Catadromus lacordairei

Green-lined Ground Beetle

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Image © Spencer & Richards

Common name: Green-lined Ground Beetle

Scientific name: ***Catadromus lacordairei*** Boisduval, 1835

Group: Invertebrate, Class Hexapoda, Order Coleoptera, Family Carabidae

Name history: Catadromus Carabid Beetle

Status: *Threatened Species Protection Act 1995*: **vulnerable**
Environment Protection and Biodiversity Conservation Act 1999: **Not listed**
IUCN Red List: **Not listed**

Distribution: Endemic status: **Not endemic to Tasmania**
Tasmanian NRM Regions: **South, North**

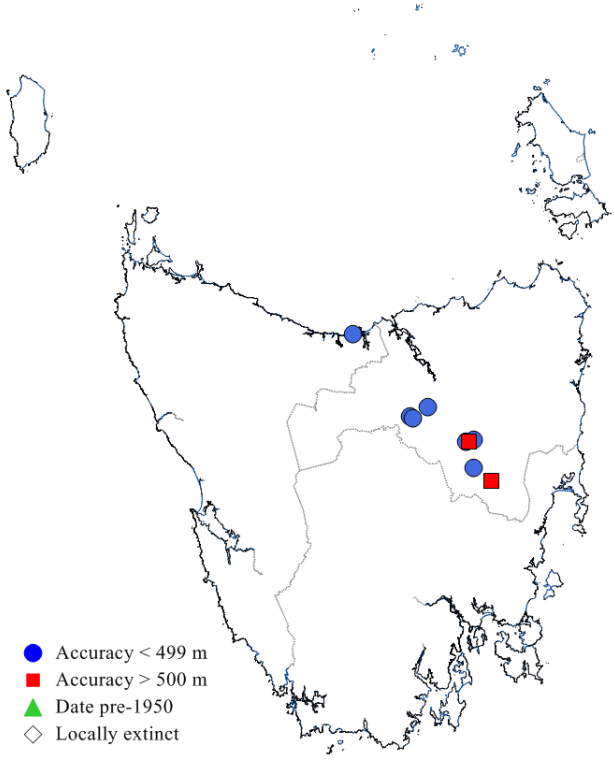

Figure 1. The distribution of the Green-lined Ground Beetle in Tasmania, showing NRM regions

Plate 1. The Green-lined Ground Beetle (images © Spencer & Richards)

SUMMARY

The Green-lined Ground Beetle is a large and predatory ground-dwelling beetle, shiny black in colour and with a distinctive metallic green line down the other side of the body. The species has only been recorded from a small number of sites in Tasmania, mainly in the northern and central Midlands. It also occurs on mainland Australia. The species occurs in open grassy woodland associated with wetlands at low elevations. The Green-lined Ground Beetle is threatened by past and continuing loss and degradation of its habitat, and a lack of information on its distribution and ecology. The objectives for management of this species include the protection of all known populations, surveying for any new populations, and improving understanding of the species' ecological requirements.

IDENTIFICATION AND ECOLOGY

The Green-lined Ground Beetle (*Catadromus lacordairei*) is a member of the family Carabidae (ground beetles), represented in Tasmania by about 200 species. In Tasmania, the species has long been known as the Catadromus Carabid Beetle, a simple direct translation of the generic name. However, a more descriptive name is the Green-lined Ground Beetle, which describes the distinctive green margin of the body and the predominantly ground-dwelling habit of the species. This common name was used in the Shell Picture Card Series (Card No. 314), cards dealing with Australian fauna and flora issued free in the 1960s by the Shell Petroleum Company (Hawkeswood 2007).

Characteristics of the genus include filiform antennae, broad strongly curved mandibles and simple anterior tibiae (Moore 1965). The adult Green-lined Ground Beetle is a winged beetle with a body length of 28 to 37 mm (Plate 1). The elytra are deeply etched with longitudinal striae. Adults are shiny black with metallic golden/green margins extending in a continuous line from the anterior corner of the thorax to the abdominal apex, and also appearing on the ventral surface of some specimens (Moore 1983, Spencer & Richards 2010). Adults are strong flyers. The larvae are undescribed; however, they are thought to be specialist soil-dwelling predators. Nothing has been recorded of the pupal phase.

Adult Green-lined Ground Beetles are opportunistic predators/scavengers, taking a wide range of invertebrate prey, including oligochaetes (worms), coleopteran (beetle) larvae, dipteran (fly) larvae, *Teleogryllus commodus* (Black Field Cricket) and metamorphling frogs. They are crepuscular (dusk and dawn) hunters and actively pursue prey on the ground surface, beneath debris and in soil crevices (Spencer & Richards 2010).

Survey techniques

The most suitable survey method for the Green-lined Ground Beetle is active searching (by day) for adults in potentially suitable habitat e.g. by turning over likely shelter sites such as logs and rocks (Spencer & Richards 2010.). Use of a black light and white sheet at night (adults are strong flyers and likely to be attracted to ultraviolet light) close to potential habitat is also a possible method but has not been field-tested for the Green-lined Ground Beetle (Spencer & Richards 2010). The species has been detected in pitfall traps in studies of ground-dwelling invertebrates on mainland Australia.

Confusing species

Adult Green-lined Ground Beetles are unlikely to be confused with any other species due to the distinct green line on the side of the otherwise shiny black body. Giachino (2005) noted that the species differs from all the other species of the genus in its smaller size, the shape of the pronotum (sides neatly sinuate before the posterior angles that are sharp, not rounded).

DISTRIBUTION AND HABITAT

The Green-lined Ground Beetle occurs across much of Australia (Giachino 2005) Australia, including Tasmania. In Tasmania, the species has only been recorded from 8 locations in the northern/central Midlands (Figure 1, Table 1).

The species has a relatively long history of collection in Tasmania, with Sloane (1920) noting its distribution as "Macquarie River" based on an earlier collection by Augustus

Simson. Subsequent records are from near Ross in 1973, the Bracknell region in 1983 and 1984, Cleveland in 1987 and Wesley Vale in 1992 (Spencer & Fearn unpubl. data). More recently (2007), the species has been recorded from a property near Longford and two properties near Cleveland (Fearn, unpubl. data). The distribution of the species is summarised in Spencer & Richards (2010).

The species occurs in open grassy woodland associated with wetlands at low elevations (Plate 2). In this habitat, adults occur beneath stones and woody debris (Plates 3-4) and may also be found sheltering and hunting within the fissures of basaltic clay soils (Spencer & Richards 2010).

Plate 2. Overview of potential habitat of the Green-lined Ground Beetle showing open woodland in the background, grazed mixed exotic/native pasture in the foreground and wetland between (image by C. Spencer)

Of the sites surveyed, beetles were recorded in highest densities in areas associated with naturally occurring wetlands. Most recent sites for the species have been within a hundred metres of permanent water such as a dam or wetland (Spencer & Richards 2010).

It is likely that the Green-lined Ground Beetle was more widespread historically in Tasmania, prior to extensive land clearing and modification of natural wetlands and large river systems in the Tasmanian Midlands. Recent collections of the species from novel sites, but within the broader predicted range of low elevation Midlands, suggests that minor range extensions and infillings are possible, with targeted surveys (Spencer & Richards 2010).

POPULATION PARAMETERS

Based on the known locations for the species creating a minimum convex polygon, while recognising the low precision of most of the older collections and the large expanses of unsuitable habitat between known locations, the extent of occurrence of the Green-lined Ground Beetle is estimated at 16,162 km^2. There is insufficient information available to estimate the area of occupancy of subpopulations of the Green-lined Ground Beetle.

Plates 3-5. Potential sheltering sites: top – decayed log amongst tussocks; middle – large surface rock; bottom – close-cropped exotic pasture grasses amongst native tussocks (images by C. Spencer)

Table 1. Population summary for the Green-lined Ground Beetle

	Location	Tenure	NRM region*	1:25 000 mapsheet	Years seen	Extent of subpopulation (ha)	Abundance
1	Near 'Fosterville' homestead `800m W of Macquarie R	Unknown	South	Unknown	pre-1920	Unknown	2
2	Auburn Rd 8.2km W of Ross	Unknown	South	Unknown	1973	Unknown	1
3	~700 m WSW Bracknell	Private property	South	Liffey	1983/1984	Unknown	2 + 1
4	Diprose Lagoon, 2.5km WSW of Cleveland	Private property	South	Cleveland	1987	Unknown	Unknown
5	'Northdown' ~6km W of Port Sorell	Private property	North	Devonport	1992	Unknown	20-30
6	Near 'Springbanks' homestead 4.6km W of Longford	Private property	South	Longford	2007	Unknown	1
7	Near Valleyfield airfield 8.4km W of Cleveland	Private property	South	Cleveland	2007	Unknown	1
8	3km ENE of Cleveland	Private property	South	Cleveland	2007	Unknown	1
10	'Ellinthorp' near Isis R 13.5km W of Ross	Private property	South	Ellinthorp	2011	Unknown	1
11	Campbell Town Golf Course	Private	South	Campbell Town	1998	Unknown	1

*NRM region = Natural Resource Management region; data sources: [1] Sloane (1920), also cited by Giachino (2005), who noted the Simson collection comprised 2 males, held at South Australian Museum; [2] Giachino (2005), citing a single male specimen collected on 3 Sept. 1973 from "amongst rotting wood under stump", held at South Australian Museum; see Spencer & Richards (2010); [4] S. Fearn, unpublished data; [5] cited in Jackson & Bryant (1999), *Tasmania's Threatened Fauna Handbook*, but with no supporting data in *Natural Values Atlas*; there are also two historical collections simply labelled "Tasmania" held at South Australian Museum, an unconfirmed sighting from about 1 km east of Diprose Lagoon near Cleveland, and the Campbell Town Golf Course (Spencer & Richards 2010).

There is insufficient information available to estimate the total population size of the Green-lined Ground Beetle. Most surveys have been informal and aimed at detecting the species only rather than making estimates of abundance. One site near Wesley Vale yielded 20-30 individuals over several hours of searching (Spencer & Richards 2010).

RESERVATION STATUS

The known sites for the Green-lined Ground Beetle all occur on unreserved private property.

CONSERVATION STATUS

The Green-lined Ground Beetle was listed in 1995 as rare on the Tasmanian *Threatened Species Protection Act 1995*, based on a restricted distribution and low population density. Following surveys that detected new sites but noted two historical sites as extinct and habitat degradation continuing at all sites, the Green-lined Ground Beetle was upgraded to vulnerable in 2008, meeting criterion B (extent of occurrence estimated to be less than 2000 km^2 and area of occupancy less than 0.5 km^2), specifically B1 (severely fragmented) and B2c (continuing decline in area, extent and/or quality of habitat).

THREATS, LIMITING FACTORS & MANAGEMENT ISSUES

Key threats to the Green-lined Ground Beetle are historical and contemporary habitat loss and degradation, combined with lack of detailed information on the distribution and ecology of the species. A low survey effort means that management is focused on a small number of known sites.

Habitat modification: Historically, many wetlands (and adjacent areas important to the ecofunctioning of the wetland habitat) within the potential range of the Green-lined Ground Beetle have been significantly modified or completely eliminated (e.g. for agricultural use), which has probably resulted in the loss of substantial areas of potential habitat for the species. Inappropriate management of wetlands is a continuing threat to known sites and potential habitat of the Green-lined Ground Beetle (e.g. stock access, draining, development of adjacent housing, weed infestations, etc.).

Forestry activities (plantation establishment on cleared land): The main threat from forestry practices is the establishment of monoculture plantations on previously cleared land adjacent to known sites and potential habitat. Such establishment is likely to alter the microhabitat conditions of the adjacent wetland and also result in broader changes to the ecosystem (e.g. loss or isolation of remnant patches of native vegetation that may support shelter sites for adult beetles).

Illegal collection: Illegal collection for purposes of selling or personal insect collections is a threat to any sites for the species. However, it is considered a minor threat, as there are no documented cases of illegal trade in the species and the species is widespread on mainland Australia.

Climate change: The trend towards a warmer climate may increase the frequency of and exacerbate the effects of drought and wildfire on the habitat of the Green-lined Ground Beetle. A warmer climate may also result in unfavourable alterations (e.g. increased weed infestations, altered grazing regimes altering soil conditions) to the poorly-drained low elevation habitats inhabited by the species.

Stochastic risk: The likely small size of the subpopulations of the Green-lined Ground Beetle, the apparent fragmented distribution (with little opportunity for genetic exchange between subpopulations), and localised nature of subpopulations, exposes the species to a stochastic risk of extinction.

MANAGEMENT STRATEGY

What has been done?

Targeted surveys & monitoring: Most surveys to date have been opportunistic and undertaken by independent invertebrate specialists, although some areas of potential habitat have been assessed as part of proposed forestry activities through the provisions of the *Forest Practices Code* (C. Spencer, pers. comm.).

Forestry management: The Green-lined Ground Beetle is included in the *Threatened Fauna Adviser*, a decision-support system used by the forest industry to take account of threatened fauna in wood production forests managed under the Tasmanian *Forest Practices Code* (FPB 2000, 2002). Surveys are likely to be required at known sites, and in potential habitat, that may be affected by forestry-related proposals, to develop site-specific management recommendations to ensure the viability of the species.

Management objectives

- Prevent the loss or degradation of habitat supporting known subpopulations;
- Identify new subpopulations of the species;
- Increase the information and data available on the location, size and condition of known subpopulations;
- Improve the understanding of the ecological requirements of the species;
- Improve reservation status and/or develop management agreements with private landowners to minimise the loss or degradation of subpopulations.

What is needed?

- To improve understanding of the status of the species – monitor known subpopulations in relation to area of occupancy, condition of habitat and abundance of the species, and gauge their response to disturbance events (e.g. fire, slashing, stock grazing, drought, flooding);
- To better document the range of the species – undertake extension surveys of potential habitat within the species' potential range;
- To improve understanding of the ecology of the species – undertake ecologically-oriented research into the species e.g. daily and seasonal movement patterns, microhabitat requirements, feeding ecology, reproductive ecology, effects of various potential threats e.g. grazing;
- To improve protection of the species – support the Private Land Conservation Program (DPIPWE) with the establishment of conservation covenants for private land supporting the Green-lined Ground Beetle, and ensure that current priorities for the species are incorporated into the program's reservation strategies;
- To improve protection of the species – provide information and extension support to relevant Natural Resource Management committees, local councils, government agencies, the local community and development proponents on the locality, significance and management of known subpopulations and potential habitat of the Green-lined Ground Beetle.

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Permit: A permit is required under the *Tasmanian Threatened Species Protection Act 1995* and *Nature Conservation Act 2002* to "take" (which includes kill, injure, catch, damage, destroy and collect), keep, trade in or process any specimen or products of a listed species. Additional permits may also be required under other Acts or regulations to take, disturb or interfere with any form of wildlife or its products, e.g. on reserved land.