Advice to the Minister for the Environment,Water, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

1. Scientific name (common name)

Hoplogonus bornemisszai (Bornemissza's stag beetle)

2. Reason for Conservation Assessment by the Committee

This advice is based on a public nomination to list Bornemissza's stag beetle. The nominator suggested listing in the 'endangered' category of the list. The advice also follows information supplied through the Commonwealth's Species Information Partnership (SIP) with the Government of Tasmania, which is aimed at systematically reviewing species that are inconsistently listed under the EPBC Act and relevant state legislation/lists.

This is the Committee's first consideration of the species under the EPBC Act.

3. Summary of Conclusion

The Committee judges that the species has been demonstrated to have met sufficient elements of Criterion 2 to make it **eligible** for listing as **critically endangered.**

4. Taxonomy

The species is conventionally accepted as *Hoplogonus bornemisszai* (Bornemissza's stag beetle), (Bartolozzi, 1996a).

5. Description

Bornemissza's stag beetle is a large, ground-dwelling, flightless stag beetle. Males have an average body length of 24 mm and females 18 mm. The species is a sheen black colour, with large rounded jaws and two distinctive pairs of shoulder spines.

Bornemissza's stag beetle occurs in mature wet or damp eucalypt and mixed forest in north-eastern Tasmania. The species can occur in dry eucalypt forest within close proximity to areas of wet or damp forest or drainage lines (Munks et al., 2004).

6. National Context

Bornemissza's stag beetle is endemic to north-eastern Tasmania.

Bornemissza's stag beetle is currently listed as endangered under the Tasmanian *Threatened Species Protection Act 1995.*

7. Relevant Biology/Ecology

Bornemissza's stag beetle belongs to a group of flightless, black, ground-dwelling (depths of 22-35 cm) beetles, with distinctive elytral spines (hardened forewings that form a protective cover for the softer hindwings), and rounded mandibles (jaws) each with three apical (top) teeth. The species is found in an area east of the Blue Tier in north eastern Tasmania, with its

range centred near the Terry's Hill area, north of the Ransom River (North Natural Resource Management Region).

Bornemissza's stag beetle is known from five locations over 10 km² — their proximity makes the locations somewhat contiguous, although proposed forestry operations may lead to fragmentation.

Only a limited number of live adult individuals have been recorded.

Bornemissza's stag beetle can broadly be considered a wet/damp forest species and occurs in mature wet or damp eucalypt and mixed forest

(Munks et al., 2004). However, a number of records indicate that the species also occurs in dry eucalypt forest, within close proximity either to areas of wet/damp forest or moist drainage lines. Bryant and Jackson (1999) and Meggs et al. (2003) suggest that the species' habitat may be specialised (wet, damp, flat and cool forested sites subject to low disturbance).

Of the potential habitat for this species, 79% is in unreserved land (able to be logged) (64% State Forest, 15% private land) and of this some 54% has been identified for potential wood production to meet sustainable yield targets. Some 20% of the species' potential habitat is currently reserved or bound by a covenant that precludes forestry activity (Munks et al., 2004).

The biology and habitat of Bornemissza's stag beetle and Simpson's stag beetle (*Hoplogonus simsoni),* which occurs in the same area, are broadly similar (Bryant and Jackson, 1999, Meggs et al 2003 in Munks, Richards, Meggs, Wapstra and Corkrey, 2004). Adult Simpson's stag beetles can live for three years. Pupae are thought to emerge in late summer, after laying dormant within the soil over winter as sexually immature beetles. Simpson's stag beetles break out in spring to look for mates on the ground. Many males are seen in the early part of summer and it is assumed that they do most of their mate searching during this time. Female Simpson's stag beetles are more prevalent in late summer amongst the forest floor looking for a place to lay their eggs. The reproductive cycle may take more than one year to complete.

The nature of the species' reproduction and habits suggest it is unlikely to undergo extreme natural fluctuations in numbers, although due to the difficulty in locating live adult individuals this is not certain (McQuillan, pers. comm., 2007).

8. Description of Threats

Habitat loss and modification

The primary threat to Bornemissza's stag beetle is any activity that opens the forest canopy or disturbs the soil and litter layer leading to exposure to sunlight and dehydration — such as forest practices, land clearing, fire or the impacts of climate change. Clearing of habitat is likely to lead to the species becoming more accessible to predators such as the omnivorous black currawong (*Strepera Fuliginosa*), which can learn to follow forestry operations (McQuillan, 2005).

Establishment of plantations or clearing for agriculture within the range of Bornemissza's stag beetle is likely to permanently remove the species' habitat (Munks et al., 2004). Some parts of the species' range have been converted to plantation/agricultural land, and areas of forest supporting the species are suitable for conversion to both plantation and pasture/crop usage indicating that this threat is both historical and current. As outlined at Section 7 above, Munks et al. (2004) indicate that 79% of the potential habitat of Bornemissza's stag beetle is in unreserved private land and State forest, and that more than half of the unreserved land has been identified for potential wood production to meet sustainable yield targets.

Forestry practices pose the greatest threat to Bornemissza's stag beetle given that much of its habitat in State forestry areas has been identified as having potential for wood production (Munks et al., 2004). These practices include selected logging, clearfell, burn and sow operations.

High intensity burns as part of forestry operations or wildfire are possible serious threats that have potential to destroy habitat. Firewood collection occurs on all tenures and may remove moist woody habitat.

Munks et al. (2004) indicate that evidence of Bornemissza's stag beetle has been found in forest that is regenerating 14 years after forestry practices. These may have survived the clearfell, burn and sow operations due to moist refuges or they may have recolonised the site. However, these authors recommend caution due to the small area sampled, and that there be a review of the effects of forest practices following the long-term study (now in its fourth year) on the related Simpson's stag beetle.

9. Public Consultation

The information supplied as part of the nomination of Bornemissza's stag beetle was made available for public exhibition and comment for 30 business days. The Committee has had regard to all public comment that was relevant to the survival of the species.

10. How judged by the Committee in relation to the criteria of the EPBC Act and Regulations

The Committee judges that the species is **eligible** for listing as **critically endangered** under the EPBC Act. The assessment against the criteria is as follows:

Criterion 1: It has undergone, is suspected to have undergone or is likely to undergo in the immediate future a very severe, severe or substantial reduction in numbers

The habitat of Bornemissza's stag beetle has been surveyed on numerous occasions (Richards, 1999; Meggs et al., 2003; Munks et al., 2004), although few live individuals have been found during surveying (Munks et al., 2004).

The total population number of Bornemissza's stag beetle is estimated, based on observation, to be between several hundred and several thousand (McQuillan, 2007). Another estimate, based on extrapolating density of carcasses observed over the estimated area of potential habitat, led to a much higher number (between 1.4 million and 24.5 million) (Munks et al., 2004), but it is recognised that, due to the species' patchy distribution, low density and cryptic characteristics, population estimates are difficult using this method (Munks et al., 2004). The Committee acknowledges the issues in estimating population numbers, and considers there is insufficient information to determine whether the number of individuals is limited to any particular degree.

There are no data available to indicate whether population size of Bornemissza's stag beetle has experienced a reduction. However, some parts of the species' range have already been converted to plantation and agricultural land. Munks et al. (2004) state that this activity permanently removes habitat. The Committee considers such activity would significantly impact a species whose habitat is mature wet, damp forest and that it is likely that Bornemissza's stag beetle has experienced a reduction in population size.

The species' populations may also be subject to future declines. Of the species' unreserved habitat, more than half the area has been identified as having potential for wood production to meet sustainable yield targets (Munks et al., 2004).

It should be noted there are currently forestry policies in place to manage known sites and potential habitat for this species (Forestry Practices Board, 2000). However, there is no information on how well these mitigation measures are being implemented and there are no data on how effective the measures would be in abating the threat.

The Committee is satisfied that Bornemissza's stag beetle has undergone some historical loss of habitat and future losses, due to the threats of forestry and agriculture activities, are likely. These losses are likely to result in corresponding declines in population numbers, however there are no quantitative data available on the extent of these declines.

The Committee judges that the species is suspected to have undergone and is likely to undergo a reduction in numbers. However, it also judges there are insufficient data available to determine whether the reduction has been or will be very severe, severe, substantial, or not substantial. Therefore, the species has not been demonstrated to have met each of the required elements of Criterion 1, and is **not eligible** for listing in any category under this criterion.

Criterion 2 – Its geographic distribution is precarious for the survival of the species and is very restricted, restricted or limited

In 2006 Bornemissza's stag beetle was known from only five locations which are not considered to be severely fragmented at this stage. The current estimated extent of occurrence for the species is approximately 10 km^2 and it is unlikely that future surveys will significantly extend the extent of occurrence because much of the current known distribution is surrounded by unsuitable habitat (dry eucalypt forest) (Munks et al., 2004). An estimated area of occupancy of 7 km^2 is provided by Munks et al. (2004), where potential habitat (defined as mature wet or damp eucalypt and mixed forest) is used as a surrogate for area of occupancy. The Committee considers the extent of occurrence and the area of occupancy to be very restricted.

The Committee is conscious that, given its specialised habitat (wet, damp, flat and cool forested sites with low disturbance (Bryant and Jackson, 1999, Meggs et al., 2003)), its location and the size of the area of occupancy, Bornemissza's stag beetle is subject to a range of threats due to forestry practices. As outlined at Criterion 1 above there are currently forestry policies in place to manage the habitat for this species (Forestry Practices Board, 2000), but there is no information on how effective these mitigation measures are. Further, the Committee considers that a single catastrophic event, such as an intense burn or wildfire, could destroy the habitat and the species.

Given that much of the species' potential habitat may be subject to forestry and agricultural operations and catastrophic events, the Committee considers that the geographic distribution of Bornemissza's stag beetle is precarious for its survival.

The Committee considers that the species' geographic distribution is very restricted and is precarious for its survival. Therefore, the species has been demonstrated to have met the required elements of Criterion 2 and is considered **eligible** for listing as **critically endangered** under this criterion.

Criterion 3 – The estimated total number of mature individuals is limited to a particular degree and:

(a) evidence suggests that the number will continue to decline at a particular rate; or

(b) the number is likely to continue to decline and its geographic distribution is precarious for its survival

It is recognised that this species has cryptic characteristics and that population estimates based on observation (several hundred to several thousand individuals) vary greatly from the estimates based on density and potential habitat (several millions). The Committee notes that very few live mature adults have been observed. Population numbers remain uncertain and the Committee considers that there is insufficient information to determine whether the number of mature individuals is limited to any particular degree.

The Committee considers that the geographic distribution of Bornemissza's stag beetle is precarious for its survival (see Criterion 2). In relation to population numbers, the Committee has concluded that numbers are likely to have declined and are likely to continue to decline due to forestry operations, but that there is no evidence that this will occur at any particular rate.

Therefore, as the species has not been demonstrated to have met each of the required elements of Criterion 3, it is **not eligible** for listing in any category under this criterion.

Criterion 4 – The estimated total number of mature individuals is extremely low, very low or low

As set out in Criterion 1, the population size of Bornemissza's stag beetle is estimated to be between several hundred and several thousand (Mc Quillan pers. comm., 2007), however estimates based on density and potential habitat place the numbers much higher than this (Munks et al., 2004). The Committee acknowledges the difficulties in estimating numbers of cryptic individuals and notes that few live individuals have been observed.

The Committee considers that there is insufficient information to determine whether the total number of mature individuals is extremely low, very low or low. Therefore, as the species has not been demonstrated to have met any required element of Criterion 4, it is **not eligible** for listing in any category under this criterion.

Criterion 5: Probability of extinction in the wild that is at least:

a) 50% in the immediate future; or
b) 20% in the near future; or
c) 10% in the medium-term future.

There are no data available to estimate a probability of extinction of the species in the wild over a relevant timeframe. Therefore, as the species has not been demonstrated to have met the required elements of Criterion 5, it is **not eligible** for listing in any category under this criterion.

CONCLUSION

Conservation Status

Bornemissza's stag beetle has cryptic characteristics and occurs in wet or damp forest areas in north-eastern Tasmania. The number of individuals is uncertain. The species has a very restricted geographic distribution, known from five locations over an area of approximately 10 km². More than three quarters of the species' potential habitat occurs in unreserved private land or State Forest which may be subject to forestry or agricultural operations, and more than half of this is identified as having potential for wood production to meet sustainable yield targets.

The impacts of forestry and agricultural operations are related to the effectiveness of mitigation measures employed, but there is no measure of this effectiveness. The species has experienced habitat loss due to forestry practices and its population is likely to have declined and is likely to experience future declines. The Committee is conscious that the specialised habitat is subject to a range of forestry related threats and may be vulnerable to a single catastrophic event, such as an intense fire.

The Committee has concluded under Criterion 2 that this species has a geographic distribution that is both precarious for its survival and is very restricted, and it is therefore **eligible** for listing as **critically endangered**.

Recovery Plan

The Committee considers there should be a recovery plan for *Hoplogonus bornemisszai* (Bornemissza's stag beetle). The 'Draft Fauna Recovery Plan: Threatened Tasmanian Stag Beetles 2006 - 2011', being prepared by the Tasmanian Department of Primary Industries and Water, may be suitable for adoption as a recovery plan under the EPBC Act.

12. Recommendations

(i) The Committee recommends that the list referred to in section 178 of the EPBC Act be amended by **including** in the list in the **critically endangered** category:

***Hoplogonus bornemisszai* (Bornemissza's stag beetle)**

(ii) The Committee recommends that there should be a recovery plan for this species.

Associate Professor Robert J.S. Beeton

Chair

Threatened Species Scientific Committee

13. References cited in the advice

Bartolozzi L (1996). A new species of *Hoplogonus* Parry, 1875 (Coleoptera, Lucanidae). Mitteilungen der schweizerischen entonomologischen Gesellschaft 69: 483-487.

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Munks S, Richards K, Meggs J, Wapstra M and Corkrey R (2004). Distribution, habitat and conservation of two threatened stag beetles, *Hoplogonus bornemisszai* and *H. vanderschoori* (Coleoptera: Lucanidae) in north-east Tasmania. Australian Zoologist 32(4): 586-596.

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Tasmanian Department of Primary Industries and Water (2006). Fauna Recovery Plan: Threatened Tasmanian Stag Beetles 2006-2011. In Draft.