

## Preliminary Weed and Pest Management Plan Chalumbin Wind Farm

**Prepared for:**

Chalumbin Wind Farm Pty Ltd

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## 1.0 Introduction

This Weed and Pest Management Plan (Plan) has been prepared to support the Public Environment Report (PER) for the Chalumbin Wind Farm Project (the Project) and should be read in conjunction with the PER. Specifically, this Plan addresses section 7.2.2 of the *Guidelines for the Content of a Draft Public Environment Report: Chalumbin Wind Farm, near Ravenshoe, Queensland (reference: 2021/8983)* (PER Guidelines), issued by the Department of Agriculture, Water and the Environment (DAWE) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), which relates to the development of a detailed outline of a Weed and Pest Management Plan to be prepared for the Project.

Section 7.2.2 of the PER Guidelines requires:

- *A weed and pest management plan that includes management of Phytophthora cinnamomic, Chytrid amphibian fungus, Myrtle Rust and any other relevant weeds and pests.*

This Plan is not intended for implementation purposes, nor as a stand-alone report, and therefore does not:

- Describe the Project (a comprehensive Project description is provided within section 2.0 of the PER);
- Describe the proposed Project construction works (a description of the proposed construction activities is provided within section 2.3 of the PER);
- Provide a detailed analysis of aspects and impacts associated with Matters of National Environmental Significance (this analysis is provided within sections 4.0 and 5.0 of the PER);
- Identify mitigation and management measures beyond those specifically requested for inclusion by DAWE (the proposed safeguards and mitigation measures are provided within section 6.0 of the PER).



## 2.0 Objectives

The objectives of this Weed and Pest Management Plan are to:

- Mitigate the spread and reduce the adverse impacts of existing infestations through appropriate control methods and hygiene procedures of identified weed and pest species including the ongoing monitoring and reporting throughout all stages of the Project;
- Meet regulatory obligations and associated biosecurity management plans; and
- Minimise the introduction of new species to the site and prevent the spread of new and existing species across the site.



### 3.0 Weed and Pest Management

Database searches of the Study area (including the PMST) found records of 54 introduced flora and 19 introduced fauna species (see Table 5.7). Of these, 13 flora and 7 fauna are listed as a restricted or prohibited matter under the Queensland *Biosecurity Act 2014* (categories are provided in **Table 3.1**), and 10 flora species listed as Weeds of National Significance (WoNS). Species that are listed as Priority Pest Species under the Tablelands Regional Council (TRC) Biosecurity Plan 2019-2024 are also provided in **Table 3.1**.

Restricted matter is biosecurity matter found in Queensland that may have a significant impact on human health, social amenity, the economy or the environment (Queensland Government 2022). Restricted matter can include:

- diseases, viruses or parasites;
- invasive animals or plants (e.g. pest animals or weeds).

Under the *Biosecurity Act 2014*, a person who has control over a Restricted Matter must not do the following:

- Category 1 – take any action likely to exacerbate the biosecurity risk;
- Category 3 – a person who has, or has a thing infested with, the Restricted Matter in the person’s possession or under the person’s control must not distribute or dispose of the restricted matter unless the distribution or disposal is carried out via the methods set out in the *Biosecurity Act 2014*;
- Category 4 – move the Restricted Matter, or cause or allow it to be moved;
- Category 5 – keep in the person’s possession or under the person’s control; and
- Category 6 – give food to the Restricted Matter.

**Table 3.1 Classification of Pest Flora and Fauna Species**

Species Name	Source	Biosecurity Act Category	WoNS	TRC Priority Pest Species
<b>Flora</b>				
<i>Acacia nilotica</i> subsp. <i>Indica</i> , prickly acacia	PMST		Yes	
<i>Aeschynomene villosa</i>	WildNet			
<i>Ageratum conyzoides</i> , billygoat weed	WildNet			
<i>Annona glabra</i> , pond apple	PMST	3	Yes	
<i>Axonopus compressus</i>	WildNet			
<i>Axonopus fissifolius</i>	WildNet			
<i>Bidens pilosa</i>	WildNet			
<i>Cabomba caroliniana</i> , fanwort	PMST	3	Yes	



Species Name	Source	Biosecurity Act Category	WoNS	TRC Priority Pest Species
<i>Cenchrus ciliaris</i> , buffel-grass	PMST			
<i>Cestrum elegans</i>	WildNet			
<i>Chamaecrista rotundifolia</i> var. <i>rotundifolia</i>	WildNet			
<i>Chromolaena odorata</i> , Siam weed	WildNet	3		Yes
<i>Cirsium vulgare</i> , spear thistle	WildNet			
<i>Crassocephalum crepidioides</i> , thickhead	WildNet			
<i>Cryptostegia grandiflora</i> , rubber vine	PMST	3	Yes	Yes
<i>Cyperus profler</i> , dwarf papyrus	WildNet			
<i>Dichrocephala integrifolia</i>	WildNet			
<i>Dolichandra unguis-cati</i> , cat's claw creeper	WildNet	3	Yes	Yes
<i>Eragrostis Mexicana</i> , Mexican lovegrass	WildNet			
<i>Erechtites valerianifolius</i> forma <i>valerianifolius</i>	WildNet			
<i>Erigeron bonariensis</i>	WildNet			
<i>Erigeron pussilus</i>	WildNet			
<i>Euphorbia hirta</i>	WildNet			
<i>Hymenachne amplexicaulis</i> , olive hymenachne	PMST	3	Yes	Yes
<i>Hyparrhenia rufa</i> subsp. <i>altissima</i>	WildNet			
<i>Hypoestes phyllostachya</i>	WildNet			
<i>Impatiens walleriana</i> , balsam	WildNet			
<i>Lantana camara</i> , lantana	PMST WildNet	3	Yes	Yes
<i>Leucas zeylanica</i>	WildNet			



Species Name	Source	Biosecurity Act Category	WoNS	TRC Priority Pest Species
<i>Mecardonia procumbens</i>	WildNet			
<i>Parthenium hysterophorus</i> , parthenium weed	PMST	3	Yes	Yes
<i>Paspalum paniculatum</i> , Russell River grass	WildNet			
<i>Paspalum urvillei</i> , vasey grass	WildNet			
<i>Plantago major</i> , greater plantain	WildNet			
<i>Praxelis clematidea</i>	WildNet			
<i>Pyllanthus tenellus</i>	WildNet			
<i>Phyllostachys bambusoides</i>	WildNet			
<i>Richardia brasiliensis</i> , white eye	WildNet			
<i>Salvinia molesta</i> , salvinia	PMST	3	Yes	Yes
<i>Scoparia dulcis</i> , scoparia	WildNet			
<i>Senecio madagascariensis</i> , fireweed*	PMST	3	Yes	Yes
<i>Senna septemtrionalis</i>	WildNet			
<i>Setaria pulia</i> subsp. <i>subtesselata</i>	WildNet			
<i>Sida rhombifolia</i>	WildNet			
<i>Solanum americanum</i>	WildNet			
<i>Solanum lasiocarpum</i>	WildNet			
<i>Solanum mauritianum</i> , wild tobacco	WildNet			
<i>Sporobolus fertilis</i> , giant Parramatta grass	WildNet	3		
<i>Sporobolus pyramidalis</i> , giant rat's tail grass	WildNet	3		Yes
<i>Stachytarpheta jamaicensis</i> , Jamaica snakeweed	WildNet			
<i>Stevia ovata</i>	WildNet	3		Yes
<i>Urena lobata</i> , urena weed	WildNet			



Species Name	Source	Biosecurity Act Category	WoNS	TRC Priority Pest Species
<i>Urochloa decumbrens</i>	WildNet			
<i>Verbena incompta</i>	WildNet			
<b>Fauna</b>				
<i>Acridotheres tristis</i> , common myna	PMST			
<i>Anas platyrhynchos</i> , mallard	PMST			
<i>Bos taurus</i> , domestic cattle	PMST			
<i>Canis lupus dingo</i> , dingo	WildNet	3, 4, 5, 6		
<i>Canis lupus familiaris</i> , domestic dog	PMST WildNet	3, 4, 6		Yes
<i>Columba livia</i> , rock pigeon	PMST			
<i>Felis catus</i> , domestic cat	PMST WildNet	3, 4, 6		Yes
Feral deer	PMST	3, 4, 6		
<i>Hemidactylus frenatus</i> , Asian house gecko	PMST			
<i>Lonchura punctulate</i> , nutmeg mannikin	PMST			
<i>Mus musculus</i> , house mouse	PMST WildNet			
<i>Oryctolagus cuniculus</i> , rabbit	PMST WildNet	3, 4, 5, 6		Yes
<i>Passer domesticus</i> , house sparrow	PMST			
<i>Rattus rattus</i> , black rat	PMST WildNet			
<i>Rhinella marina</i> , cane toad	PMST WildNet			
<i>Streptopelia chinensis</i> , spotted turtle-dove	PMST			
<i>Sturnus vulgaris</i> , common starling	PMST			



Species Name	Source	Biosecurity Act Category	WoNS	TRC Priority Pest Species
<i>Sus scrofa</i> , pig	PMST WildNet	3, 4, 6		Yes
<i>Vulpes vulpes</i> , red fox	PMST	3, 4, 5, 6		
<b>Fungal Disease</b>				
<i>Austropuccinia psidii</i> , myrtle rust (fungal disease)	Known distribution: Widespread across Queensland, limited detections west of Great Dividing Range (Queensland Government, 2021)			
<i>Batrachochytrium dendrobatidis</i> , chytrid fungus (amphibian infectious disease)	Known distribution: Confined to relatively cool and wet areas of the Great Dividing Range and adjacent coastal areas of Queensland (DSEWPC 2022)	1		
<i>Phytophthora cinnamomi</i> , root rot (plant pathogen)	Known distribution: Relatively uncommon in Far North Queensland (Burgess et al. 2016)			

Weeds, diseases and other pests have the potential to establish and/or spread across the Project area during construction. An increase of opportunistic weed and pest colonisation creates numerous environmental impacts through displacement of native species from increased resource competition, the prevention of seedling recruitment of native plant species, alteration of geomorphological and hydrological cycles, changes to soil nutrients, fire regimes, the degradation of fauna habitat and subsequent changes of fauna abundance (DEC 1999).

Weeds may be introduced and spread by vehicles or by contaminated soil or materials bought into the Project area (e.g. machinery, equipment, clothing and boots). The *Biosecurity Act 2014* provides a legislative framework to manage pest flora and fauna, diseases and environmental contaminants, to address the impacts they have on the economy, environment, agriculture, tourism and society. The Act prohibits or restricts the introduction and spread of declared plant and animal pests within Queensland and directs obligations in taking reasonable and practical measures to prevent or minimise biosecurity risks associated with activities undertaken.

The implementation of weed and pest control mechanisms will be consistent with best practice guidelines in response to the detection of pest flora and fauna in the Project area. Relevant guidelines include:

- Australian Pest Animal Strategy 2017 – 2027, Invasive Plants and Animals Committee, Cwth Department of Agriculture and Water Resources, 2017;
- Principles of pest management, Queensland Department of Agriculture and Fisheries; and
- Controlling pest animals on your property, Business Queensland.



These are discussed in further detail in the following sections.

### **3.1 Weed Control Methods**

General weed control methods are listed as follows and will be adapted for specific weeds of concern based on national, state and local legislative requirements.

#### **3.1.1 Integrated Management**

The concept of integrated management involves the use of a variety of control methods described below. The integrated management method is ideal to use across broad areas that may be constrained by a number of environmental, safety or other concerns that a single management option is insufficient to work effectively and address the weed and pest management concerns. The most appropriate control methods will be adapted and selected for individual outbreaks within the Project area, in consultation with pest contractors and as per published guidelines.

#### **3.1.2 Controlled Burns**

A controlled burn in areas of sufficient infestation of some weed species is a control measure that may be implemented. Controlled burns would be commenced in the cooler months of the year and in a manner that allows for adequate control of the fire to prevent damage to adjacent areas. Controlled burns have a high weed control success when used in conjunction with the application of appropriate herbicides. Prior to any controlled burns there is a requirement to obtain a Permit to Light from the Rural Fire Brigade. If this method is to be adopted, and is likely to affect external parties, it would be undertaken in consultation with landowners and interested stakeholders. Controlled burning regimes require competent and qualified personnel to conduct such fire ecology specialist works and such expertise will be consulted with to implement the method.

Controlled burns would be undertaken in accordance with the fire regimes specified for each respective regional ecosystem within the *Queensland Herbarium Regional Ecosystem Fire Guidelines – December 2021*.

#### **3.1.3 Weed Removal**

Manual removal is an intensive, effective method of eradicating infestation in instances of isolated weed presence. The overall success of manual removal of weeds is based on the ability to remove any material that may result in regeneration of the species; this includes but is not limited to root systems, branches, leaves, seeds and other reproductive material. This method is best applied to areas where the species have only recently started to occur or at the end of an intensive treatment regime where there are only isolated plants occurring.

#### **3.1.4 Herbicide Application**

Herbicide control is the most used control method for managing weed species. Herbicide treatments are commonly used in conjunction with other control methods or repeat applications. Herbicide application requires trained, competent and qualified personnel to implement the method. Herbicides should only be used as directed by the product label and all safety procedures and warnings detailed in the Material Safety Data Sheet (MSDS) should be adhered throughout any application treatment.



## **3.2 Weed Hygiene Procedures**

### **3.2.1 Personal**

All personnel are required to take all necessary steps throughout project activities to ensure weed seeds, contaminated plant material and mud attached to personal items (clothing, including boots, laces, socks, trousers, shirt cuffs or pockets) is adequately removed. The following personal weed hygiene measures are aimed at ensuring weed spread is minimised by all personnel:

- Clothing is to be regularly inspected and cleaned (brushed down) throughout the day when working in any areas where weeds may be present (i.e. grassy paddocks, bushland and road side areas etc.);
- Prior to departing areas of weed infestation; clothing, footwear and any other personal equipment (i.e. bags, jackets etc.) must be inspected and cleaned of any attached seeds, grass or mud.

### **3.2.2 Equipment and Machinery**

The aim of wash-downs/cleaning is to be systematic, consistent and thorough in the washing down of all areas and parts of the vehicle and machinery to remove mud/weeds and seeds and minimise contamination potential. Vehicles/equipment travelling from a declared restricted place or quarantine area will undertake a washdown prior to accessing site and moving to a weed free area will possess a current weed hygiene inspection certificate from an inspector who is deemed competent and is certified in line with DAF requirements.

## **3.3 Pest Control Methods**

There exists an opportunity to design and implement a comprehensive invasive pest species control program that targets the pest species known to be present (and populous) within the Project area.

### **3.3.1 Integrated Pest Management**

The concept of integrated management involves the use of a variety of control methods, as described above. Integrated pest management will not be commenced without consultation with affected relevant stakeholders, and/or relevant government bodies as required by statutory commitments. This will allow for a coordinated approach to management of target species to ensure successful pest management.

### **3.3.2 Baiting**

Baiting for pest species is a cost effective and proven management control. Baiting requires trained and qualified personnel to utilise baits for pest control. Pest baiting requires knowledge of what species are being targeted so that appropriate deployment and bait are utilised. A detractor to use of baits is their potential appeal to non-targeted species. Prescribed baiting campaigns will be organised in consultation with relevant stakeholders.

### **3.3.3 Trapping**

Trapping is a common alternative to baiting in areas where baiting poses a high risk to humans, livestock or native wildlife. Trapping for small animals such as rats and mice provides all year management and is very low cost, low labour intensity and no training or qualification are required. Trapping for the larger fauna such as foxes and cats is



a method that is best utilised when the objective is to manage low population numbers. This control method requires trained and skilled personnel. Trapping devices are to be inspected daily for success and pests captured are to be disposed of promptly and humanely.

### 3.3.4 Shooting

Shooting of pests is occasionally carried out by qualified persons. This control method is only effective for low numbers of pest animals and is undertaken opportunistically.

**Table 3.2** provides examples of approved species-specific feral animal control measures recommended by the Queensland and Commonwealth governments.

**Table 3.2 Species specific control methods for pest animals**

Species	Control Method
Pig ( <i>Sus scrofa</i> )	Trapping – funnel entrance/tripped-gate entrance/pig-specific trigger Shooting – ground shooting or shooting from helicopter Baiting – 1080 poison baits selectively positioned (DAF 2020a)
Fox ( <i>Vulpes vulpes</i> )	Ground baiting – 1080 and PAPP poison baits selectively positioned Shooting – highly selective and carried out at night (DAF 2020b)
Cat ( <i>Felis catus</i> )	Shooting – highly selective and carried out at night Baiting – fresh meat baits containing 1080 poison baits Trapping – rubber-jawed, leg-hold traps in ideal locations (DAF 2020c)
Dogs ( <i>Canis lupus familiaris</i> )	Ground baiting – 1080 and PAPP poison baits selectively positioned Foot hold traps – must be padded or offset laminated jawed traps Shooting – opportunistic method (DAF 2020d)

## 3.4 Disease Management

### 3.4.1 Myrtle rust (*Austropuccinia psidii*)

Myrtle rust is a fungal disease caused by the fungus *Austropuccinia psidii* affecting many plants within the Myrtaceae family. The full extent of impact this disease has on native plant communities, natural systems and associated wildlife in Australia is unknown (Queensland Government 2022). Rusts are highly transportable – spores can be spread by contaminated clothing, infected plant material, equipment and hand tools. Management for prevention and treatment include biological controls, life-cycle interruption, microclimate manipulation, the use of chemical controls, and a combination of these.



### 3.4.1.1 Control Methods for Myrtle rust (*Austropuccinia psidii*)

**Table 3.3 Control Methods for Myrtle rust (*Austropuccinia psidii*)**

Weeding of infected plants: Ineffective	Fire: Ineffective	Containment and Exclusion	Chemical
<ul style="list-style-type: none"> <li>▪ The fungus is fully autoecious, requiring only one species of host (or in this case any of a large suite of hosts) throughout its life cycle (Morin et al. 2014; Stewart et al. 2017), and so is not susceptible to control via removal of an alternate host.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lightweight spores will be mobilised by fire updraught into the air column before heat kills them and distributed in unaffected areas. Moreover, the post-fire vegetation response of seedling germination and re-sprouting will provide a large bed of exactly the sort of young plant tissue that is most vulnerable to reinfection. The likelihood of reinfection from adjacent unburnt areas will usually be high, and the rapid life cycle of the rust will allow it to bulk up long before the regenerating tissues reach an age of lower vulnerability.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Containment is only likely to be successful in cases of geographic isolation from other areas of infection, coupled with very early detection and a rapid and well-organised response with the aim of eradication.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No chemical treatment identified to eradicate <i>A. psidii</i>/Resistance promoters (similar to Phosphite for <i>P. cinnamomi</i>) are yet to be evaluated for Myrtle rust.</li> <li>▪ Fungicides and chemicals to be used under the Emergency Permit (PER12156):               <ul style="list-style-type: none"> <li>○ Amistar 250 SC fungicide and other registered products containing 250 g/L azoxystrobin as its only active constituent, Amistar WG fungicide and other registered products containing 500 g/kg azoxystrobin as its only active constituent, Bayfidan 250 EC fungicide and other registered products containing 250 g/L triadimenol as its only active constituent, Saprool fungicide and other registered products containing 190 g/L triforine as its only active constituent and Tilt 250 EC systemic fungicide and other registered products containing 250 g/L propiconazole as its only active constituent.</li> <li>○ The labels provide information on the suitability of the</li> </ul> </li> </ul>



Weeding of infected plants: Ineffective	Fire: Ineffective	Containment and Exclusion	Chemical
			<p>fungicide for the application. The approved fungicides vary in their mode of action, being either contact, translaminar or systemic (see AVPMA permit).</p>

### 3.4.1.2 Hygiene Procedures for Myrtle rust (*Austropuccinia psidii*)

**Table 3.4 Hygiene Procedures for Myrtle rust (*Austropuccinia psidii*)**

Low-level (General)	Medium-level	High-level
<ul style="list-style-type: none"> <li>▪ Relevant to all bushland in myrtle rust risk areas:               <ul style="list-style-type: none"> <li>○ Clean vehicles weekly with high pressure spray and antifungal disinfectant (e.g. 5% Farmcleanse), including undersides and wheel arches.</li> <li>○ Decontaminate inside vehicles weekly (e.g. with 70% methylated spirits) concentrating on seats, steering wheel and floors.</li> <li>○ Commence each day with clean clothes.</li> <li>○ Decontaminate boots and hat each day (e.g. with 70% methylated spirits).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Relevant to non-critical sites for threatened Myrtaceae and ecological communities; other bushland remote from high human activity and known infected sites; known infected sites:               <ul style="list-style-type: none"> <li>▪ Before/after fieldwork: low-level protocol;</li> <li>▪ At site entry/exit: nominate decontamination point.</li> <li>▪ Vehicle:                   <ul style="list-style-type: none"> <li>○ Spray exterior of vehicle (e.g. with 70% methylated spirits) paying attention to undersides, wheel arches and chassis.</li> <li>○ Remove any vegetation and dirt where practical from the undersides of the vehicle.</li> <li>○ Spray inside the vehicle (e.g. with 70% methylated spirits) concentrating on seats, steering wheel and floors.</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Before/after work: low-level protocol and ensure all personnel trained in the use of PPE</li> <li>▪ Full personnel and vehicle procedures</li> <li>▪ Site entry/exit:               <ul style="list-style-type: none"> <li>○ Nominate a decontamination point that is situated away from the location of threatened species or other high-value assets.</li> <li>○ Define a 'quarantine' line – this is the line that separates 'clean' from 'dirty'. Use a mark to indicate a line on the ground if appropriate.</li> <li>○ Lay down a ground sheet if necessary.</li> </ul> </li> <li>○ Transfer any excess clothing and all unnecessary items from pockets to the vehicle.</li> <li>○ Make up disinfectant in accordance with instructions as</li> </ul>



Low-level (General)	Medium-level	High-level
	<p>Alcohol wipes can be used for inside vehicles.</p> <ul style="list-style-type: none"> <li>○ Spray equipment (e.g. with 70% methylated spirits). Alcohol wipes can be used on hand tools.               <ul style="list-style-type: none"> <li>▪ Personnel:</li> </ul> </li> <li>○ Spray from head to toe (e.g. with 70% methylated spirits) including hats and boots.</li> <li>○ Use alcohol wipes for hands and personal effects like sunglasses, phones and GPS.</li> <li>○ Clean dirt from the soles of boots.               <ul style="list-style-type: none"> <li>▪ Materials:</li> </ul> </li> <li>○ Leave all organic material (e.g. weeds, mulched vegetation, soil) from known infected sites on site.</li> <li>○ Limit travel between multiple sites in a day.</li> <li>○ Repeat personal and vehicle decontamination when entering or leaving each site.</li> </ul>	<p>required – both tub and sprayer. Fill bucket with water and soap, and place a towel nearby.</p> <ul style="list-style-type: none"> <li>○ Take all equipment and personal items to go on-site to the line now, NOT later; only take what is needed and do not go back and forth over the line.</li> <li>○ Dip or spray all the items to go on-site in disinfectant. Put on PPE appropriate to the task and in accordance with the task risk assessment and procedure.</li> <li>○ Put PPE on in the following order: clean shirts, shorts, socks and gloves (unless hands are washed at the end and then put on gloves), overalls, footwear, respiratory protection, eyewear, overall hood.</li> <li>○ Note: a snood for beards must be worn only if a P2 mask is not required. P2 masks, half and full face respirators are not suitable for personnel with beards.</li> <li>○ Enter the site. Once on-site, all items needed on the site should be reachable from the site side of the line, including the first aid kit.</li> </ul>

### 3.4.2 *Phytophthora cinnamomi*

*P. cinnamomi* is a soilborne fungus and is easily spread through the movement of soil, organic matter and water. Zoospores (motile asexual spores) are important for the rapid spread of the pathogen. This occurs when free water is present in the soil or on aerial plant surfaces (DAF 2013). Methods for prevention include mapping presence of *P. cinnamomi* within area of interest if resources allow strict hygiene procedures for movement between sites and procedures for high-risk activities that potentially disturb soil or facilitate runoff. *P. cinnamomi* cannot be completely eradicated however, chemical treatment can provide protection to susceptible plants.



### 3.4.2.1 Control Methods for *Phytophthora cinnamomic*

**Table 3.5 Control Methods for *Phytophthora cinnamomi***

Planning and Timing	Materials	Procedures during constructions	Procedures during restoration/ fire management
<ul style="list-style-type: none"> <li>▪ Activities including fire break maintenance, slashing and removal of woody weeds to occur in dry soil conditions i.e., scheduled between March-November and postponed during and following rainfall (grading of gravel roads can occur when the road is damp but not wet).</li> <li>▪ Survey the area for <i>P. cinnamomi</i> for presence or absence.</li> <li>▪ Annual monitoring for signs of infection.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Materials brought onto the site is to be free of <i>P. cinnamomi</i> – certified by NIASA. If a site is infested, materials do not need to be free of <i>P. cinnamomi</i>.</li> <li>▪ Stockpile topsoil and return it to the site in preference to importing fill.</li> <li>▪ Scheme or bore water, or sterilised water to be used.</li> <li>▪ Store materials at the work site on a hard, dry, well-drained surface that does not drain towards vegetation, and is already clear of vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Stay within the construction zone and on designated access track - avoid accessing areas that are wet and muddy.</li> <li>▪ When grading: grade from upslope to downslope (when applicable), grading equipment is to be clean before commencing work, the angle of grader blade is to be adjusted to avoid carrying soil/gravel long distances and do not grade wider than prescribed.</li> <li>▪ Minimise the number of tracks, ensure they have hard, dry and well-drained surfaces.</li> <li>▪ Proposed tracks should not travel from infested to uninfested and mapping of <i>P. cinnamomi</i> prior to development.</li> </ul>	<ul style="list-style-type: none"> <li>▪ If weeds are being manually removed, they should be immediately placed in a container, so plant material or soil is not dropped into other parts of the site.</li> <li>▪ Revegetation has a high risk of introducing <i>P. cinnamomi</i>, but if required:               <ul style="list-style-type: none"> <li>○ Direct seeding rather than planting seedlings;</li> <li>○ Purchase plants from nurseries by NIASA, or nurseries with excellent hygiene procedures;</li> <li>○ If using mulch, ensure that it has been well composted (the heating part of the composting process kills <i>P. cinnamomi</i>).</li> </ul> </li> <li>▪ When maintaining firebreaks by grading, do not grade wider than the existing area and mow, slash or use herbicide rather than plough or grade.</li> </ul>



### 3.4.2.2 Hygiene Procedures and Treatment for *Phytophthora cinnamomic*

**Table 3.6 Hygiene Procedure and Treatment for *Phytophthora cinnamomi***

Machinery and light vehicle	Clothing, footwear and small hand tools	Treatment
<ul style="list-style-type: none"> <li>▪ Vehicles, machinery and equipment to be visually inspected free of mud and soil when transporting material, moving between sites, entering and exiting site.</li> <li>▪ Clean down method should follow:</li> <li>▪ Brush down station located on a hard, well-drained surface e.g. a road well away from remnant vegetation.</li> <li>▪ remove dried mud and soil with a brush/spade/bar or compressed air and remaining/wet soil washed off with a hose. Ensure runoff does not enter nearby drains or bush.</li> <li>▪ all parts of vehicle to be cleaned, with emphasis on tyres and mudflaps.</li> <li>▪ A Vehicle Inspection Field Sheet must accompany any vehicle exiting a field hygiene facility (e.g. Hygiene inspection form and Hygiene Register).</li> <li>▪ Vehicles should carry a biosecurity hygiene kit (Commonwealth of Australia 2015) containing:               <ul style="list-style-type: none"> <li>▪ plastic tub with a lid (to carry items and to use as a footbath)</li> <li>▪ stiff brush</li> <li>▪ newspaper to cover the foot well of vehicles (replace with clean newspaper regularly)</li> <li>▪ dustpan and brush; possibly also a long-handled broom</li> <li>▪ plastic bag for sweepings and dirty newspaper</li> <li>▪ drum of water and sterilising solution, i.e.:</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Use a small brush and spray bottle (70% methylated spirits, 30% water) spray and leave for 2 minutes, scrub thoroughly to make sure there is no soil attached. Spray again with methylated spirits to rinse (Worboys and Gadek 2004).</li> <li>▪ Collect removed mud and soil in a bag or bucket and dispose of in an infested site or where there is no remnant vegetation.</li> <li>▪ Soak soiled equipment/workwear for 2 minutes in a tub of 1 part bleach (containing active ingredient sodium hypochlorite) and 10 parts water, then rinse (follow manufacturer's procedure).</li> <li>▪ Sterilising water: add 6mL of sodium hypochlorite to every 10L water</li> </ul>	<ul style="list-style-type: none"> <li>▪ Presently there is no cure for <i>P. cinnamomi</i>, however chemical treatment of Phosphite (Fosject 200), a biodegradable fungicide, provides protection to susceptible plants.</li> <li>▪ Injection into trees or spraying understorey foliage is most effective for protection, but also helps infected plants recover:               <ul style="list-style-type: none"> <li>Injecting provides protection for 3-5 years;</li> <li>Spraying for 2-3 years.</li> </ul> </li> </ul>



Machinery and light vehicle	Clothing, footwear and small hand tools	Treatment
<ul style="list-style-type: none"> <li>▪ solution of 70% ethanol/methylated spirits in 30% water</li> <li>▪ 20% household bleach (with 5% active ingredient) in 80% water</li> <li>▪ quaternary ammonium disinfectant diluted according to manufacturer's directions</li> <li>▪ spray bottle containing sterilising solution (as above)</li> <li>▪ alcohol wipes or gel for hands and personal items.</li> </ul>		

### 3.4.3 Chytrid Fungus (*Batrachochytrium dendrobatidis*)

Chytridiomycosis is an infectious disease that affects amphibians worldwide and is caused by the chytrid fungus (*B. dendrobatidis*), a fungus capable of causing sporadic deaths in some amphibian populations and 100 per cent mortality in others. *B. dendrobatidis* is transferred by direct contact between frogs and tadpoles, or through exposure to infected water. The disease may not kill frogs immediately, and they can swim or hop to other areas before they die, spreading fungal spores to new ponds and streams, thus it is very important not to move frogs from one area to another.

There is no evidence that the amphibian chytrid fungus or other pathogens of amphibians have been transmitted between water catchments by vehicles, footwear or clothing (Speare et al. 2004). Nevertheless, vehicles, machinery and personal hygiene will be undertaken between movement of sites to reduce the risk of spreading other pathogens (Myrtle rust and *P. cinnamomi*).

The greatest risk of transmission of infectious agents is when amphibians are placed together in contact or in the same container or in containers reused for holding amphibians without disinfection between amphibians. Humans aid in the transmission and spread of chytrid fungus within and among amphibian populations, therefore strict hygiene protocols are paramount when working in habitat of rare, geographically restricted or threatened species.

#### 3.4.3.1 Hygiene Procedures and Treatment for Chytrid Fungus (*Batrachochytrium dendrobatidis*)

When travelling across the Project area, it is recommended that the following hygiene precautions be undertaken to minimise the transfer of disease from footwear, equipment and/or vehicles.

**Table 3.7 Hygiene Procedures and Treatment for Chytrid Fungus (*Batrachochytrium dendrobatidis*)**

Footwear	Equipment	Vehicles	Handling of frogs
<ul style="list-style-type: none"> <li>▪ Footwear must be thoroughly cleaned and disinfected at the commencement of</li> </ul>	<ul style="list-style-type: none"> <li>▪ Equipment such as nets, balances, callipers, bags, scalpels, headlamps, torches, wetsuits</li> </ul>	<ul style="list-style-type: none"> <li>▪ Where necessary, vehicle tyres should be sprayed/flushed with a disinfecting</li> </ul>	<ul style="list-style-type: none"> <li>▪ Where handling of frogs is necessary the risk of pathogen transfer should be minimised as follows:</li> </ul>



Footwear	Equipment	Vehicles	Handling of frogs
<p>fieldwork and between each sampling site.</p> <ul style="list-style-type: none"> <li>▪ This can be achieved by initially scraping boots clear of mud and standing the soles in a disinfecting solution. The remainder of the boot should be rinsed or sprayed with a disinfecting solution that contains benzalkonium chloride as the active ingredient. Disinfecting solutions should be prevented from entering any water bodies.</li> <li>▪ Rubber boots such as 'gum boots' or 'Wellingtons' are recommended because of the ease with which they can be cleaned and disinfected.</li> <li>▪ Several changes of footwear bagged between sites might be a practical alternative to cleaning</li> </ul>	<p>and waders etc. that are used at one site must be cleaned and disinfected before reuse at another site.</p> <ul style="list-style-type: none"> <li>▪ Disposable items should be used where possible. Non-disposable equipment should be used only once during a particular field exercise and disinfected later or disinfected at the site between uses using procedures outlined in 2.4 below.</li> </ul>	<p>solution in high-risk areas.</p> <ul style="list-style-type: none"> <li>▪ Transmission of disease from vehicles is unlikely to be a problem. However, if a vehicle is used to traverse a known frog site, which could result in mud and water being transferred to other bodies of water or frog sites, then wheels and tyres should undergo cleaning and disinfection. This should be carried out at a safe distance from water bodies, so that the disinfecting solution can infiltrate soil rather than runoff into a nearby water body.</li> <li>▪ Spraying with 'toilet duck' (active ingredient benzalkonium chloride) is recommended to disinfect car wheels and tyres.</li> <li>▪ Cleaning of footwear before getting back into the car will prevent the transfer of pathogens from/to vehicle floor and control pedals.</li> </ul>	<ul style="list-style-type: none"> <li>○ Single-use gloves (latex, nitrile or vinyl) and/or;</li> <li>○ Single-use lightweight plastic bags;</li> <li>○ Adequate cleaning of hands and handling equipment;</li> <li>○ If gloves unavailable: wash hands with 70% ethanol and dry. If ethanol unavailable, wash hands in water amphibian is normally exposed to</li> <li>○ Where amphibians must be held temporarily: <ul style="list-style-type: none"> <li>• Individuals should be housed in single-use containers (e.g. plastic bags) or in containers disinfected between each animal</li> <li>• Adults should not be held in groups.</li> <li>• Tadpoles from the same water body may be housed for short periods in a common container, although overcrowding should be avoided.</li> </ul> </li> <li>▪ Longer holding times (&gt;60 min) will require changes to water and the provision of appropriate food (&gt;24 h). Return to same site it was retrieved.</li> </ul>



Disinfecting agents for hands and equipment must be effective against bacteria and both the vegetative and spore stages of fungi. The agents outlined in **Table 3.8** are recommended for the application to equipment, footwear and cloth as summarised below by Phillot et al. (2010) and Web at al. (2021):

**Table 3.8 Disinfection methods for Chytrid Fungus (*Batrachochytrium dendrobatidis*)**

Application	Disinfectant	Strength	Time
Collection equipment and containers	Sodium hypochlorite (bleach contains 4% sodium hypochlorite)	1%	1 min
	Path X or quaternary ammonium compound 128	1 in 500 dilution	0.5 min
	Trigene	1 in 5000 dilution	1 min
	F10	1 in 1500 dilution	1 min
	Virkon	2 mg ml <sup>-1</sup>	1 min
	Potassium permanganate	1%	10 min
	Complete drying		>3 hours
	Heat 60 C		30 min
	Heat 37 C		8 hours
Footwear	Sodium hypochlorite (bleach contains 4% sodium hypochlorite)	1%	1 min
	Path X or quaternary ammonium compound 128	1 in 500 dilution	0.5 min
	Trigene	1 in 5000 dilution	1 min
	F10	1 in 1500 dilution	1 min
	Phytoclean (30% benzalkonium chloride)	0.075%	1 min
	Complete drying		>3 hours
Cloth (clothing, bags)	Hot wash 60°C or greater		30 min



## 4.0 Monitoring and Reporting

Monitoring of weed populations, control methods, decreasing or increasing populations, problematic species and new detections should be continuous throughout all stages of the wind farm. It is the responsibility of the Principal Contractor and/or the Environmental Officer to ensure progressive records and observations of weed management are kept. The establishment of performance indicators will help identify that the most efficient and effective methods of weed and pest management are being implemented throughout the construction and operational phases of the Project. Updates, amendments and corrections to the management actions will be made annually and reported upon accordingly to reflect changes to weed statuses (new threats or decreases in threats) on the wind farm, changes to legislation, and other relevant amendments as deemed necessary.



## 5.0 References

This Pest and Weed Management Plan Outline has been developed with reference to the following:

- Department of Environment and Climate Change (NSW) 2008. Hygiene protocol for the control of disease in frogs. Information Circular Number 6. DECC (NSW), Sydney South.
- Myrtle rust | Business Queensland (2021)
- Pest Weeds & Feral Animal Management - TRC - Tablelands Regional Council
- Office of Environment and Heritage (OEH). (2011). Management of Myrtle Rust on the National Parks Estate. NSW Government.
- Australian Nursery Industry. (2012). Australian Nursery Industry Myrtle Rust Management Plan version 2.0.
- Tablelands-Biosecurity-Plan-2019-24.pdf
- Myrtle rust | Business Queensland
- Phytophthora root rot | Department of Agriculture and Fisheries, Queensland (daf.qld.gov.au)