

Derwent Estuary Foreshore Threatened Flora

Review of threatened flora & recommendations
(Data from Natural Values Atlas: 7-Jan-2010)



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Australian Government



Derwent Estuary
Program

The Derwent Estuary Program (DEP) is a regional partnership between local governments, the Tasmanian State Government, commercial and industrial enterprises, and community-based groups to restore and promote our estuary. The DEP was established in 1999 and has been nationally recognised for excellence in coordinating initiatives to reduce water pollution, conserve habitats and species, monitor river health and promote greater use and enjoyment of the foreshore. Our major sponsors include: Brighton, Clarence, Derwent Valley, Glenorchy, Hobart and Kingborough councils, the Tasmanian State Government, Southern Water, Tasmanian Ports Corporation, Norske Skog Boyer, Nyrstar Hobart and Hydro Tasmania



Norske Skog
Boyer



Derwent Estuary Foreshore –Threatened Flora
Review of distribution & recommendations
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Preamble

The Natural values Atlas (NVA) is a database managed by the Tasmanian Department of Primary, Industries, Parks, Water and Environment. The following document has been prepared from NVA data downloaded on the 7-Jan-2010 to assess threatened flora around the Derwent Estuary. The Derwent estuary extends from New Norfolk to the estuary entrance (between the Iran Pot and Tinderbox), and includes Ralphs Bay. Threatened flora observations from the NVA have been analysed in MAPINFO GIS software so as to assess the:

- 1) Number of threatened flora species observation with the immediate water drainage catchment of the Derwent Estuary (~800 km²) – see area within the ‘*catchment boundary*’ in **Figure 1**. Note this excludes the greater River Derwent and Jordan River, and their tributaries.
- 2) Number of threatened flora species observation with the immediate foreshore of the Derwent Estuary. This area includes a swath around the coast, within 100m of the Mean High Water Mark (MHWM) and includes broader expanses where there are wetlands and saltmarshes (~27km²) — see the area within the ‘*foreshore study area*’ in **Figure 1**.
- 3) Percentage of Tasmanian threatened flora observations represented within the immediate water ‘*catchment boundary*’ of the Derwent estuary – see **Table 1**.
- 4) Percentage of Tasmanian threatened flora observations represented within the Derwent estuary ‘*foreshore study area*’ – see **Table 1** and **Figure 1**.
- 5) Identify locations where there are high numbers of threatened flora observations within the Derwent estuary ‘*foreshore study area*’
 - a. Identify priority areas for further attention: study and management.
 - b. Identify other noteworthy areas.

This report includes a brief discussion of these areas.

Threatened flora within the immediate Derwent estuary catchment and foreshore.

Threatened species in Tasmania are listed subject to the following national and state Acts:

National - *Environment Protection and Biodiversity Conservation Act 1999*

The list of threatened species under the national schedule are divided into the following categories: EX) Extinct, EW) Extinct in the Wild, CR) Critically Endangered, EN) Endangered, VU) Vulnerable and CD) Conservation Dependent.

Tasmania - *Threatened Species Protection Act 1995*

Under the Tasmanian legislation there are four categories of threat status recognised as follows:

- x) presumed extinct: on the ground that no occurrence of the taxon in the wild can be confirmed during the past 50 years.
- e) endangered: in danger of extinction because long term survival is unlikely while the factors causing the species to be endangered continue operating.
- v) vulnerable: a species which is likely to become endangered while the factors causing it to be vulnerable continue operating.
- r) rare: a species which has a small population in Tasmania that is not endangered or vulnerable but is at risk.

The greater Hobart region contains a number of rare or threatened plant species. A search of the immediate water 'catchment boundary' of the Derwent estuary on DPIWWE 'Natural Values Atlas' database indicates that there are 147 threatened plant species within the region, as indicated in **Table 1**, with a total of ~3000 individual observations within the 'catchment boundary' of the estuary. A sub-set consisting of 42 of these species can be found around the estuary foreshore (where they consist of ~217 individual observations). According to Tasmanian threatened species legislation, these threatened flora are classified as:

- 2 species presumed extinct;
- 23 species endangered;
- 22 species (2 unofficially) vulnerable;
- 93 species (4 unofficially) rare.

Note: those species unofficially designated have not been formally listed under the *Threatened Species Protection Act 1995*.

Of the 147 threatened Tasmanian plant species in the immediate water 'catchment boundary' of the Derwent estuary, 35 species have 50% or more of their known distribution found in this area, and of these, 11 species are found only in this region. The 11 threatened flora endemic to the DEP area includes: *Caladenia sylvicola* (forest fingers), *Hibbertia basaltica* (basalt guineaflower), *Hydrocotyle laxiflora* (stinking pennywort), *Ozothamnus reflexifolius* (reflexed everlastingbush), *Parmelina pallida*, *Plantago gaudichaudii* (narrow plantain), *Prasophyllum perangustum* (knocklofty leek-orchid), *Thesium australe* (southern toadflax), *Veronica notabilis* (forest speedwell), *Xanthoparmelia vicaria* and *Xanthoparmelia vicariella*. There are several threatened species that have a high number of their known Tasmanian observations within the Derwent estuary foreshore (see **Table 1**). The following is a list of the species with ≥10% of their Tasmania observation (as of 7-Jan-2010) within the Derwent estuary foreshore:

- 41% - *Spyridium eriocephalum* var. *eriocephalum* (heath dustymiller),
- 37% - *Austrostipa scabra* subsp. *scabra* (rough speargrass),
- 25% - *Pomaderris pilifera* subsp. *talpicutica* (moleskin dogwood),
- 25% - *Lachnagrostis punicea* subsp. *filifolia* (narrowleaf blowgrass),
- 18% - *Brachyscome sieberi* var. *gunnii* (forest daisy),
- 14% - *Stenopetalum lineare* (narrow threadpetal),
- 10% - *Vittadinia gracilis* (woolly new-holland-daisy), and
- 10% - *Cuscuta tasmanica* (golden dodder).

Threatened flora
 Derwent Estuary Program area
 Natural values Atlas data 7-1-2010

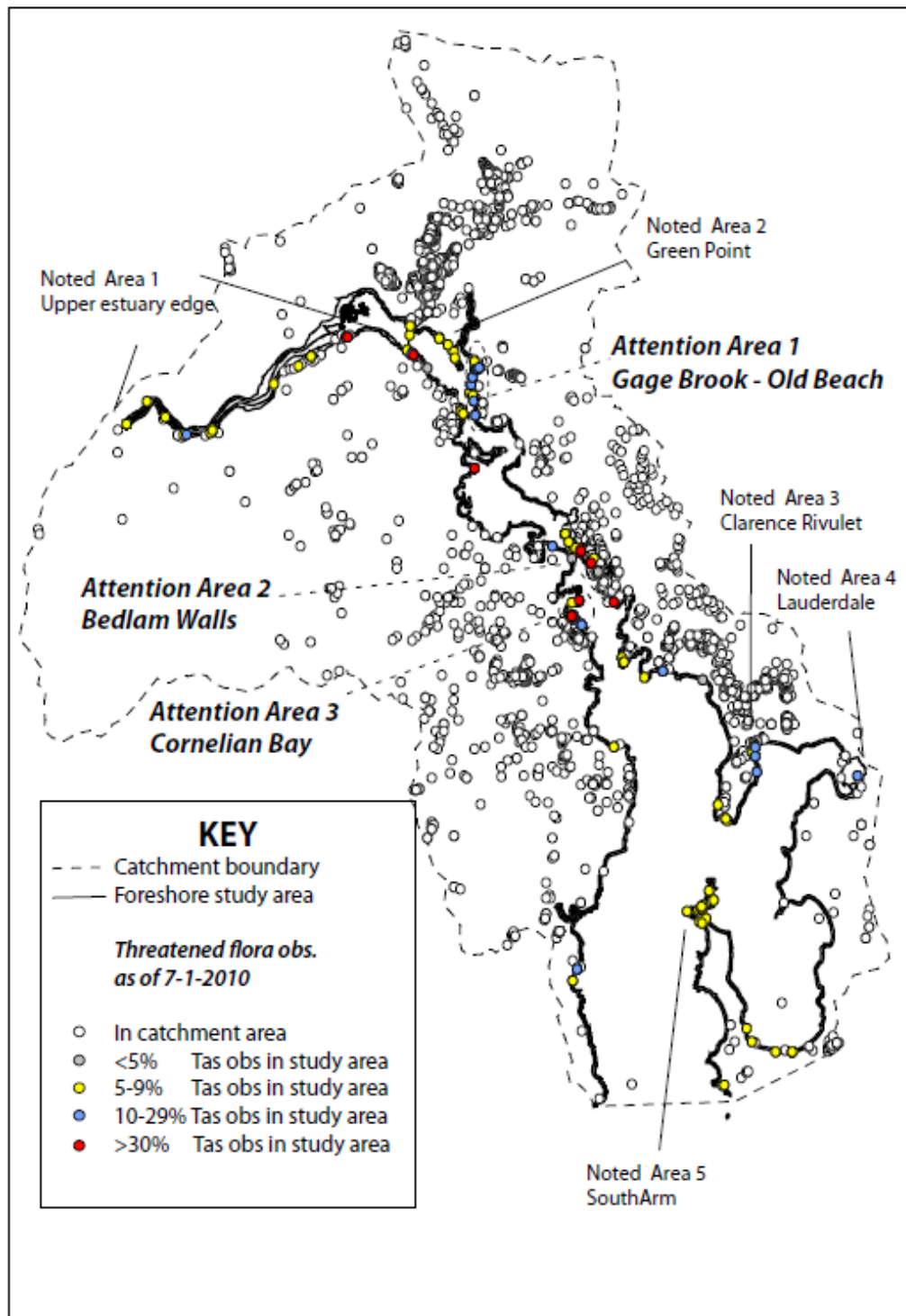


Figure 1. Threatened flora observations within the immediate water ‘catchment boundary’ of the Derwent estuary and ‘foreshore study area’ as of 7-1-2010. Observations within the foreshore have been colour coded to represent % of total Tasmanian observations. Areas with a high abundance of threatened species, representing (in particular those representing >10% of Tasmanian observations occurring in the Derwent foreshore— have been called ‘Attention areas’. Other noteworthy areas have also been identified.

Table 1. Threatened Flora list from the immediate water 'catchment boundary' (DEP AREA) and foreshore (DEP COAST) of the Derwent estuary (NVA data 7-1-2010). Comparison of % Tasmanian observations. Derwent foreshore data also provide from North Barker Ecosystem Services (NBCoast).

Threatened flora	state	DEP	DEP		% TAS in	%TAS in	%TAS in	Fig 1	
Scientific name	status	TAS	AREA	COAST	NBcoast	DEP AREA	DEP COAST	NBcoast	Code
<i>Acacia ulicifolia</i>	r	255	2	0	0	0.78	0.00	0.00	
<i>Allocasuarina duncani</i>	r	25	1	0	0	4.00	0.00	0.00	
<i>Anogramma leptophylla</i>	v	15	2	0	0	13.33	0.00	0.00	
<i>Aphello gracilis</i>	r	70	1	0	0	1.43	0.00	0.00	
<i>Arthropodium strictum</i>	r	463	108	0	0	23.33	0.00	0.00	
<i>Asperula scoparia</i> var. <i>scoparia</i>	r	131	38	2	2	29.01	1.53	1.53	<5
<i>Asperula subsimplex</i>	r	30	2	0	0	6.67	0.00	0.00	
<i>Atriplex suberecta</i>	v	14	2	0	0	14.29	0.00	0.00	
<i>Australina pusilla</i> subsp. <i>muelleri</i>	r	6	1	0	0	16.67	0.00	0.00	
<i>Austrodanthonia induta</i>	r	216	168	9	9	77.78	4.17	4.17	<5
<i>Austrodanthonia popinensis</i>	e	198	134	5	4	67.68	2.53	2.02	<5
<i>Austrostipa bigeniculata</i>	r	53	39	2	2	73.58	3.77	3.77	<5
<i>Austrostipa blackii</i>	r	12	3	0	0	25.00	0.00	0.00	
<i>Austrostipa nodosa</i>	r	371	204	20	16	54.99	5.39	4.31	5-9
<i>Austrostipa scabra</i>	r	133	70	2	5	52.63	1.50	3.76	<5
<i>Austrostipa scabra</i> subsp. <i>falcata</i>	pr	78	27	4	4	34.62	5.19	5.13	5-9
<i>Austrostipa scabra</i> subsp. <i>scabra</i>	pr	16	7	6	6	43.75	37.50	37.50	>30
<i>Bolboschoenus caldwellii</i>	r	54	11	1	4	20.37	1.89	7.41	5-9
<i>Boschia obcordata</i>	r	94	2	2	2	2.13	2.13	2.13	<5
<i>Brachyglottis brunonis</i>	r	48	37	0	0	77.08	0.00	0.00	
<i>Brachyscome perpusilla</i>	r	3	1	0	0	33.33	0.00	0.00	
<i>Brachyscome radicata</i>	r	87	1	0	0	1.15	0.00	0.00	
<i>Brachyscome rigidula</i>	v	38	2	1	2	5.26	2.63	5.26	5-9
<i>Brachyscome sieberi</i> var. <i>gunnii</i>	r	33	14	6	6	42.42	18.18	18.18	10-29
<i>Caladenia anthracina</i>	e	33	4	2	2	12.12	6.06	6.06	5-9
<i>Caladenia caudata</i>	v	166	39	7	7	23.49	4.22	4.22	<5
<i>Caladenia filamentosa</i>	r	64	25	0	0	39.06	0.00	0.00	
<i>Caladenia sylvicola</i>	e	7	7	0	0	100.00	0.00	0.00	
<i>Calocephalus citreus</i>	r	136	71	0	0	52.21	0.00	0.00	
<i>Calocephalus lacteus</i>	r	124	6	0	0	4.84	0.00	0.00	
<i>Calystegia soldanella</i>	r	22	1	0	0	4.55	0.00	0.00	
<i>Carex gunniana</i>	r	44	13	1	1	29.55	2.27	2.27	<5
<i>Carex longibrachata</i>	r	77	5	0	0	6.49	0.00	0.00	
<i>Carex tasmanica</i>	r	186	91	4	3	48.92	2.15	1.61	<5
<i>Colobanthus curtisiae</i>	r	169	1	0	0	0.59	0.00	0.00	
<i>Comesperma defoliatum</i>	r	32	1	0	0	3.13	0.00	0.00	
<i>Corunastylis nuda</i>	r	38	3	0	0	7.89	0.00	0.00	
<i>Corunastylis nudiscapa</i>	e	16	15	0	0	93.75	0.00	0.00	
<i>Cotula vulgaris</i> var. <i>australasica</i>	r	42	1	0	0	2.38	0.00	0.00	
<i>Cryptandra amara</i>	e	57	5	0	0	8.77	0.00	0.00	
<i>Cuscuta tasmanica</i>	r	10	3	1	1	30.00	10.00	10.00	10-29
<i>Cynoglossum australe</i>	r	303	45	24	13	14.85	7.97	4.29	5-9
<i>Cyrtostylis robusta</i>	r	96	4	0	0	4.17	0.00	0.00	
<i>Damasonium minus</i>	r	3	1	0	0	33.33	0.00	0.00	
<i>Desmodium varians</i>	pv	4	2	0	0	50.00	0.00	0.00	
<i>Deyeuxia benthamiana</i>	r	31	4	0	0	12.90	0.00	0.00	
<i>Deyeuxia densa</i>	r	44	4	0	0	9.09	0.00	0.00	
<i>Dianella amara</i>	r	360	206	1	3	57.22	0.28	0.83	<5
<i>Diuris palustris</i>	e	53	6	0	0	11.32	0.00	0.00	
<i>Epacris acuminata</i>	r	370	44	0	0	11.89	0.00	0.00	
<i>Epacris virgata</i> (Kettering)	pv	228	9	0	0	3.95	0.00	0.00	
<i>Epilobium pallidiflorum</i>	r	118	2	0	0	1.69	0.00	0.00	
<i>Erigeron avinuum</i>	v	65	36	0	0	55.38	0.00	0.00	
<i>Eucalyptus morrisbyi</i>	e	31	13	2	2	41.94	6.45	6.45	5-9
<i>Eucalyptus risdonii</i>	r	434	291	6	6	67.05	1.38	1.38	<5
<i>Euphrasia gibbsiae</i> subsp. <i>wellingtonensis</i>	r	6	2	0	0	33.33	0.00	0.00	
<i>Euphrasia scabra</i>	e	37	11	0	0	29.73	0.00	0.00	
<i>Glycine latrobeana</i>	v	158	14	0	0	8.86	0.00	0.00	
<i>Gratiola pubescens</i>	v	15	1	0	0	6.67	0.00	0.00	
<i>Halaragis aspera</i>	v	7	2	0	0	28.57	0.00	0.00	
<i>Halaragis heterophylla</i>	r	124	35	0	0	28.23	0.00	0.00	
<i>Hibbertia basaltica</i>	e	91	91	0	0	100.00	0.00	0.00	
<i>Howea tasmanica</i>	r	98	8	0	0	8.16	0.00	0.00	
<i>Hyalosperma demissum</i>	e	36	5	0	0	13.89	0.00	0.00	
<i>Hydrocotyle laxiflora</i>	v	5	5	0	0	100.00	0.00	0.00	
<i>Hypoxis vaginata</i>	r	80	4	0	0	5.00	0.00	0.00	
<i>Hypoxis vaginata</i> var. <i>brevistigmata</i>	pr	187	4	0	0	2.14	0.00	0.00	
<i>Isotopsis graminifolia</i>	e	38	23	0	0	60.53	0.00	0.00	
<i>Isoplepis habra</i>	r	13	3	0	0	23.08	0.00	0.00	
<i>Juncus amabilis</i>	r	196	59	1	1	30.10	0.51	0.51	
<i>Juncus vaginatus</i>	r	29	1	0	0	3.45	0.00	0.00	
<i>Lochnagrostis punicea</i> subsp. <i>filifolia</i>	r	4	2	1	1	50.00	25.00	25.00	10-29
<i>Lochnagrostis punicea</i> subsp. <i>punicea</i>	r	11	1	1	1	9.09	9.09	9.09	5-9

Table 1. continued

Threatened flora Scientific name	Common name	state status	DEP			% TAS in DEP AREA	%TAS in DEP COAST	%TAS in NBcoast	Fig 1 Code
			TAS	AREA	COAST				
<i>Lachnagrostis robusta</i>	tall blowinggrass	r	20	4	1	20.00	5.00	0.00	5-9
<i>Lepidium hyssopifolium</i>	soft peppergrass	e	142	22	5	15.49	3.52	3.52	<5
<u><i>Lepidium pseudotasmanicum</i></u>	shade peppergrass	r	249	142	19	57.03	7.63	8.03	5-9
<i>Lepidosperma tortuosum</i>	twisting rapieredge	r	36	2	1	5.56	2.78	2.78	<5
<i>Lepilaena patentifolia</i>	spreading watermat	r	35	2	0	5.71	0.00	0.00	
<i>Lepilaena preissii</i>	slender watermat	r	11	3	0	27.27	0.00	0.00	
<i>Leucopogon virgatus</i> var. <i>brevifolius</i>	shortleaf beardheath	r	15	1	0	6.67	0.00	0.00	
<i>Limonium australe</i>	yellow sea-lavender	r	54	3	0	5.56	0.00	0.00	
<i>Lobelia pratioides</i>	poison lobelia	v	35	1	0	2.86	0.00	0.00	
<i>Lotus australis</i>	australian trefoil	r	66	2	1	3.03	1.52	1.52	<5
<i>Lythrum salicaria</i>	purple loosestrife	v	76	1	0	1.32	0.00	0.00	
<i>Olearia hookeri</i>	crimsontip daisybush	r	25	11	1	44.00	4.00	4.00	<5
* <u><i>Ozothamnus reflexifolius</i></u>	reflexed everlastingbush	v	10	10	0	100.00	0.00	0.00	
<i>Parietaria debilis</i>	shade pellitory	r	115	1	0	0.87	0.00	0.00	
* <u><i>Parmelina pallida</i></u>		e	1	1	0	100.00	0.00	0.00	
<i>Parmelina whinrayi</i>		r	3	1	0	33.33	0.00	0.00	
<i>Pellaea calidniupium</i>	hotrock fern	r	63	9	0	14.29	0.00	0.00	
<i>Pentachondra ericifolia</i>	fine frillyheath	r	55	3	0	5.45	0.00	0.00	
<i>Pimelea curviflora</i> var. <i>gracilis</i>	slender curved riceflower	r	71	3	1	4.23	1.41	1.41	<5
<i>Pimelea flava</i> subsp. <i>flava</i>	yellow riceflower	r	665	24	0	3.61	0.00	0.00	
* <u><i>Plantago gaudichaudii</i></u>	narrow plantain	v	1	1	0	100.00	0.00	0.00	
<i>Poa mollis</i>	soft tussockgrass	r	41	4	0	9.76	0.00	0.00	
<i>Pomaderris elachophylla</i>	small-leaf dogwood	v	515	2	0	0.39	0.00	0.00	
<i>Pomaderris intermedia</i>	lemon dogwood	r	105	1	0	0.95	0.00	0.95	<5
<i>Pomaderris pillifera</i> subsp. <i>talpicutica</i>	moleskin dogwood	e	4	1	1	25.00	25.00	0.00	10-25
<i>Potamogeton pectinatus</i>	fennel pondweed	r	26	3	0	11.54	0.00	0.00	
<i>Prasophyllum apoxychilum</i>	tapered leek-orchid	e	34	2	0	5.88	0.00	0.00	
* <u><i>Prasophyllum perangustum</i></u>	knocklotty leek-orchid	e	4	4	0	100.00	0.00	0.00	
<i>Pterostylis squamata</i>	ruddy greenhood	r	51	9	0	17.65	0.00	0.00	
<i>Pterostylis wagstrarum</i>	fleshy greenhood	e	17	6	0	35.29	0.00	0.00	
<i>Pterostylis ziegeleri</i>	grassland greenhood	v	90	26	0	28.89	0.00	0.00	
<i>Pultenaea prostrata</i>	silky bushpea	v	53	6	0	11.32	0.00	0.00	
<i>Ranunculus pumilio</i> var. <i>pumilio</i>	ferry buttercup	r	56	5	0	8.93	0.00	1.79	<5
<i>Ranunculus sessiliflorus</i> var. <i>sessiliflorus</i>	rockplate buttercup	r	125	19	7	15.20	5.60	5.60	5-9
<i>Rhodanthe anthemoides</i>	chamomile sunray	r	131	1	0	0.76	0.00	0.00	
<i>Ruppia megacarpa</i>	largefruit seatassel	r	21	5	0	23.81	0.00	0.00	
<u><i>Ruppia tuberosa</i></u>	tuberous seatassel	r	5	3	0	60.00	0.00	0.00	
<i>Schoenoplectus validus</i>	river clubsedg	r	25	1	0	4.00	0.00	0.00	
<i>Scleranthus brockiei</i>	mountain knawel	r	164	4	0	2.44	0.00	0.00	
<i>Scleranthus diander</i>	tufted knawel	v	32	1	0	3.13	0.00	0.00	
<i>Scleranthus fasciculatus</i>	spreading knawel	v	154	19	0	12.34	0.00	0.00	
<i>Senecio squarrosus</i>	leafy fireweed	r	102	26	1	25.49	0.98	0.98	<5
<i>Senecio velleioides</i>	forest groundsel	r	41	5	0	12.20	0.00	0.00	
<u><i>Sesuvium eriocephalum</i> var. <i>eriocephalum</i></u>	heath dustymiller	e	17	12	7	70.59	41.18	41.18	>30
<i>Spyridium vexilliferum</i> var. <i>vexilliferum</i>	helicopter bush	r	209	5	0	2.39	0.00	0.00	
<i>Stellaria multiflora</i>	rayless starwort	r	132	3	0	2.27	0.00	0.00	
<u><i>Stenopetalum lineare</i></u>	narrow threadpetal	e	7	5	1	71.43	18.78	14.29	10-25
<i>Stylidium despectum</i>	small triggerplant	r	40	1	0	2.50	0.00	0.00	
<i>Teucrium corymbosum</i>	forest germander	r	120	21	5	17.50	4.17	4.17	<5
<i>Thelymitra atronitida</i>	blackhood sun-orchid	e	12	5	0	41.67	0.00	0.00	
<u><i>Thelymitra bracteata</i></u>	leafy sun-orchid	e	6	4	0	66.67	0.00	0.00	
* <u><i>Thesium australe</i></u>	southern toadflax	x	1	1	0	100.00	0.00	0.00	
<i>Thimia rodwayi</i>	fairy lanterns	r	78	6	0	7.69	0.00	0.00	
<i>Triglochin minutissimum</i>	tiny arrowgrass	r	27	1	0	3.70	0.00	0.00	
<i>Triptilodiscus pygmaeus</i>	dwarf sunray	v	39	6	0	15.38	0.00	0.00	
<i>Uncinia elegans</i>	handsome hooksedge	r	26	3	0	11.54	0.00	0.00	
<u><i>Vallisneria americana</i> var. <i>americana</i></u>	river ribbons	r	27	15	0	55.56	0.00	0.00	
<i>Velleia paradoxa</i>	spur velleia	v	58	25	5	43.10	8.62	8.62	5-9
* <u><i>Veronica natabilis</i></u>	forest speedwell	x	1	1	0	100.00	0.00	0.00	
<i>Viola cunninghamii</i>	alpine violet	r	300	3	0	1.00	0.00	0.00	
<i>Vittadinia burbridgeae</i>	smooth new-holland-daisy	pr	33	4	1	12.12	3.03	3.03	<5
<i>Vittadinia cuneata</i> var. <i>cuneata</i>	fuzzy new-holland-daisy	r	148	9	1	6.08	0.68	0.68	<5
<i>Vittadinia gracilis</i>	woolly new-holland-daisy	r	235	85	24	36.17	10.21	9.36	10-25
<u><i>Vittadinia muelleri</i></u>	narrow leaf new holland daisy	r	434	258	24	59.45	5.53	5.07	5-9
<i>Westringia angustifolia</i>	narrowleaf westringia	r	112	11	0	9.82	0.00	0.00	
<i>Wilsonia rotundifolia</i>	roundleaf wilsonia	r	103	1	0	0.97	0.00	0.00	
<u><i>Xanthoparmelia amphixantha</i></u>		e	54	49	0	90.74	0.00	0.00	
<i>Xanthoparmelia jarmaniae</i>		v	5	1	0	20.00	0.00	0.00	
<i>Xanthoparmelia mannumensis</i>		v	8	3	0	37.50	0.00	0.00	
<u><i>Xanthoparmelia molliscula</i></u>		e	13	11	0	84.62	0.00	0.00	
<i>Xanthoparmelia oleosa</i>		r	2	1	0	50.00	0.00	0.00	
* <u><i>Xanthoparmelia vicaria</i></u>		r	2	2	0	100.00	0.00	0.00	
* <u><i>Xanthoparmelia vicariella</i></u>		r	16	16	0	100.00	0.00	0.00	
<i>Xerochrysum bicolor</i>	eastcoast everlasting	r	59	1	0	1.69	0.00	0.00	

- * and Underlined species = 100% Tasmanian observation occur in DEP AREA (i.e. immediate water 'catchment boundary').
- Underlined only = species with ≥ 50% Tasmanian observation occur in DEP AREA
- Figure 1 codes = colour coding of foreshore species illustrated in Figure 1. These codes are based upon the % Tasmanian observations that occur either in the DEP COAST (i.e. Derwent foreshore NVA 7-1-10 data) or NBcoast (Northbarker Ecosystem Services Derwent foreshore data).

Attention Areas: Threatened flora within the estuary foreshore

At least three areas warrant further attention in order to make sure threaten flora values are protected within the Derwent estuary foreshore. These areas have been identified based on three or more observations of threatened species in an area, and that these species have $\geq 10\%$ of their state observations with the Derwent estuary foreshore. A brief description of these areas and recommendations are provided:

Attention Area 1: Gage Brook – Old Beach

Threatened species occur at a few locations along 2.7 km of coast within;

Allocasuarina verticillata forest (NAV),
Bursaria - Acacia woodland and scrub (NBA), and to a lesser extent,
Urban areas (FUR).

Of those species with 10% and 18% off their known Tasmanian observation (as of 7-Jan-2010) occurring within the Derwent estuary, several specimens of *Vittadinia gracilis* (woolly new-holland-daisy) and one of *Brachyscome sieberi* var. *gunnii* (forest daisy) occur in this area. There are also several observations of other threatened species in this area, which include: *Vittadinia muelleri* (narrow leaf new holland daisy), *Austrostipa nodosa* (knotty speargrass), *Austrostipa scabra* subsp. *falcate* (sickle speargrass), *Cynoglossum australe* (coast houndstongue) and *Ranunculus sessiliflorus* var. *sessiliflorus* (rockplate buttercup). All species are considered to be rare, with the exception of *A. scabra* subsp. *falcate* that is presumed rare, under the Tasmanian *Threatened Species Protection Act 1995*.

Recommendations:

- Further assess area for distribution of threatened species,
- Assess weed and other risks to currently observed threatened species,
 - In-particular for *Vittadinia gracilis* (woolly new-holland-daisy) and one of *Brachyscome sieberi* var. *gunnii* (forest daisy)
- Assess ‘back-yard creep’ into foreshore areas,
- Explore option of seed-bank collection and propagation (with Botanical Gardens)
 - Assess value of planting established threatened species seedlings in this area.

Attention Area 2: Bedlam Walls

Threatened species occur along, or adjacent to, much of a 2.5 km of coast strip along Bedlam Walls. This area contains several observations of the endangered species *Spyridium eriocephalum* var. *eriocephalum* (heath dustymiller). This species has 41% of its’ state observations within the Derwent foreshore, and the Bedlam Walls is crucial part of its range. Threatened species occur here within the following vegetation types:

Allocasuarina verticillata forest (NAV)
Eucalyptus globulus dry forest and woodland (DGL),
Eucalyptus risdonii forest and woodland (DRI),
Eucalyptus amygdalina forest and woodland on mudstone (DAM),
Bursaria - Acacia woodland and scrub (NBA), and
Eucalyptus viminalis grassy forest and woodland (DVG),

The vegetation type ‘*Eucalyptus risdonii* forest and woodland (DRI)’, is also significant in that it is dominated by the threatened (rare) species *E. risdonii*. There

are also several observations of other threatened species in this foreshore area, which include: *Ranunculus sessiliflorus* var. *sessiliflorus* (rockplate buttercup), *Austrodanthonia induta* (tall wallabygrass), *Lepidium pseudotasmanicum* (shade peppercress), and *Velleia paradoxa* (spur velleia). These species are considered to be rare, with the exception of *Velleia paradoxa* that is vulnerable, under the Tasmanian *Threatened Species Protection Act 1995*.

Recommendations:

- Further assess area for distribution of threatened species,
- Assess weed and other risks to currently observed threatened species,
 - In-particular for the endangered species *Spyridium eriocephalum* var. *eriocephalum* (heath dustymiller).
- Identify if there is a fire-management plan for Bedlam Walls, if so – is this compatible with threatened flora values for those species that are largely restricted to this area (e.g. *Spyridium eriocephalum* var. *eriocephalum* (heath dustymiller) and *Eucalyptus risdonii*).
- Explore option of seed-bank collection and propagation (with Botanical Gardens)
 - Assess value of planting established threatened species seedlings in this area.
 - Assess value of planting *Spyridium eriocephalum* var. *eriocephalum* (heath dustymiller) seedlings at a new location to create an insurance population in case inappropriate conditions were to occur at Bedlam Walls.

Attention Area 3: Cornelian Bay

Threatened species occur along parts of the Cornelian Bay foreshore, and nearby areas, along a 3 km coastal strip. This area contains a few observations of the rare species *Austrostipa scabra* subsp. *scabra* (rough speargrass). This species has 37% of its' state observations within the Derwent foreshore, and the Cornelian bay area is crucial part of its range. This area supports the endangered species, *Austrodanthonia popinensis* (blue wallabygrass), - represented here through several observations. These and other threatened species occur here within the following vegetation types:

Eucalyptus viminalis grassy forest and woodland (DVG),
Bursaria - Acacia woodland and scrub (NBA),
Allocasuarina verticillata forest (NAV), and
Urban areas (FUR).

There are also several observations of other threatened species in this area, which include: *Brachyscome sieberi* var. *gunnii* (forest daisy), *Vittadinia gracilis* (woolly new-holland-daisy), *Vittadinia muelleri* (narrow leaf new holland daisy), *Lepidium pseudotasmanicum* (shade peppercress), *Austrostipa nodosa* (knotty speargrass), *Asperula scoparia* var. *scoparia* (prickly woodruff) and *Austrostipa bigeniculata* (doublejointed speargrass). These species are considered to be rare under the Tasmanian *Threatened Species Protection Act 1995*.

Recommendations:

- Further assess area for distribution of threatened species,
- Assess weed and other risks to currently observed threatened species,
 - In-particular for the endangered species *Austrodanthonia popinensis* (blue wallabygrass), and also for *Austrostipa scabra* subsp. *scabra*

- (rough speargrass) that has one of the states strongholds at this location.
 - Also for the species *Vittadinia gracilis* (woolly new-holland-daisy) and one of *Brachyscome sieberi* var. *gunnii* (forest daisy)
- Identify if there is a fire-management plan for this area (much of the area is owned by the Hobart City Council), if so – is this compatible with threatened flora values for those species that are largely restricted to this area (e.g. *Austrostipa scabra* subsp. *scabra* (rough speargrass)).
- Explore option of seed-bank collection and propagation (with Botanical Gardens)
 - Assess value of planting established threatened species seedlings in this area.
 - Assess value of planting *Austrostipa scabra* subsp. *scabra* (rough speargrass) seedlings at a new location to create an insurance population in case inappropriate conditions were to occur here.

Noteworthy Areas: Threatened flora within the estuary foreshore.

Noted Area 1: Upper estuary edge

The upper estuary contains large area of significant wetland and saltmarsh vegetation. There are a number of threatened flora observations within this region, however, the majority are not found within the significant wetland and saltmarsh areas. These observations typically occur just landward, or in coastal areas in between the wetlands and saltmarshes (mapped in Nortbarker (2008a)). Some noteworthy threatened species observations include the presence of *Austrostipa scabra* subsp. *scabra* (rough speargrass). This species has 37% of its' state observations within the Derwent foreshore. Other noteworthy observations include the endangered species *Austrodanthonia popinensis* (blue wallabygrass). Other threatened floral species also occur in this region.

Recommendations:

- Further assess area for distribution of threatened species,
- Assess weed and other risks to currently observed threatened species,
 - In-particular for the endangered species *Austrodanthonia popinensis* (blue wallabygrass), and also for *Austrostipa scabra* subsp. *scabra* (rough speargrass).
- A number of the threatened species observations are close to road verges where various land-use and road expansion/maintenance action may take place
 - Assess if broader plant distributions occur away from road easements.
 - Assess how potential weed management only the road and railway edges of the wetland habitats may pose a risk to threatened flora.
- Explore option of seed-bank collection and propagation (with Botanical Gardens)
 - In-particular for the endangered species *Austrodanthonia popinensis* (blue wallabygrass), and also for *Austrostipa scabra* subsp. *scabra* (rough speargrass).
 - Assess if any genetic diversity exists, between *Austrostipa scabra* subsp. *scabra* (rough speargrass) here and other Derwent estuary locations (such as Cornelian Bay). Assess value of creating a new population at a new location to preserve potential genetic diversity.

- Explore changes in vegetation, and potential threatened flora distribution in the future due to sea-level rise. The report by Prahalad *et al.* (2009), prepared for the Derwent estuary program and funded by NRM South, may assist in this assessment.

Noted Area 2: Green Point

Several threatened floral species observations have been recorded in the vicinity of Green Point. These include the species *Austrostipa scabra* subsp. *falcate* (sickle speargrass), *Austrostipa nodosa* (knotty speargrass), *Cynoglossum australe* (coast houndstongue), *Dianella amoena* (grassland flaxlily) and *Senecio squarrosus* (leafy fireweed). All species are considered to be rare, with the exception of *A. scabra* subsp. *falcate* that is presumed rare, under the Tasmanian *Threatened Species Protection Act 1995*.

Recommendations:

- Further assess area for distribution of threatened species,
- Assess weed and other risks to currently observed threatened species.

Noted Area 3: Clarence Rivulet

Along the foreshore, in the vicinity of the entrance of the Clarence Plains Rivulet, there are noteworthy observations of the threatened floral species *Vittadinia gracilis* (woolly new-holland-daisy) and *Vittadinia muelleri* (narrow leaf new holland daisy). Other threatened floral species in this area of the foreshore include *Lepidium pseudotasmanicum* (shade peppercress), *Carex tasmanica* (curly sedge), and *Juncus amabilis* (gentle rush).

Recommendations:

- Further assess area for distribution of threatened species,
- Assess weed and other risks to currently observed threatened species.

Noted Area 4: Lauderdale

The Lauderdale saltmarsh occupies an area of approximately 1km² and the vegetation communities were mapped in 2008 by NorthBarker for the DEP, using 2001 aerial photos. The vegetation is dominated by *succulent saline herbland* (ASS); 0.7 km², representing 88% of the Derwent estuary coverage of this vegetation type. This herbland can be divided into at least four different vegetation communities, which differ in species dominance (NorthBarker 2008b). The next dominant vegetation within the Lauderdale saltmarsh is *saline sedgeland/rushland* (ARS) 0.2 km², representing 15% of the Derwent estuary coverage of this vegetation type. The complex mosaic of vegetation communities occurring here is in part due to variations in salinity, water and disturbance regimes. The Lauderdale wetland and saltmarsh is a critical habitat for the endemic Tasmanian saltmarsh moth, *Dasybela achroa*, which is listed as vulnerable under the Tasmanian *Threatened Species Protection Act 1995*. Only a few specimens of this moth have been recorded outside of this area.

A noteworthy threatened species observation includes the presence of *Cuscuta tasmanica* (golden dodder). This species has 10% of its' state observations within the Derwent foreshore. Some other observation of this species also occur landward of the saltmarsh. Other threatened flora on the seaward periphery of the saltmarsh

include: *Limonium austral* (yellow sea-lavender) and *Potamogeton pectinatus* (fennel pondweed). The saltmarsh community also contains two plants considered rare in Tasmania: *Lawrenzia spicata* (candle saltmallow) and *Wahlenbergia multicaulis* (the many-stemmed bluebell (NorthBarker 2008b) – but neither are listed as threatened under the Tasmanian *Threatened Species Protection Act 1995*.

Recommendations:

- Further assess area for distribution of threatened species,
- Assess weed and other risks to currently observed threatened and rare species,
 - In-particular *Cuscuta tasmanica* (golden dodder).
- Assess impacts through past and current land uses, including infilling for the Lauderdale tip and associated leachate, altered hydrology, grazing, off-road vehicles, road construction, weeds and climate change (as described in Clarence City Council 2008; NorthBarker 2008b, Prahalad et al. 2009) on the overall saltmarsh vegetation community and endemic Tasmanian saltmarsh moth.
- Explore option of seed-bank collection and propagation (with Botanical Gardens)
 - In-particular for the *Cuscuta tasmanica* (golden dodder).
- Explore changes in vegetation, and potential threatened flora distribution in the future due to sea-level rise. The report by Prahalad *et al.* (2009), prepared for the Derwent estuary program and funded by NRM South, may assist in this assessment.
 - In-particular for the *Cuscuta tasmanica* (golden dodder), which occurs in areas of current and projected future saltmarsh extent.

Noted Area 5; South-arm

The foreshore around the northern tip of South-arm is a very important area for the threatened species *Cynoglossum australe* (coast houndstongue). This site contains approximately 5% of the known Tasmanian observations of this species. There is also at least one observation of the threatened species *Vittadinia muelleri* (narrow leaf new holland daisy) in the foreshore here. The species *Cynoglossum australe* appears to be present in altered vegetation types consisting of:

Marram grassland (FMG), and
Agricultural land (FAG).

It also occurs in some remnant native vegetation consisting of:

Coastal grass and herbfield (GHC), and
Allocasuarina verticillata forest (NAV).

Recommendations:

- Further assess area for distribution of threatened species,
- Assess weed and other risks to currently observed threatened species,
 - In-particular *Cynoglossum australe* (coast houndstongue).

General comments and recommendation relating to specific species

It may be appropriate in some instances for the Derwent Estuary Program give management priority to those threatened species having a large proportion of their Tasmanian distribution within the Derwent estuary foreshore. This would include the previously listed species that have ≥10% of their Tasmania observation (as of 7-Jan-2010) within the Derwent estuary foreshore. Management priority should also

perhaps include those threatened species within foreshore regions that are recognised as endangered and vulnerable (**Figure 2**), as of 7-Jan-2010 such a list would include:

Endangered flora found within the Derwent foreshore (as of 7-Jan-2010):

The following % represents proportion of state observations within the Derwent foreshore:

- 41% - *Spyridium eriocephalum* var. *eriocephalum* (heath dustymiller),
- 25% - *Pomaderris pilifera* subsp. *talpicutica* (moleskin dogwood),
- 14% - *Stenopetalum lineare* (narrow threadpetal).
- 6% - *Eucalyptus morrisbyi* (morrisbys gum),
- 6% - *Caladenia anthracina* (blacktip spider-orchid),
- 4% - *Lepidium hyssopifolium* (soft peppercress), and
- 3% - *Austrodanthonia popinensis* (blue wallabygrass),

Vulnerable flora found within the Derwent foreshore (as of 7-Jan-2010). The following % represents proportion of state observations within the Derwent foreshore:

- 9% - *Velleia paradoxa* (spur velleia),
- 4% - *Caladenia caudata* (*Caladenia caudata*), and
- 3 to 5% - *Brachyscome rigidula* (cutleaf daisy).

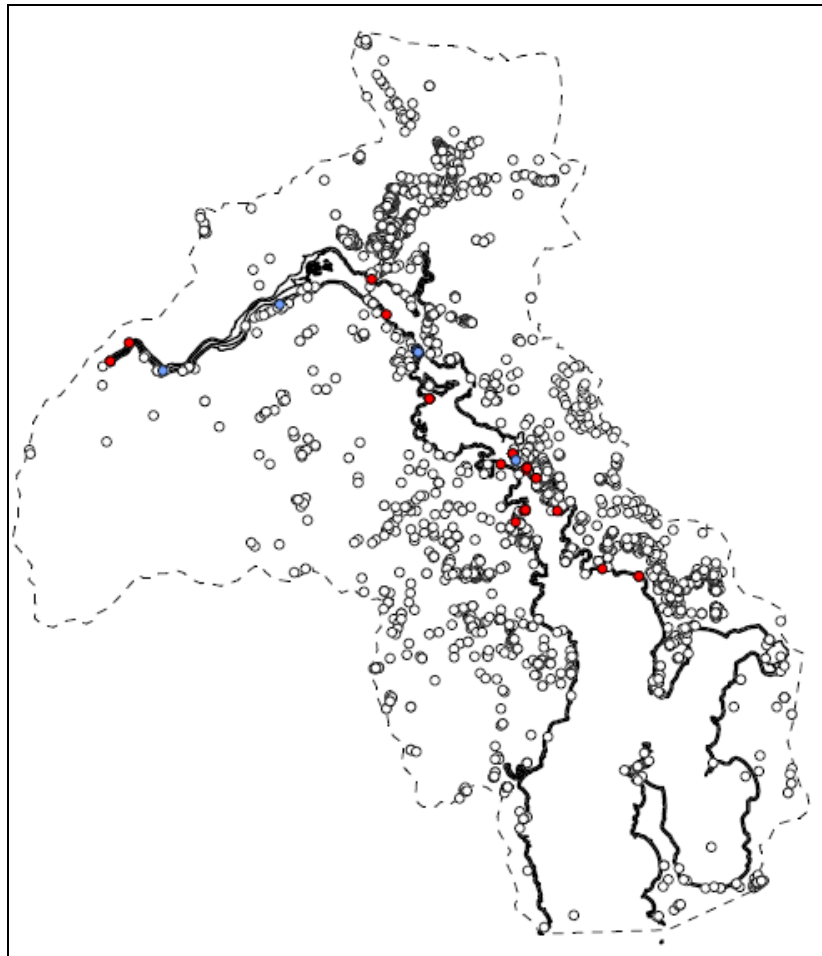


Figure 2. Threatened flora observations (from Figure 1) within the foreshore have been colour coded to represent ENDANGERED = RED and VULNERABLE = BLUE – as listed under the Tasmanian Threatened Species Protection Act 1995.

Recommendations:

- Further assess foreshore area for distribution of threatened species,
 - In particular those species that are endangered and have a significant number of their known observations within in the Derwent estuary foreshore, such as *Spyridium eriocephalum* var. *eriocephalum* (heath dustymiller), and *Pomaderris pilifera* subsp. *talpicutica* (moleskin dogwood).
 - Searches should also target other threatened (rare) species that have a relatively higher likelihood of being found within the Derwent foreshore, such as: *Austrostipa scabra* subsp. *scabra* (rough speargrass), *Lachnagrostis punicea* subsp. *filifolia* (narrowleaf blowngrass), and *Brachyscome sieberi* var. *gunnii* (forest daisy).
- Assess weed and other risks to currently observed threatened species.
 - Seek advice from various vegetation experts on general weed threats at the attention areas and noteworthy areas – described above. Also seek advice on weed threats to specific threatened species, especially those listed as endangered, vulnerable, or have a significant ($\geq 10\%$ of Tasmanian observations) within the Derwent foreshore.
- Develop recovery plans for some threatened species.
 - Recovery plans may focus on improving overall habitats at certain locations (attention areas and noteworthy areas – described above)
 - Create seed-banks and propagate for revegetation – using threatened species where appropriate (seek assistance and advice from the Royal Botanical Gardens and vegetation experts within DPIPWE).

ACKNOWLEDGMENTS

Data obtained from the Natural values Atlas, 7/1/2010, Department of Primary Industries, Parks, Water and Environment, Tasmania,
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