RESTORE LAKE PEDDER

FACT SHEET

Weeds and diseases

Coordinated by
Lake Pedder Restoration Inc.
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Weeds and diseases

Weeds and diseases have the capacity to alter the trajectory of restoration of both flora and fauna following dewatering of the Huon-Serpentine Impoundment. The key to managing potential weed and disease threats is understanding the potential known threat organisms, reducing their potential spread and early responses or treatments. The three main risks known at this time include weeds, 'root rot' that affects susceptible plants and chytrid fungus, a pathogen that impacts amphibian populations.

Weed species – existing species and potential threats

Declared weeds recorded within 5000m of the Huon Serpentine Impoundment

Declared weeds are plants that are recognised for their threat to primary industry, the natural environment or public safety. They are regulated under the Weed Management Act and must have a plan to reduce spread and to control, therefore, they are a high priority for consideration in the restoration processes.

The following declared weeds have been recorded in the Natural Values Atlas to occur within 5000m of the existing impoundment. Depending on how many seeds the plants set, how the seeds are spread throughout the landscape and their ability to withstand the hot and drier bare peat, some of these weeds are a greater risk than others for potential invasion. Preliminary notes on their threat potential are given and this would be expanded in any subsequent weed management plan prior to restoration.

Common name	Scientific name	Status and threat potential
Creeping Thistle	*Cirsium arvense* var. *arvense*	Perennial, highly dispersible (>1km) wind borne seed dispersal, high threat for bare peat.
Karamu	*Coprosma robusta*	Perennial shrub, birds disperse seeds. Potential weed of damper sites/riparian but not known if it would germinate on dark, bare surfaces of bare peat.
Pink Pampas Grass	*Cortaderia jubata*	Perennial, highly invasive and highly dispersible (>25km) prolific seeds. Very serious threat for germination on bare peat and increase flammability of reservoir area.
Silver Pampas Grass	*Cortaderia selloana*	Perennial, highly invasive and highly dispersible (>25km) prolific seeds. Very serious threat for germination on bare peat and increase flammability of reservoir area.
Pampas Grass	*Cortaderia sp.*	Perennial, highly invasive and highly dispersible (>25km) prolific seeds. Very serious threat for germination on bare peat and increase flammability of reservoir area.
English Broom	*Cytisus scoparius*	Localised spread by seedpods, animals and some water-borne dispersal of hard seeds. Moderate risk of germination and persistence on peat.

Common name	Scientific name	Status and threat potential
Berryflower heath	*Erica baccans*	Spread by seed dispersal wind and water, animals and movement of soil and mud on machinery. A serious weed threat for establishment on bare peat and exposed quartzite.
Spanish Heath	*Erica lusitanica*	A widespread weed in the Pedder region with a persistent seedbank. Spread by seed dispersal via wind and water, animals and movement of soil and mud on machinery. A serious weed threat for establishment on bare peat and exposed quartzite.
Montpellier Broom	*Genista monspessulana*	Localised spread by seedpods, animals and some water-borne dispersal of hard seeds. Moderate risk of germination and persistence on peat.
Holly	*Ilex aquifolium*	Perennial shrub/tree, birds disperse seeds. Potential weed of damper sites/riparian and likely to also germinate on dark, bare surfaces of bare peat.
Himalayan Honeysuckle	*Leycesteria formosa*	Deciduous shrub, birds disperse seeds. Potential weed of damper sites/riparian but uncertain if it would germinate on dark, bare surfaces of bare peat.
Blackberry	*Rubus fruticosus* spp agg	Group of rambling berries, seeds dispersed by animals and running water and vegetation expansion into dense thickets. A serious weed threat for establishment on bare peat and exposed quartzite.
Goat Willow	*Salix caprea*	Salix species have been significant weed species of peat soils in Victoria, particularly post-fire. A serious weed threat for establishment on bare peat and exposed quartzite.
Basket Willow	*Salix x rubens*	Salix species have been significant weed species of peat soils in Victoria, particularly post-fire. A serious weed threat for establishment on bare peat and exposed quartzite.
Ragwort	*Senecio jacobaea*	A biennial herb flowering in the second year. Locally spread seed, some dispersed (up to 1km) by strong winds) and by attachment to animals and machinery. A high weed threat for establishment on bare peat and exposed quartzite.
Gorse	*Ulex europaeus*	Localised spread by seedpods, animals and some water-borne dispersal of hard seeds. High risk of germination and persistence on peat increase flammability of reservoir area.

Priority weeds within 5000m

Priority weeds are those that are known to pose a potential risk threat to primary industry, the natural environment or public safety. The following priority weeds have been recorded in the Natural Values Atlas to occur within 5000m of the existing impoundment. Depending on how many seeds the plants set, how the seeds are spread throughout the landscape and their ability to withstand the hot and drier bare peat, some of these weeds are a greater risk than others for potential invasion. Preliminary notes on their threat potential are given and this would be expanded in any subsequent weed management plan prior to restoration.

Common name	Scientific name	Status and threat potential
Yarrow	Achillea millefolium	Rhizomatous herb, short dispersal by wind. A moderate weed threat for establishment on bare peat.
Wild Teasel	Dipsacus fullonum	A biennial herb flowering in the second year. Locally spread seed, also spread by animals and water flows. A moderate weed threat.
Broadleaf Dock	Rumex obtusifolius	A perennial herb. Winged fruits dispersal by wind, water, animals and humans. A moderate weed threat.

Weed control considerations and mitigation measures for restoration

Given the presence of weeds in the catchment and environs and potential for introduction, prior to any restoration works a series of plans and actions would be required to reduce the risk of large-scale weed invasion on the newly-exposed reservoir basin. The plans should focus on control of weed or invasive species and rapid revegetation of the reservoir areas with native grasses, shrubs and trees as the primary method for restoration. This approach is consistent with other dam removal and reservoir restoration plans by ensuring restoration efforts emphasise revegetation of newly exposed floodplain areas with native plants while actively controlling weeds and invasive species.

Weed management activities would aim to reduce the potential seed and propagule sources of weeds that could disperse into the newly exposed reservoir by undertaking the following measures:

1. Field survey of weed species in surrounds and along machinery and visitor access routes
2. Model potential high risk, windblown weeds to understand areas at risk and species posing greatest risk
3. Assign weed severity priority
4. Develop a control target species list based on identifying plants with the largest potential to (1) spread quickly, (2) take over extensive areas, (3) compete for resources with native species, and (4) cause any other environmental damage.
5. Pre-restoration weed treatment (minimum 1 to 2 years pre-drawdown)
6. Identify species that can be controlled by water level management (i.e. *Typha* spp.)
7. Identify ruderal weed species that are likely to reduce in abundance once natural regeneration processes establish

8. Ongoing treatment and monitoring during drawdown with ongoing monitoring and treatment of weed species
9. Identify any poorly-colonising bare areas at high risk of weed invasion in the reservoir area
10. Continue weed monitoring and adaptive management as required.

Overall, the restoration project would require a well developed and implemented Integrated Pest Management Plan for the project area. At a minimum, this should consist of the following key elements:

• Measures to prevent invasive exotic weeds from establishing through use of weed-free plant materials and straw (i.e. clean source, clean machinery)

• Regular monitoring to facilitate early detection of emerging invasive exotic weeds

• Utilize appropriate and cost-effective strategies to reduce or eliminate weed populations

• Planning and scheduling - coordinate weed management with all aspects of the revegetation and dam removal management activities to prevent introduction of any new weed species into the project area and limit existing weed species

• Training – require weed awareness and prevention training and efforts amongst staff and contractors through contract requirements or incentives.

• Expedite revegetation with native plants.

• Monitor to identify and eradicate any invasive exotic species impeding achievement of the revegetation objectives

• Evaluate effectiveness – A continual process of active management ensures the success of the weed control program.

• Adaptive management - revisit and re-establish goals or methods to achieve the objective.

Threatening processes and biosecurity risks

Root rot (*Phytophthora cinnamomi*)

Root rot (cinnamon fungus, jarrah dieback) is an introduced pathogenic water mould that causes the dieback of susceptible plant species and impact the species composition of plant communities. It is believed to have been introduced to Tasmania following European settlement and is now well established in many areas of moorland, including many records around the Huon-Serpentine Impoundment. In these areas, the disease has reduced the abundance of susceptible plant species from the shrub and herbaceous families Dilleniaceae, Ericaceae (except *Sprengelia incarnata*), Fabaceae, Proteaceae and Rutaceae. Buttongrass (*Gymnoschoenus sphaerocephalus*) is the dominant species in the moorlands and is resistant to the disease so the buttongrass moorland vegetation can look superficially intact but it will have reduced species richness and an absence of many flowers in spring and summer.

The pathogen is spread by the movement of soil or infected material both by people on field equipment and/or from existing infections with the movement of water and animals. Given the capacity of humans to spread the fungus over long distances and natural barriers and the existing widespread distribution in Tasmania, the goal for reducing the impact of the fungus is aimed at reducing its spread to new priority areas. These priority areas include:

- threatened species that are susceptible to disease
- large disease-free areas of susceptible native vegetation
- highly susceptible communities

The Huon-Serpentine Impoundment has areas of the threatened vegetation community Banksia wet scrub which, given the dominance of Banksia plants, is heavily susceptible to the fungus, therefore this would be a priority for management actions to prevent infection to existing communities or in areas where this community may regenerate.

Measures to prevent the introduction of Phytophthora root rot to uninfected areas should include:

- managing developments and works that increase the risk of introduction eg roads and walking tracks;
- track rerouting, track hardening and drainage management, one-way tracks and access management
- sourcing materials to be used in management works from *P. cinnamomi*-free stock
- sequencing and timing operations to reduce risk of introduction
- hygiene prescriptions such as washdown requirement and washdown stations on walking tracks like the ones on the Mount Anne track.

A walker wash-down station at the start of a walking track Image Anita Wild

Chytrid fungus (*Batrachochytrium dendrobatidis*)

Chytrid fungus (*Batrachochytrium dendrobatidis*) causes a disease (chytridiomycosis) that currently threatens Tasmania's native amphibians. The fungus infects the skin of frogs destroying its structure and function and can ultimately cause death. Sporadic deaths occur in some frog populations, and 100 per cent mortality occurs in other populations.

In Tasmania, chytrid infection has spread widely in most habitats including two records of infection at Lake Gordon adjacent to the Huon-Serpentine Impoundment. It is currently not known if the fungus affects amphibians in the proposed restoration area. Despite these nearby positive records, it is still a management priority and a precautionary approach to exclude or reduce the spread of the pathogen in remote areas, therefore, hygiene measures would be necessary during restoration works.

Chytrid fungus, or infected frogs or tadpoles infected by it, can be spread by people carrying water and mud on boots, camping equipment and vehicle tyres, and in water used for drinking, or spraying on gravel roads or fighting fires.

Further Reading

Balmer, J & Corbett, E (2001) The vegetation of the Lake Pedder Area Prior to Flooding. in Sharples, C. (ed.) *Lake Pedder: Values and Restoration, Occassional Paper No. 27*, Centre for Environmental Studies, University of Tasmania.

Auble GT, Shaforth PB, Scott ML and Roelle JE (2007) Early Vegetation Development on an Exposed Reservoir. *Environmental Management* 39:806–818

Balmer, J. (1991) Buttongrass moorland vegetation. In: Tasmanian Native Bush; A Management Handbook (Ed. Kirkpatrick, J.B.). Tasmanian Environment Centre Inc., Hobart

Wild AS (2020) *A review of potential responses to the restoration of Lake Pedder: Vegetation and Flora*. Report commissioned by Lake Pedder Restoration Inc. Hobart, Tasmania. https://lakepedder.org/thescience

This factsheet is one of a series commissioned by Lake Pedder Restoration Inc. and prepared by Dr Anita Wild and colleagues to understand the impacts of the full ecological restoration of the original Lake Pedder and surrounding ecosystems in the Tasmanian Wilderness World Heritage Area. Released August 2020.

For more information go to www.lakepedder.org.