

# Hall's Island, Lake Malbena, Walls of Jerusalem

# FLORA AND FAUNA ASSESSMENT

21<sup>st</sup> November 2016 For Riverfly (RIV002)



# Summary

The lessee of a historic hut on Hall's Island, Lake Malbena, in the Walls of Jerusalem National Park, is investigating the potential for guided tours to the island. The proposed impacts to the island include the construction of 4 new huts (joined by boardwalk), a helicopter landing pad, and potentially some boardwalks and foot pads leading to points of interest. To assist in the avoidance of threatened natural values and inform a Reserve Activity Assessment, the proponent engaged North Barker Ecosystem Services to undertake a flora and fauna assessment of the island.

### Vegetation

Prior to our survey, data held within the TASVEG v3.0 database suggested that Hall's Island was covered by Athrotaxis cupressoides/ Nothofagus gunnii short rainforest (RPF). Our field survey established that this community is not actually present and that the island is comprised of the following units:

- Sphagnum peatland (MSP) 0.60 ha NCA<sup>1</sup> threatened and EPBCA<sup>2</sup> endangered;
- Lichen lithosphere (ORO) 0.18 ha;
- Athrotaxis selaginoides rainforest (RKP) 0.03 ha NCA threatened;
- Highland low rainforest and scrub (RSH) 1.16 ha; and
- Eucalyptus subcrenulata forest and woodland (WSU) 7.8 ha.

### Threatened Flora

The island supports a population of *Pherosphaera* hookeriana, which is listed as vulnerable under the Tasmanian *Threatened Species Protection Act* 1995 (TSPA).

### Threatened Fauna

The only threatened fauna species known to occur within 5 km of the island is the Clarence galaxias, *Galaxias johnstoni* (TSPA and EPBCA endangered). The known occurrence of this species is adjacent to an area that will potentially be traversed on foot by visitors to the island. The island itself has no suitable habitat for the species.

No impacts to other threatened fauna species are likely to result from the proposal.

### Summary

Our field survey has established that the island contains two threatened vegetation communities (MSP and RKP) and one threatened plant species (*P. hookeriana*). It is recommended that the locations of these values are not utilised for hut or helicopter pad placement. Management prescriptions should also be applied to protect these values from fire and to avoid tramping.

It is understood that the current proposal is to place the hut and helicopter pad footprint within the ORO and WSU communities. These non-threatened communities are likely to be resilient to a proposal of this nature and potential losses in extent are considered to be negligible. It may be possible to construct boardwalks within the other communities by using a boardwalk design with minimal footprint and shading.

<sup>&</sup>lt;sup>1</sup> Tasmanian Nature Conservation Act 2002 (NCA)

<sup>&</sup>lt;sup>2</sup> Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBCA)

# Acknowledgments

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Client consultation: Dan Hackett



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# 1. Introduction and Methods

# 1.1. Background

The lessee of a historic hut on Hall's Island, Lake Malbena, in the Walls of Jerusalem National Park<sup>3</sup>, is investigating the potential for guided tours to the island. The proposed impacts to the island include the construction of 4 new huts (joined by boardwalk), a helicopter landing pad, and potentially some boardwalks and foot pads leading to points of interest. To assist in the avoidance of threatened natural values and inform a Reserve Activity Assessment by the Tasmanian Parks and Wildlife Service, the proponent engaged North Barker Ecosystem Services to undertake a flora and fauna assessment of the island and a targeted threatened flora search within potential impact areas. The proposal may also include guests hiking to Lake Malbena from the east, but at this stage no formal track has been proposed and it is expected that the number of walkers will be low and proposed that concentrated impacts can be avoided by walkers fanning out and traversing the edges of bogs.

# **1.2. Location and Methods**

# 1.2.1. Hall's Island

Hall's Island is located within the Central Highlands Council and the Tasmanian Central Highlands bioregion (Figure 1). Altitude on the island ranges from 1030 m to 1050 m AHD<sup>4</sup>. Average annual rainfall in the area is around 1000 mm<sup>5</sup>. The substrate is derived from Jurassic dolerite and the island is part of the listed geoconservation site 'Central Plateau Terrain', which is listed for its global significance as an example of both a continental erosion surface and a passive margin horst block.

# 1.2.2. Survey Area and Field Methods

The potential impact areas on the island were not definitively marked on the ground, but the proponent was present to identify proposed actions and sites, which are approximately indicated in Figure 2.

Field work was undertaken on foot by one observer on the 24<sup>th</sup> and 25<sup>th</sup> of October, 2016. Vegetation was mapped across the island in accordance with units defined in TASVEG 3.0<sup>6</sup>. Three quarters of the island (excluding the northwest quadrant where no actions are proposed and no impacts are anticipated based on the vegetation) were surveyed for vascular plants using a meandering area search technique<sup>7</sup>. Additional effort was focussed around the potential impact footprint, within potential threatened species<sup>8</sup> habitats and within threatened vegetation communities<sup>9</sup>. Plant species lists were compiled within each vegetation type using the current census of

<sup>&</sup>lt;sup>3</sup> Part of the Tasmanian Wilderness World Heritage Area

<sup>&</sup>lt;sup>4</sup> Australian Height Datum

<sup>&</sup>lt;sup>5</sup> Station details: Liawenee, Central Tasmania, 41.8997°S, 146.6694°E, 1057m AHD, commenced 2001

<sup>&</sup>lt;sup>6</sup> Kitchener and Harris 2013

<sup>&</sup>lt;sup>7</sup> Goff *et al.* 1982

<sup>&</sup>lt;sup>8</sup> Tasmanian *Threatened Species Protection Act 1995* (TSPA) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA)

<sup>&</sup>lt;sup>9</sup> Tasmanian Nature Conservation Act 2002 (NCA) or the EPBCA

Tasmanian plants<sup>10</sup> for nomenclature. Surveying and identification of non-vascular flora was limited to searches for the EPBCA vulnerable *Pseudocephalozia* paludicola. Observations of habitat suitability for fauna, as well as direct or indirect indicators of presence (*i.e.* sightings, scats, tracks, dens, etc.) were made concurrently with the flora survey.

Vegetation was not mapped on the walk to Lake Malbena, but to aid the avoidance of vegetation potentially sensitive to trampling, waypoints were taken adjacent to patches of *Sphagnum* peatland.

All data points were recorded with a handheld GPS.

## **1.2.3.** Limitations

Due to seasonal variations in detectability and identification, there may be some species on the island that have been overlooked or were seasonally absent during the survey. In particular, grasses and graminoids were largely lacking fertile material. To compensate for these limitations to some degree, data from the present survey are supplemented with data from the Tasmanian Natural Values Atlas<sup>11</sup> (NVA) and the EPBC Significant Matters database (PMST\_GLKPXZ). From these sources, all threatened species known or with the potential to occur within 5 km are considered in terms of habitat suitability on the island.



Figure 1: Location of Lake Malbena and Hall's Island, within the Walls of Jerusalem

<sup>10</sup> de Salas and Baker 2016

<sup>&</sup>lt;sup>11</sup> nvr\_2\_02-Sep-2016



Figure 2: Approximate locations of proposed huts and helipad on Hall's Island (points and image supplied by proponent)

# 2. Results - Biological Values

# 2.1. Vegetation

Prior to our survey, data held within the TASVEG v3.0 database suggested that Hall's Island was covered by Athrotaxis cupressoides/ Nothofagus gunnii short rainforest (RPF). Our field survey established that this community is not actually present and that the island is comprised of the following units:

- Sphagnum peatland (MSP) 0.60 ha NCA threatened and EPBCA endangered;
- Lichen lithosphere (ORO) 0.18 ha;
- Athrotaxis selaginoides rainforest (RKP) 0.03 ha NCA threatened;
- Highland low rainforest and scrub (RSH) 1.16 ha; and
- Eucalyptus subcrenulata forest and woodland (WSU) 7.8 ha.

Distribution of vegetation communities within the island are presented in Figure 3, with floristics in Appendix A and brief summaries of defining traits below.

# 2.1.1. *Sphagnum* peatland (MSP)

This bog community occupies poorly drained depressions in the eastern half of the island (Figure 3). Dominant vascular plant species were found to be *Gleichenia alpina* (coral fern) and *Empodisma minus*, with occasional patches of other sedges and graminoids, including Carpha alpina, Carex appressa and Juncus sarophorus (Plate 1). Shrub species were infrequent, but some patches of *Richea scoparia* and *Baeckea gunniana* were present, as well as infrequent *Sprengelia incarnata* and *Almaleea subumbellata*. Herbs were mostly sparse, although a small pond within one patch contained a high cover of *Isolepis fluitans*.

Despite the high percentage cover of coral fern and monocots, the dominant factor defining this community is the percentage of ground covered by *Sphagnum* moss. 30 % cover of *Sphagnum* is required to be classified as *Sphagnum* peatland (MSP) under TASVEG 3.0<sup>12</sup>, which is listed as threatened under the NCA and meets the definition for the 'alpine sphagnum bog and associated fens' community listed as endangered under the EPBCA. All the bogs on Hall's Island have thus been mapped as MSP because of the percentage cover of *Sphagnum* species, with most patches having well over the required 30 % cover (up to 80 % ground cover in some cases) and over 50 cm depth of *Sphagnum* being evident in places (Plate 2). Of note, the patch of MSP adjacent to the rainforest communities contains emergent pencil pines *Athrotaxis cupressoides* (Plate 3). The description of the TASVEG community for pencil pine woodland (RPW), allows for the presence of *Sphagnum* in this patch is so high (> 75 %) it best fits the definition of the MSP can be taken to include MSP\_AC.

Several Sphagnum bogs were recorded on the way into Lake Malbena (Appendix B).

# 2.1.2. Lichen lithosphere (ORO)

This community has been mapped on the island where bare rock and/or lichens predominate over vascular plants or *Sphagnum* species. The largest patch of ORO on the island includes small clusters of shrubs on the edge of the rock (Plate 4), with the species composition mostly being derived from the adjacent sclerophyll vegetation. The most frequent shrubs include Orites revolutus, Planocarpa petiolaris and Monotoca empetrifolia.

<sup>&</sup>lt;sup>12</sup> Kitchener and Harris 2013



Figure 3: Distribution of TASVEG units on Hall's Island



Plate 1: Sphagnum peatland (foreground) with emergent Gleichenia and Empodisma – MSP community



Plate 2: Bench of Sphagnum on edge of MSP\_AC patch



Plate 3: Sphagnum peatland with emergent pencil pine Athrotaxis cupressoides – MSP\_AC



Plate 4: Lichen lithosphere within the potential impact area of hut number 1

# 2.1.3. Rainforest – highland low rainforest and scrub (RSH), and *Athrotaxis selaginoides* rainforest (RKP)

These communities occur in a shallow but protected gully in the south of the island (Figure 3). The patch is characteristically species poor and structurally simple (Plate 5 and 6). The RSH is dominated by a canopy of Nothofagus cunninghamii over a very sparse understorey of occasional Leptecophylla juniperina ssp. parvifolia, Coprosma nitida, Phyllocladus aspleniifolius and Telopea truncata. Occasional epiphytic ferns include Grammitis billardierei and Hymenophyllum peltatum. The small area of Athrotaxis selaginoides rainforest (RKP) was differentiated from the RSH because of the presence of a cluster of sub-dominant and co-dominant king billy pines amongst the Nothofagus cunninghamii. RKP is a threatened community listed under the Tasmanian NCA.

# 2.1.4. Eucalyptus subcrenulata forest and woodland (WSU)

This was the dominant community across the island in terms of area covered (Figure 3). The canopy was dominated mainly by the yellow gum Eucalyptus subcrenulata, with localised patches of *E. delegatensis* and *E. coccifera*. The majority of the understorey was comprised of a relatively dry facies dominated by medium tall sclerophyll shrubs (Plate 7), including Hakea lissosperma, Persoonia gunnii, Lomatia polymorpha and Banksia marginata. The open ground layer included patches of Planocarpa petiolaris, Monotoca empetrifolia, Bellendena montana and Diplarrena moraea. Poorly drained niches included Bauera rubioides, Leptospermum lanigerum, Gahnia grandis and Epacris gunnii. Other sheltered niches included small stands of subcanopy Nothofagus cunninghamii and Phyllocladus aspleniifolius. The waterside margins of the community in the south-eastern part of the island included a dense stand of Pherosphaera hookeriana.



Plate 5: The edge of the patch of highland low rainforest and scrub (RSH)



Plate 6: Athrotaxis selaginoides rainforest (RKP) on the edge of a broader area of RSH



Plate 7: Eucalyptus subcrenulata forest and woodland in the north of the island

# 2.2. Plant Species of Conservation Significance

In total, 53 species of vascular plants were recorded during our field survey (Appendix C). This included one species, *Pherosphaera hookeriana* listed as vulnerable under the schedules of the TSPA (Table 1, Figure 4). This species, known as the Mount Mawson pine (or the drooping pine), was already known from Hall's Island and is the only threatened species previously recorded from within 500 m<sup>13</sup>.

Only two other threatened flora species have previously been recorded within 5 km of the island (Table 1). Although the island contains suitable habitat for these species, neither is considered highly likely to have been overlooked to the extent where unanticipated impacts may occur.

Three other EPBCA listed species are considered to have the potential to occur within 5 km<sup>14</sup> but do not have suitable habitat on the island (Table 1).

# Table 1: Flora species of conservation significance known or predicted to potentially occur within a 5 km radius of the island<sup>15</sup>

Species	Status TSPA / EPBCA	Potential to occur if not observed	Observations and preferred habitat
	KNOWN F	ROM HALL'S IS	SLAND
Pherosphaera hookeriana Mt Mawson pine	Vulnerable/ -	PRESENT	A coniferous shrub or small tree that is highly sensitive to fire. Can form extensive clonal thickets by suckering, which can make the estimation of population size difficult. Our field survey recorded a dense but narrow band of plants around most of the southern edge of the island (Figure 4, Plates 8 and 9). Estimated percentage cover within this area of $3,500 \text{ m}^2$ is $30 \%$ . The previous record of this species attributed to Hall's Island estimated $150 \pm$ 50 plants are present, but this is likely to be an underestimate based on our mapping.
	REPORTED		l 5 km <sup>16</sup>
<i>Planocarpa nitida</i> black cheeseberry	Rare/ -	Very low	A short, compact shrub endemic to Tasmanian and found mostly on the eastern Central Plateau. Only one record known from within 5 km of Hall's Island. Habitat on the island is moderately suitable in areas of WSU and ORO, but the distinctive species is considered highly unlikely to have been overlooked. The more widespread congeneric species, <i>Planocarpa petiolaris</i> , was

<sup>&</sup>lt;sup>13</sup> nvr\_2\_02-Sep-2016

<sup>16</sup> nvr\_2\_02-Sep-2016

<sup>&</sup>lt;sup>14</sup> EPBC Significant Matters database report PMST\_GLKPXZ

<sup>&</sup>lt;sup>15</sup> nvr\_2\_02-Sep-2016; EPBC Significant Matters database report PMST\_GLKPXZ

Species	Status TSPA / EPBCA	Potential to occur if not observed	Observations and preferred habitat
			present on the island and is differentiated by leaf morphology and inflorescence traits.
Pseudocephalozia paludicola liverwort	-/ VULNERABLE	Low	An erect liverwort that is light coloured and often lucid green. Known to occur in wet ground in subalpine grassland, moorland and sphagnous areas. Only one record is known from within 5 km of the island. Suitable habitat (areas of MSP) were searched for the species and it was not recorded.
PF	REDICTED AS POSS	IBLY OCCURRI	ING WITHIN 5 km <sup>17</sup>
<i>Colobanthus curtisiae</i> Curtis' colobanth	Rare/ VULNERABLE	None	A small perennial herb of grasslands and grassy woodlands, often on rocky outcrops within these habitats. No suitable habitat on the island and not likely to have been overlooked.
<i>Eucalyptus gunnii</i> ssp. <i>divaricata</i> Miena cider gum	Endangered/ ENDANGERED	None	No suitable habitat is found on the island and the species is highly unlikely to have been overlooked. During the walk in to Lake Malbena some specimens of <i>E. gunnii</i> were noted around 443429.59 E, 5355189.74 N. Material collected from these plants is being examined to differentiate to the subspecies level. Impacts to these trees are very unlikely given the nature of the proposal.
<i>Leucochrysum albicans</i> var. <i>tricolor</i> grassland paper daisy	Endangered/ ENDANGERED	None	A floriferous herb of grasslands and grassy woodlands, generally on basalt soil. No suitable habitat on the island and not likely to have been overlooked.

<sup>&</sup>lt;sup>17</sup> EPBC Significant Matters database report PMST\_GLKPXZ



Plate 8: Female Pherosphaera hookeriana on Hall's Island



Plate 9: Thicket of *Pherosphaera hookeriana* on the edge of the water of Lake Malbena (looking east from Hall's Island)



Figure 4: Threatened flora observations on Hall's Island

# 2.3. Introduced Plants

No introduced plant species were observed on the island.

# 2.4. Fauna Species of Conservation Significance

## 2.4.1. Field survey results

Eleven species of vertebrate fauna were observed directly or indirectly during our survey (Appendix D). Based on our observations, the long-tailed mice (*Pseudomys higginsi*) and the Tasmanian froglet (*Crinia tasmaniensis*) may be the only vertebrate species permanently resident on the island. No threatened fauna species were observed, nor were any habitat elements that could conceivably be used for nesting or denning by threatened species.

# 2.4.2. Range boundaries within 500 m

Based on range boundaries from the NVA, the island is in the potential range of seven threatened fauna species (Table 2). Each of these species have average home range sizes that are too large for the island to support permanent populations. Based on the absence of available nesting and denning opportunities, it is likely that if any of these species use the island it would only be occasionally for foraging. Even if nesting or denning was attempted by any of the species in Table 2, it is unlikely that the island would have sufficient prey to make raising a litter/brood there energetically viable.

No eagle nests are known or likely to occur within 500 m or 1 km line of sight.

# Table 2: Threatened fauna species with range boundaries within a 500 m radius of the island<sup>18</sup> - SS = TSPA; NS = EPBCA

Species	Common Name	SS	NS	Potential	Known	Core
Aquila audax	wedge-tailed eagle	pe	PEN	1	0	0
Dasyurus maculatus	spotted-tailed quoll	r	VU	1	0	0
Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	e	EN	1	0	0
Sarcophilus harrisii	tasmanian devil	e	EN	1	0	0
Tyto novaehollandiae	masked owl	pe	PVU	I.	0	0
Accipiter novaehollandiae	grey goshawk	e		I.	0	0
Haliaeetus leucogaster	white-bellied sea-eagle	v		1	0	0

# 2.4.3. Known occurrences within 5 km

The only threatened fauna species known to occur within 5 km of the island is the Clarence galaxias, *Galaxias johnstoni* (TSPA and EPBCA endangered). The known occurrence of this species (Table 3) is adjacent to an area that will potentially be traversed on foot by visitors to the island. The island itself has no suitable habitat for the species.

# 2.4.4. EPBCA database predictions within 5 km

Several other species are predicted by the EPBCA protected matters database as having potential to occur within 5 km of the island (Table 4)<sup>19</sup>. Of these species, only the Japanese snipe and the satin flycatcher have a moderate likelihood of utilising the island. The snipe is a non-breeding migrant that may use the bogs for foraging. The flycatcher is unlikely to be impacted by a proposal of this scale and nature.

<sup>&</sup>lt;sup>18</sup> nvr\_2\_02-Sep-2016

<sup>&</sup>lt;sup>19</sup> EPBC Significant Matters database report PMST\_GLKPXZ

# Table 3: Known observations of threatened fauna within a 5 km radius of the island<sup>20</sup> - SS = TSPA; NS = EPBCA

ld	Species	Common Name	SS	NS	Observers	Date	Obs Type	Easting/Northing GDA94 Zone 55
1357038	Galaxias johnstoni	clarence galaxias	e	EN	Jean Jackson (1308).Andrew Harvey (1844)	13-Apr-2000	Sighting	446588, 5355240 +/- 20m
1262700	Galaxias johnstoni	clarence galaxias	e	EN	Robert Freeman (20722)	01-jan-2009	Sighting	446808, 5355059 +/- 200m
1357039	Galaxias johnstoni	clarence galaxias	e	EN	Jean Jackson (1308),Andrew Harvey (1844)	13-Apr-2000	Sighting	446588, 5355240 +/- 20m
1262702	Galaxias johnstoni	clarence galaxias	e	EN	Jean Jackson (1308)	07-Nov-2001	Sighting	446008, 5355006 +/- 100m
1262701	Galaxias johnstoni	clarence galaxias	e	EN	Jean Jackson (1308)	13-Apr-2000	Sighting	446812, 5355058 +/- 100m

# Table 4: Potential for EPBCA listed threatened and/or migratory species to occur within 5 km of the island, based on the protected matters database and excluding species covered in Table 2 and 3 – status refers to EPBCA listing only<sup>21</sup>

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Lathamus discolor		
Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera		
Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Insects		
Oreixenica ptunarra		
Ptunarra Brown, Ptunarra Brown Butterfly, Ptunarra Xenica [26327]	Endangered	Species or species habitat may occur within area

<sup>20</sup> nvr\_2\_02-Sep-2016

<sup>21</sup> EPBC Significant Matters database report PMST\_GLKPXZ

#### Table 4 continued

Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
<u>Myiagra cyanoleuca</u>		
Satin Flycatcher [612]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<u>Gallinago hardwickii</u>		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
<u>Numenius madagascariensis</u>		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

# 3. Potential Impacts and Scope for Mitigation

The current proposal is to locate the new huts primarily within the main patch of ORO, with some encroachment into the WSU, but no buildings will be located within *Sphagnum* bogs or any of the rainforest communities. The proposal may include boardwalks through these communities.

### **3.1. Threatened Vegetation Communities**

- Sphagnum peatlands are vulnerable to trampling. Permanent tracks should not be formed within the areas of MSP on the island and the patches specified in Appendix B.
- Patches within Appendix B can be avoided by routing visitors around the margins of the patches into more resilient vegetation types. Should other patches be found following route changes, no walking should occur within areas with > 30 % cover of Sphagnum moss.
- If necessary, patches on the island may be traversed with boardwalks that have minimal footprint and block very little light. In one patch, a small foot pad already exists from the jetty to the existing hut site (Reg's Hut in Figure 2). Given this pad is already present with seemingly minimal impacts (Plate 10), it could be viable to maintain it as a track without compromising the MSP patch. Lining the edges of the track with natural stone or similar could dissuade visitors from encroaching beyond the existing pad.
- The island contains patches of fire sensitive vegetation in the form of MSP, RKP and to a lesser extent RSH. The pencils pines within MSP\_AC and the king billy pines within the RKP are very fire sensitive.
- The Walls of Jerusalem is a Fuel Stove Only Area and large areas of the parks fire sensitive vegetation have been lost to past fires. Any intention to equip the huts with fireplaces would need to be done with strict specifications to prevent a bushfire.



Plate 10: Existing foot pad through one patch of MSP on the island

### 3.2. Threatened Fauna

- Impacts to the habitat of the Clarence galaxias should be avoided by routing visitors to the island around the bog in which the species is known to occur. As this area is one of the bogs specified for avoidance in Appendix B, this will be achieved by following the mitigation measures for threatened vegetation communities. No other impacts to the habitat of this species are likely.
- No impacts to other threatened fauna species are likely to result from the proposal.

### 3.3. Weeds

- Although the vegetation communities on the island are relatively resilient to weed invasion, there is suitable habitat for the orange hawkweed *Hieracium* aurantiacum, which is a declared weed under the Tasmanian Weed Management Act 1999 and is recognised as a threat to Sphagnum communities<sup>22</sup>. The orange hawkweed is known from the Derwent Bridge/Lake St Clair area, as well as near the Lake Highway.
- Any proposal to guide visitors to the island, either by foot or by air, should include hygiene measures to prevent visitors introducing weeds such as orange hawkweed to the island and the National Park more broadly. Hygiene measures should include inspections of gear for seeds and other contaminants (such as clumps of soil).

<sup>&</sup>lt;sup>22</sup> Commonwealth of Australia 2009

# 3.4. Threatened Flora

- The impact footprint should be designed to avoid Pherosphaera hookeriana.
- During works, physical impacts to any *P. hookeriana* plants near the impact area should be avoided by flagging or cordoning off the plants and alerting construction workers as to their location.
- If there are any plants of this species (or any other threatened flora species) that cannot be avoided entirely, the proponent must apply for a permit to take from DPIPWE.
- *P. hookeriana* are very fire sensitive. As is a similar species of small pine, *Diselma archeri*, which also occurs on the island, including co-occurring within the main patch of *P. hookeriana*. For the same reasons as mentioned in the threatened community section, any intention to equip the huts with fireplaces would need to be done with strict specifications to prevent a bushfire and damage to these species.

### 3.5. General

- During works, to avoid inadvertent and unnecessary impact beyond the footprint, threatened species and communities near impact areas should be flagged and construction workers made aware of their locations. This includes locations for stockpiling materials, which should be excluded from areas of threatened values and where possible not be located near trees (to prevent root smothering).
- Avoidance and protection of values may best be achieved by having an ecologist present during site design/ placement of huts, pads, etc.
- A sensitive construction method in this case could involve airlifting in kit-style huts and depositing them within the impact area.
- Because neither ORO nor WSU are threatened communities, the impact footprint should be placed preferentially in these communities. The potential scale of losses to the communities from this proposal is negligible in relation to their extent at a local, State and national level.

# 4. Legislative Requirements for Flora and Fauna

### 4.1. Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The EPBCA is structured for self-assessment, with guidelines and criteria available<sup>23</sup> to assist any person who proposes to take an action to decide whether they should submit a referral to the Australian Government Department of the Environment for a decision by the Australian Government Environment Minister (the minister) on whether assessment and approval is required under the Act.

Under the Act, an action will require approval from the minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance (MNES), which includes all species and communities listed as threatened and/or migratory under the Act.

<sup>&</sup>lt;sup>23</sup> Commonwealth of Australia 2013

Although it was not observed during our survey, the patches of MSP on Hall's Island are suitable habitat for the EPBCA vulnerable *Pseudocephalozia paludicola*. The species is unlikely to have been overlooked, but if it is in fact present, a significant impact is likely to be avoided by following the recommended prescriptions for the avoidance of trampling and prevention of fire within the MSP community. The probability of any other EPBCA listed flora species occurring within the impact area is negligible.

Significant impacts to the Clarence galaxias are likely to be avoided by the avoidance of tramping the patches of bog within Appendix B. No other significant impacts to EPBCA listed fauna are likely.

Significant impacts to the EPBCA listed 'alpine sphagnum bogs and associated fens' ecological community can be avoided by applying the prescriptions for avoidance of trampling and fire within the MSP community (Appendix E).

With these prescriptions and careful design of the impact footprint, referral to the minister based on impacts to species or communities that are MNES is not considered to be necessary for this proposal. However, because the proposal is within a World Heritage Area this aspect must also be considered in relation to significant impacts.

# 4.2. Tasmanian Threatened Species Protection Act 1995

Any impact on threatened plant species listed under the TSPA will require a 'permit to take' from the Policy and Conservation Assessments Branch (PCAB) at the Department of Primary Industries, Parks, Wildlife and the Environment (DPIPWE). Thus, if complete avoidance is not possible, the proponent will be required to obtain a permit to take for *Pherosphaera hookeri*.

# 4.3. Tasmanian Weed Management Act 1999

No action is currently required to eradicate or control species under this Act. Appropriate visitor hygiene should be applied to maintain compliance.

# 5. Conclusion

Our field survey has established that the island contains two threatened vegetation communities (MSP and RKP) and one threatened plant species (*P. hookeriana*). It is recommended that the locations of these values are not utilised for hut or helicopter pad placement. Management prescriptions should also be applied to protect these values from fire and to avoid tramping.

It is understood that the current proposal is to place the hut and helicopter pad footprint within the ORO and WSU communities. These non-threatened communities are likely to be resilient to a proposal of this nature and potential losses in extent are considered to be negligible. It may be possible to construct boardwalks within the other communities by using a boardwalk design with minimal footprint and shading.

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# **Appendix A - Vascular Plant Species in Communities**

### **ORO** in potential impact footprint

Grid Reference: Accuracy: Recorder: Date of Survey:	441961E, 5355432N within 50 metres Grant Daniels 25 Oct 2016
Trees:	Eucalyptus delegatensis subsp. tasmaniensis, Eucalyptus subcrenulata, Phyllocladus aspleniifolius
Tall Shrubs:	Leptospermum lanigerum, Oxylobium ellipticum
Shrubs:	Bauera rubioides, Hakea lissosperma, Leptecophylla juniperina subsp. parvifolia, Monotoca submutica, Orites revolutus, Persoonia gunnii, Planocarpa petiolaris, Pultenaea juniperina
Low Shrubs:	Olearia erubescens
Herbs:	Stylidium graminifolium
Grasses:	Poa sp., Rytidosperma sp.

#### MSP - sphagnum peatland with emergent coral fern and cord rush

Grid Reference:	441969E, 5355456N
Accuracy:	within 50 metres
Recorder:	Grant Daniels
Date of Survey:	25 Oct 2016
Shrubs:	Baeckea gunniana, Richea scoparia, Sprengelia incarnata
Herbs:	Almaleea subumbellata, Ranunculus sp.
Graminoids:	Carex appressa, Carpha sp., Empodisma minus, Gahnia grandis, Isolepis fluitans, Juncus sarophorus
Ferns:	Gleichenia alpina

### WSU - E. subcrenulata forest

Grid Reference:	441919E, 5355498N
Accuracy:	within 100 metres
Recorder:	Grant Daniels
Date of Survey:	25 Oct 2016
Trees:	Eucalyptus coccifera, Eucalyptus delegatensis subsp. tasmaniensis, Eucalyptus subcrenulata, Phyllocladus aspleniifolius
Tall Shrubs:	Banksia marginata, Leptospermum lanigerum, Olearia argophylla, Oxylobium ellipticum, Telopea truncata
Shrubs:	Bauera rubioides, Bossiaea riparia, Coprosma nitida, Diselma archeri, Epacris gunnii, Exocarpos humifusus, Hakea lissosperma, Leptecophylla juniperina subsp. parvifolia, Lomatia polymorpha, Monotoca empetrifolia, Orites revolutus, Persoonia gunnii, Pherosphaera hookeriana, Pultenaea juniperina, Tasmannia lanceolata
Low Shrubs:	Olearia erubescens, Pentachondra pumila
Herbs:	Bellendena montana, Stylidium graminifolium
Graminoids:	Diplarrena moraea, Gahnia grandis
Grasses:	Poa sp.

RSH - highland scrub rainforest,	RPK - king billy pine rainforest and edge of
MSP_AC	

Grid Reference: Accuracy: Recorder: Date of Survey:	441844E, 5355339N within 100 metres Grant Daniels 25 Oct 2016
Trees:	Athrotaxis cupressoides, Athrotaxis selaginoides, Nothofagus cunninghamii, Phyllocladus aspleniifolius
Tall Shrubs:	Telopea truncata
Shrubs:	Coprosma nitida, Leptecophylla juniperina subsp. parvifolia, Pherosphaera
Low Shrubs:	Olearia erubescens
Herbs:	Viola hederacea
Grasses:	Poa tenera
Ferns:	Grammitis billardierei, Hymenophyllum peltatum, Polystichum proliferum

# Appendix B - Sphagnum bogs identified for avoidance

The following patches of bogs were identified on the walk into Hall's Island as containing *Sphagnum* species and potentially being sensitive to trampling – no formal surveys were undertaken in these patches but it is likely the percentage cover of *Sphagnum* in most or all patches is sufficient to qualify for protection under the NCA and EPBCA

Habitat type	East_GDA	North_GDA	Location accuracy (m)	Date	Surveyed by
Bog with Sphagnum spp.	446520.23	5355466.07	within 100 m	24/10/2016	Grant Daniels
Bog with Sphagnum spp.	446441.23	5355401.19	within 100 m	24/10/2016	Grant Daniels
Bog with Sphagnum spp.	446400.08	5355373.56	within 100 m	24/10/2016	Grant Daniels
Bog with Sphagnum spp.	446340.86	5355301.83	within 100 m	24/10/2016	Grant Daniels
Bog with Sphagnum spp.	446176.24	5355215.53	within 100 m	24/10/2016	Grant Daniels
Bog with Sphagnum spp.	446060.71	5355213.88	within 100 m	24/10/2016	Grant Daniels
Bog with Sphagnum spp.	445880.12	5355256.14	within 100 m	24/10/2016	Grant Daniels
Bog with Sphagnum spp.	445492.97	5355417.51	within 100 m	24/10/2016	Grant Daniels
Bog with Sphagnum spp.	445176.34	5355418.52	within 100 m	24/10/2016	Grant Daniels
Bog with Sphagnum spp.	443870.44	5355128.17	within 100 m	24/10/2016	Grant Daniels
Bog with Sphagnum spp.	442444.95	5355257.45	within 100 m	24/10/2016	Grant Daniels
Bog with Sphagnum spp.	444823.14	5355057.69	within 100 m	25/10/2016	Grant Daniels
Bog with Sphagnum spp.	445149.15	5355236.21	within 100 m	25/10/2016	Grant Daniels

# **Appendix C - Vascular Plant Species List**

Status co ORIGIN	odes: N I	NATIONAL SCHEDULE	STATE SCHE TSP Act 199	DULE
d - decl en - en t - withi	lared weed WM Act demic to Tasmania n Australia, occurs only in Tas.	CR - critically endangered EN - endangered /U - vulnerable	e - endangere v - vulnerable r - rare	d
Sites: 1 ( 2	DRO in potential impact footprint - E44190 MSP - sphagnum peatland with emergent E441969, N5355456	61, N5355432 coral fern and cord rush -	25-10-2016 Grar 25-10-2016 Grar	nt Daniels nt Daniels
3 \ 4 \ 5   3	WSU - E. subcrenulata forest - E441919, Vertebrate fauna recorded on island - E44 RSH - highland scrub rainforest, RPK - kir and edge of MSP_AC - E441844, N53553	N5355498 1925, N5355500 ng billy pine rainforest 139	25-10-2016 Grar 25-10-2016 Grar 25-10-2016 Grar	nt Daniels nt Daniels nt Daniels
Site	Name	Common name		Status
	DICOTYLEDONAE			
	ASTERACEAE			
3 1 3 5	Olearia argophylla Olearia erubescens	musk daisybush moth daisybush		
13	CUNONIACEAE Bauera rubioides	wiry bauera		
	EPACRIDACEAE			
3	Epacris gunnii	coral heath		
135	Leptecophylla juniperina subsp. pa	arvifolia mountain pinkberr	У	en
3	Monotoca empetrifolia Monotoca submutica	mat broomheath	oath	en
3	Pentachondra pumila	carpet frillyheath	lealli	en
1	, Planocarpa petiolaris	alpine cheeseberr	у	en
2 2	Richea scoparia Sprengelia incarnata	scoparia pink swampheath		en
	FABACEAE			
2	Almaleea subumbellata	wiry bushpea		
3	Bossiaea riparia	leafless bossiaea		
13	Pultenaea juniperina	prickly beauty	1	
	FAGACEAE			
5	Nothofagus cunninghamii	myrtle beech		
	MYRTACEAE			
2	Baeckea gunniana	alpine heathmyrtle	)	
3 13	Eucalyptus coccitera Eucalyptus delegatensis subsp	snow peppermint	/hark	en
10	tasmaniensis	guntoppou ounigj	buik	on
13	Eucalyptus subcrenulata	alpine yellow gum		en
13	Leptospermum lanigerum	woolly teatree		
2	PROTEACEAE Banksia marginata	silver banksia		
3	Bellendena montana	mountain rocket		en
13	Hakea lissosperma	mountain needleb	ush	
3	Lomatia polymorpha	mountain guitarpla	ant	en
13	Orites revolutus	revolute orites		en
13 35	Telopea truncata	tasmanian warata	y h	en

RANUNCULACEAE

2	Ranunculus sp.	buttercup	
	RUBIACEAE		
35	Coprosma nitida	mountain currant	
	SANTAL ACFAF		
з	Exocarpos humifusus	mountain native-cherry	en
Ū		mountain naive energy	en
4.0			
13	Stylidium graminifolium	narrowlear triggerplant	
	VIOLACEAE		
5	Viola hederacea	ivyleaf violet	
	WINTERACEAE		
3	Tasmannia lanceolata	mountain pepper	
_	CUPRESSACEAE		
5	Athrotaxis cupressoides	pencil pine	en
5	Athrotaxis selaginoides	king billy pine	en
3	Diseima archen	dwari pine	en
	PHYLLOCLADACEAE		
135	Phyllocladus aspleniifolius	celerytop pine	en
	PODOCARPACEAE		
35	Pherosphaera hookeriana	drooping pine	en
v			
0		toll and re	
2	Carex appressa Careba se	flower-rush	
23	Gahnia grandis	cutting grass	
2	Isolepis fluitans	floating clubsedge	
	IRIDACEAE		
3	Diplarrena moraea	white flag-iris	
		0	
2	JUNCACEAE	broom rush	
Z		broom rush	
13	Poa sn	noa	
5	Poa tenera	scrambling tussockgrass	
1	Rytidosperma sp.	wallabygrass	
	RESTIONACEAE		
2	Empodisma minus	spreading roperush	
_	ASPIDIACEAE		
5	Polystichum proliferum	mother shieldfern	
	GLEICHENIACEAE		
2	Gleichenia alpina	alpine coralfern	en
	GRAMMITIDACEAE		
5	Grammitis billardierei	common fingerfern	
		č	
5	Hymenophyllum peltatum	alpine filmvfern	
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# **Appendix D - Vertebrate Species List**

### Vertebrate fauna recorded on Hall's island

Grid Reference: Accuracy: Recorder: Date of Survey: 441925E, 5355500N within 100 metres Grant Daniels 25 Oct 2016

Amphibians:Crinia tasmaniensisMammals:Macropus rufogriseus, Pseudocheirus peregrinus, Pseudomys higginsiBirds:Chalcites lucidus, Colluricincla harmonica, Lichenostomus flavicollis, Phylidonyris<br/>pyrrhoptera, Platycercus caledonicus, Strepera fuliginosa, Zosterops lateralis

#### Birds

Chalcites lucidus Colluricincla harmonica Lichenostomus flavicollis Phylidonyris pyrrhoptera Platycercus caledonicus Strepera fuliginosa Zosterops lateralis

Frogs Crinia tasmaniensis

#### Mammals

Macropus rufogriseus Pseudocheirus peregrinus Pseudomys higginsi Shining Bronze Cuckoo Grey Shrike-Thrush Yellow-Throated Honeyeater Crescent Honeyeater Green Rosella Black Currawong Silvereye

Tasmanian Froglet

Bennett's Wallaby Common Ringtail Possum Long-Tailed Mouse

# **Appendix E – EPBCA significant impact criteria for MSP**

### Critically endangered and endangered ecological communities

### Significant impact criteria

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- · reduce the extent of an ecological community
- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
- · adversely affect habitat critical to the survival of an ecological community
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an
  ecological community's survival, including reduction of groundwater levels, or substantial alteration
  of surface water drainage patterns
- cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
  - assisting invasive species, that are harmful to the listed ecological community, to become established, or
  - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
- interfere with the recovery of an ecological community.