

THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

The Minister approved this Conservation Advice on 31/10/2019.

Conservation Advice

Lissotes latidens

Broad-toothed Stag Beetle

Conservation Status

Lissotes latidens (Broad-toothed Stag Beetle) is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) effective from the 3 December 2002.

Species can also be listed as threatened under state and territory legislation. For information on the current listing status of this species under relevant state or territory legislation, see <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>

The main factors that make the species eligible for listing in the Endangered category are the species' restricted severely fragmented distribution and the possible decline in area of occupancy, extent of occurrence, quality of habitat and number of mature individuals.

Description

The Broad-toothed Stag Beetle is a medium-sized flightless stag beetle, dull black in colour. Adult male Broad-toothed Stag Beetles have prominent jaws shaped like bull's horns (FPA 2002) and a body length of 13-18 mm (Lea 1910).

Distribution

The Broad-toothed Stag Beetle has a very restricted range in south-eastern Tasmania in the area between Orford and Copping, and on Maria Island, within which it is known from 103 sites. Its distribution is centred on the Wielangta State Forest (Bryant & Jackson 1999; Meggs & Munks 2003, TSSC 2002), the species more prevalent in the eastern half of its range.

The known extent of occurrence is approximately 443 km² (Richards & Spencer 2018) while the area of occupancy much lower, estimated as 64 km² (FPA 2012; TSS 2018). On Maria Island potential habitat extends to the south beyond the current known range of the species (Meggs & Munks 2003). Approximately 20 percent of forest cover within the species' area of occurrence has been cleared since European settlement, primarily for grazing (Meggs 1999).

Current populations of the Broad-toothed Stag Beetle, especially in the western part of its range, are largely restricted to damp forests and riparian forest along watercourses in dry forests due to specific habitat requirements (Clarke & Spier-Ashcroft 2003).

Relevant Biology/Ecology

Both the adults and larvae of the Broad-toothed Stag Beetle are edaphic (soil dwelling), with decaying logs providing shelter from desiccation, predation and habitat disturbance (Bryant & Jackson 1999; FPA 2002). While the larvae are edaphic, they may sometimes be found in shallow depressions in the soil underneath decaying logs (Clarke & Spier-Ashcroft 2003; Meggs 1999; Richards & Spencer 2018).

Adult Broad-toothed Stag Beetles are active from September to April (Clarke & Spier-Ashcroft 2003; Meggs 1999), activity peaking in the warmer months (Dec – Feb) when adults emerge from the soil to disperse and mate. (Clarke & Spier-Ashcroft 2003; Meggs 1999; Richards & Spencer 2018).

The larval duration is up to 2 years, depending on habitat condition; the larval stage having three instars (Richards & Spencer 2018). Pupation may occur throughout the year with fully formed adults remaining in the pupal chamber until late spring. Male Broad-toothed Stag Beetles may live for up to two years, but the females usually die shortly after egg deposition (Richards & Spencer 2018).

The Broad-toothed Stag Beetle occurs at relatively low densities and generally only one or two individuals (Meggs & Munks 2003; Richards et al. 2006; Richards & Spencer 2018). The highest observed density of adult Broad-toothed Stag Beetle is 30/ha or 0.01/m², taken from data recorded at a single location. The total population size of Broad-toothed Stag Beetle is estimated to be over 2,500 individuals with density varying according to locality (Meggs 1999).

The optimal habitat for *the* Broad-tooth Stag Beetle includes wet forest dominated by *Eucalyptus obliqua* (Tasmanian Oak), *E. regnans* (Mountain Ash) and *E. globulus* (Tasmanian Bluegum), which may occur either as extensive stands of wet forest or as patches in dry eucalypt forest (Bryant & Jackson 1999; FPA 2002; TSSC 2002). The wet forest is characterised by a well-developed canopy cover and a ground cover of coarse woody debris (CWD) (greater than 10%), where CWD is dominated by small (<10 cm) and medium (10-50 cm) diameter logs (Meggs & Munks 2003). This preference may relate to a requirement for a relatively cool and moist microclimate with good soil quality (Meggs & Munks 2003). Although the quantity of CWD appears to be an important habitat component, the species is not a log dweller (Meggs & Munks 2003). Logs may help provide a cool microclimate and protection from predators. They may also supply nutrients into the soil and improve the larval food supply.

Threats

Table 1: Threats impacting the Broad-toothed Stag Beetle in approximate order of severity of risk, based on available evidence.

Number	Threat factor	Threat type and status	Evidence base
1.0	Habitat loss, disturbance and modifications		
1.1	Clearing and forestry practices	Known/Current	Approximately 90% of this species' potential habitat occurs on private land or in Permanent Timber Production Zone and Future Potential Production Zone and appears to be severely fragmented (Meggs 1999).
2.0	Fire		
2.1	Too frequent burning and hot burns	Known/Current	Fire which occurs too frequently, particularly hot burns, will cause the loss of ground litter layer and decaying logs beneath which beetle's shelter (Meggs and Munks 2003).
3.0	Firewood collection		
3.1	Removal of logs	Known/Current	Targeted removal of decaying logs, including firewood collection or heaping for burning removes optimal habitat for the Broad-toothed Stag Beetle (TSSC 2002). Other indirect impacts of firewood collection include the spread of weeds and pathogens. The loss of woody debris can also lead to increased competition for habitat.

4.0	Insect collection		
4.1	Illegal collection of beetles	Known/Current	The Broad-toothed Stag Beetle is much sought after by insect collectors (TSSC 2002).

Conservation and Management priorities

Habitat loss, disturbance and modifications

- Seek protection and management of optimal stag beetle habitat on private land through conservation covenants, or through purchase and incorporation within the public land reserve system. This action is linked to 1.1 in the Threats table.
- Seek protection and management of optimal stag beetle habitat on State forest and on other public land through reservation and/or other management agreement such as Public Authority Management Agreements. This action is linked to 1.1 in the Threats table.
- Use existing identified reservation priorities and other information to prioritise for protection State forest and private land supporting stag beetle habitat. This action is linked to 1.1 in the Threats table.
- Continue to review and revise management prescriptions for activities in areas outside reserves on public and private land. This action is linked to 1.1 in the Threats table.
- Manage potential habitat through implementing reserve management plans, management agreements, and management prescriptions outside reserves, for example increasing/maintaining coarse woody debris, litter layer and managing forest structure to enhance habitat complexity. This action is linked to 1.1 in the Threats table.
- Investigate options for linking, enhancing or establishing additional populations. This action is linked to 1.1 in the Threats table.
- Use all available data to assess the impacts of land-use activities on each species and incorporate the results into reserve management, management agreements, and management prescription revisions. This action is linked to 1.1 in the Threats table.

Fire

- Develop and implement a suitable fire management strategy for the species to reduce fire intensity and intervals. This action is linked to 2.1 in the Threats table.
- Make data available to land managers to ensure areas containing Broad-toothed Stag beetle populations are known. This action is linked to 2.1 in the Threats table.

Firewood removal

- Prepare and erect signage on the environmental effects of firewood removal. This action is linked to 3.1 in the Threats table.
- Quantify the extent of illegal firewood harvesting in the beetle's optimum habitat.
- Enforce action targeted at reducing illegal firewood harvesters. This action is linked to 3.1 in the Threats table.

- Introduce a certification system for legal fire wood harvesters to demonstrate wood is harvested in accordance with codes of practice. This action is linked to 3.1 in the Threats table.

Illegal collection

- Communicate with the entomological community through relevant information avenues on the ecological effects of illegal collection of the Broad-toothed Stag Beetle. This action is linked to 4.1 in the Threats table.
- Prepare and erect signage about the species' uniqueness, conservation status, potential threats and recovery actions. This action is linked to 4.1 in the Threats table.
- Continue with education activities, increasing local community awareness and advising stakeholders on the Broad-toothed Stag Beetle. This action is linked to 4.1 in the Threats table.
- Produce and distribute a brochure on threatened Tasmanian stag beetle habitat requirements, conservation issues and how people can be involved in the recovery program; and the brochure needs to emphasise that collection of threatened stag beetles poses a potential threat, particularly to the Broad-toothed Stag Beetle. It should also highlight that collecting threatened species is an illegal activity without a permit under the *Nature Conservation Act 2002* and the *Threatened Species Protection Act 1995*. This action is linked to 4.1 in the Threats table.

Stakeholder Engagement

- Encourage collaboration between the forestry industry, environmental agencies, private landholders and local councils on the impacts of habitat loss, and on the impacts of forestry and agricultural activities on threatened stag beetles, to refine planning protocols and management prescriptions.
- Develop and implement general and specific guidelines to manage the Broad-toothed Stag Beetle habitat on private land.
- Inform and liaise with relevant landholders, land managers and government and non-government natural resource management organisations (such as NRM groups and the Understorey Network) regarding protection and conservation of threatened stag beetles.
- Produce a brochure which highlights the threats to stag beetles, and what can and is being done to improve their habitat and reservation status. Distribute this brochure, via the internet and local councils and will be made available to schools, community groups, private landholders, industry and interested individuals.

Survey and Monitoring priorities

- Undertake annual monitoring of the Broad-toothed Stag Beetle in forestry areas under the RFA. Monitoring will aid in the understanding of the dynamics of recolonisation, habitat requirements, population trends, effects of disturbance and impact of climate change, and will further strengthen the identity of habitat characteristics that promote high-density populations.
- Measure vegetation extent and structure within and adjacent to the known range of all species, using aerial photography, GIS applications and ground-truth surveying of sites.
- Monitor known sites to develop a better understanding of its response to disturbance;
- Continue to undertake survey work in suitable habitat or potential habitat to locate additional populations.

Information and Research priorities

- Implement an assessment method to measure the impacts of different forestry and agricultural activities on the species.
- More precisely assess population size, distribution, ecological requirements and the relative impacts of threatening processes.

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