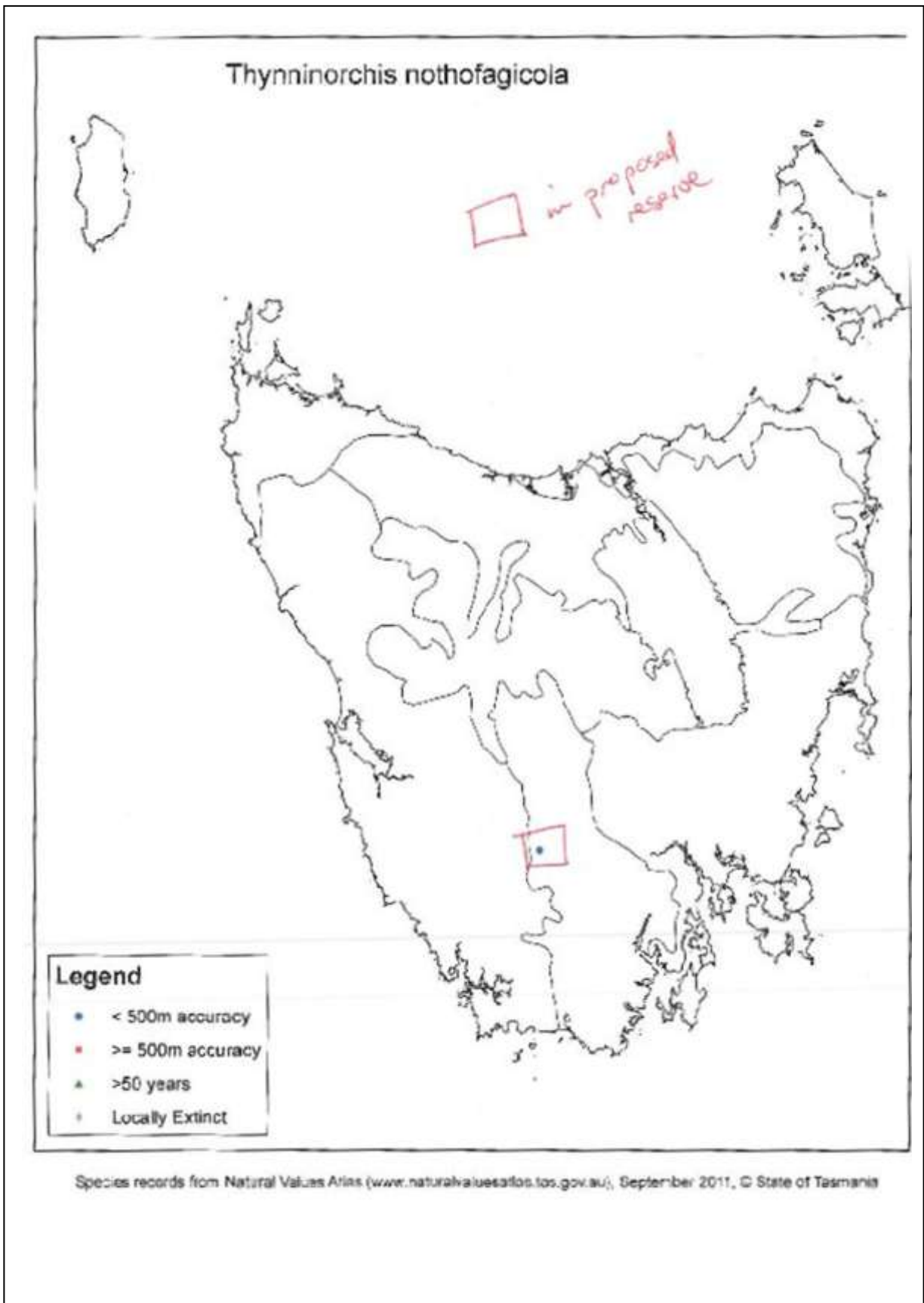
Proposed reserve contribution percentage state wide: 100%; **bioregion:** SR – 100%

This species is known from only from the 1 site with a maximum of 3 plants recorded at any one time. The site is captured by proposed reserve 23 in the SR bioregion, which is responsible for the state and bioregional significance of the proposed reserves for the species.

Data quality: It is considered unlikely that many, if any, new sites for this species will be found despite a large extent of seemingly suitable habitat for the species. On the other hand, the species is inconspicuous, has a brief identification window and does not emerge annually making them easy to escape detection. The plants have had to be caged to protect them from lyre bird diggings –another reason that additional sites are unlikely to be found.

Species comments: *Thynninorchis nothofagicola* is an orchid which is endemic to Tasmania and is known only from one small population in the southwest of the State, occupying only a few square metres.

Thynninorchis nothofagicola distribution map



Rank: 32

Species:

Rank: 33

Species: *Xerochrysum palustre*

Status: Vulnerable (EPBC Act)

Life form: herb

Weighting: 3

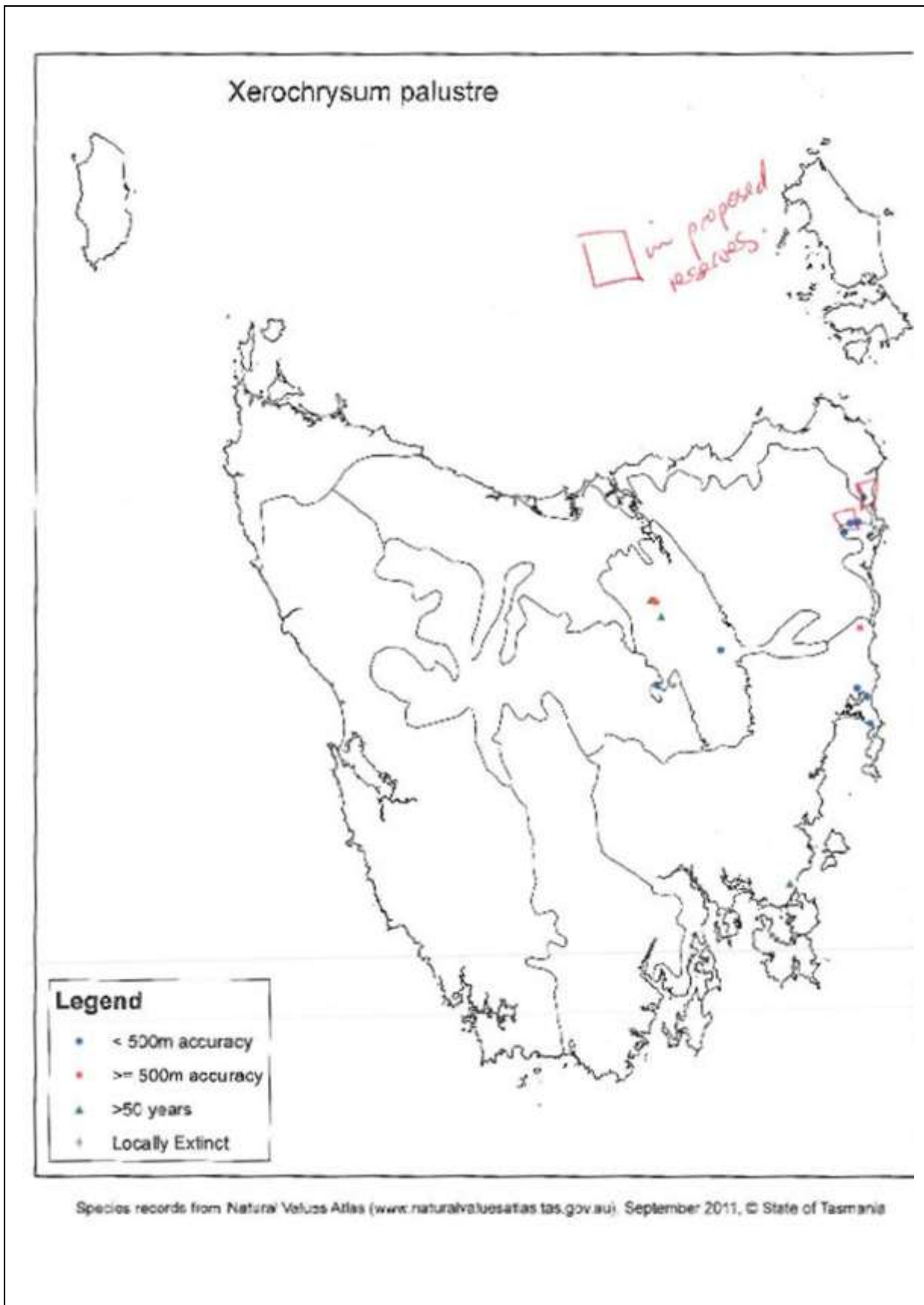
Proposed reserve contribution – state wide: 12% **bioregion:** BL: 50%; FLI: 33%

This species occurs in the FLI bioregion, and just extends into the BL bioregion, and several sites occur in each of the NML and SE bioregions. Observations falling in proposed reserves 245 in the FLI bioregion and 217 in the CH bioregions are responsible for the state significance and significance for these 2 bioregions of the proposed reserves for this species

Data quality: The distribution of this species is becoming better understood with the discovery of several new sites in recent years. Until recently the species was considered data deficient accounting for why the species has not been considered for listing at the state level despite being listed under the EPBC Act. It is likely that new sites will be found with further survey.

Species comments: On the mainland this species occurs in Victoria. In Tasmania, *Xerochrysum palustre* grows in swamps or winter-wet grasslands and swampy riparian vegetation.

Xerochrysum palustre distribution map

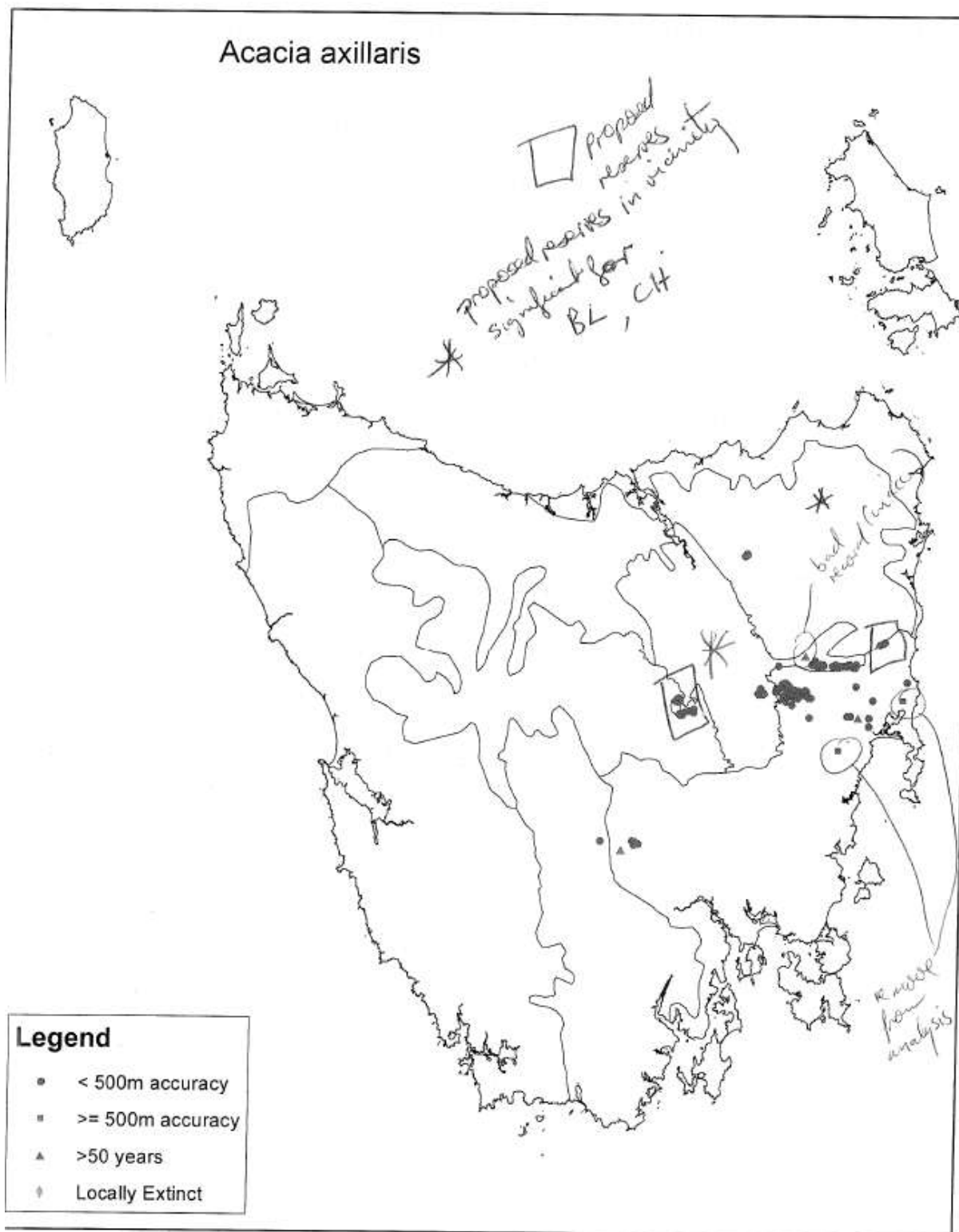


Appendix 2: List of species that have a significant benefit from the ENGO proposed reserves in Tasmania in a bioregion

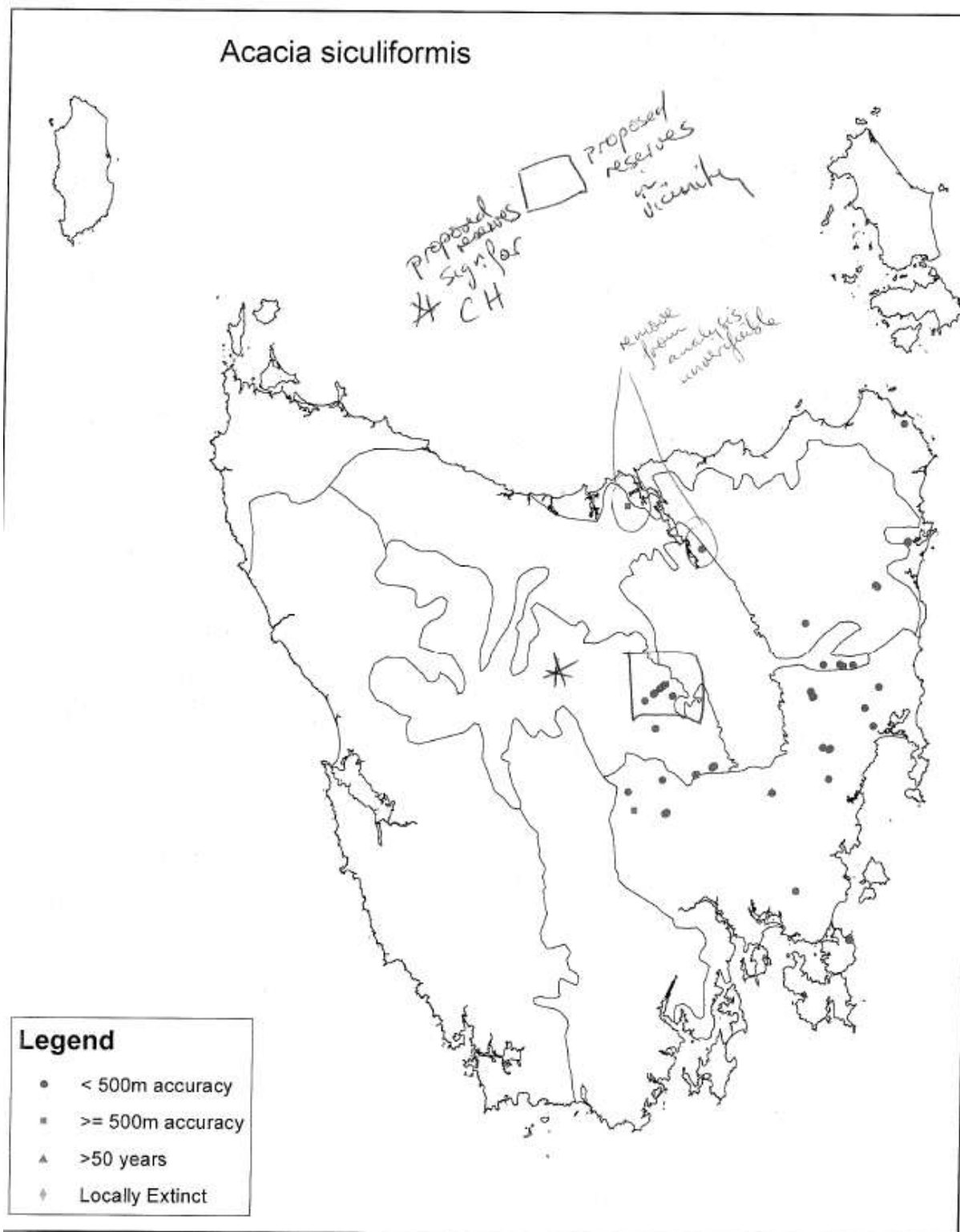
(note that the analysis excluded threatened eucalypts and palaeoendemics)

Hard copies of annotated distribution maps have been provided.

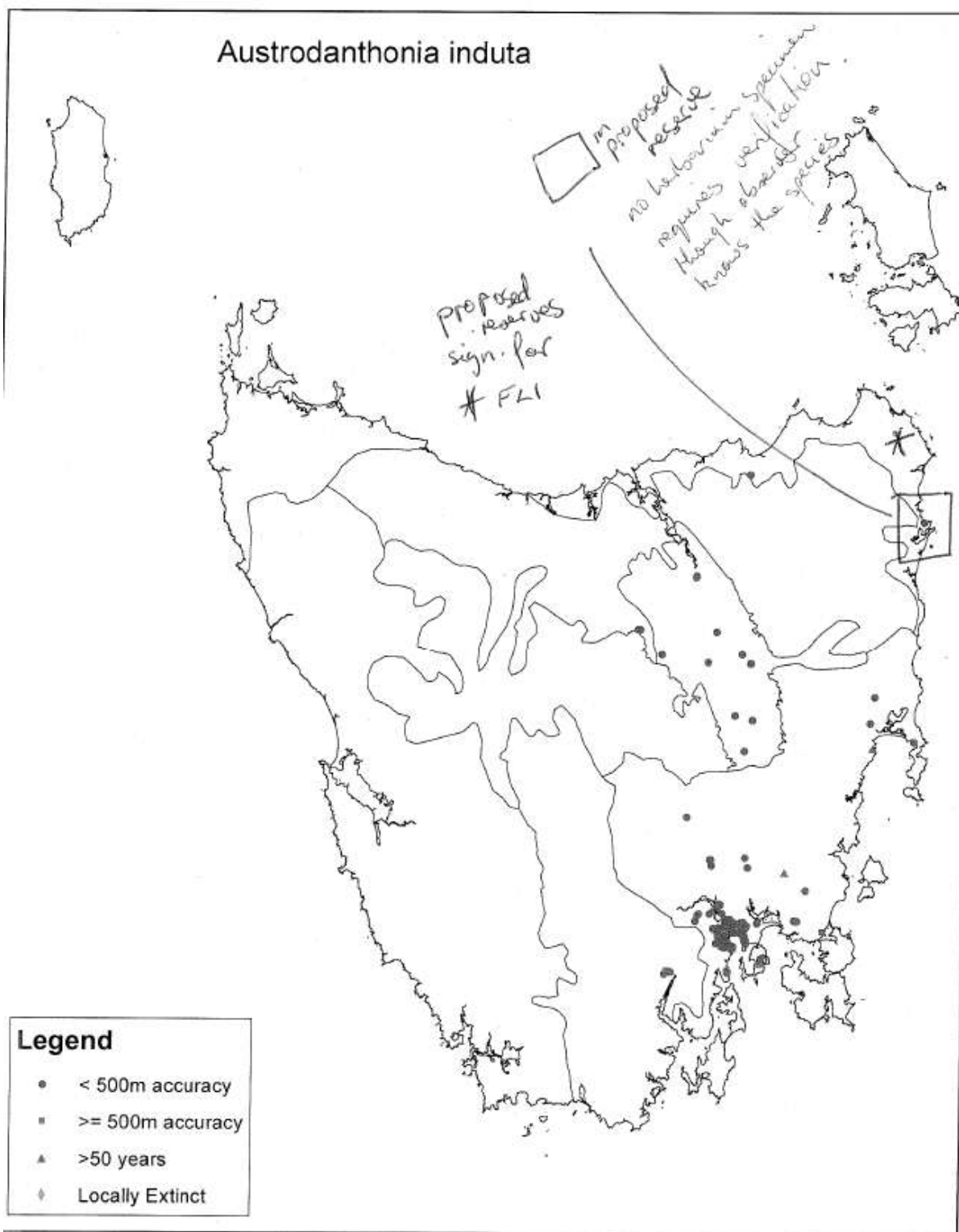
Acacia axillaris
Acacia siculiformis
Austrodanthonia induta
Baumea gunnii
Blechnum cartilagineum
Caladenia caudata
Caladenia congesta
Caladenia pusilla
Cyphanthera tasmanica
Desmodium gunnii
Deyeuxia brachyathera
Deyeuxia minor
Gratiola pubescens
Hypolepis muelleri
Lobelia rhombifolia
Orthoceras strictum
Pellaea calidirupium
Pentachondra ericifolia
Plantago debilis
Prasophyllum apoxychilum
Pterostylis atriola
Senecio velleioides
Spyridium parvifolium var. parvifolium
Stellaria multiflora
Thelymitra holmesii
Uncinia elegans
Xerochrysum bicolor



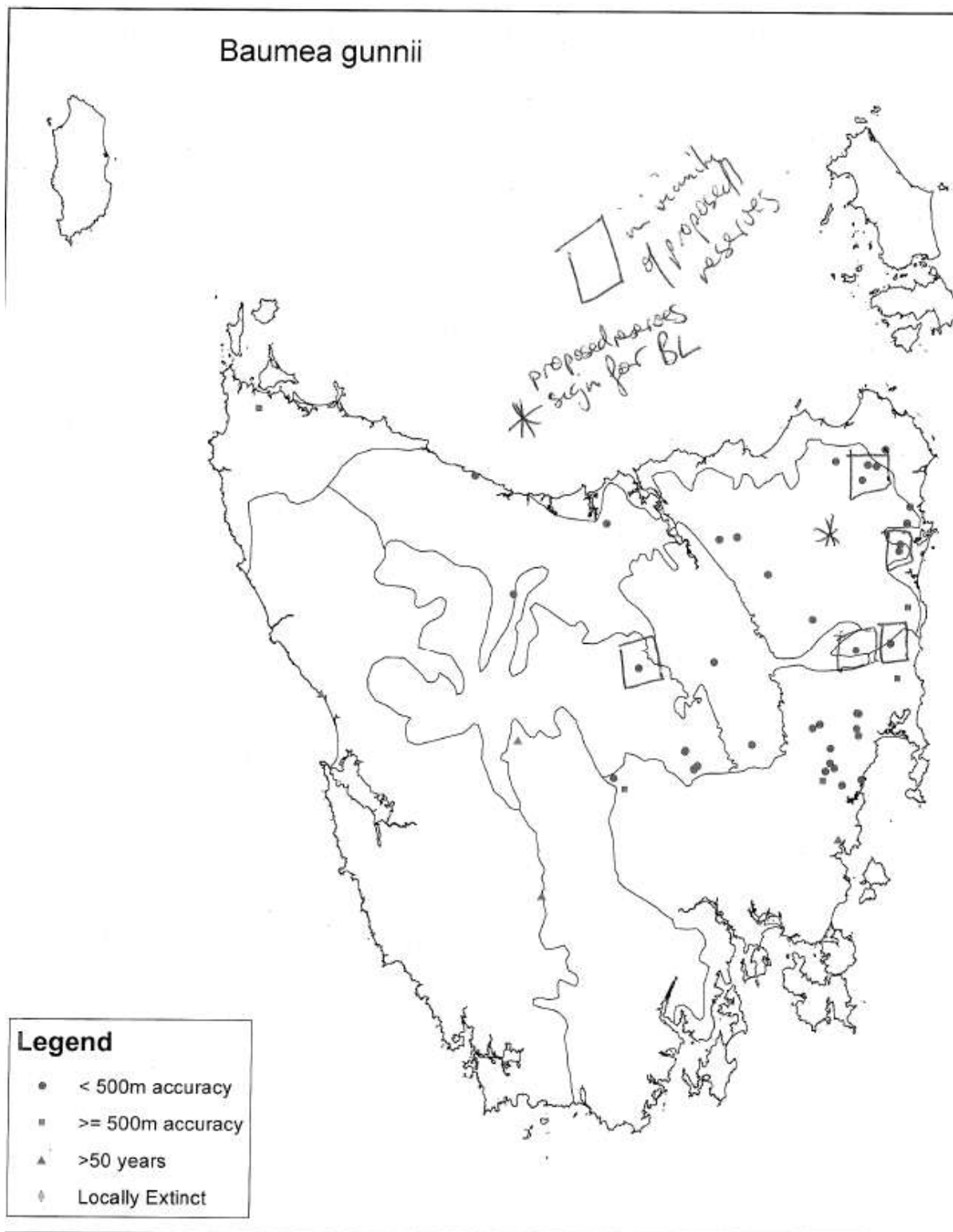
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



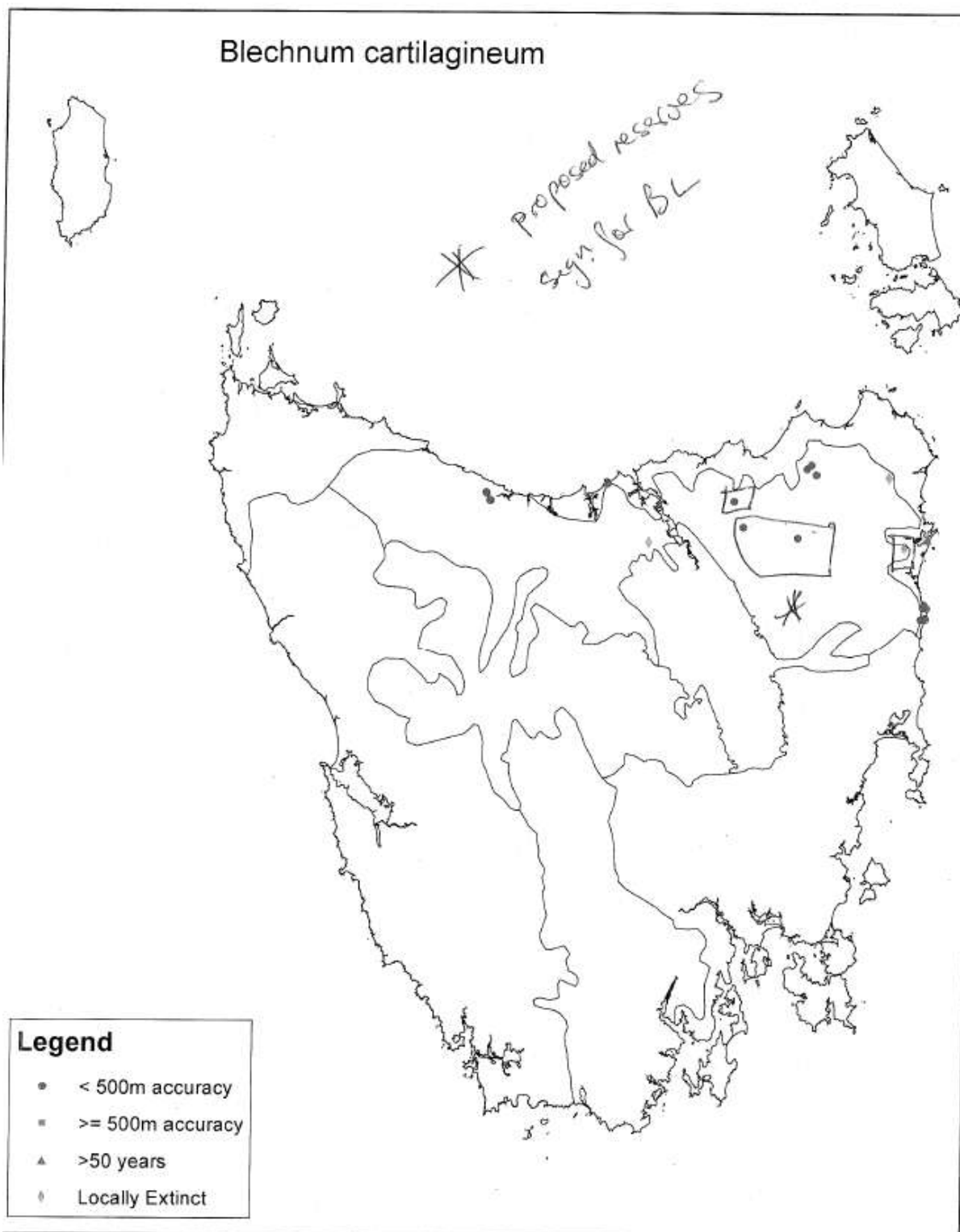
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



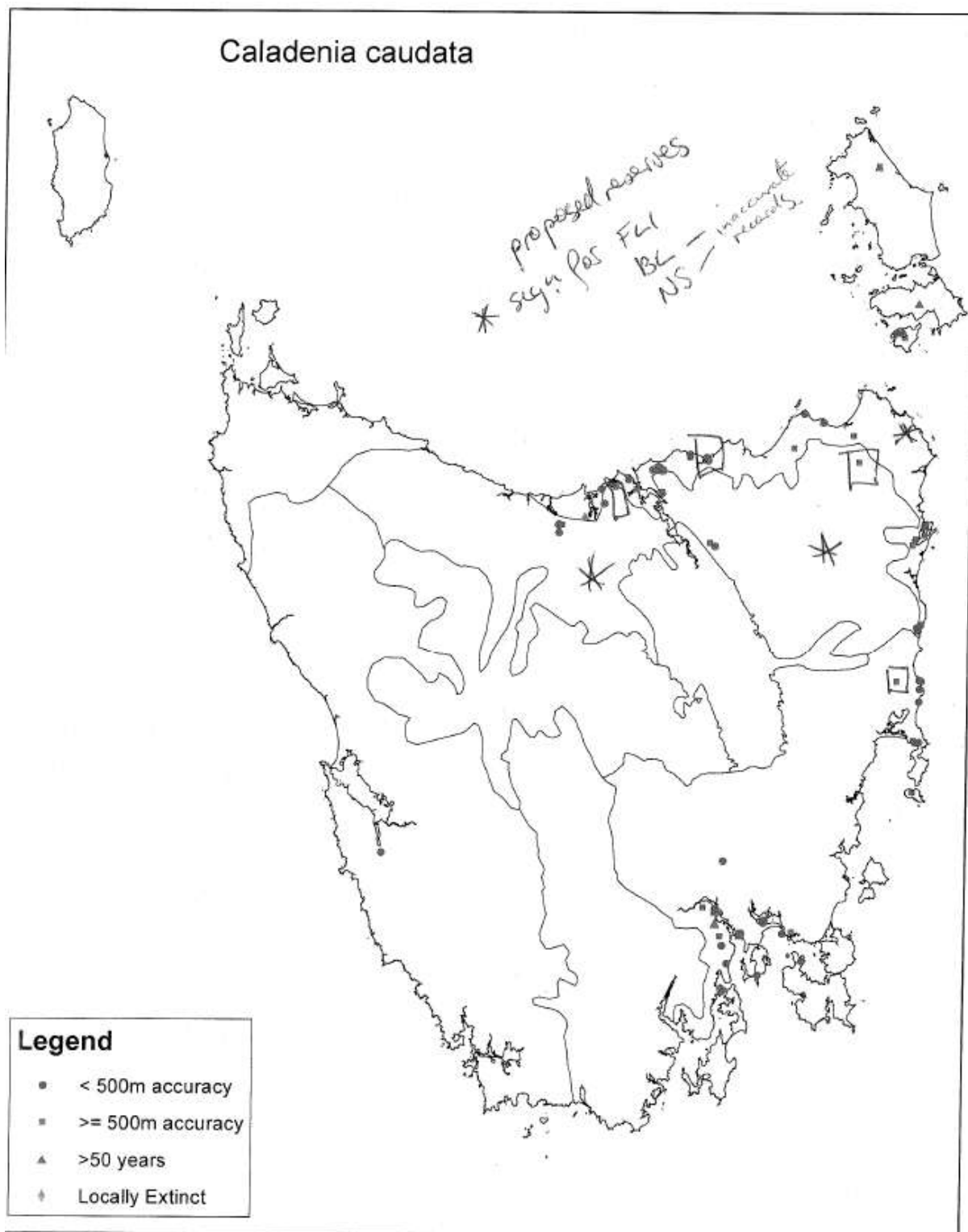
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



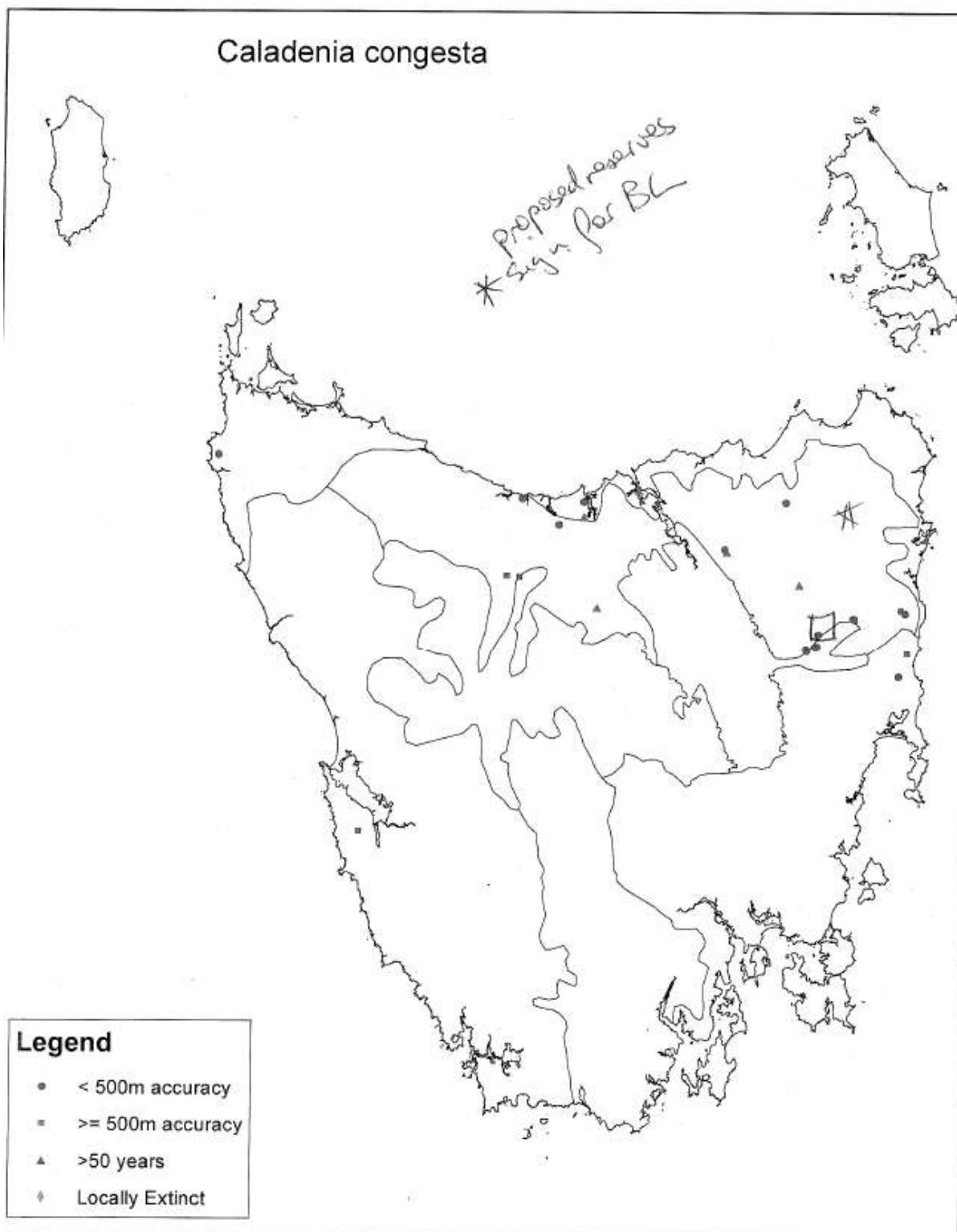
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



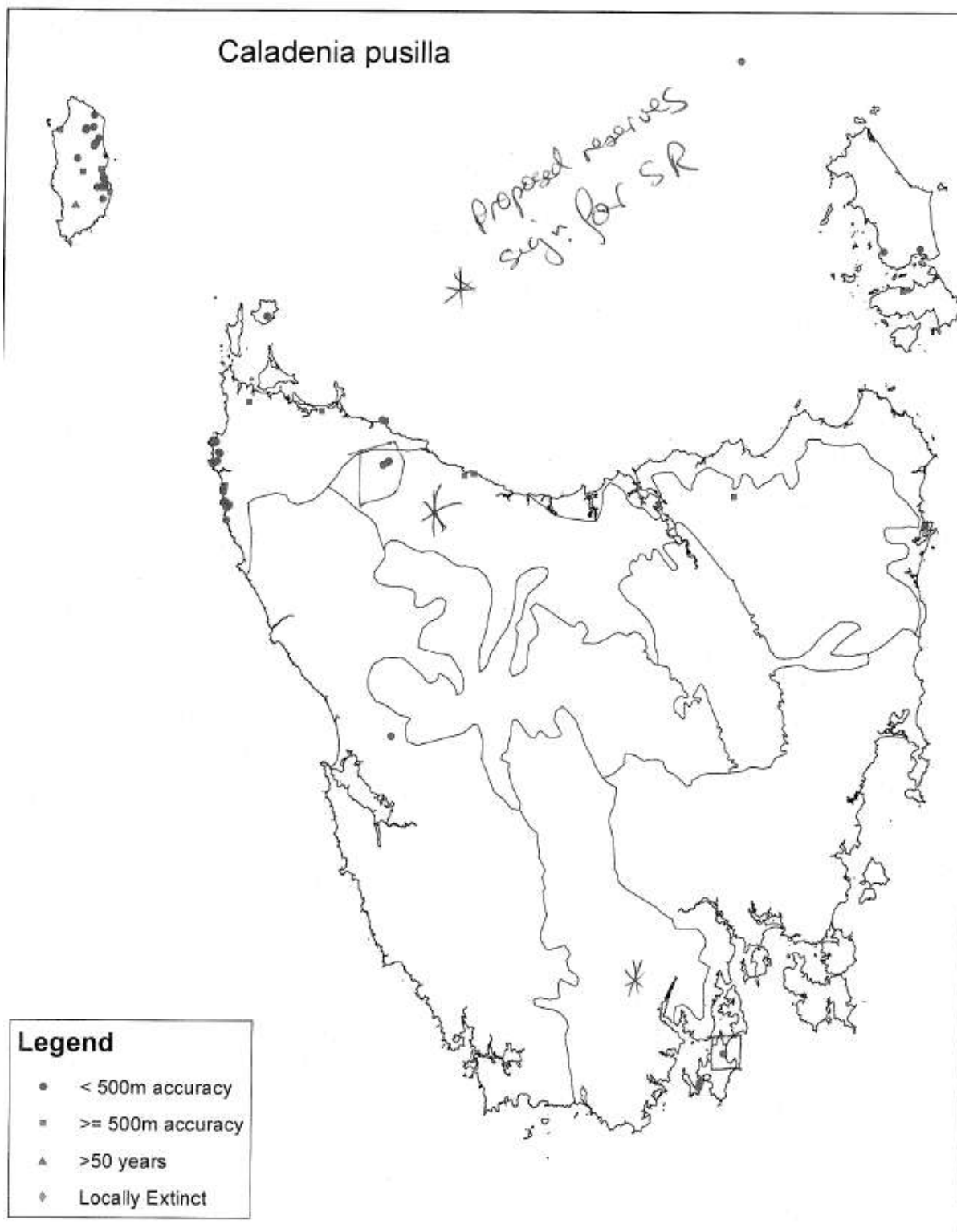
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



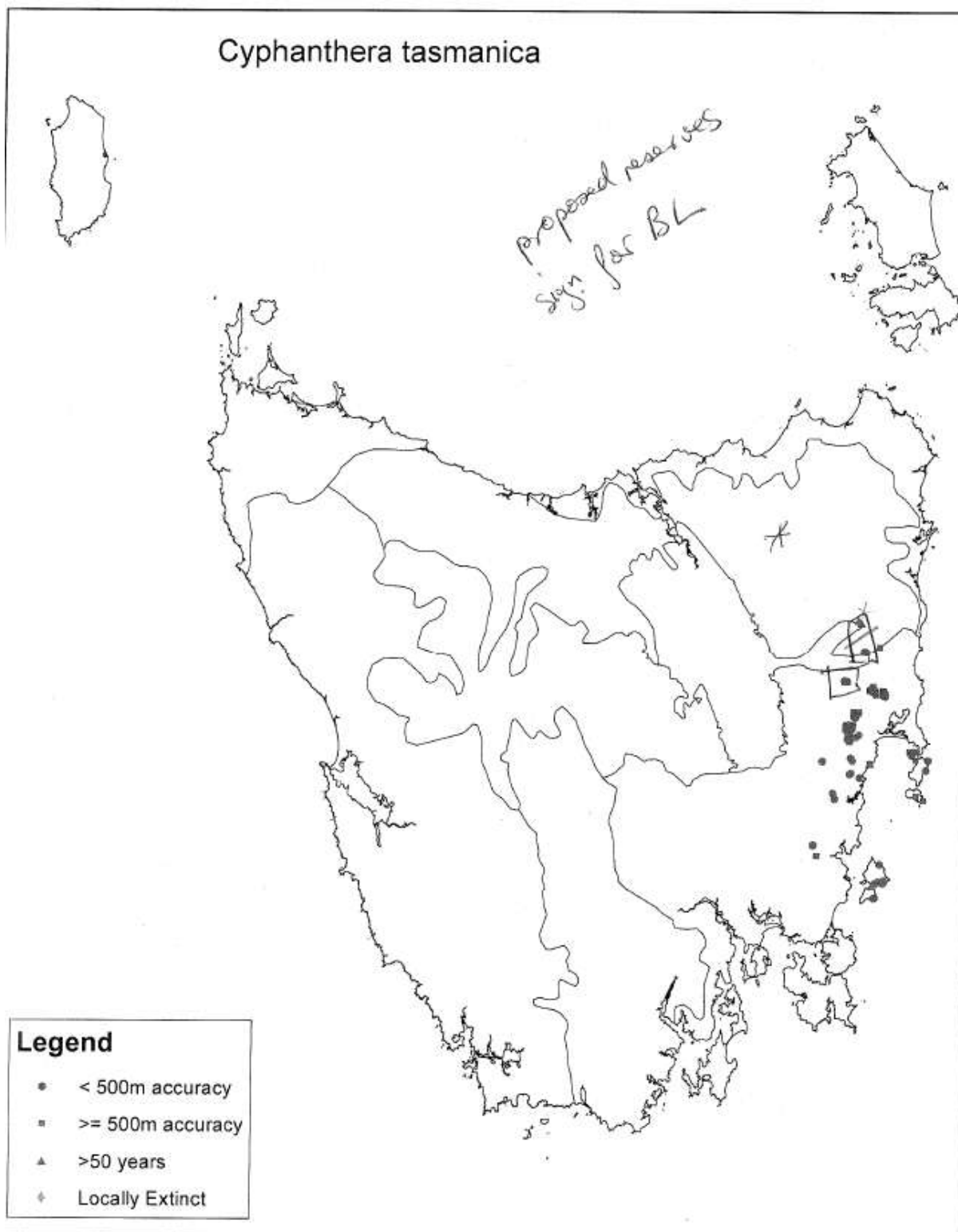
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



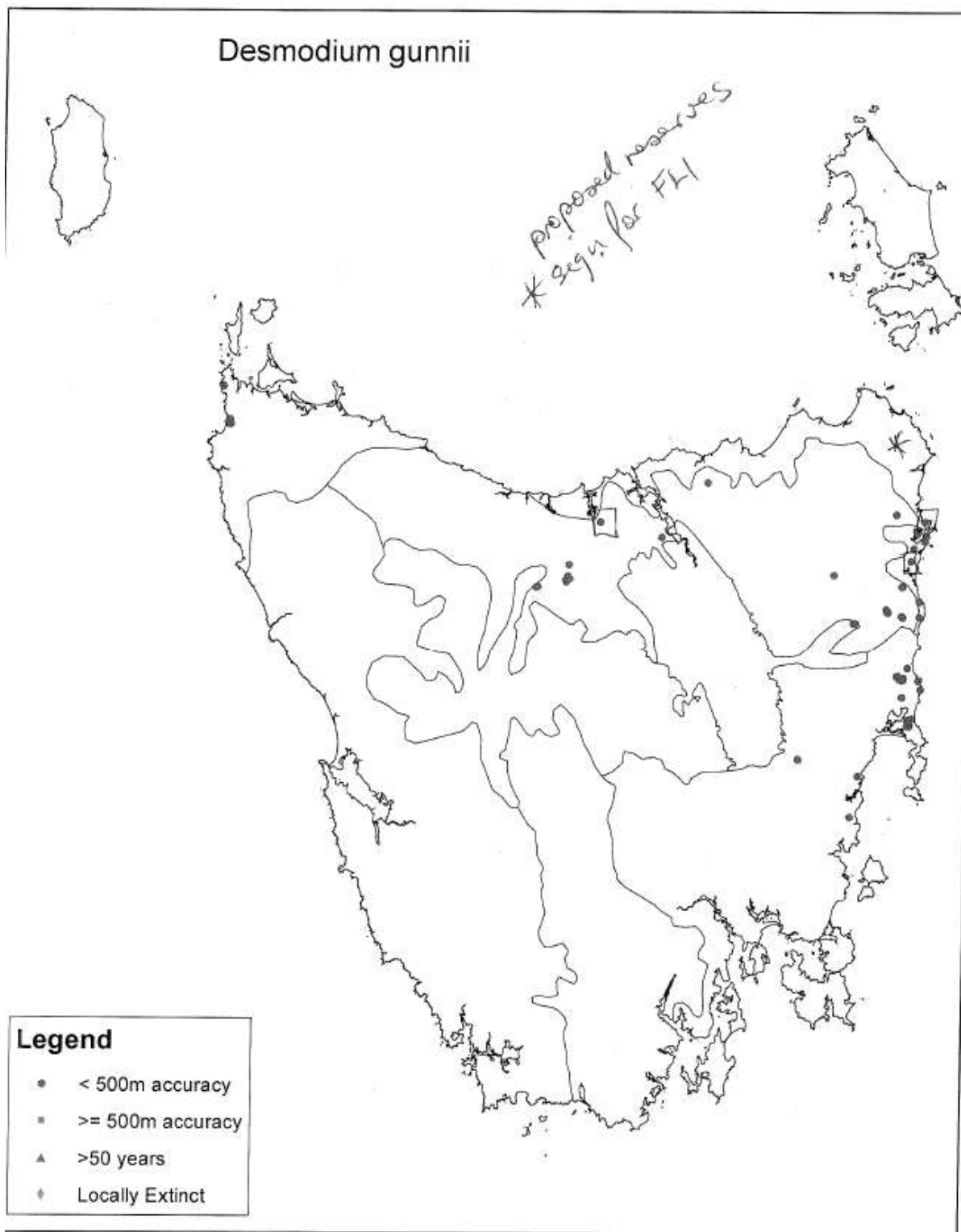
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



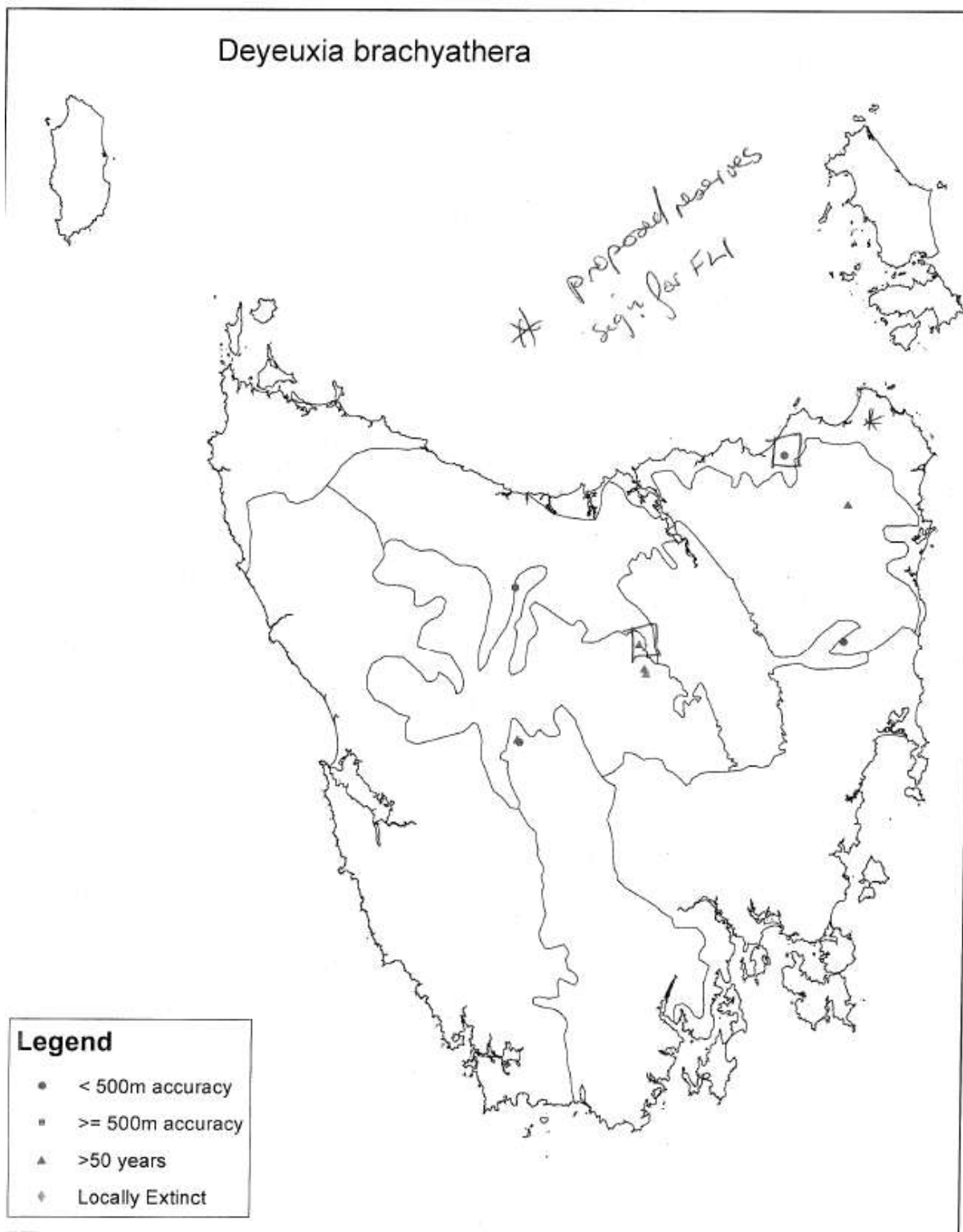
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



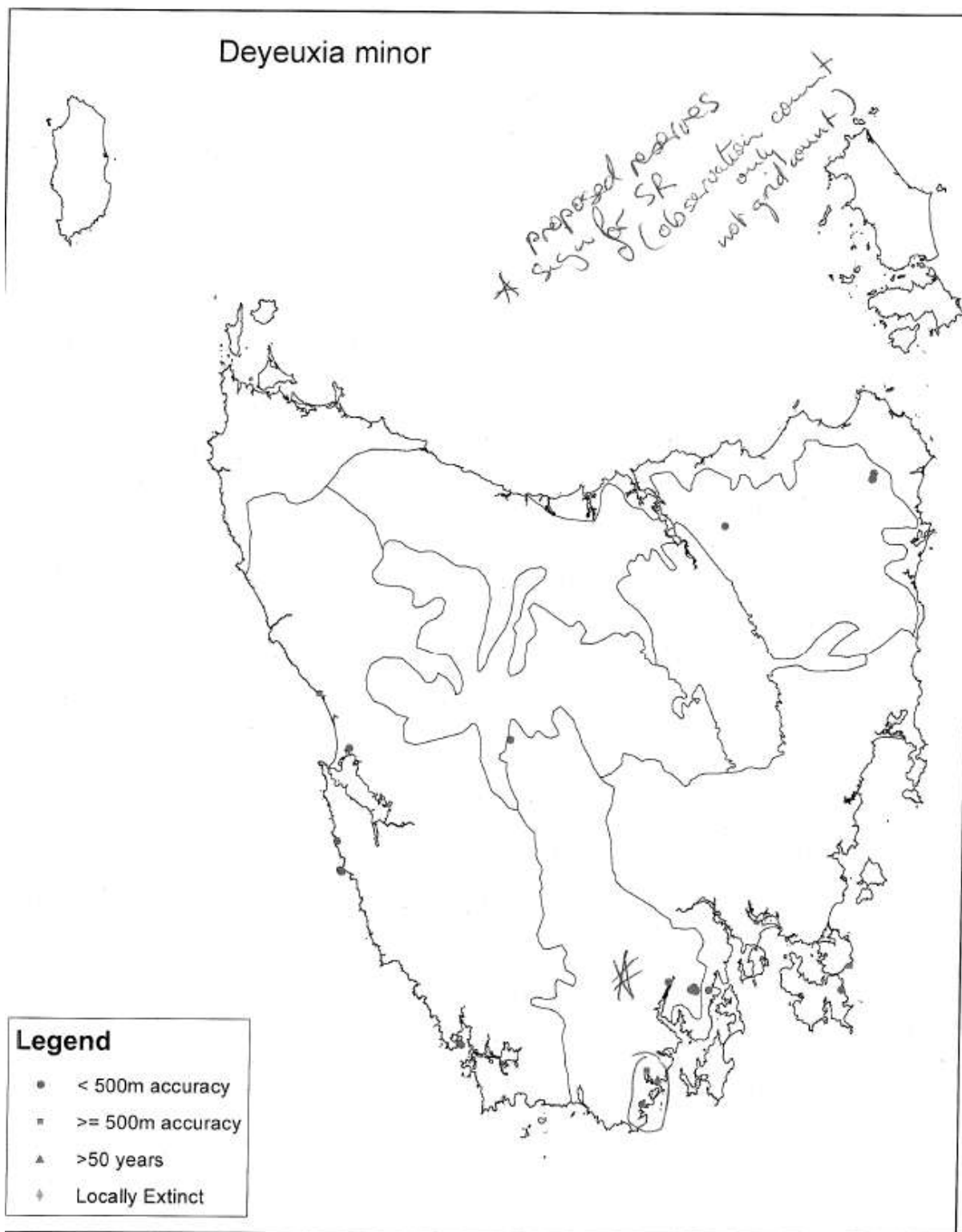
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



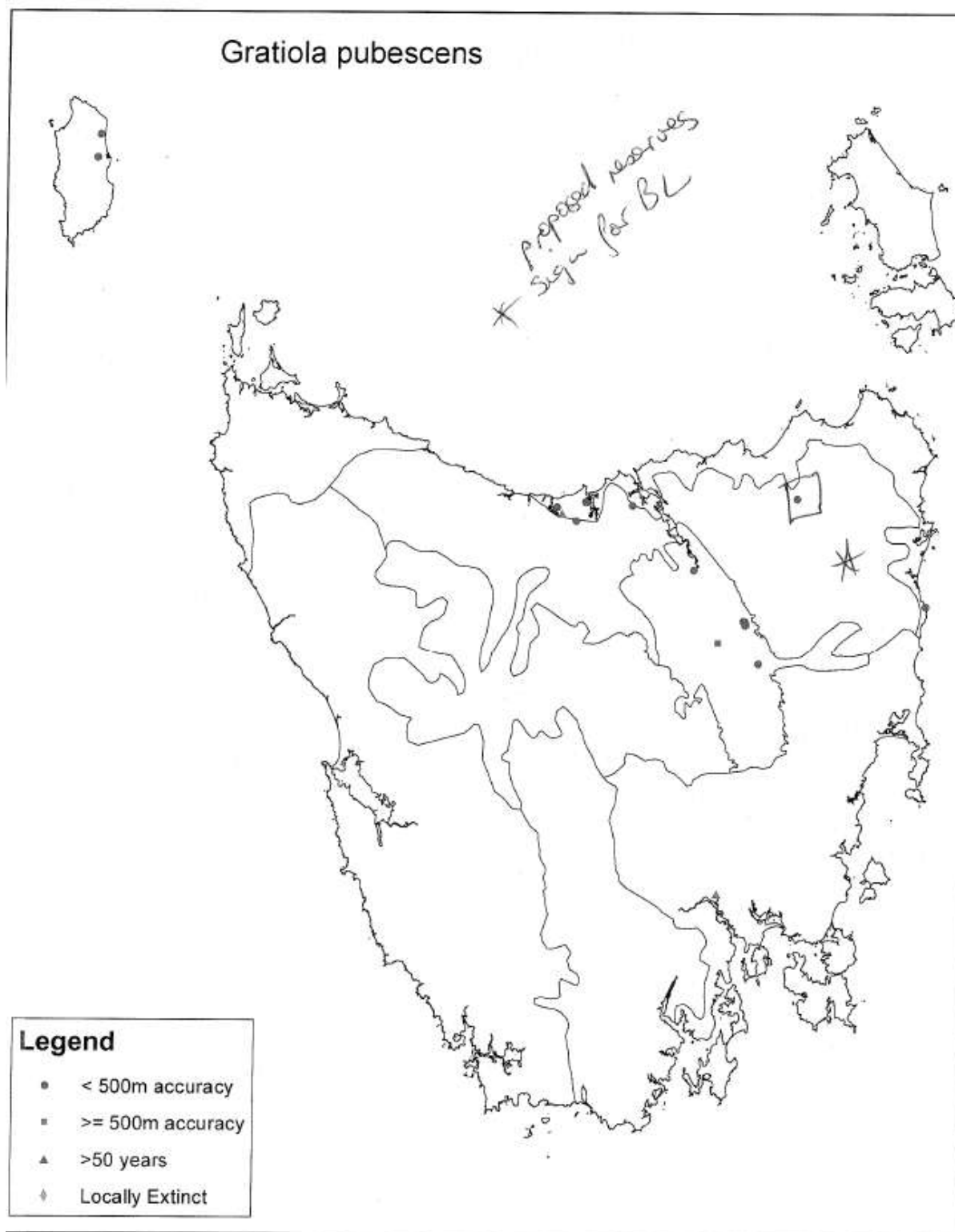
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



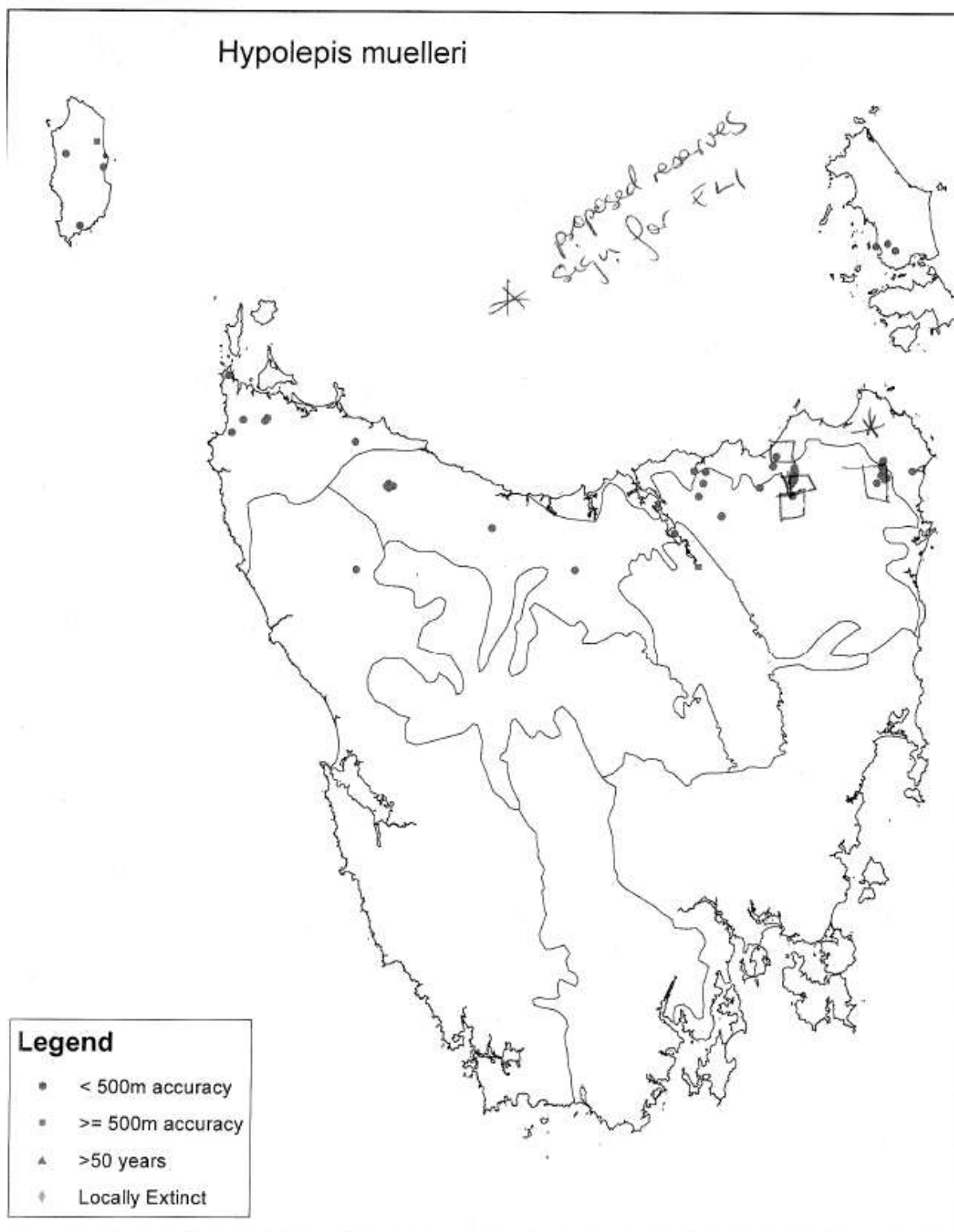
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



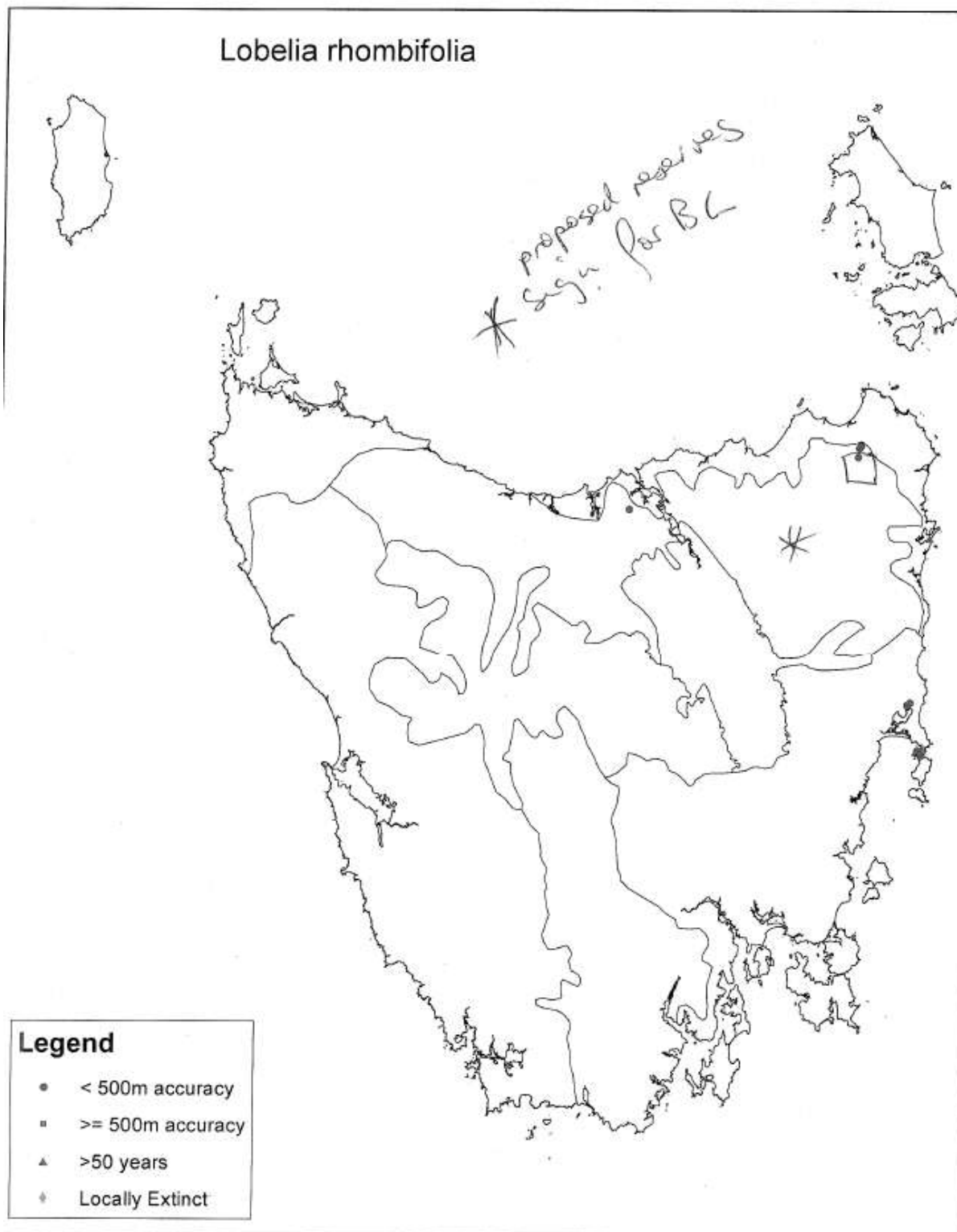
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



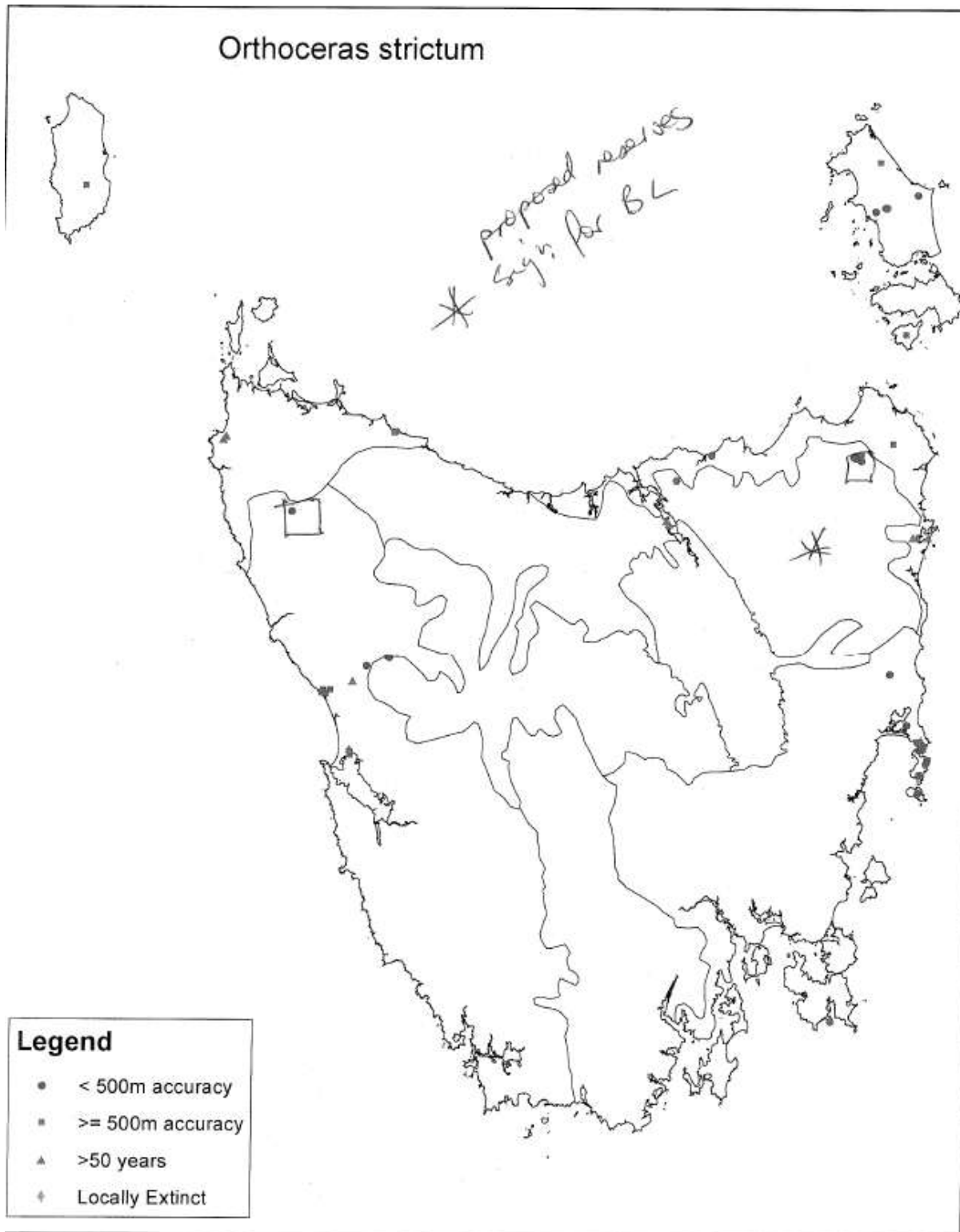
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011. © State of Tasmania

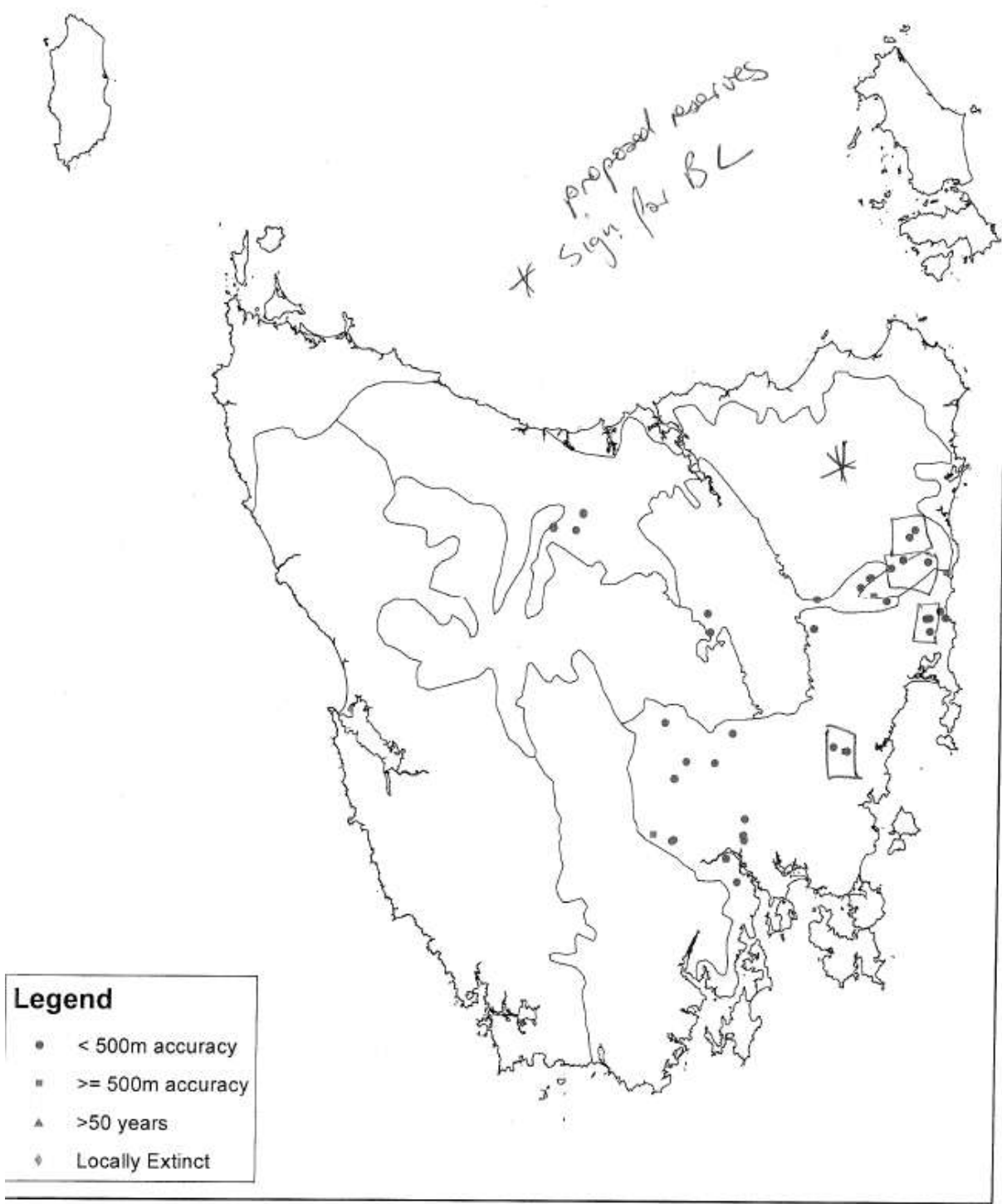


Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania

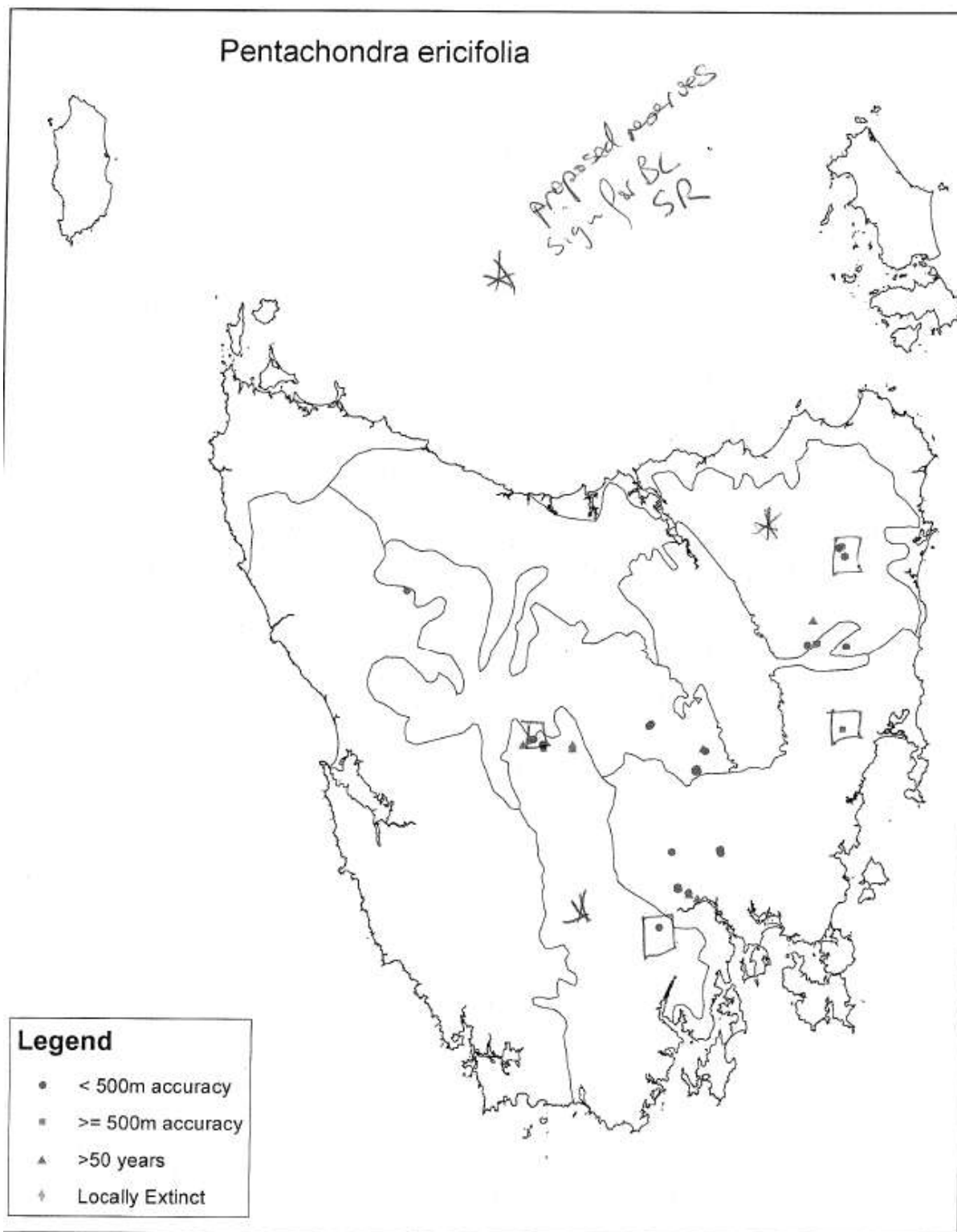


Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania

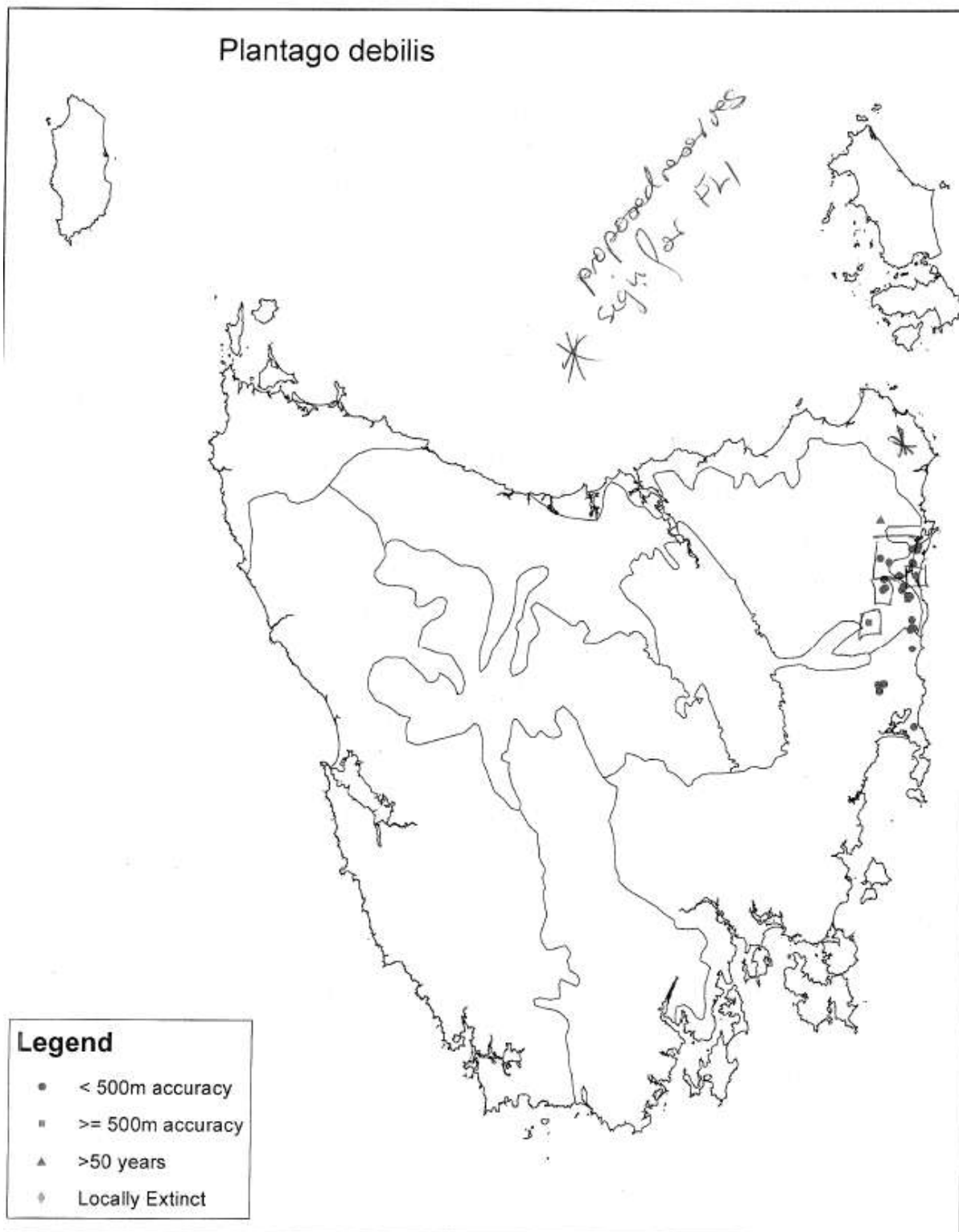
Pellaea calidirupium



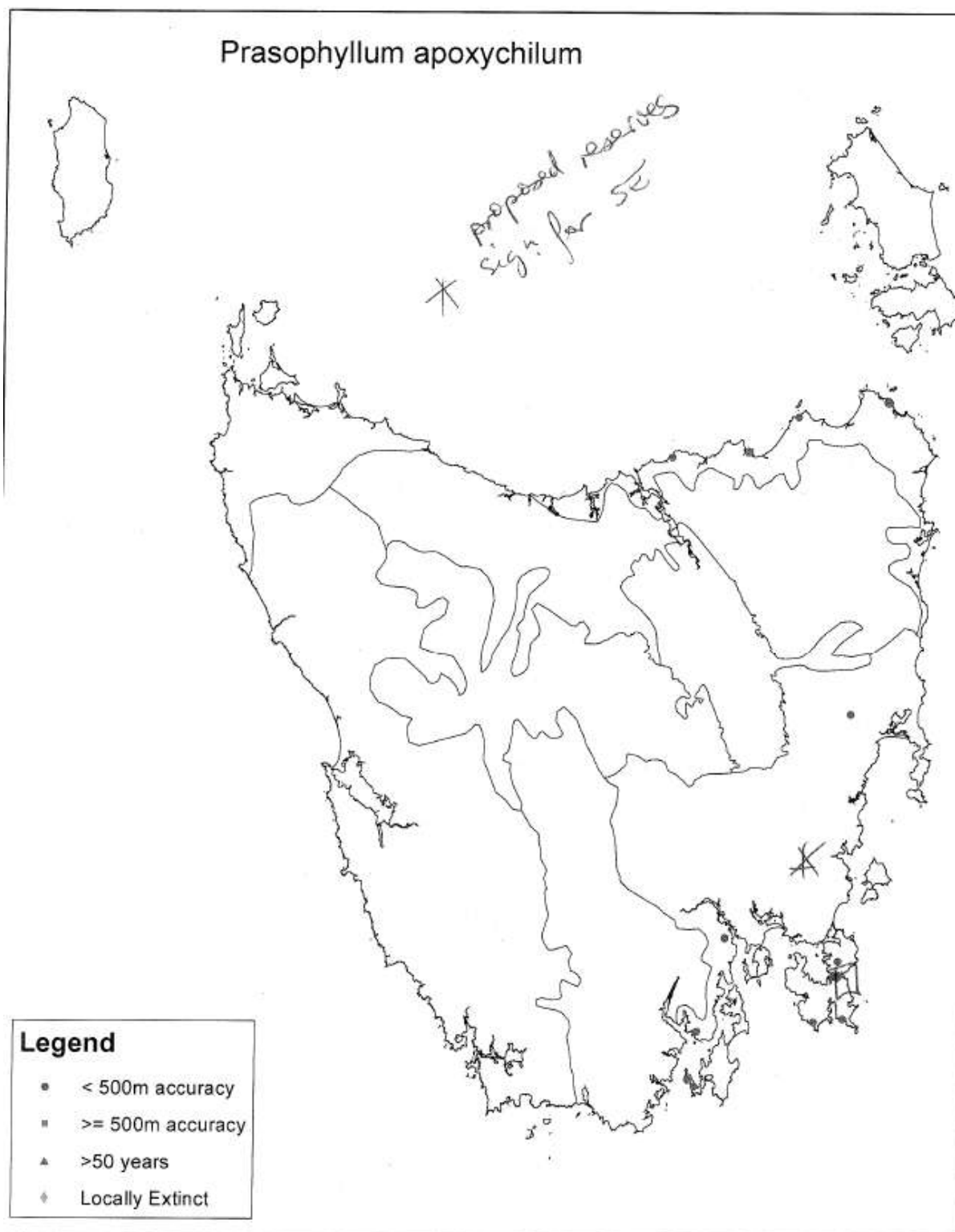
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



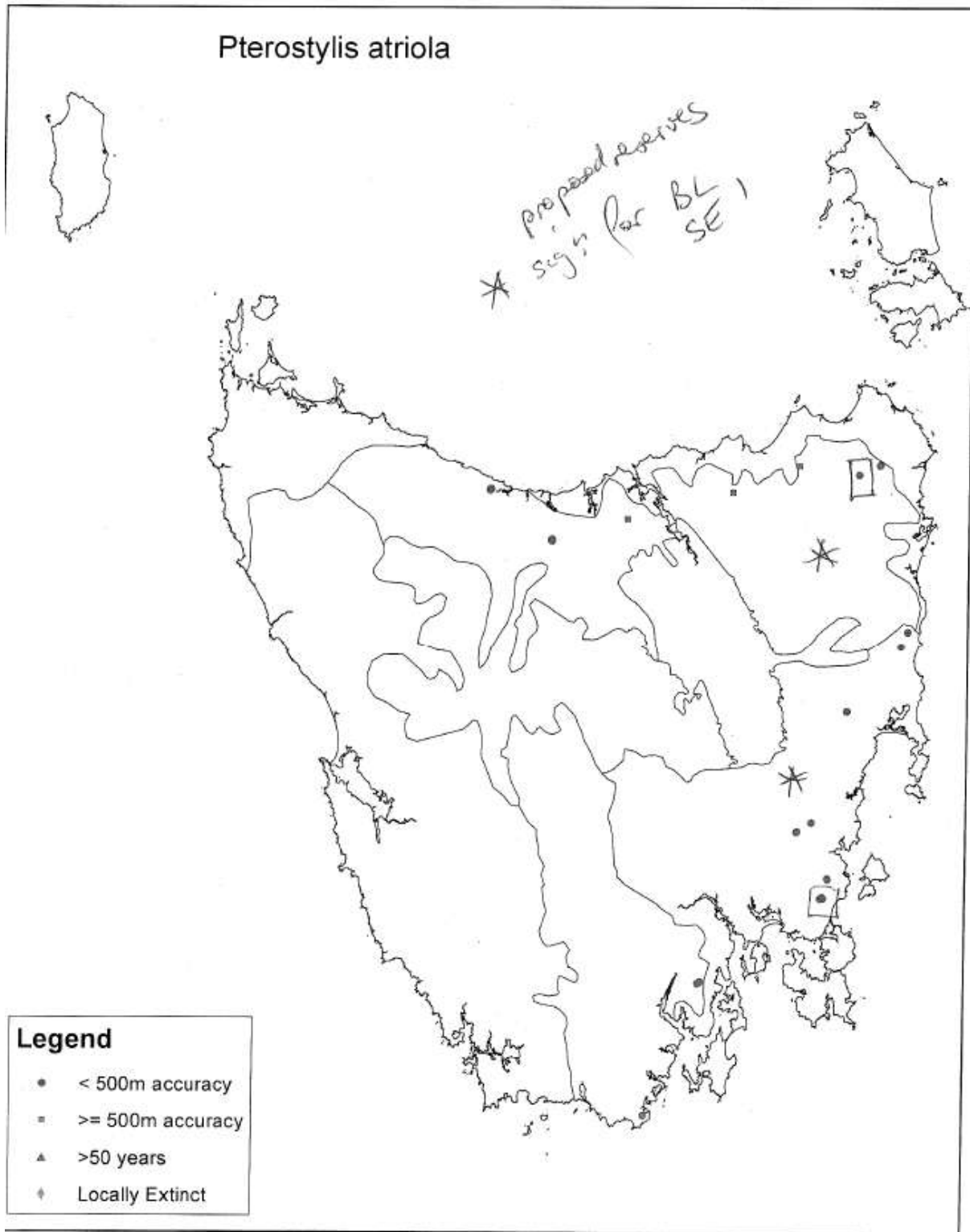
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



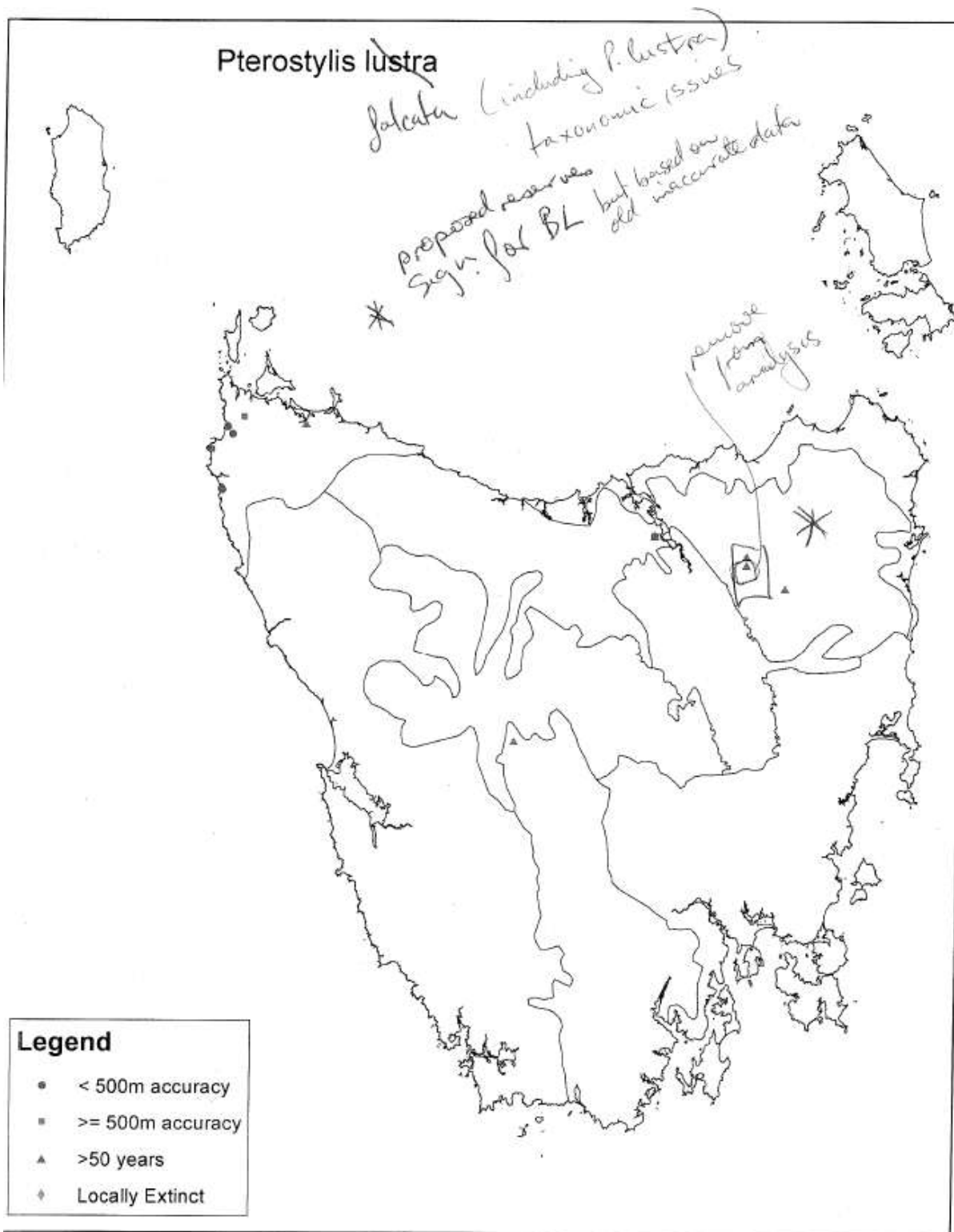
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



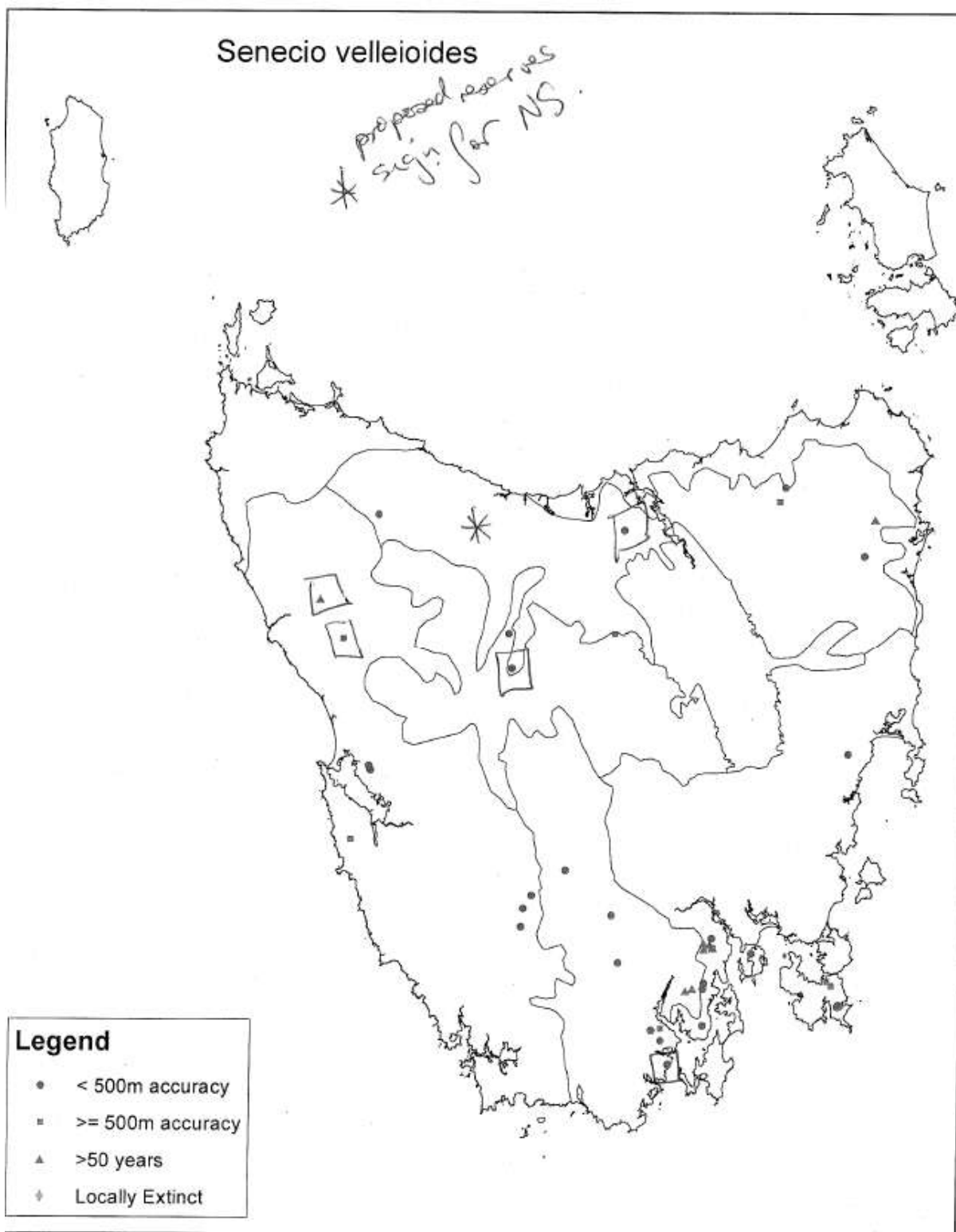
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



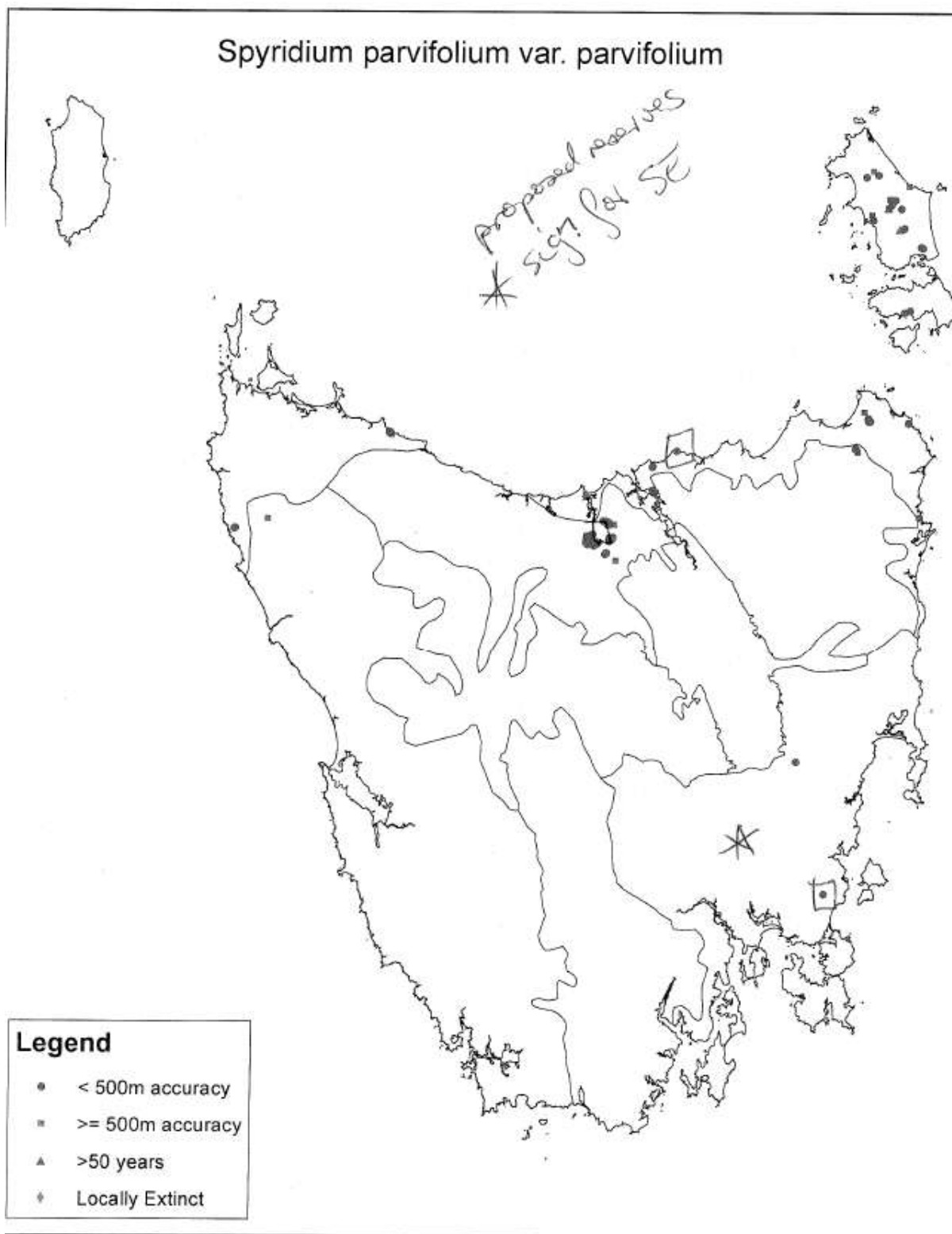
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



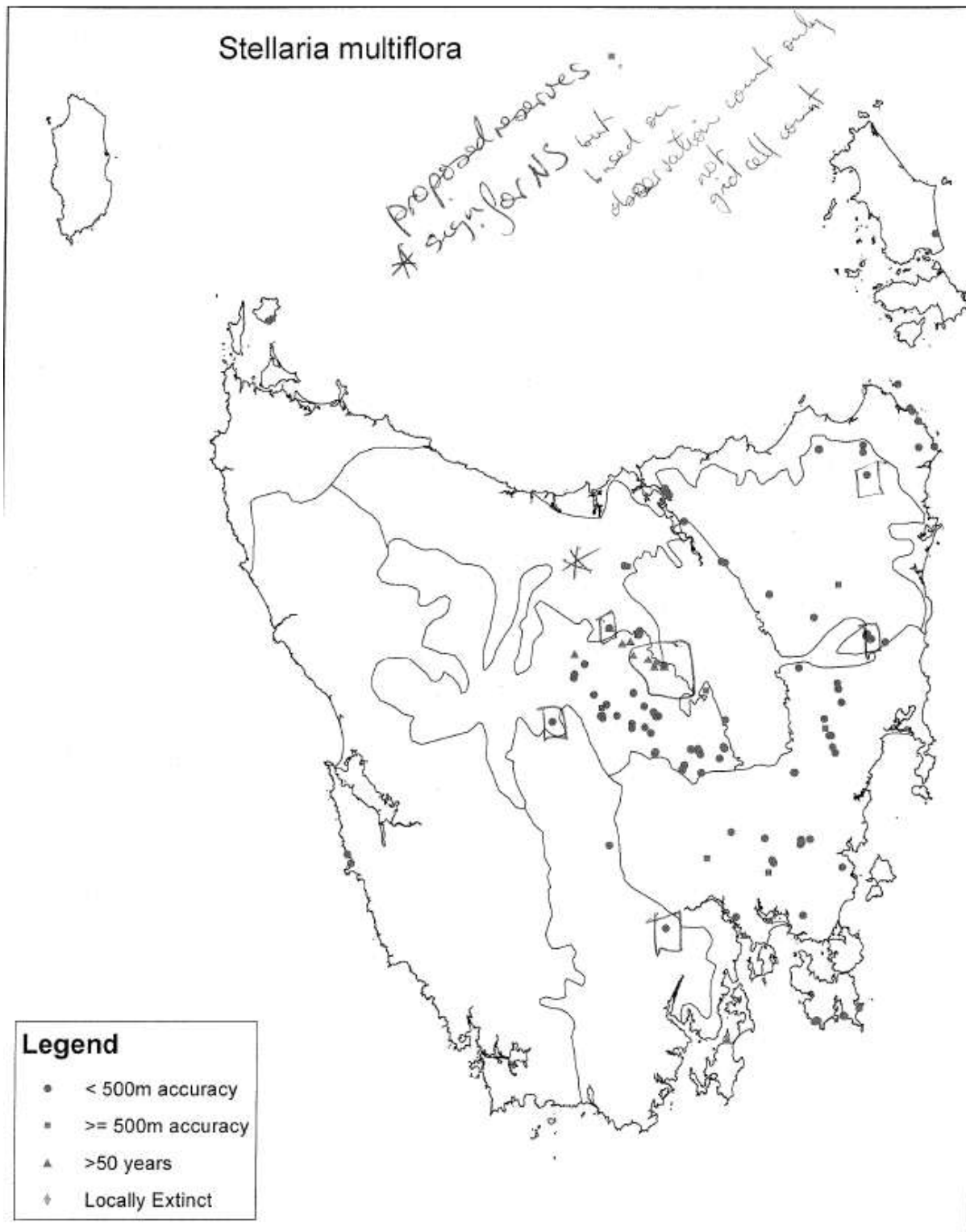
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



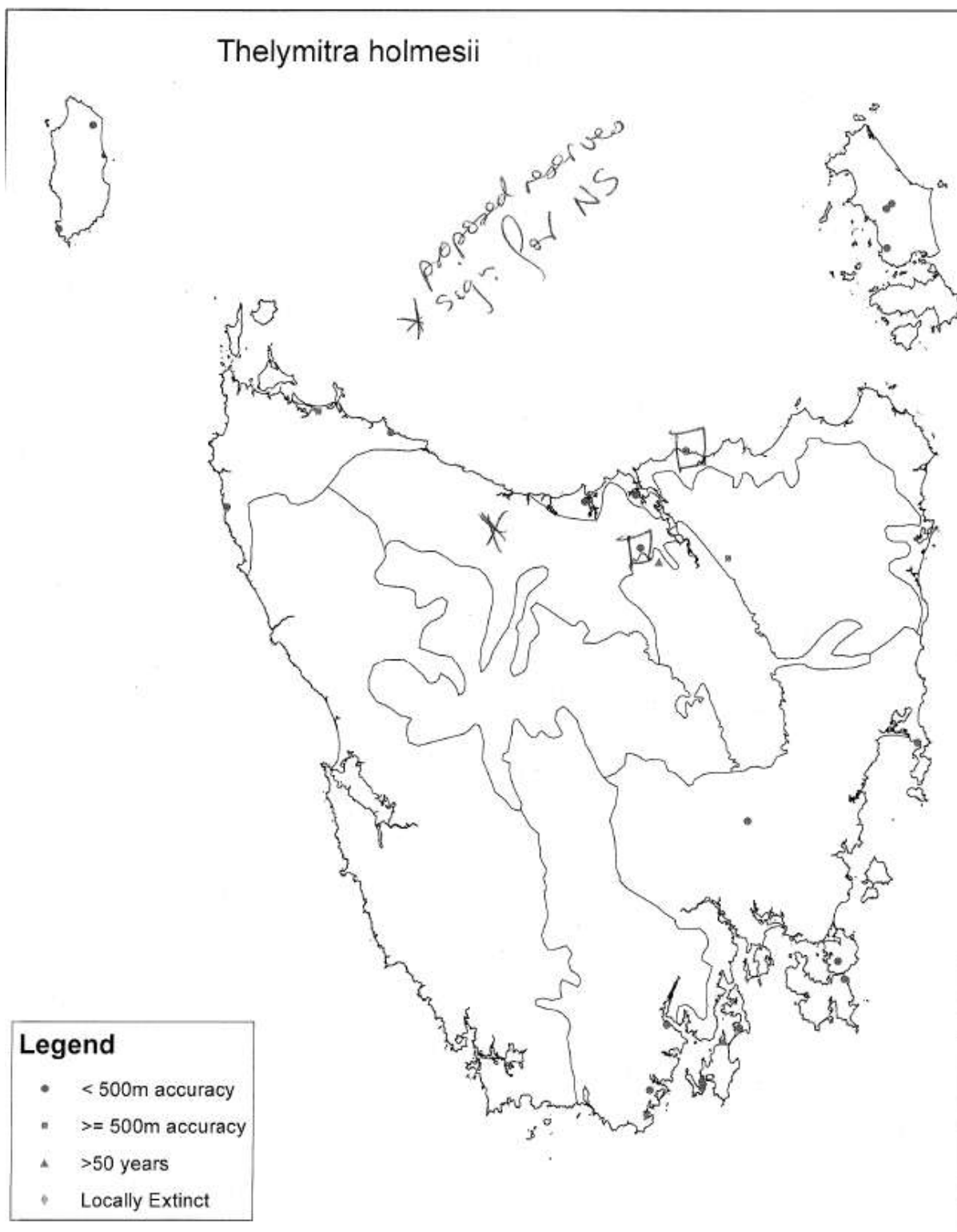
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



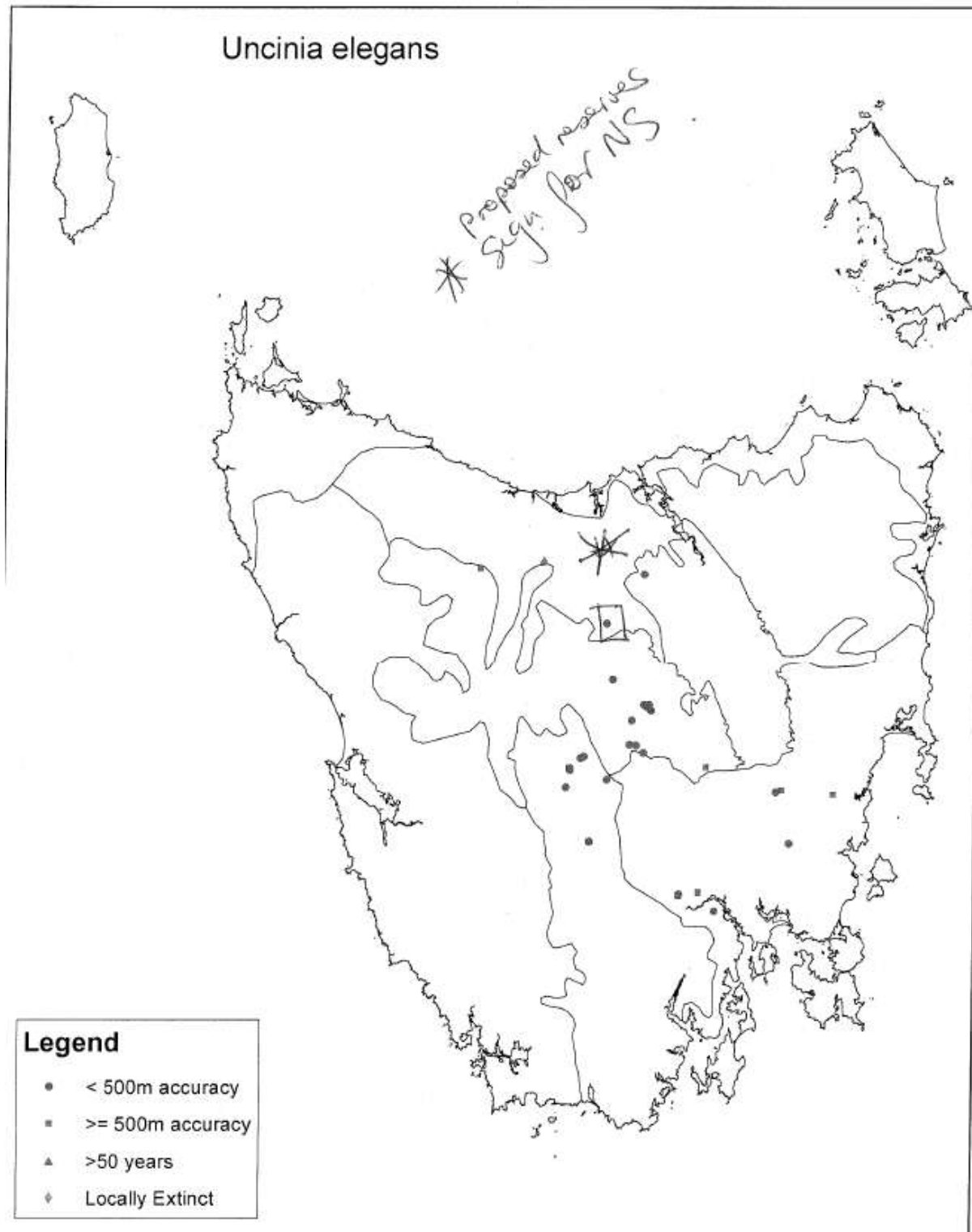
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



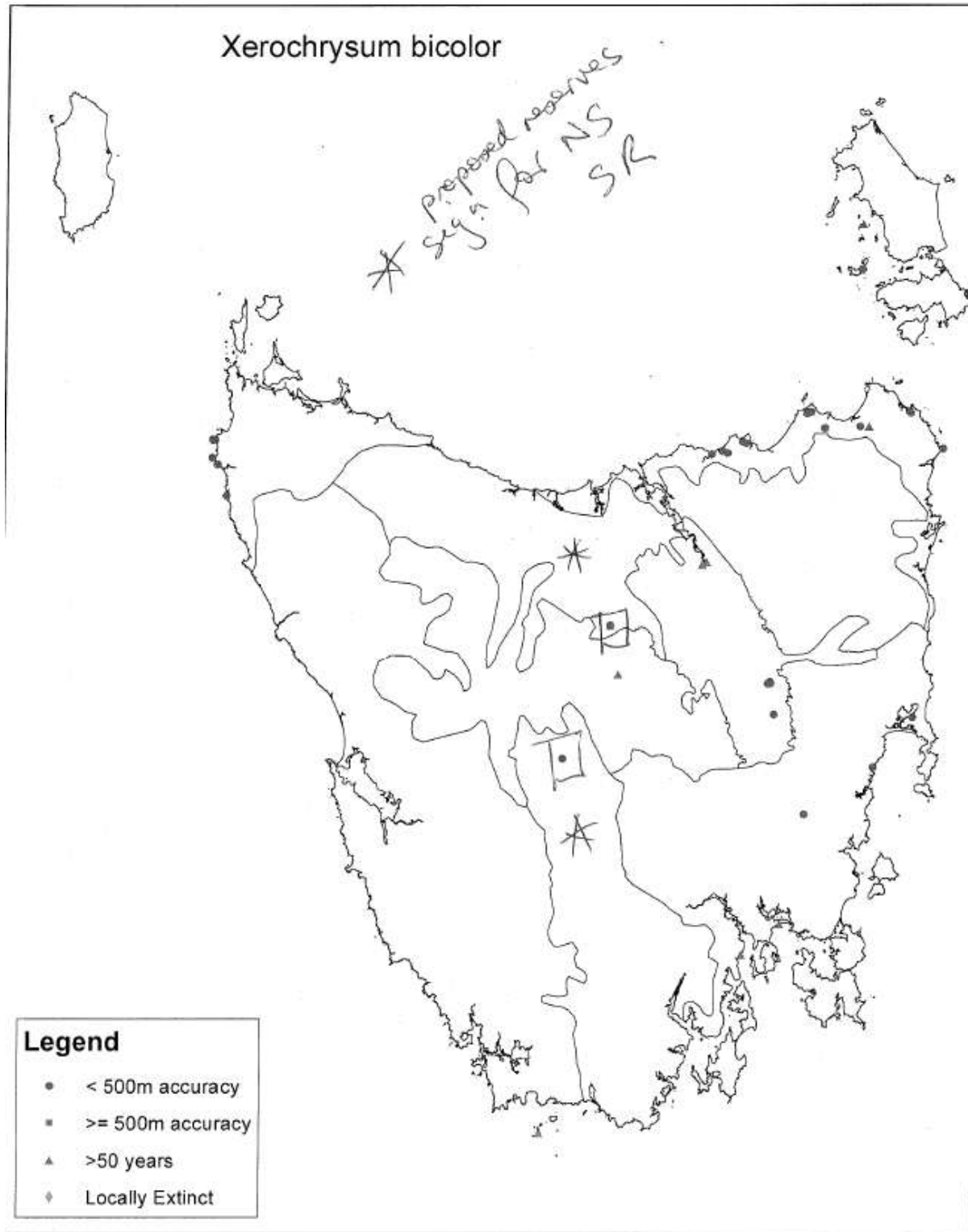
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



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Appendix 3: Threatened flora eucalypt and palaeoendemic species that are likely to benefit from the ENGO proposed reserves that were included in separate reports

Pre data 'clean up' distribution maps for these species follow this list.

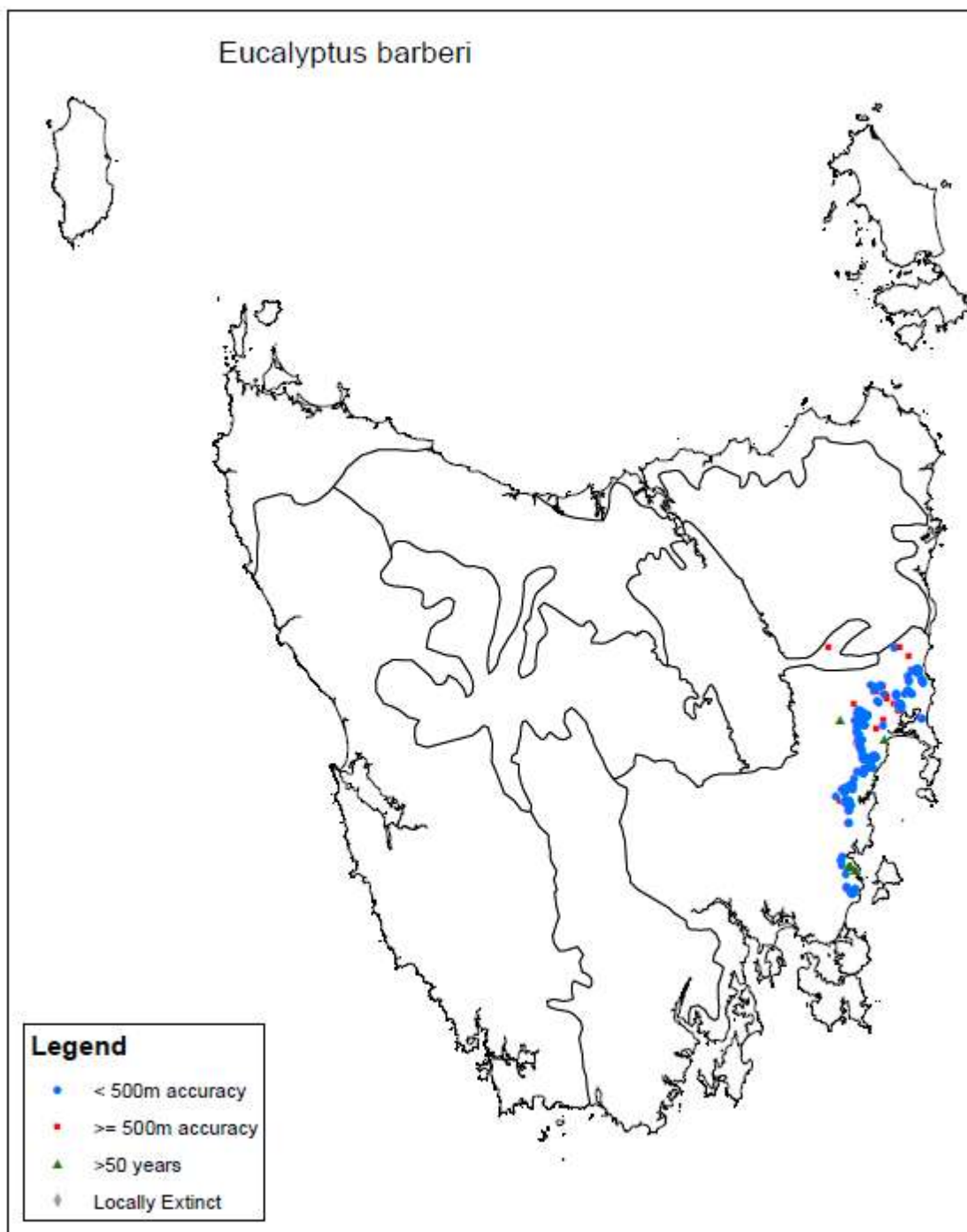
Eucalyptus barberi (rare on TSP Act, endemic to Tasmania)

Eucalyptus gunnii subsp. *divaricata* (endangered TSP Act, Endangered EPBC Act, endemic)

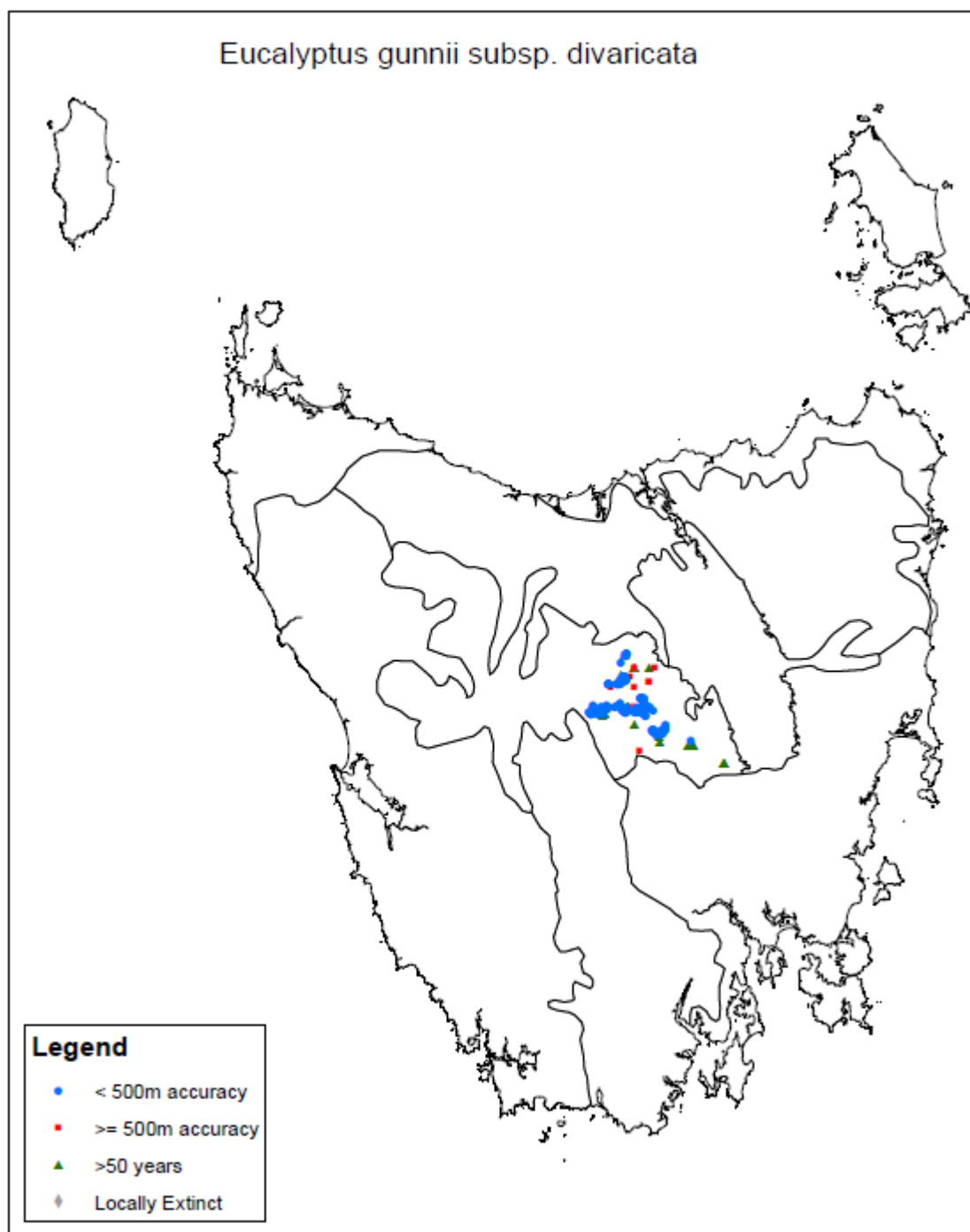
Eucalyptus radiata subsp. *radiata* (rare on TSP Act, not endemic to Tasmania)

Pherosphaera hookeriana (vulnerable on TSP Act, endemic to Tasmania)

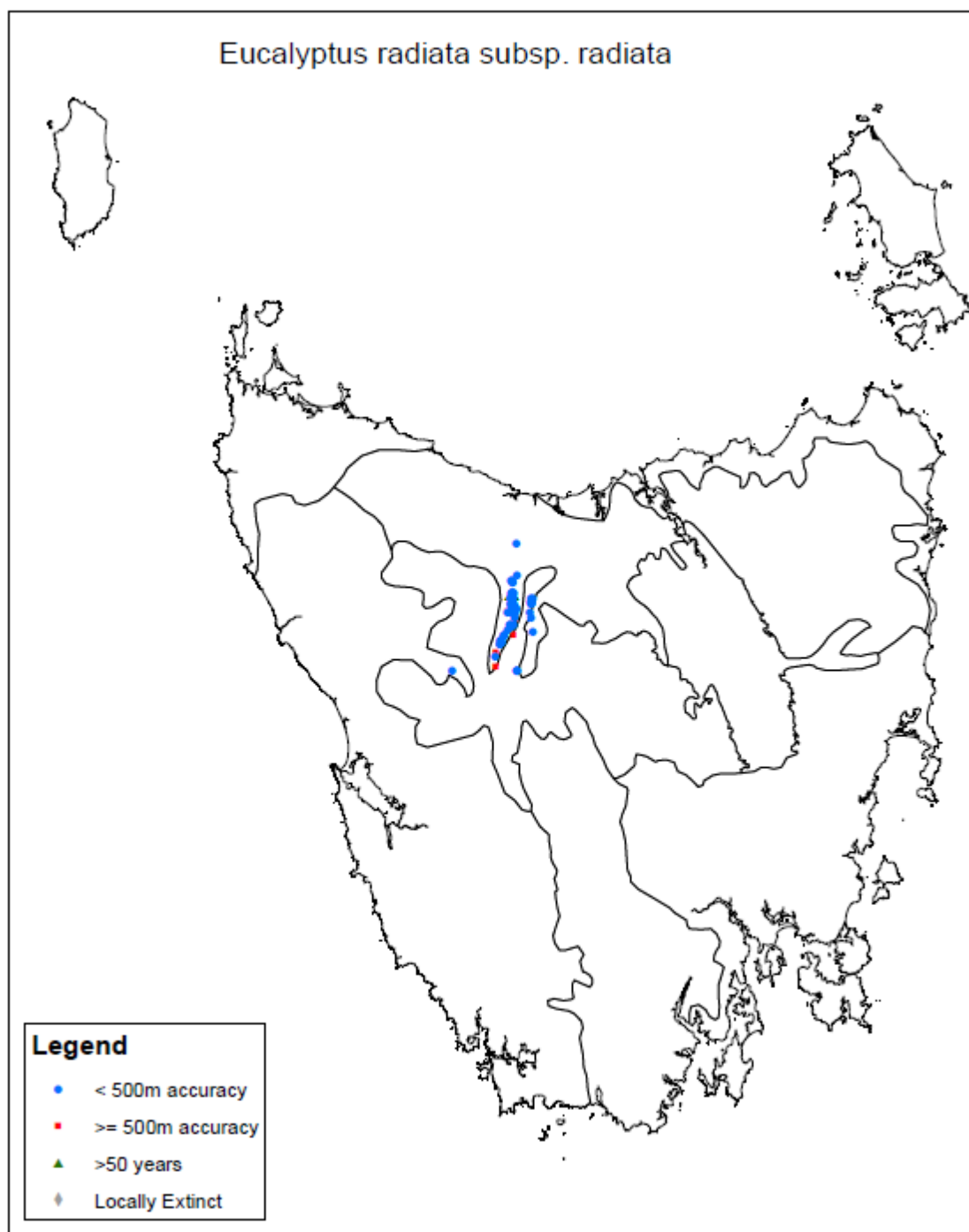
Planocarpa nitida (rare on TSP Act, endemic to Tasmania)



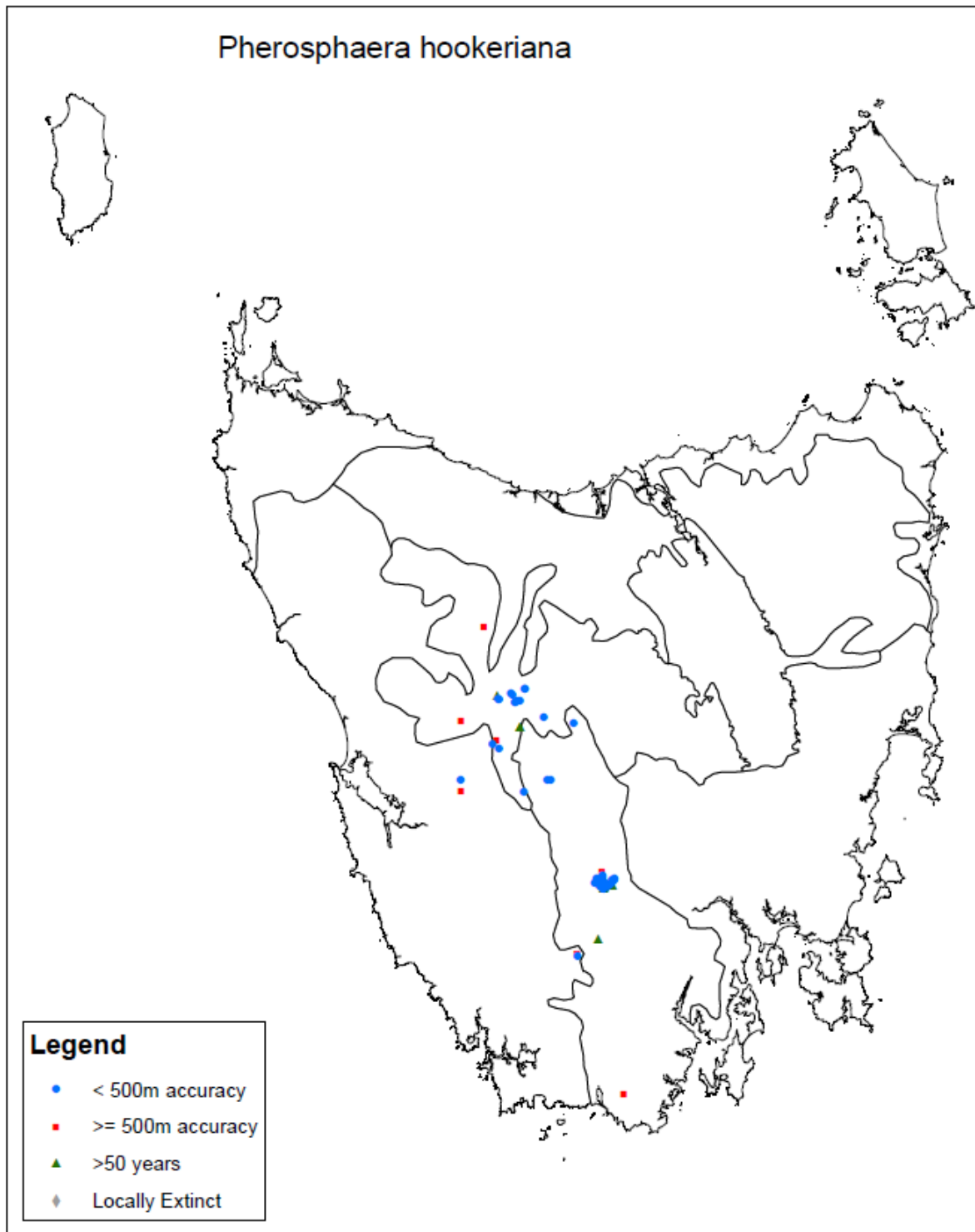
Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



Species records from Natural Values Atlas (www.naturalvaluesatlas.tas.gov.au), September 2011, © State of Tasmania



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Planocarpa nitida



Appendix 4: The limitations of reserves as a management strategy for priority flora.

Some priority flora species are negatively affected by disturbance, and for these species reservation is a successful management strategy. However, reservation is not an appropriate management strategy for all priority species, as some species are positively associated with disturbance. Management by reservation alone will not cater for the ecological requirements of all of Tasmania's priority flora species and reservation should be regarded as only one aspect of a comprehensive strategy for managing Tasmania's priority flora species. For many priority species reservation needs to be accompanied by a commitment to manage reserved areas to ensure that the balance of their natural values is maintained. In the most part this can be achieved through an appropriate fire regime.

In a report provided to the Independent Verification Group (IVG FC Report 10), Koch *et al.* (2012) discusses the limitations of reserves as management strategies. Many of the key limitations discussed in Lindenmayer and Franklin (2002), and highlighted by Koch *et al.* (2012), apply to the management of priority flora species in Tasmania. The point: '*Forest biodiversity changes between young and old forests, so a range of age classes are required to maintain biodiversity. Disturbance is typically minimised in reserve areas, meaning they provide limited habitat for some taxa*' is particularly relevant to many of Tasmania's priority flora species which are disturbance-dependant. Disturbance in a forest context can be in the form of fire, or mechanical damage to the plant itself or its habitat. Research has shown that some priority flora species require disturbance of some kind to promote seed germination and regeneration, and in some cases species have responded positively to a forestry activity. To illustrate this point, two case studies are presented summarising the results of research.

Case study one: *Odixia achlaena*

Odixia achlaena is a Tasmanian endemic species with a highly restricted range and is listed as rare on the *Tasmanian Threatened Species Protection Act 1995*.

Odixia responds positively to disturbance. Leaman (2004) reported regeneration of *Odixia* from soil-stored seed after fire, mechanical disturbance (road construction) and native forest logging (selective harvesting followed by burning to promote regeneration). Age class distribution of mature plants displayed uniform recruitment, which was associated with a recorded disturbance event (Leaman 2004). The data collected by Leaman (2004) suggests that *Odixia* is probably reliant on regular disturbance for long-term survival. Leaman (2004) suggests a disturbance regime of 15-20 years is optimal for promoting the regeneration of the species, as the species has a maximum age of approximately 25 years.

Reserved populations of *Odixia* may not be subject to the disturbance events which are required by the species; and therefore management in areas outside of the reserves is required. In terms of forestry activities, *Odixia* is tolerant of native forest harvesting, and the average rotation lengths for selective harvesting may fit the required disturbance regime for this species.

4.2 Case study two: *Boronia hemichiton* and *B. hippopala*

Boronia hemichiton and *B. hippopala* are considered a high priority for conservation due to their endemism and restricted distribution in Tasmania. Both species are listed on the Tasmanian *Threatened Species Protection Act* 1995 as endangered and vulnerable (respectively); and listed on the *Environment Protection and Biodiversity Conservation Act* 1999 as Vulnerable.

Boronia hemichiton and *B. hippopala* are found in northeastern and eastern Tasmania in disjunct population. *Boronia hemichiton* is known only from Mount Arthur in Tasmania's northeast, and *B. hippopala* is found in eastern Tasmania in the Dukes March area. Research indicates that both *B. hemichiton* and *B. hippopala* respond positively to disturbance by fire, as evident by an increase in seedling regeneration (Chuter 2010, Schahinger 2004). A general finding for the *Boronia* genus is that seedling numbers decrease with time since disturbance (Shapcott et al. 2005) and that mature plants of *B. hemichiton* and *B. hippopala* become suppressed as associated vegetation cover increases in the years after disturbance (Chuter 2010) are poor competitors with other vegetation increases. . The results of the studies by Chuter (2010) and Schahinger (2004) indicate that active management using appropriate disturbance regime may be needed to ensure that *B. hemichiton* and *B. hippopala* persist into the long term. Schahinger (2004) recommended a burn regime of 12-20 years; a recommendation supported by the results of research by Chuter (2010). Formal reservation of these species, without active management using an appropriate disturbance regime, may be detrimental to the long term persistence of *B. hemichiton* and *B. hippopala*.