Centrolepis pedderensis

Flora Recovery Plan

Australian Government

Tasmania

Explore the possibilities

ACKNOWLEDGMENTS

This Plan was prepared by Threatened Species Section personnel (DPIPWE) in consultation with Louise Gilfedder (Conservation Policy and Planning Branch, DPIPWE), Jayne Balmer (Biodiversity Conservation Branch, DPIPWE), Jean Jarman and Alex Buchanan (Tasmanian Herbarium). The Plan draws upon the previous Recovery Plan (Gilfedder 1989) and Listing Statement (TSS 2009). The preparation of this Plan was funded by the Australian Government Department of Sustainability, Environment, Water, Population and Communities.

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Abbreviations

DPIPWE	Department of Primary Industries, Parks, Water and Environment (Tasmania)
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (Australian Government)
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FT	Forestry Tasmania
NRM	Natural Resource Management
PWS	Tasmanian Parks and Wildlife Service (DPIPWE)
RTBG	Royal Tasmanian Botanical Gardens (DPIPWE)
TSP Act	Tasmanian *Threatened Species Protection Act 1995*
TSS	Threatened Species Section (DPIPWE)
WHA	Tasmanian Wilderness World Heritage Area

Taxonomy follows Buchanan (2007); common names are consistent with Wapstra *et al.* (2005).

CONTENTS

SPECIES INFORMATION

Scientific name: *Centrolepis pedderensis* W.M.Curtis, *Brunonia* 7: 299 (1984)
Common Name: pedder bristlewort (Wapstra *et al.* 2005), Pedder Centrolepis (EPBC Act)
Group: vascular plant, monocotyledon, family **Centrolepidaceae**

Status: *Threatened Species Protection Act 1995*: **endangered**
Environment Protection and Biodiversity Conservation Act 1999: **Endangered**

Distribution: Endemic status: **Endemic to Tasmania**
Tasmanian NRM Region: **South**

Description

Centrolepis pedderensis is a summer-growing perennial herb (or a facultative annual in less favourable sites), forming loose tufts up to 7 cm in diameter. Individual tufts are composed of densely packed very narrow leaves to 3 cm long, and are overtopped by solitary flower heads. Leaves are numerous, distichous, suberect in a fan-shaped cluster and glabrous. The leaf sheath is 3 to 10 mm long, passing abruptly into a subterete keeled lamina 3 to 20 mm long. The scapes are slightly longer than the leaves and are often crimson and are glabrous. The reproductive parts are enclosed within two overlapping bracts that are erect and lanceolate to 4.5 to 5 mm long, their outer surfaces light brown, and often flushed crimson. They consist of 2 to 6 parts comprised of reduced flowers (pseudanthia). 1 to 2 of the pseudanthia are bisexual and the others lack the stamen. The stamen's filament and anther are crimson. The stigma carries stout 3-lobed receptive hairs (Curtis 1984, Cooke 1992, Curtis & Morris 1994).

Life history and ecology

Centrolepis pedderensis flowers from November to March (Cooke 1992). Plants occur in clumps, with each clump possibly comprised of more than 1 individual. The species typically grows in water 5 to 10 cm deep with tufts appearing to break apart over time, leading to floating remnants that become attached to twigs and other debris. These fragments may be a means for the species to establish vegetatively into areas of suitable habitat around the lakeshore and downstream. No other information on the reproductive biology and recruitment strategy of this species is known. The Australian National Botanical Gardens tried unsuccessfully to germinate seed collected in 1990 (Gilfedder 1999). The response of the species to disturbance is unknown.

Distribution and habitat

Centrolepis pedderensis is endemic to southwest Tasmania (Curtis 1984). The species has been recorded with certainty from only three sites (Table 1, Figure 1); Lake Pedder, Gordon River, and Sanctuary Lake (Gilfedder 1989). Only the Sanctuary Lake site in the Frankland Range is extant (Gilfedder 1989, Lynch & Wells 1994).

The species grows in the sandy alluvium of streams and lakeshores, typically in areas subject to seasonal inundation and drying (Bayly *et al.* 1972, Cooke 1992, Curtis & Morris 1994).

At Sanctuary Lake the species occurs in shallow areas in sheltered bays around the lake, and also along the lake's outlet creek (Balmer, pers. comm.), typically growing in water 5 to 10 cm deep on quartz gravels. The geology of Sanctuary Lake is composed of pre-Cambrian metamorphic pelitic sequences, with Pleistocene till, fluvioglacial and periglacial and associated deposits at the outlet to the lake (Gilfedder 1989). Associated plant species include the allied species *Centrolepis monogyna*, *Isolepis* sp. and *Myriophyllum* sp., while the vegetation away from the lake itself consists of a thick subalpine heath and coniferous shrubbery dominated

by *Leptospermum nitidum* and *Baeckea leptocaulis* between 3 to 4 m high (Gilfedder 1989). Moorland dominated by *Gymnoschoenus sphaerocephalus* prevails between the lake's two outlet creeks (Jayne Balmer 2008, pers. comm.). The altitude at lake level is 640 m above sea level and the annual rainfall greater than 2000 mm.

The linear range of the extant subpopulation at Sanctuary Lake is less than 200 m, the extent of occurrence about 0.006 km^2, and the area of occupancy less than 1 ha (Table 1). Prior to the loss of the Lake Pedder and Gordon River subpopulations following the damming of Lake Pedder in 1972, the species' extent of occurrence would have been about 110 km^2. The altitude range of recorded sites is 50 to 640 m above sea level.

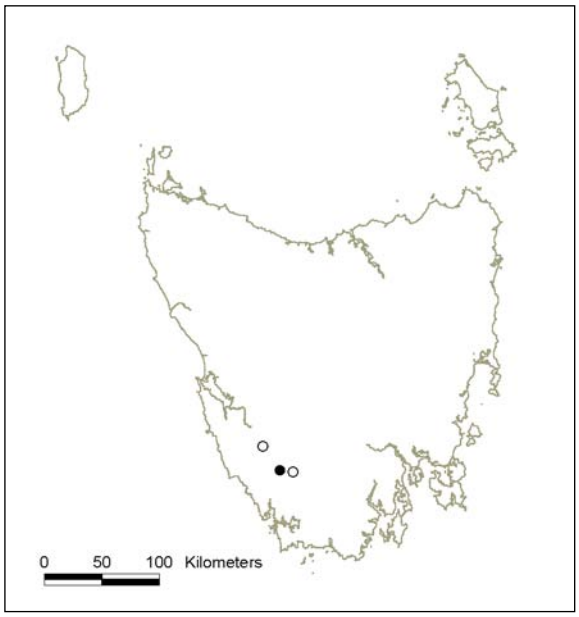

Figure 1. Distribution of *Centrolepis pedderensis*
(● = extant, ○ = presumed extinct)

Population estimate

The species is known from a single extant subpopulation of 100 to 150 clumps in the State's southwest at Sanctuary Lake (Table 1). Each clump may be comprised of more than 1 genotype and may possibly contain more than one mature plant.

A reference to the collection of the species from an unknown alkaline pan in the Giblin River area is reported in Jarman et al. (1988). No herbarium specimen was lodged to confirm the identification of the specimen and the site information was not recorded. More recent searches for the species within alkaline pans in the Giblin and Maxwell River areas have failed to locate the species (Jayne Balmer 2008, pers. comm.). This unconfirmed record has been disregarded for the purposes of this document.

A number of targeted surveys have been undertaken for *Centrolepis pedderensis* in southwest Tasmania following the inundation of the Lake Pedder subpopulation in 1972 (Bayly *et al.* 1971, Curtis 1984). Gilfedder (1989) reported the results of surveys in the following areas: Sanctuary Lake, Serpentine River below the Serpentine dam wall, the margins of the Huon-Serpentine impoundment (Lake Pedder), as well as buttongrass communities at Condominium Creek, Sandfly Creek, Gelignite Creek, Red Knoll and McPartlan Pass. Targeted surveys of alkaline pans in the valleys of the Giblin, Olga, Maxwell and Hardwood Rivers were undertaken in April 2001 and January 2005 to determine the veracity of earlier reports of the species' presence (Jarman *et al.* 1988, Lynch & Wells 1994). DPIPWE personnel also conducted surveys of the Frankland Range subpopulation at Sanctuary Lake in January and March 2005, with surveys of nearby Bluff Tarn in March 2005 (unpublished data held by TSS, DPIPWE, Hobart).

As noted by Lynch & Wells (1994), *Centrolepis pedderensis* suffers from a lack of 'collectability', often being

overlooked as the species is small, it is usually submerged in water, and it is a monocot. Gilfedder (1989) and Lynch & Wells (1994) both envisaged that additional (small) subpopulations of the species would be revealed given a targeted survey effort. However, this has not proven to be the case. A number of unsurveyed small glacial lakes and tarns in the Frankland, Wilmot and Companion Ranges would appear to offer the best hope of harbouring other subpopulations. The Gordon River subpopulation is presumed to be extinct at the recorded Splits site (see below). However, additional surveys are required to determine if the species persists in lower reaches of the river.

Reservation status

The extant subpopulation of *Centrolepis pedderensis* occurs within the 605,000 ha Southwest National Park, part of the Tasmanian Wilderness World Heritage Area (PWS 1999, Balmer *et al.* 2004). The presumed extinct site at Lake Pedder is within Southwest National Park, while the Gordon River site is within the Franklin-Gordon Wild Rivers National Park, also within the World Heritage Area (Table 1).

Table 1. Population summary for *Centrolepis pedderensis*

	Subpopulation	Tenure	NRM Region	1:25 000 mapsheet	Year last (first) seen	Area occupied (ha)	Number of clumps*	Specific Threats
1	**Sanctuary Lake** (Frankland Range)	Southwest National Park	South	Solitary	2005 (1980s)	< 0.1	100–150	Climate change, stochastic risk
2	**The Splits** (Gordon River)	Franklin-Gordon Wild Rivers National Park	South	Serpentine	1977 (1977)	Unknown	Presumed extinct	Regulated river flows since late 1977
3	**Lake Pedder**	Southwest National Park	South	Solitary	1971 (1953)	Unknown	Was locally common. Presumed extinct	Habitat inundated by dam in 1972

(* each clump may contain more than one mature plant).

Threats, limiting factors and management issues

Threats to *Centrolepis pedderensis* include inundation of habitat through hydro-electric power schemes, regulated water flows, potentially inappropriate fire regimes, climate change, disease and weeds and stochastic events. Many of these threats may have indirect impacts as, being a wetland plant, *Centrolepis pedderensis* may be susceptible to changes in the condition of surrounding vegetation in the catchment which lead to degradation of its habitat. Research, monitoring and management activities also have the potential to adversely impact the species, both directly and indirectly.

Inundation and regulated river flows: Two of the three recorded *Centrolepis pedderensis* subpopulations in southwest Tasmania are thought to have become extinct through activities associated with the development of the Middle Gordon power scheme in the 1960s and 1970s. The Lake Pedder subpopulation was lost through direct inundation in 1972, a consequence of the damming of the Serpentine River (McKenry 1972, Bayly *et al.* 1972). The Gordon River subpopulation is thought to have been lost through regulated river flows subsequent to the commissioning of two turbines at the Middle Gordon power station in 1977 (Wilde 1978, Lupton 1999). The commissioning of a third turbine in the early 2000s to support the Basslink Power Scheme is likely to result in even fewer colonisation opportunities for the species due to reduced habitat along the Gordon River (Davidson & Gibbons 2001).

Inappropriate fire regimes: Fires pose a largely indirect threat to the species through changes to hydrology and sedimentation rates. There is a small risk that plants might be directly impacted by fire if a

wildfire occurred during summer when the lake levels were very low. There is also a small risk that long fire-free intervals may enable the foreshore vegetation to develop into forest that casts significantly increased shade and reduces the habitat for *Centrolepis pedderensis*, which is likely to be dependent on low competition.

Before specific fire management prescriptions can be developed it is important that guidelines for fuel reduction burning in buttongrass moorland be followed as described in the *Tasmanian Wilderness World Heritage Area Tactical Fire Management Plan* (PWS 1999). It is also imperative to ensure that the WHA is maintained as a fuel stove only area.

Climate change: While the trend towards a warmer drier climate may impact upon *Centrolepis pedderensis* this is unlikely to be due directly to increased temperatures. The species has had a wide altitudinal range suggesting that it will be able to cope with an average temperature increase of at least six degrees. However, changed rainfall patterns in combination with increased temperatures and evaporation rates on the lake levels at Sanctuary Lake may pose a greater concern for the long term viability of the habitat of the species. Changed rainfall patterns may also result in more frequent and intense fires or allow the establishment of disease and weeds that may be impact adversely on the species either directly or indirectly.

Disease and weeds: Visitation to the site risks the introduction of disease or to a lesser extent, weeds, that may impact on the species directly or through indirect impacts to its habitat should they become established. While *Centrolepis pedderensis* does not occur in habitat conducive to infection by *Phytophthora cinnamomi*, floristic components of adjacent plant communities may be susceptible to the pathogen, and their decline could contribute indirectly to less favourable conditions for *Centrolepis pedderensis*.

Stochastic Risk: The species' localised distribution exposes it to stochastic risk of endangerment. While the only known subpopulation occurs in a remote area of southwest Tasmania, it is considered to be at some risk from inappropriate collecting/sampling and unforeseen human activities, as well as stochastic events such as localised drought, severe fire or flooding. The species may also suffer from low genetic diversity and reproductive vitality. It is important to assess the overall health of such a small subpopulation, as the effect of background mortality in these subpopulations may be accentuated without vigorous recruitment.

Visitation: Unintentional impacts could arise from visits to the site by scientists and land managers. Given the remote location of Sanctuary Lake, visitation is most likely to be by helicopter carrying the risk of introducing *Phytophthora cinnamomi*, other disease or weeds from the helicopter itself (particularly if making multiple landings) or from people entering the area with infested soil on their boots or equipment. The lakeshore is difficult to access and visitation will inevitably result in trampling pressure on the heath and scrub around the lakeshore. It is difficult to find plants of *Centrolepis pedderensis* without walking in the lake and disturbing the lake bottom, potentially impacting on plants.

Conservation status

Centrolepis pedderensis was listed as endangered on schedules of the TSP Act when the Act came into being in 1995. A change in status was not recommended following a review in 2008. The species was transferred to Endangered from the Vulnerable category under the EPBC Act in 2008, primarily because the species '*is known from a single population and has a very low number of mature individuals*'.

Habitat critical to the survival of the species

Habitat considered critical to the survival of *Centrolepis pedderensis* includes:

- the currently known area of occupancy and adjacent habitat into which the species could expand;
- supporting habitat surrounding the known subpopulation that could impact on the species if disturbed;
- sites including gently shoaling lakes in the Frankland Range (southwest Tasmania) that potentially support the species or could be used for the establishment of *ex situ* introductions;
- unsurveyed potential habitat in the lower reaches of the Gordon River;

- the local catchment for the surface and/or groundwater that maintains the habitat of the species.

These areas have not been mapped.

RECOVERY

Existing conservation measures

The extant *Centrolepis pedderensis* subpopulation occurs within Southwest National Park. Proposed activities within the Park are subject to the *Tasmanian Reserve Management Code of Practice* (PWS, FT & DPIWE 2003). In addition, areas within the National Park are included in a Fire Management Plan for the Tasmanian Wilderness World Heritage Area (PWS 2004).

A Recovery Plan was developed for *Centrolepis pedderensis* in 1994 (Lynch & Wells 1994). Tasmanian Government agencies have implemented a limited number of the recovery actions including targeted extension surveys in 2001 and 2005 and a census in 2005. No further subpopulations were found during these surveys. Material collected from the Sanctuary Lake subpopulation in 2005 has been cultivated at the Royal Tasmanian Botanical Gardens (Hobart), and also by a local plant enthusiast.

A listing statement for *Centrolepis pedderensis* was prepared under provisions of the TSP Act in 2008 and revised in 2009 (TSS 2009).

Strategy for recovery and progress evaluation

This Recovery Plan will run for five years and is based on strategies to increase the number of subpopulations, maintain or increase numbers of individuals and habitat quality, and manage subpopulations in the long term. This will be achieved by determining disturbance requirements, survey and monitoring, the establishment of *ex situ* holdings, habitat management and provisions for long term management.

This Plan has been prepared in consultation with various representatives of DPIPWE's Biodiversity Conservation Branch, PWS including its Fire Management Section, RTBG, the Tasmanian Herbarium and various experts. It incorporates management issues and strategies outlined in the earlier Recovery Plan (Lynch & Wells 1994) and Listing Statement (TSS 2009) and takes existing conservation measures into account.

TSS will guide implementation, monitoring and review of this Plan or parts thereof if funding is secured. Evaluation of the success or failure of the Recovery Plan can be measured against the performance criteria. A formal review within 5 years of adoption is required under the EPBC Act. Significant developments will be communicated to the general public through Listing Statement updates, websites, newsletters and reports.

This Plan is consistent with the aims of the *Threatened Species Strategy for Tasmania* (PWS 2000) and *Tasmania's Nature Conservation Strategy* (NCB 2002).

Recovery objectives, performance criteria and actions needed

The **overall objective** of this Recovery Plan is to prevent the status of *Centrolepis pedderensis* from declining further and/or becoming extinct, and to address threats to its population.

Specific objectives are to:

1. maintain or increase numbers *in situ*;
2. increase the number of subpopulations through survey;
3. establish a conservation holding for use in the event of extinction in the wild.

The **criteria** for achieving the objectives constitute a quantifiable decrease in the risk of extinction over five years of Recovery Plan implementation. They are:

1. over the duration of the Plan, no decline in the area occupied by the known population;
2. number of subpopulations increased as a result of surveys;
3. *ex situ* holdings of living plants established at the RTBG by the end of year 2 and additional plants propagated and seed produced for research;
4. seedling recruitment increased following the application of altered regimes as determined by research;

The **actions** required to achieve these objectives are:

1. monitor;
2. protect sites;
3. conduct research;
4. survey;
5. establish an *ex situ* holding;
6. manage the species for the long term.

Recovery actions

1. Monitor

A census and mapping of the known site and any newly discovered subpopulations will be undertaken every 5 years (using protocols developed in Action 2) to determine population trends and the need for management intervention, and to collect data on the condition of plants and habitat (e.g. water levels of lakes), recruitment, and responses to any disturbance, such as fire. Monitoring will be undertaken in late February or March when plants are in flower.

2. Protect sites

This action involves:

- developing protocols for site access and monitoring activities to ensure the protection of the site from inadvertent impacts that may occur through visitation;
- following the guidelines for fuel reduction burning in buttongrass moorland to prevent the inadvertent destruction or decline of this species through inappropriate fire regimes, as described in the Tactical Fire Management Plan for the WHA;
- liaison with PWS to ensure that the World Heritage Area is maintained as a fuel stove only area;
- liaison with Hydro Tasmania and other relevant bodies regarding any subpopulations discovered in sites subject or proposed to be subject to regulated flow regimes;
- mapping sites considered critical to the survival of the species and distributing location information to relevant agencies.

3. Conduct research

Extremely little is known about the species' seed dispersal or germination, the conditions associated with recruitment events, or population dynamics and structure. More frequent monitoring of the subpopulation, particularly following disturbance events such as fire, will assist in this process but has the potential to impact on the subpopulation. This action involves:

- experimental studies of plants propagated at the RTBG to better understand the autecology of the species and its relative tolerance to changes in hydrology and climate, whether or not intervention may be effective in improving seedling recruitment, and to determine how the viability of the subpopulation can be improved;

- corresponding studies of related and associated species such as *Hydatella filamentosa, Isolepis* species and *Centrolepis monogyna*, which all occur at Sanctuary Lake, to increase the robustness of the study as the responses of these species to changes in conditions are likely to impact on the responses of *Centrolepis pedderensis* through competitive interactions;
- seed germination research in order to be able to successfully reintroduce the species in case of extinction in the wild using conservation holdings of seed (Action 5).

This research could be undertaken as part of a post-graduate research project at the University of Tasmania.

4. Survey

This action involves:

- survey of a number of small glacial lakes and tarns in the Frankland, Wilmot and Companion Ranges which appear to offer the best hope of harbouring other subpopulations;
- additional surveys to determine if the species persists in the lower reaches of the Gordon River;
- a repeat survey of Sceptre Lake below Coronation Peak during the flowering period in case the species was overlooked amongst the extensive mats of *Hydatella filamentosa.*

Any future extension surveys should be undertaken in late February or March when in flower to increase the chance of locating the species, as it is difficult to identify the plant when not flowering. Determination of suitable habitat from aerial photographs is warranted prior to survey in order to determine the best survey strategy. Given the remoteness of the region, helicopter is the most efficient transport for this operation.

5. Establish an *ex situ* holding

Centrolepis pedderensis faces a high stochastic risk of extinction in the wild. It is considered essential that an *ex situ* holding be established so that if the wild population is damaged or destroyed then material would be available to re-establish the species in the wild. This action involves establishment of an *ex situ* holding comprised of both live plants as a propagule source of plants and seed for research (Action 3) and seed for conservation banking. The plant and seed holdings should be genetically representative, each taken from at least 10 plants across the range of the extant subpopulation. Vegetative material could be collected for growing on at the RTBG when the subpopulation is monitored during flowering (Action 1) though later visits may be required to collect seed when it matures. Given the low number of plants in the wild, and the cost and potential impact of visitation, it may not be feasible to collect sufficient seed from the wild, even with collections from successive years. In this case seed may need to be bulked from the collection of living plants at the RTBG. The seed holding will be stored at the Tasmanian Seed Conservation Centre at the RTBG with a back up holding at the Millennium Seedbank facility at Kew in the UK.

6. Manage the species for the long term

This action involves:

- the collation and interpretation of data on *Centrolepis pedderensis;*
- dissemination of this information to stakeholders and other interest groups;
- implementing mechanisms to facilitate community participation in, and ownership of, the recovery program.

The availability of the up to date information is a necessary base for formulating management advice, as well as informing the allocation of resources and the assessment of the impact of development proposals.

Ongoing data and data interpretation requirements as new information becomes available are:

- entry of spatial, population, disturbance and threat information into the Natural Values Atlas (DPIPWE);
- regular reassessment and documentation of the species' extinction risk, and preparation of nominations for a change in the conservation status for State and Commonwealth legislation as required;

- regular interpretation of data, including research data, to inform, adapt and prioritise on-ground management;
- lodgement of specimens of any new subpopulations with the Tasmanian Herbarium in case of future taxonomic treatments.

Requirements for the dissemination of information are:

- update the *Centrolepis pedderensis* listing statement (TSS 2009) as new information becomes available, and include on the DPIPWE website to allow access to the wider botanical community and the general public;
- review the Recovery Plan every five years, and update if required, circulate to libraries and the wider botanical community, and include on the DPIPWE and DSEWPaC websites to allow access to the general public;
- prepare written management advice for any new subpopulations and update existing advice for known sites as necessary and provide to landowners/managers;
- circulate spatial information to relevant users including PWS, NRM South, Hydro Tasmania and regulators including the Development and Conservation Assessment Branch and Water Resources Division of DPIPWE, the Environment Division (DPIPWE), the Tasmanian Planning Commission and DSEWPaC.

Mechanisms to facilitate community participation and ownership are*:*

- involve the NRM South in the recovery process
- make requests to volunteer networks to participate in specific (in this case off site) recovery actions (groups might include Wildcare's Threatened Plants Tasmania, and the Australian Plant Society);
- request participation in recovery actions by the wider botanical community through the Tasmanian Flora Network;
- provide advice to community groups on possible funding and assist with funding applications;
- when necessary, organise (1) permission from landowners/managers to access sites, and (2) permits from TSS for the collection of propagation material and/or herbarium specimens

Table 2. Duration and estimated cost of recovery

Actions	Cost estimate	Timeframe	NRM region
1. Monitor	$25,000	Years 1–5	South
2. Protect sites	$30,000	Years 1–5	South
3. Conduct research	$30,000	Years 2–5	South
4. Survey	$40,000	Years 1–3	South
5. Establish an *ex situ* holding	$40,000	Years 1–5	South
6. Manage the species for the long term	$15,000	Years 1–5	State
Total	**$180,000**		

Duration and cost

The Plan will run for five years with the estimated cost being $180,000 (Table 2).

The *Centrolepis pedderensis* Recovery Plan may be supported, and may benefit from projects supported by DPIPWE and DSEWPaC (including WHA programs), PWS, RTBG, NRM South and Wildcare's Threatened Plants Tasmania.

Management practices

Under the EPBC Act, any activity which could have a significant impact on a listed threatened species, such as *Centrolepis pedderensis*, must be referred to the Minister for the Environment, Heritage and the Arts for a decision as to whether assessment and approval is required under the Act.

Management practices required to avoid significant impacts on *Centrolepis pedderensis* include:

- maintain seed storage and plant propagation facilities at RTBG;
- maintain DPIPWE databases;
- restrict access to Sanctuary Lake, with all access to follow the protocols developed in Recovery Action 2;
- maintain conservation management of the Southwest National Park and the WHA.

Actions which result in any of the following, within critical habitat of *Centrolepis pedderensis*, could have a significant impact on the species:

- removal, destruction and/or damage to plants of the species;
- removal of native vegetation;
- changes to the hydrological regime;
- changes to the water quality, water levels or sedimentation in Sanctuary Lake;
- collection of *Centrolepis pedderensis*, including plant parts or seeds, without a permit;
- introduction of diseases, weeds or pests.

International obligations

Centrolepis pedderensis is not listed under any international agreement and the Plan does not affect Australia's international responsibilities.

Affected interests and social and economic impacts

Affected interests are stakeholders and interested parties and include PWS, DPIPWE, Hydro Tasmania, Tasmanian Seed Conservation Centre, RTBG, Tasmanian Herbarium, Wildcare's Threatened Plants Tasmania, Tasmanian Flora Network, Australian Plant Society, Millennium Seedbank (Kew).

Centrolepis pedderensis has legal protection as a listed entity at the State and Federal level. All known sites occur are on reserved land that is maintained for its natural values. Given the remoteness of the only extant site, the implementation of this Recovery Plan is unlikely to cause significant adverse social or economic impacts.

Role and interests of indigenous people

In the preparation of this Plan the important role Tasmanian Aboriginal people have played in land management was recognised, and the impact of European settlement on this role acknowledged.

The following Aboriginal organisations have been consulted on the significance of *Centrolepis pedderensis* in Aboriginal cultural tradition, and on their knowledge, role and interest in its management: Aboriginal Land Council of Tasmania, Tasmanian Aboriginal Centre, and Tasmanian Aboriginal Land and Sea Council.

Implementation of this Plan will involve:

- knowledge sharing;
- participation in education and training relevant to threatened species management; and
- engagement in recovery actions where relevant to Aboriginal land management and communities.

If, during any recovery activity, suspected evidence of Aboriginal heritage significance is found, this will be reported to Aboriginal Heritage Tasmania, and, if the evidence is to be disturbed, the activity will be suspended pending appropriate follow-up.

Biodiversity benefits

The implementation of recovery actions proposed in this Plan will help to maintain the floral diversity of southwest Tasmania and the Tasmanian Wilderness World Heritage Area. Implementation of this Plan is likely to enhance our understanding of the species and its ecosystem.

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