Species Management Plan

Myrtle Rust impacted species:

Native Guava *Rhodomyrtus psidioides*
Scrub Turpentine *Rhodamnia rubescens*

Scrub Turpentine with Myrtle Rust

Native Guava – Myrtle Rust damage on foliage

Prepared: December 2021

Forestry Corporation

Table of Contents

INTRODUCTION

Myrtle Rust (*Austropuccinia psidii*) (MR) is a fungal disease that infects plants in the Myrtaceae family. The rust, first discovered in NSW in 2010, was quickly determined to be readily dispersed by wind and is now found in NSW, Victoria, Queensland, Tasmania, the Northern Territory including the Tiwi Islands.
Two native species known to be seriously impacted by MR are the Scrub Turpentine *Rhodamnia rubescens* and Native Guava *Rhodomyrtus psidioides.*
Both species were listed as critically endangered due to the impacts of MR during 2019 along with the 'Introduction and establishment of exotic rust fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae' as a key threatening process' in 2011.

The listing of *R. psidioides* and *R. rubescens* occurred after the Coastal Integrated Forestry Operations Approval (State of NSW & EPA, 2018) was approved and a site-specific biodiversity condition (SSBC) was required to be sought for their management from the NSW Environment Protection Authority (EPA). This SSBC required the development of a species management plan. The SSBC conditions are detailed in Appendix 4. Following the partial completion of the initial aims of the conditions a report was submitted detailing findings of a far north coast program. This and discussions with experts, highlighted the need for further refinement of the aims of the species management plan to be developed. This required focus on locating, protecting, and monitoring the status of flowering and fruiting individuals along with providing the opportunity for further research and germplasm collection on those individuals.

SAVING OUR SPECIES (SOS) STATUS

Rhodamnia rubescens and *Rhodomyrtus psidioides* have been assigned to the 'Landscape' species management stream within the 'Saving our Species' program. This strategy aims to ensure that the species is secure in NSW and that its NSW geographic range is extended or maintained and maintain its conservation status under the Biodiversity Conservation Act 2016.

OBJECTIVES

The objectives of this species management plan are to:

- Provide an understanding of the spread of species records and a health and myrtle rust impact score for records (using standardised Department of Planning, Industry and Environment (DPIE) methodology) within the State Forest estate
- Provide for the development of a habitat model enabling an informed understanding of the modelled distribution of the extent of the population within the reserved network within State Forests and National Parks
- Identify and protect large healthy individuals and flowering and fruiting examples
- Provide opportunity for monitoring of these significant individuals / populations
- Provide for opportunities for the collection of germplasm (cuttings, suckers and seed)
- Provide for collaborative partnerships and monitoring of significant individuals / populations with DPI, DPIE, University projects and other land management agencies.

In addition to these listed conservation objectives, the use of tree retention clump provisions within the coastal IFOA are expected to protect additional individuals and populations of both species from ***forestry operations*** where these can also meet the other selection criteria and objectives listed in Protocol 22 (NSW EPA, 2018) for clumps.

COMMENCEMENT DATE

The program of management, targeted survey and monitoring will commence in March 2022.

DISTRIBUTION AND ABUNDANCE

Rhodamnia rubescens occurs in coastal areas within NSW, from Batemans Bay to the Qld border. It is typically coastal but has been recorded inland to escarpment areas up to and an elevation of 600m above sea level.
Rhodomyrtus psidioides typically occurs in coastal and sub-coastal areas from Broken Bay to the Qld border. It is known to occur up to 120km from the coast in the Hunter and Clarence River catchments and in the Border Ranges.

ECOLOGY AND BIOLOGY

Rhodamnia rubescens is a shrub or tree, to 25m tall, occurring in littoral rainforest, warm temperate and subtropical rainforests and wet sclerophyll forests.
Rhodomyrtus psidioides is also a shrub or tree, to 12m tall, occurring as a pioneer species in littoral rainforest, warm temperate and subtropical rainforests and wet sclerophyll forests in coastal areas from Broken Bay to the Qld border.
Myrtle rust has severely impacted both these species with most examples encountered exhibiting serious effects of infection, including lack of flowering and fruiting. Mature individuals along with examples known to be flowering or fruiting are very important.

CONSERVATION AND FOREST MANAGEMENT ISSUES

Within State Forests, *R. psidioides* and *R. rubescens* occur across the range of forest management zones, in riparian and other harvest exclusion zones and partly in regrowth open forest subject to harvesting and post-harvest burning. While myrtle rust is the primary risk to these species, it has been speculated that forestry operations, including harvesting and burning, may increase their susceptibility to the fungus by causing loss of mature individuals and leaving a greater proportion of those individuals in harvest areas in a regrowth state which is thought to be more vulnerable to myrtle rust. Observations to date are that the ratio of age class of individuals observed is heavily biased to a younger cohort with fewer older individuals being observed. Those older individuals recorded are suffering more heavily from the rust. The proportions are unknown, but it is expected that a large proportion of the total SF population may be in protected areas, with the remainder subject to harvesting and a much smaller proportion to post-harvest burning. These stands will be subject to a combination of regeneration and selection harvesting, in a mosaic within a Local area landscape of up to 1500 ha. Post-harvest burning is normally conducted if weather conditions allow but is patchy and doesn't affect the whole compartment. On average, about 30% of the net harvest area is directly affected by the operation (i.e. including soil disturbance and canopy removal).

There is serious concern about impact of the MR on the species including direct mortality and the lack flowering and fruiting leading to serious declines and lack of recruitment (Pegg et al 2014, Carnegie et al 2016). This species management plan is developed to identify, protect and monitor the survivorship of significant individuals of both species to better understand the impact on and management of the two species.

REQUIREMENTS

1. Distribution Surveys:

Surveys for *R. psidioides* and *R. rubescens* will be undertaken during Broad Area Habitat Searches in operational areas. Both *R. psidioides* and *R. rubescens* will be included in the Broad Area Habitat Searches undertaken by forest technicians during compartment markup where species are known to occur within 5km (CIFOA 2018). Individuals and populations of *R. psidioides* and *R. rubescens* recorded during pre-operational surveys will be assessed using standardised DPIE methodology (Appendix 2) and FCNSW data recording details (Appendix 3) to record the health and myrtle rust status of individuals / populations at the site. The aims these surveys is to provide a large amount of information on the condition and impact of the rust on both species across a broad area of State Forests and enable the detecting and protection of significant individuals that may be resistant to the rust. The information will be available to DPIE and SOS officers to assist in understanding and developing collaborative programs across tenures to better understand the impact and management of the two species.

2. Flora SMP Exclusion Zones

2.1 SMP Exclusion Zones - Selection and Protection:

a) Protect large healthy and/or reproductive individuals and cohorts within a 20 m exclusion zone, existing exclusion or wildlife habitat or tree retention clump (as per the criteria listed in **Protocol 22: Wildlife Habitat and Tree Retention Clumps** in the CIFOA).

b) Information on and location of these individuals will be provided to DPIE as soon as possible to enable the opportunity for additional plot measurements and / or samples to be taken.

(Note: a large healthy individual is described as having a diameter at breast height greater than 5cm, or greater than 5 metres in height for *R. psidioides*, greater than 15 metres in height for *R. rubescens*, and in good health. Good health refers to 75% or greater canopy density as indicated in the scoring detailed in appendix 2 and 3)

3. Monitoring:

Monitoring of a minimum of thirty individuals (or the maximum available if less than 30), identified as requiring protection as per section 2.1 of the SMP, where available, across both species' distribution, will be undertaken. These individuals will be monitored to assess ongoing survivorship of the individual plants and as way of identifying potentially MR-resistant plants. Plants assessed as being suitable for monitoring will be protected within tree retention clumps, existing exclusions or 20-metre flora species exclusion zones. The sites will be progressively established, where available, over a 2-year period as suitable individuals are located, with a progress update provided during the initial and ongoing review meetings.

A health and myrtle rust score assessment of the individual plants will be undertaken with comments relating to the disturbance history and survivorship of the individuals. The scoring system and example recording form is provided in Appendix 2 and 3 respectively. Digital recording of the survey and results will also be undertaken with Site, Census and number of individuals recorded captured using the FCNSW Map App on an IPAD and details including distance and bearing from a reference point or other marked trees, to facilitate re-location of the individual plant(s) to be monitored. In addition, for *R. psidioides*, monitoring of sucker fields, where present, will also be undertaken in the case of an existing deceased individual or one in very poor and declining health, to assess how long the root system

continues to produce suckers after the adult tree has died. A sucker field is defined as containing 10 or more young plants in an area that are associated with a dead or declining mature tree. These will be assessed as a count (or estimate where numbers exceed 30) with an average health score, average myrtle rust score, height average and range across the field of suckers.

Location of study sites

Sites monitored will be geographically spread across the range of species dependent upon the location of the individual plants detected where an exclusion zone is established. This will involve thirty sites established across the range of the species' distributions, which may result in a bias of the number of plots on the north coast of NSW due to the availability of individuals matching the selection criteria.

Factors measured and measurement frequency

Plants will be monitored annually to indicate ongoing survivorship with a score provided on the Myrtle rust infection level and plant health status.

IMPLEMENTATION TIMETABLE

		2023	2024	2025	2026	2027
Task	Proposed Commencement Date	Plot re-measure	Plot re-measure	Plot re-measure	Plot re-measure	
SMP approval	March-2022					
Rhodamnia rubescens and *Rhodomyrtus psidioides* SMP Exclusion Zone establishment Ongoing recording of individuals - MR infection and health status						
Significant site selection and Monitoring Surveys						
	Establishment and measure sites	Mar/April 2023	Feb/Mar 2024	Feb/Mar 2025	Feb/Mar 2026	Feb/Mar 2027
Results summarise and compilation	Sept/Oct 2022	Sept/Oct 2023	Sept/Oct 2024	Sept/Oct 2025	Sept/Oct 2026	Sept/Oct 2027
Review Meeting	Nov-22	Nov-23	Nov-24	Nov-25	Nov-26	Nov-27

NOTE: the timing of the commencement of plot establishment will be dependent on finding appropriate individuals to monitor and protect.

REVIEW

The plan will be reviewed annually with a view to assessing the survivorship of the individuals monitored and to provide an opportunity for the sharing of updated knowledge on the impacts of Myrtle Rust and potential resistance observed in the individuals being monitored. Review meetings will enable discussions to evaluate the availability of individuals to select for monitoring. This may need to potentially revise the definition of suitable individuals, for monitoring and protection, to broaden opportunities if an inadequate number of individuals are identified.

The plan maybe amended at any time with the agreement of FCNSW and the EPA.

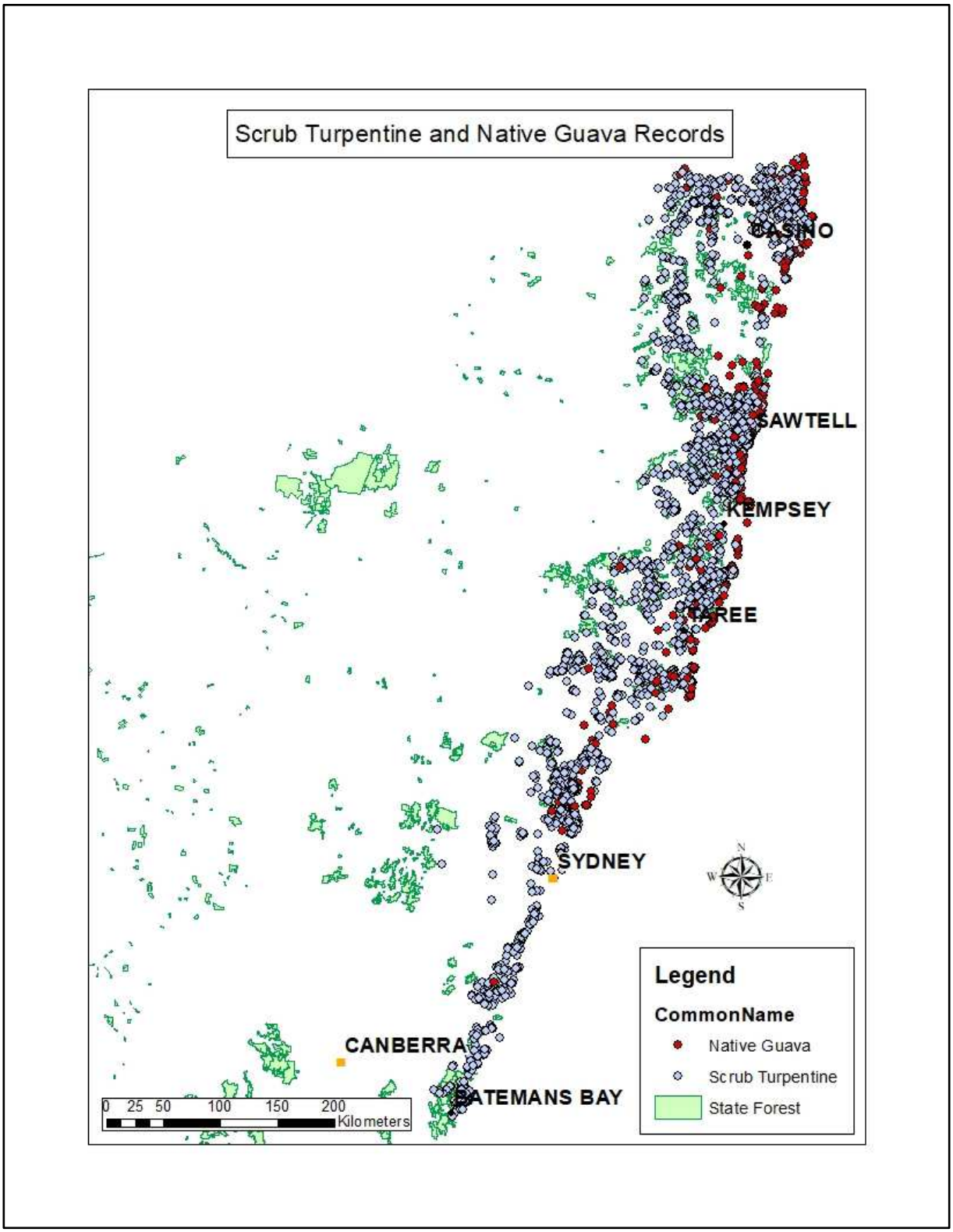
REFERENCES

Carnegie AJ, Kathuria A, Pegg GS, Entwistle P, Nagel M, Giblin FR (2016) Impact of the invasive rust Austropuccinia psidii (myrtle rust) on native Myrtaceae in natural ecosystems in Australia. Biological Invasions 18, 127–144.

NSW EPA (2018) Coastal Integrated Forestry Operations Approval. NSW Environment Protection Agency, 59 Goulburn Street, Sydney, NSW 2000

Pegg GS, Giblin FR, McTaggart AR, Guymer GP, Taylor H, Ireland KB, Shivas RG, Perry S (2014) Austropuccinia psidii in Queensland, Australia: disease symptoms, distribution and impact. Plant Pathology 63, 1005–1021.

Appendix 1. Map of records of Scrub Turpentine *Rhodamnia rubescens* and Native Guava *Rhodomyrtus psidioides* within the SMP Area.



Myrtle Rust Infection Scoring Guide Myrtle Rust Emergency Response Project

This guide is to help with scoring Myrtle Rust incidence, severity and effects, using the separate **Myrtle Rust Assessment Proforma**. This sheet shows infection severity and damage classes, using two of the current target species for emergency conservation action. The same scoring criteria can be applied to other species of the family Myrtaceae encountered. Scoring of multiple species is encouraged. **'No infection' returns for species at a site are as valuable as those reporting infection.**

Scoring for current-season leaves and new shoots (Myrtle Rust does not usually affect last-season foliage)

SCORE 00

No yellow pustules, no apparent damage

L: *Rhodamnia rubescens* (M.Fagg, ANBG). : *Rhodomyrtus psidioides* (RO Makinson)

SCORE 0A

No yellow pustules present, but possible Rust damage (e.g. brown lesions) to leaves & shoots.

L: *Rhodamnia rubescens* (C. Stehn) R: *Rhodomyrtus psidioides* (RO Makinson)

SCORE 1

Lesions small in size – average <3 pustules per leaf; no evidence of stem infection

Rhodamnia rubescens (E. Norris)

SCORE 2

Lesions small in size, average 3-5 pustules per leaf; no evidence of stem infection

L: *Rhodamnia rubescens* R: *Rhodomyrtus psidioides*

NSW SoS Myrtle Rust Emergency Response Project Support Contact: Craig Stehn, Threatened Species Officer, 02 6659 8264, email sosmyrtlerust@rbgsyd.nsw.gov.au

SCORE 3

Multiple moderate sized lesions per leaf; some blighting; infection pustules may also be on juvenile stems, but <3 per stem.

L: *Rhodamnia rubescens* (from Carnegie & Lidbetter 2011)
R: *Rhodomyrtus psidioides* (RO Makinson)

SCORE 4

Multiple moderate to large lesions per leaf; blighting and distorted growth on leaves and shoots; multiple lesions on juvenile stems.

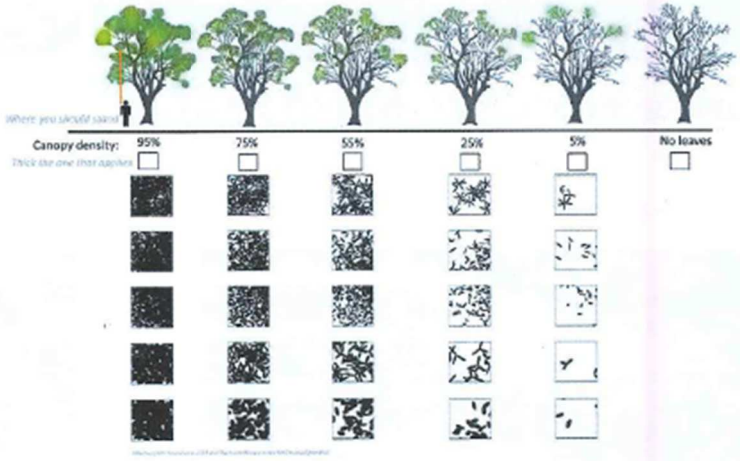
Rhodamnia rubescens (L: M. Jarman; R: AJ Carnegie)

SCORE 5

Multiple large lesions per leaf (in some cases covering entire leaf); Severe leaf blighting/distorted growth; multiple juvenile stem lesions causing shoot distortion and tip/branch dieback.

L: *Rhodamnia rubescens* (AJ Carnegie); **R:** *Rhodomyrtus psidioides* (RO Makinson)

Crown density (tree-sized plants only, stand below and look directly up).



NSW SoS Myrtle Rust Emergency Response Project Support Contact: Craig Stehn, Threatened Species Officer, 02 6659 8264, email sosmyrtlerust@rbgsyd.nsw.gov.au

Appendix 3. FCNSW Scrub Turpentine (Rhodamnia rubescens) Native Guava (Rhodomyrtus psidioides) Recording Guidance

All occurrences of both species must be recorded and the presence or absence of Myrtle Rust.

FC MAP APP
In the FCNSW Map App.

- Enter the species via the incidental entry

HFD- Incidental FF

- Enter the Species or Common Name
  Scrub Turpentine (Rhodamnia rubescens) Native Guava (Rhodomyrtus psidioides)

Species Count – enter the number of plants identified
(count if there are a small number of plants, estimate if there are a large number of plants)

Species Notes - Enter a Score as per scoring guide and comment about the presence of Myrtle Rust (as per photo guidance)
Example – 04, Myrtle Rust present on 80% of plants, plants are badly, impacted,
If numbers of plants are large, in addition to above point data entry create PlanPoly via **HFDPlanpolys** using Population
Estimate extent of population of plant species
Description – enter a comment – example Scrub Turpentine population with Myrtle Rust

Appendix 4. Site-specific biodiversity condition for Scrub Turpentine, Rhodamnia rubescens and Native Guava, Rhodomyrtus psidioides in the Coastal IFOA Region

This condition applies for the purpose of:

- condition 21 Site-specific biodiversity conditions - of the Coastal Integrated Forestry Operations Approval (IFOA)
- condition 1.2 Species requiring site-specific conditions - of the Threatened Species Licence (TSL) requirements of all ***relevant IFOAs***

Terms within this condition that are bolded and italicised have the meaning defined in Protocol 39 of the Coastal IFOA.

(1) *Rhodamnia rubescens* and *Rhodomyrtus psidioides* monitoring

a) The Forestry Corporation of NSW (FCNSW) must sample the presence and condition of *Rhodamnia rubescens* and *Rhodomyrtus psidioides* plants and the presence of myrtle rust at a subset of sites representative of regional and operational variation, where ***forestry operations*** have been undertaken in the previous 10 years in the vicinity of ***records*** of *Rhodamnia rubescens* and *Rhodomyrtus psidioides.* This may incorporate previous relevant studies where available. This sampling must be conducted in consultation with the Biodiversity and Conservation Division of the Department of Planning Industry and Environment (DPIE) and the Environment Protection Authority (EPA) and the results reported within six months of the issuing of this condition.

b) During ***broad area habitat searches*** (or compartment mark-up surveys where a TSL applies) and ***targeted surveys*** (with the exception of pre-logging pre-roading surveys relied on for operational planning that have been completed at the commencement of this condition), ***records**** must be made of: *Rhodamnia rubescens* and *Rhodomyrtus psidioides* occurrences and notes made on:

i. the condition of these plants and

ii. the apparent presence or absence of the Myrtle Rust fungus, *Austropuccinia psidii*

* where large numbers of plants are found, the population area may be estimated and recorded via a polygon of the area and numbers estimated with typical condition and apparent presence or absence of the Myrtle Rust fungus recorded. This may be recorded in FC Map App with required information designated.

c) FCNSW must establish monitoring plots at a subset of sites representative of regional* and operational variation in areas where ***forestry operations*** are undertaken within the distribution of *Rhodamnia rubescens* and *Rhodomyrtus psidioides*. At each plot representative subset of individuals of these species must be sampled within the 12 month period following both a:
i. ***harvesting operation*** and
ii. ***burning operation***

* FCNSW must aim to sample a minimum of 20 locations including two in the South Coast and nine each in Upper North East and Lower North East sub-regions along with areas of both intensive and selective harvesting.

d) The samples in (c) above must record the: i. condition of plants following the ***harvesting operation*** or ***burning operation*** and
ii. the presence or absence of myrtle rust

(2) Reporting

FCNSW must (unless otherwise identified in a relevant Species Management Plan) report annually to the Biodiversity and Conservation Division of the Department of Planning Industry and Environment and the Environment Protection Authority on the results of the monitoring identified in (1) above, including analysis, broken down to a scale of at least IFOA sub-regions, of:

a) The distributions of *Rhodamnia rubescens* and *Rhodomyrtus psidioides* and the Myrtle Rust *Austropuccinia psidii* on ***Crown-timber land***, including the prevalence of these species in the ***base net area*** and adjacent areas of ***exclusion zones*** and ***ESAs*.**

b) the survival, death or damage to *Rhodamnia rubescens* and *Rhodomyrtus psidioides* plants following: i. ***harvesting operations*** and

ii. ***burning operations***

c) the recovery of *Rhodamnia rubescens* and *Rhodomyrtus psidioides* plants following:

i. ***harvesting operations*** and

ii. ***burning operations***

d) the recruitment of *Rhodamnia rubescens* and *Rhodomyrtus psidioides* plants following:

i. ***harvesting operations*** and

ii. ***burning operations***

e) the apparent occurrence and impact of Myrtle Rust in the context of (3)(b), (c) and (d) above.

(3) Development of Species Management Plan

FCNSW must develop a Species Management Plan for these species meeting the approval of the EPA within 24 months of the issuing of this condition. This Species Management Plan must be developed in consultation with the Biodiversity and Conservation Division of the Department of Planning Industry and Environment and the Environment Protection Authority, and must include but may not be limited to integration of the monitoring program conducted under this site-specific biodiversity condition with the NSW species management strategies for *Rhodamnia rubescens* and *Rhodomyrtus psidioides*, including those for:

i. monitoring the impact of Myrtle Rust on emergency priority species* and

ii. collection of germplasm from populations of emergency priority species*

* as identified in the Plant Biosecurity Cooperative Research Centres Myrtle Rust Action Plan http://www.apbsf.org.au/wp-content/uploads/2018/06/Myrtle-rust-action-plan_accessible.pdf

The emergency priority species currently known from State Forest estate are *Rhodamnia rubescens* and *Rhodomyrtus psidioides*.