

**Surveys for *Lissotes latidens* (Broad-toothed stag beetle) in priority
coupes on the Forestier and Tasman Peninsulas**

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Introduction

The broad-toothed stag beetle, *Lissotes latidens* (Coleoptera: Lucanidae) is an endemic beetle of Tasmania and is listed as endangered under the Tasmanian *Threatened Species Protection Act 1995* due to its restricted distribution, low population density and loss of habitat (Forest Practices Board 1998). Under the Commonwealth-Tasmania *Regional Forest Agreement*, *L. latidens* was listed as a category six forest fauna species (PLUC 1997). This categorisation was a recognition that the species was believed to be at risk but its conservation needs could not be assessed without further research on its distribution and habitat requirements.

A recent study by Meggs (in prep.) on the distribution and habitat requirements of the species is almost complete. The species has now been recorded from 34 localities in south-east Tasmania, 28 on mainland Tasmania and six on Maria Island. The range of the species is in the order of 250 km², centred on Wielangta State Forest. In general, the forest habitat in which *L. latidens* inhabits can be summarised as wet eucalypt forest dominated by *Eucalyptus obliqua*, *E. regnans* and *E. globulus*, with occasional *E. viminalis*, and wet/damp eucalypt forest patches and riparian areas amongst drier forest types. Dry eucalypt forest is unsuitable habitat for the species. Meggs' (in prep.) study suggests that *L. latidens* has a preference for forest with a well developed overstorey and understorey, greater than 10% ground cover of fallen dead wood, and a leaf litter cover of greater than 50%. This study also revealed that although the species has an association with fallen dead wood, it is soil-dwelling throughout its life-cycle.

Cortex modelling of the potential state-wide distribution of *L. latidens* conducted by Meggs (in prep.) indicated that suitable environmental conditions occur on the Forestier and Tasman Peninsulas, south of the current known range of the species. Suitable forest types occur in these areas and neither region has been surveyed for this species in the past (Bornemissza, McQuillan & Michaels pers. comm.). Given the occurrence of the species on Maria Island, it is clear that it persists in areas that are geographically isolated from its current known core range on mainland Tasmania and therefore surveying of these additional areas is recommended.

The major threatening process to the survival of *L. latidens* is loss of forest habitat. Approximately half of the known range of *L. latidens* is private land and much of this has been cleared for agriculture, grazing, or pulpwood plantations. Mechanisms for the protection of remnant habitat on private land are limited, as this is dependent on the conservation status of the species on crown land. In State forest, Forestry Tasmania has announced that it intends to increase its rate of plantation establishment and the use of intensive forest management practices within the range of the species, such as regrowth-thinning, to compensate for the loss of resource that resulted from the land reserved under the *Regional Forest Agreement* (Forestry Tasmania 1998). Studies of related species have indicated that these activities can have a severe negative impact on soil and log-dwelling lucanids (Meggs 1997; Meggs & Taylor in press). Within the predicted range of the species Forestry Tasmania has largely targeted the Forestier and Tasman Peninsulas for conversion of native forest to eucalypt plantation (Forestry Tasmania 1998).

Therefore, the aims of this study are to:

1. Ground-truth the predicted range of *L. latidens* on the Forestier and Tasman Peninsulas by surveying coupes proposed in Forestry Tasmania's three-year plan for conversion of native forest to eucalypt plantation;
2. If the species is not found on either peninsula after surveying a minimum of 10 sites in each region, conduct a preliminary investigation of the effects of conversion of native forest to eucalypt plantation on *L. latidens* by sampling areas within the current known range of the species that have been converted to plantation.

This study will obtain further information on the distribution and habitat requirements of *L. latidens* vital for the formulation of a formal management agreement between Forestry Tasmania and the Tasmanian Parks and Wildlife Service to adequately conserve habitat for this species.

Methods

Coupes identified in Forestry Tasmania's three-year plan for the Forestier and Tasman Peninsulas were surveyed if they contained wet and/or damp eucalypt forest. Two to three sites within each coupe were surveyed depending on the coupe size. At each site habitat variables chosen for their anticipated value as predictors of beetle distribution and abundance were recorded.

At each site a 25 m radius plot was marked out and the underneath of all logs in this area that could be moved by field workers was searched for adult *Lissotes latidens* and larval lucanids (as per Meggs in prep.). Any live beetles were recorded and released at the site of capture. Parts of dead beetles were also recorded and then placed into vials containing 70% alcohol. Identifiable body parts included male heads, and abdomens of both sexes which have a distinctive pattern of ridges relative to other lucanid species (Bornemissza pers. comm.).

Results and Discussion

Sixteen sites, encompassing 12 coupes, were surveyed on the Forestier Peninsula (Fig. 1 & Appendix I), and a further 10 sites, encompassing 5 coupes, were surveyed on the Tasman Peninsula (Fig. 2 & Appendix I) in this study. Six sites were also surveyed in eucalypt plantations within the current known range of the beetle (Fig. 3 & Appendix I).

No *Lissotes latidens* were found on either the Forestier Peninsula or the Tasman Peninsula in this study. Hence, *L. latidens* appears to be restricted to an area of 270 km² in south east Tasmania centred on the Wielangta State Forest, and 5 km² on Maria Island (Meggs in prep.). Although this is a cryptic species, and hence it is difficult to prove its absence from a site, previous survey work conducted within the known range of the beetle indicates that the number of sites surveyed on both peninsulas is sufficient to prove the presence or absence of the species (Meggs in prep.). Therefore, it can be confidently stated that *L. latidens* does not occur on either peninsula. Given that the sites surveyed on the peninsulas share the broad characteristics of the beetle's known habitat, it is not known whether the species' absence is due to habitat characteristics other than those recorded in this study or whether it may be due to other factors, such as historical reasons.

L. latidens was found to occur in retained forest in the eucalypt plantations surveyed on Wielangta Road, within the known range of the beetle. It was not found to occur, however, in windrows within the plantations. Nor were any lucanid larvae observed in these windrows. The presence of the species in the retained streamside reserves offers encouragement that these areas will capture habitat for the species. There is still, however, a need to maintain links of potential habitat between catchments. At present there are only three to four small areas of forest within the range of the species that have been converted to plantation. Therefore, study of the impacts of these practices is difficult. Nevertheless, long-term monitoring of the population of *L. latidens* in these streamside reserves within the plantation would provide important information on the medium-to-long term viability of this retained habitat. In the mean time, recommendations for a conservation strategy for the species are currently under development (Meggs in prep.).

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Appendix I. Characteristics of the sites surveyed in this study (SSR = Streamside reserve).

Region	Coupe	Tasmap 1:25 000	E	N	Forest type	Altitude (m)	Aspect (degrees)	Slope (degrees)	% Fallen dead wood	BTSB No.	Date
Tasman Peninsula	TA018G S1	Port Arthur	571750	5226100	Wet euc	70	100 E	15	10	0	18/11/98
	TA018I	Port Arthur	571500	5226650	Damp euc	100	20 N	12.5	2.5	0	18/11/98
	TA018G S2	Port Arthur	571650	5226975	Damp euc	60	290 WNW	4	2.5	0	18/11/98
	TA020B S1	Hippolyte	575525	5224300	Wet euc	140	None	0	10	0	19/11/98
	TA020B S2	Hippolyte	576025	5224050	Wet euc	130	None	0	5	0	19/11/98
	TA020C	Hippolyte	575925	5223750	Wet euc	130	None	0	10	0	19/11/98
	TA006I	Taranna	572375	5229600	Wet euc	220	10 N	12.5	15	0	23/11/98
	TA010E	Taranna	573050	5229325	Wet euc	280	350 N	17.5	5	0	23/11/98
	TA007C S1	Hippolyte	573775	5229625	Wet euc	280	290 N	22.5	10	0	24/11/98
	TA007C S2	Hippolyte	573175	5229800	Wet euc	220	320 NW	2.5	6	0	24/11/98
	TA007C S3	Taranna	572850	5230050	Wet euc	160	10 N	5	2	0	24/11/98
	TA003I S1	Taranna	574075	5232575	Wet euc	410	None	0	40	0	25/11/98
	TA003I S2	Taranna	573500	5232625	Damp euc	330	250 W	5	10	0	25/11/98
	TA003D	Taranna	572075	5232325	Wet euc	170	130 SE	4	5	0	25/11/98
Forestier Peninsula	KY005E	Port Arthur	566300	5226175	Wet euc	280	70 E	6.5	3	0	26/11/98
	KY003A	Port Arthur	566975	5227675	Wet euc	270	65 NE	2.5	5	0	26/11/98
	FT023A S1	Murdunna	573925	5246275	Wet euc	180	355 N	2.5	6	0	2/12/98
	FT023A S2	Murdunna	574225	5246250	Damp	180	None	0	10	0	2/12/98
	FT021C S1	Murdunna	578575	5246625	Damp	170	180 S	12.5	7.5	0	3/12/98
	FT021C S2	Murdunna	578725	5246300	Wet euc	110	220 SE	2.5	15	0	3/12/98
	FT005B S1	Murdunna	576325	5243975	Wet euc	340	None	0	5	0	8/12/98
	FT005B S2	Murdunna	575875	5243725	Wet euc	300	0 N	2.5	8	0	8/12/98
	FT005G S1	Murdunna	576925	5242975	Wet euc	280	10 N	17.5	6.5	0	9/12/98
	FT005G S2	Murdunna	577125	5242225	Wet euc	350	30 NNE	7.5	2.5	0	9/12/98
	FT005G S3	Murdunna	577175	5242625	Wet euc	300	40 NE	7.5	6.5	0	9/12/98
	FT008I	Murdunna	575025	5242850	Wet euc	280	185 S	2.5	5	0	9/12/98

Appendix I (cont.). Characteristics of the sites surveyed in this study.

Region	Coupe	Tasmap 1:25 000	E	N	Forest type	Altitude (m)	Aspect (degrees)	Slope (degrees)	% Fallen dead wood	BTSB No.	Date
Wielangta Road	Jacobsons 5 y.o. S1	Kellevie	567550	5267450	Eucalypt plantation	300	40 NE	2.5	5	0	10/12/98
	Jacobsons 5 y.o. S2	Kellevie	567500	5267600	Eucalypt plantation	300	None	0	5	0	10/12/98
	Jacobsons SSR#1 S1	Kellevie	567700	5266875	Wet euc	250	180 S	5	8	2	14/12/98
	Jacobsons SSR#1 S2	Kellevie	567450	5266700	Wet euc	230	240 SW	25	5	1	14/12/98
	Jacobsons SSR#2	Kellevie	567650	5266675	Damp	260	270 W	12.5	5	1	15/12/98
	Jacobsons SSR#3	Kellevie	567325	5267050	Damp	270	300 NW	15	5	0	15/12/98