INDEPENDENT EXPERT ADVISORY PANEL FOR ENERGY TRANSITION

Stratford Renewable Energy Hub –

Interim Advice

Interim advice on serious and irreversible impacts to Scrub Turpentine (*Rhodamnia rubescens*)

14 January 2025

Report No: IEAPET 2025-01

EXECUTIVE SUMMARY

The NSW Department of Planning, Housing and Infrastructure (the Department) has requested advice from the Independent Expert Advisory Panel for Energy Transition (IEAPET) (the Panel) in relation to the proposed Stratford Renewable Energy Hub (the Project).

This interim advice has been prepared to assist the Department to consider any additional information required or provided after the Response to Submissions (RTS) stage of the assessment. The Panel's advice will be finalised following the assessment stage.

The Project's proponent is Gloucester Coal Ltd (Gloucester Coal), which is a wholly owned subsidiary of Yancoal. The application is for the construction and operation of a 300 megawatt (MW) pumped hydro energy storage and 320 MW solar farm on the site of the former Stratford Mining Complex. The Project has been declared to be critical state significant infrastructure, which means that it will be determined by the Minister for Planning and Public Spaces, under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* .

In its request for advice, the Department noted that one of the key technical biodiversity issues for the Project is potential serious and irreversible impact (SAII) on the critically endangered species (NSW and Commonwealth) Scrub Turpentine (*Rhodamnia rubescens*). Scrub Turpentine is a small rainforest tree/shrub with a wide range across eastern NSW and south-eastern Qld (extent of occurrence, 14 734 000 ha) and an area of suitable habitat where the species has been recorded within this geographical range of 336 000 ha (area of occupancy). The Project's impact would arise from the proposed clearing of native vegetation for an upper reservoir, removing at least 217 stems and 145 hectares (ha) of suitable habitat.

The Department sought advice on:

1. The extent to which the Project is likely to contribute significantly to the risk of Scrub Turpentine becoming extinct; and
2. The appropriateness of Gloucester Coal's proposed actions to contribute to the survival of the species.

The reason that Scrub Turpentine is critically endangered is the presence of an introduced fungus that causes Myrtle Rust disease. This disease is causing a rapid decline of the species across its wide range. Extensive monitoring across the State confirms that Myrtle Rust is ubiquitous and that only a small proportion of individuals remain that are apparently resistant.

A NSW government recovery program led by Department of Climate Change Energy Environment and Water (DCCEEW), "Saving our Species" (SoS) has collected samples of the plants showing resistance, which are being protected in an ex situ collection and being bred and trialled as a potential basis for re-establishment in the wild. This recovery program is showing signs of potential success, but is constrained by limited resources and the rapid pace of the disease's impacts.

The Panel advises that:

a) The Project, if approved, is unlikely to contribute significantly to the risk of extinction of Scrub Turpentine in NSW. Neither avoidance of impact by refusal of the Project, nor proceeding with the Project would lead to a material change in the survival prospect of the species.
b) Gloucester Coal's proposed actions to contribute money and (if requested) genetic material to the recovery program are appropriately directed because the identification, propagation

and distribution of rust resistant strains of the species across its range appears to be the only currently viable strategy with a reasonable prospect of preventing extinction.

c) Prior to determination, Gloucester Coal should be requested to undertake further surveys to be able to determine the likely full extent of the impacts for Scrub Turpentine, as identified by DCCEEW (BCS) in their advice to the Department (dated December 2024), subject to any alternative arrangements made between Gloucester Coal and DCCEEW that could efficiently further reduce the risk of extinction.

TABLE OF CONTENTS

CONTENTS

1.0 INTRODUCTION AND SCOPE OF WORK

The NSW Department of Planning, Housing and Infrastructure (the Department) has established the Independent Expert Advisory Panel for Energy Transition (the IEAPET). The Panel's purpose is to provide access to world's best scientific advice when assessing renewable energy transition Projects under the *Environmental Planning and Assessment Act 1979* (EP&A Act).

On 19 November 2024, the Department requested advice from the IEAPET in relation to the proposed Stratford Renewable Energy Hub (the Project). The Project's proponent is Gloucester Coal Ltd (referred to as Gloucester Coal in this report), which is a wholly owned subsidiary of Yancoal. The application is for the construction and operation of a 300 megawatt (MW) pumped hydro energy storage (with a generating capacity of 3.6 gigawatt-hours (Gwh), a 320 MW solar farm and associated supporting infrastructure on the site of the former Stratford Mining Complex. The site is located in the Gloucester Valley, approximately 95 kilometres (km) north of Newcastle.

In its request for advice, the Department noted that one of the key technical biodiversity issues for the Project is potential serious and irreversible impact (SAII) on the critically endangered species (NSW[1] and Commonwealth[2]) Scrub Turpentine (*Rhodamnia rubescens*) arising from the proposed clearing of native vegetation for the upper reservoir of the pumped hydro energy storage. The Project Biodiversity Development Assessment Report (BDAR) prepared by the appropriately engaged DCCEEW-accredited ecologist concludes that the Project will result in the removal of 217 stems (BDAR Pg. 176) and 145.08 hectares (ha) of suitable habitat for the species (BDAR Pg. 99).

In its Environmental Impact Statement (EIS), (EIS Pg. 42), Gloucester Coal had identified that the species as a whole is currently threatened by the effects of the exotic fungus Myrtle Rust (*Austropuccinia psidii*) and subsequent onset of the Myrtle Rust disease, which is projected to reduce the global population of Scrub Turpentine by >80% over three generations or 10 years (BDAR Pg. 283, Table 10.2).

Gloucester Coal has proposed to undertake two actions (EIS Pg. 42) that would contribute to the survival of the species, including:

- providing the Saving our Species (SoS) program with germplasm material of potentially resistant individuals of the Scrub Turpentine within the development footprint to aid in establishment or augmentation of ex situ collections of genetically variable and potentially somewhat resistant individuals of the species; and
- contributing $250,000 for independent research to produce positive outcomes for the species.

The Department requested that the Panel provide advice to inform the Department's assessment of the following:

1. The extent to which the Project is likely to contribute significantly to the risk of Scrub Turpentine becoming extinct; and
2. The appropriateness of Gloucester Coal's proposed actions to contribute to the survival of the species

This document constitutes the Panel's interim advice on these questions.

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[1] *Biodiversity Conservation Act 2016*
[2] *Environment Protection and Biodiversity Conservation Act 1999*

1.1. METHOD OF OPERATION

A Panel of four members was convened by the Panel Chair to prepare the advice.

The Panel members were Simon Smith (Chair) (BA Hons), Emeritus Professor Nick Reid (FRSN, BSc Hons PhD), Nathan Garvey (FEIANZ, BSc) and Terry Bailey (reviewer) (BSc MBA, MPPM). All members confirmed that they were unaware of any potential for a perceived or actual conflict of interest in connection with the Project. Further information on each Panel member is at Appendix C.

Each member was appointed to lead and/or assist in one or more sections or aspects of the report and all members reviewed and contributed to the finalisation of the whole document.

The Panel received administrative support from Secretariat staff provided by the Department.

The Panel was briefed by staff from relevant government departments and Gloucester Coal, but conducted its work independently. Panel members also consulted with relevant expert researchers.

The Department asked the Panel to provide interim advice to inform the RTS stage of the assessment process, with final advice to be provided later, just prior to the completion of the assessment stage.

The Panel prepared this interim advice between 16 December 2024 and 13 January 2025.

1.2. KEY DOCUMENTS

Several documents were provided through the Department to support the Panel in preparing this interim advice, which are listed below. Other documents cited in the advice are referenced in footnotes.

Table 1: Key documents provided to the Panel.

Document Reference	Document Name
Documents provided by DPHI	Stratford Renewable Energy Hub Environmental Impact Statement, Gloucester Coal, September 2024 and the associated appendices: • Appendix D – Biodiversity Development Assessment Report
Agency Advice	Agency advice – DCCEEW Biodiversity Conservation Science Division (BCS) – dated 13 December 2024
Additional documents	• IEAPET Presentation - provided by Gloucester Coal • Scrub Turpentine Sites Map - provided by Gloucester Coal • Operational Response Plan MR Species – provided by BCS – dated May 2021 • SoS report *Rhodamnia* and *Rodomyrtus* – provided by BCS – dated March 2022 • SoS conservation Strategy – Scrub Turpentine Fact Sheet – published by DCCEEW (March 2022) • Guidance to assist a decisionmaker to determine a serious and irreversible impact – published by DCCEEW (2019)

	• Letter from Gloucester Coal – Response to request for information (dated 20 December 2024) • Also see cited references at Section 6.0

1.3. SITE VISIT AND MEETINGS

Three Panel members visited the proposed Project site on 16 December 2024.

Panel meetings were convened on multiple occasions by videoconference during the preparation of this advice.

Table 2: Schedule of formal meetings involving the Panel.

Meeting Date	Meeting Information
16 December 2024	Site Visit
17 December 2024	Internal Panel discussion on report drafting strategy
18 December 2024	Panel meeting with DCCEEW Saving our Species staff working on Scrub Turpentine
18 December 2024	Panel meeting with Gloucester Coal
18 December 2024	Panel meeting with DPHI Energy and Resource Assessments
23 December 2024	Internal Panel discussion on interim report

2.0 DEVELOPMENT ASSESSMENT AND DETERMINATION FRAMEWORK

This section describes the development assessment context for this interim advice.

The Minister for Planning and Public Spaces has declared the Project to be critical state significant infrastructure (CSSI), which means that it will be assessed, and determined by the Minister, pursuant to Section 5.13 of Part 5, Division 5.2, Subdivision 1 of the EP&A Act.

The Project proposes direct impacts on threatened species, so the assessment under the EP&A Act is also subject to Section 7.9 of the *Biodiversity Conservation Act 2016* (BC Act), which requires the preparation of a Biodiversity Development Assessment Report (BDAR) for Projects assessed under Division 5.2 of the EP&A Act. BDARs must be prepared in conformance with the *Biodiversity Assessment Method* (BAM), by a DCCEEW-accredited ecologist.

Critical context for this advice is the specific requirement within Section 6.5 of the BC Act for the BDAR to identify threatened species and communities at risk of a serious and irreversible impact (SAII) and evaluate the extent and severity of the impact on an entity at risk of an SAII.

Whether a Project will result in an SAII is determined by the decision maker; i.e., not by the proponent or the accredited assessor preparing the BDAR. In considering whether a Project will result in SAII the penultimate test is established by Section 6.7(2) of the BC Regulation:

> "it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct . . ."

Scrub Turpentine (*Rhodamnia rubescens*) has been identified by DCCEEW as a species at risk of SAII (NSW Department of Planning and Environment, 2024).

This interim advice considers whether the Project proposes an impact on Scrub Turpentine that would be SAII (if approved), based on the information available at this stage of the assessment process, prior to a response to submissions (RTS) being provided by Gloucester Coal that may provide additional information regarding the proposed impact of the Project on Scrub Turpentine.

Further discussion of development assessment and determination framework is contained in Appendix D.

3.0 SCRUB TURPENTINE AND MYRTLE RUST

This section provides an overview of Scrub Turpentine, how it came to be listed as Critically Endangered in both NSW and by the Commonwealth in 2019 and 2020, respectively, as a result of its susceptibility to the invasive fungal pathogen, Myrtle Rust, and the collaborative recovery efforts for Scrub Turpentine as part of the NSW Government's 'Saving our Species' program, led by DCCEEW.

3.1. FORM, FEATURES, HABITAT AND RANGE OF SCRUB TURPENTINE

Scrub Turpentine (*Rhodamnia rubescens*, syn. *R. trinervia*, Myrtaceae), also known as brush turpentine, scrub stringybark and brown malletwood, can be a tree to 30 m with a stem diameter of 80 cm (Francis 1951, Floyd 2008), but is more commonly an evergreen small tree (5–7 m) or tall shrub (2–5 m; Nicholson and Nicholson 2001, Costermans 2009). It was formerly common along the subtropical east coast of Australia and adjacent Great Dividing Range up to 600 m a.s.l., from Batemans Bay on the South Coast of NSW to near Childers, inland of Bundaberg, Qld (NSW OEH 2022; Figure 1). It occurred chiefly in warmer rainforest, rainforest margins and moist sites in wet sclerophyll forest communities and regrowth, with a mean annual rainfall of 1000–1600 mm.

The extent of occurrence of Scrub Turpentine records (Figure 1) from south-eastern Qld to the South Coast of NSW is 14 734 000 ha. This is the area of the minimum convex polygon enclosing all reliable records of the species (NSW TSSC 2019). Within this geographical range, the area of occupancy (AOO) where the species has been recorded in suitable habitat is 336 000 ha, based on the number of 2 km × 2 km grid cells in which the species has been reliably recorded (NSW TSSC 2019). This is the method for assessing AOO recommended by IUCN (2024).

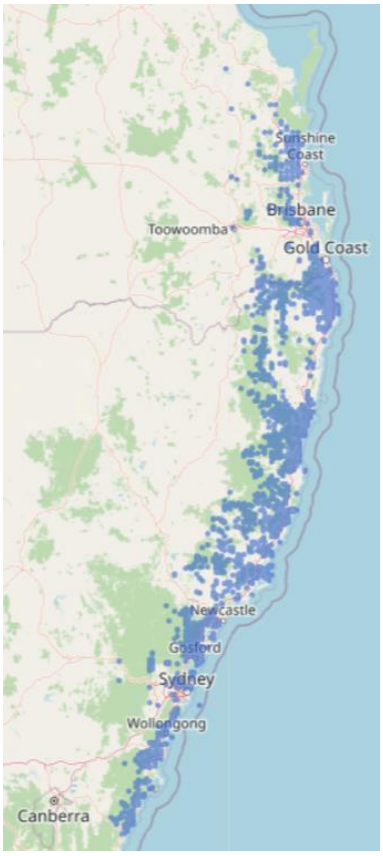

Figure 1: Distribution of records (blue dots) of Scrub Turpentine (*Rhodamnia rubescens*) in coastal and subcoastal eastern Australia, from near Childers, Qld, in the north, to Batemans Bay, NSW, in the south (Atlas of Living Australia 2025).

The leaves of Scrub Turpentine are opposite, shortly petiolate, ovate to elliptic, 4–12 cm in length and shortly acuminate, with three distinct veins (midvein and two marginal veins). The inflorescences of white open flowers with numerous stamens, about 0.8–1 cm across, appear in spring, 1–3 per axil and each usually 3-flowered. The fruits ripen in summer, the globose berries being 4–8 mm in diameter, containing several seeds and turning red, then glossy black (Cronin 2000; Wilson 2002). The fruit are eaten and seeds dispersed by rainforest frugivorous birds, including Brown Cuckoo-Dove, Southern Figbird, Green Catbird (Floyd 2008), Regent Bowerbird and Satin Bowerbird (Church 1997).

3.2. LISTING OF THE SPECIES AS THREATENED UNDER LEGISLATION

Scrub Turpentine, a species in the family Myrtaceae, was listed as Critically Endangered in NSW under the *Biodiversity Conservation Act 2016* (BC Act) on 1 February 2019 (NSW OEH 2022). The species is highly to extremely susceptible to infection by Myrtle Rust, an exotic microfungal pathogen of Myrtaceae. Myrtle Rust was first detected in Australia in a commercial nursery on the Central Coast of NSW in April 2010 and subsequently at other business premises in the ensuing months (Carnegie and Cooper 2011). Within six months, it was detected in adjacent bushland, and subsequently invaded natural ecosystems throughout coastal NSW and south-east Qld.

Myrtle Rust affects all the above-ground parts (leaves, stems, flowers and fruits) of infected plants of Scrub Turpentine. Infection by Myrtle Rust has led to the precipitous decline of the species throughout its range by killing plants of all ages and suppressing vegetative resprouting and seedling recruitment. The NSW Threatened Species Committee (2018) observed that Scrub Turpentine is unlikely to have soil-stored seed banks, meaning the survival of the species in the

wild is dependent on the production of viable seed-containing fruit by healthy plants and their subsequent dispersal.

The NSW Threatened Species Scientific Committee (2019) observed in its Final Determination to list the species as Critically Endangered, that:

a) Infection of Scrub Turpentine by Myrtle Rust is widespread and severe through the species' entire range (Figure 1);
b) In a survey of 43 sites between Batemans Bay, NSW, and Gympie, Qld (Carnegie et al. 2016), Myrtle Rust-infected plants were present at all sites, all age classes of tree were similarly affected, and disease incidence was greater on immature leaves than on mature foliage;
c) Where local populations have been revisited and surveyed after a period of a year or more, mortality has generally increased;
d) Seedlings and vegetative suckers of Scrub Turpentine are killed by Myrtle Rust, and so the continued decline of mature plants and the lack of successful regeneration threaten the species' long-term viability;
e) No effective or practical chemical, biological or management control is available for protecting populations of Scrub Turpentine in natural ecosystems from Myrtle Rust infection;
f) In the absence of an effective control strategy for Myrtle Rust, further rapid declines of Scrub Turpentine are highly likely;
g) It is also suspected that, in the past, some populations of Scrub Turpentine underwent significant decline due to land clearing, fragmentation of populations, and weed invasion;
h) Under documented rates of decline due to Myrtle Rust, Scrub Turpentine is likely to undergo a 96–99% reduction in population size across its range within three generations (i.e. ~100 years);
i) Scrub Turpentine is facing an extremely high risk of extinction in the immediate future due to Myrtle Rust infection.

The panel noted that Gloucester Coal's EIS (BDAR) represented the projected population size reduction as >80% over three generations or 10 years, which accords with the NSW TSSC's (2019) Final Determination that "the species is projected to experience a population reduction of > 80% ([Critically Endangered] threshold) over three generations or 10 years due to the effects of introduced … pathogens …"

The NSW Threatened Species Scientific Committee in its preliminary Conservation Assessment (NSW TSSC 2018) earlier observed that relatively healthy individual Scrub Turpentine plants have been detected in some sites, and these should be further investigated.

Following NSW's listing decision, the Commonwealth listed Scrub Turpentine as Critically Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* on 11 December 2020. The Commonwealth's Threatened Species Scientific Committee's (2020) advice was based on the NSW Government's assessment and determination. The Commonwealth did not require a Recovery Plan to be developed, stating that the Approved Conservation Advice provided sufficient direction to implement priority actions and mitigate against key threats.

For broader context, in September 2024, the Qld Government reviewed its threatened species listings and also reclassified Scrub Turpentine as Critically Endangered (Qld Government 2024).

3.3. IMPACTS OF MYRTLE RUST

Myrtle Rust is a fungus from South America that affects trees and shrubs in the family Myrtaceae, which includes Scrub Turpentine. It infects leaves, stems, flower buds and fruits,

with varying impact. Some species of Myrtaceae experience only mild symptoms, such as leaf spots, while others, such as Native Guava (*Rhodomyrtus psidioides*) is highly susceptible and near extinct in the wild (Invasive Species Council 2024). Individuals of some affected species of Myrtaceae vary in their susceptibility to the disease. Still other Myrtaceae are not recorded as exhibiting any overt symptoms of infection, even under inoculation screening conditions optimal for the pathogen; these species may be fully resistant (SoS 2021). Symptom-less species are not considered to be host species of Myrtle Rust.

Myrtle Rust spores are spread by wind, water, insects, other animals, as well as being carried on infected plants and on tools, vehicles and clothing (Invasive Species Council 2024). The spores can move large distances and infect plants many kilometres away.

Since its detection in 2010 at a cut flower growing business near Gosford, NSW, Myrtle Rust has spread rapidly, establishing itself across eastern and northern Australia, from Tasmania to the Torres Strait islands, and west to the Kimberley (Invasive Species Council 2024). Myrtle Rust is best suited to the tropical and subtropical rainforest environments of eastern Qld and NSW. Although present in Victoria and Tasmania, colder climates as well as dry regions limit its spread.

The NSW Government gazetted the '*Introduction and establishment of Exotic Rust Fungi of the order Austropucciniales pathogenic on plants of the family Myrtaceae'* as a Key Threatening Process (KTP) on 15 April 2011, and the KTP was transitioned onto Schedule 4 of the BC Act. The NSW Scientific Committee's (2011) final determination for the KTP listing stated:

a) Exotic disease-causing rusts (basidiomycete fungi of the order Pucciniales) like Myrtle Rust are a major threat to native Australian species of Myrtaceae.
b) Australia, including its offshore island territories, has 88 genera and about 2,253 native species of plant belonging to the family Myrtaceae, representing around 10% of Australia's native flora.
c) Myrtaceous plants are ecologically important, often being a frequent or dominant floristic and structural element in many Australian terrestrial ecological communities (e.g. eucalypt forests, woodlands and mallee).
d) Of 83 native Australian species of Myrtaceae from 19 genera tested for susceptibility to Myrtle Rust, 73 species from 16 genera showed some degree of susceptibility in more than 30% of sample plants. The taxa showing infectability – in the wild, in cultivation, or in the laboratory – represent 13 of the 17 tribes currently recognised in the family, suggesting a broad taxonomic range of potential hosts and an existing broad base of capability for Myrtle Rust to infect new host species.
e) When Myrtle Rust was first identified on the Central Coast of NSW in 2010, the extent of infection at another bushland site suggests the disease may have already been present in Australia for about two years.
f) Initially mainly found on cultivated plants in horticultural situations, the disease was detected on wild plants in bushland sites in the same region from late October 2010.
g) By March 2011, Myrtle Rust had been found on more than 40 species of cultivated and wild Australian native plants at many sites along the NSW coast north from Ulladulla, in south-east Qld, and in the Cairns region of north Qld.
h) Wet and windy conditions through much of 2010 are thought to have been conducive to reproduction and spread, as well as human transportation of infected material.
i) Myrtle Rust manifests initially on its host plants as purple or grey to brown lesions (spots) on leaves and sometimes on buds and young stems, developing into pustules with yellow powdery masses of spores, or less conspicuous brownish spore-producing pustules.
j) Myrtle Rust attacks young growing leaves and shoots, which may become stunted, distorted, or necrotic, and heavy infection may affect the habit and viability of the host plant.
k) The asexual life cycle can be completed in as little as 10 days.

l) Spores of Myrtle Rustcan be dispersed by wind, water-splash, on plant material including seed, on people and their clothing and equipment, and by insects including honeybees (*Apis mellifera*) which work the spore masses. Transport of domestic bee hives is a potential vector for long-distance dispersal.
m) Spores are thought to be able to remain viable for up to 90 days on plant material and in the environment.
n) Myrtle Rust is known to infect a wide range of Australian Myrtaceae under field and/or laboratory conditions, including genera that are ecologically important in Australian ecological communities such as *Angophora*, *Callistemon*, *Corymbia*,*Eucalyptus*, *Kunzea*, *Melaleuca*, *Syncarpia* and *Syzygium*.
o) The susceptibility or resistance of myrtaceous plants to Myrtle Rust infection, and the severity of the resulting disease symptoms, varies with rust biotype, host species, host provenance within species, and host stage of growth.
p) Myrtle Rust is unlikely to establish in arid and semi-arid regions due to its need for high humidity for germination.
q) Preliminary bioclimatic modelling of areas of Australia likely to be at high risk of Myrtle Rust establishment predict, as a minimum, that most of the eastern seaboard and the eastern fall of the Great Dividing Range, and coastal areas in the Top End of the Northern Territory, are climatically suitable, assuming the presence of suitable host species and microhabitat. A zone of lower risk extends onto the western slopes of the Divide.
r) The area of highest risk in NSW is the coastal zone from the Illawarra north to the Qld border. This latter area includes a large proportion of the NSW conservation reserve system, many Myrtaceae-dominated communities of heath, woodland and forest, and most of the NSW component of Australia's World Heritage-listed rainforest, which has a high proportion of myrtaceous species.
s) Alternative bioclimatic modelling to define climatic habitat likely to be suitable for the rust for only some years per decade, extends the lower-risk area well west of the Divide in northern and southern Qld.
t) Large differences in resistance to Myrtle Rust infection have been observed within and between species of Myrtaceae and between seedlots of the same provenance. Intraspecific variability of hosts in disease reaction may be an important factor in determining the severity and impact of the disease as it naturalises and spreads in Australia. Host species or genotypes with low disease severity may nevertheless act as reservoirs of the rust organism and support its spread.

The Commonwealth included Myrtle Rust in the Key Threatening Process, 'Novel biota and their impact on biodiversity', listed on 26 February 2013 under the EPBC Act. The Threatened Species Scientific Committee (2013) noted in its advice to the Commonwealth Minister at the time that:

a) Myrtle Rust posed a potentially serious threat to native species of Myrtaceae.
b) The impact of Myrtle Rust on native species was still unclear.
c) The National Myrtle Rust Coordination group was coordinating ongoing actions to respond to Myrtle Rust focusing on mitigating its impact on the natural environment, including threatened and endangered species, and on industries that rely on myrtaceous species.

By 2017, the Invasive Species Council (2017), a not-for-profit organisation, reported that more than 350 native species (more than 10% of native Myrtaceae) were susceptible to Myrtle Rust (in the laboratory or wild). About 20% of the susceptible species in the wild were 'highly' or 'extremely' susceptible, including 48 Qld native species. Myrtaceae species listed as threatened (under state or Commonwealth legislation) that were susceptible included angle-stemmed myrtle (*Gossia gonoclada*, endangered, Cwth, and critically endangered, Qld), peach myrtle (*Uromyrtus australis*, endangered, Cwth and NSW), narrow-leaved malletwood (*Rhodamnia angustifolia*, critically endangered, Cwth and Qld), *Backhousia oligantha* (endangered, Qld), giant ironwood (*Choricarpia subargentea*, endangered, NSW) and sweet myrtle (*Gossia fragrantissima*, endangered, Cwth and NSW). The conservation status of Scrub Turpentine and

native guava (*Rhodomyrtus psidioides*) were not of concern prior to 2010 but they both were now recognised to be at risk of regional or global extinction, both subsequently being listed as critically endangered in NSW and Qld and by the Commonwealth.

By 2020, the same year as the release of the *Myrtle Rust National Action Plan* (Makinson et al. 2020), the number of Myrtaceae species susceptible to infection had increased to 382 native species or subspecies. Sixteen species were recommended for the most urgent conservation action, five of them on an 'emergency' basis by 2023–2025. Scrub Turpentine is one of the five emergency species. The rationale for the recommendations is that minimisation of declines and extinctions and at least partial species and ecosystem recovery involving the species is possible, if options are secured as quickly as possible. Time is of the essence because the most susceptible species, including Scrub Turpentine, have lost a large percentage of their populations already, reducing the neutral genetic diversity among often a few remaining survivors and greatly increasing the risk of extinction due to inbreeding depression, let alone Myrtle Rust infection (Chen et al. 2024). The reduction in the global population of Scrub Turpentine has been so precipitous since 2010 that the species' effective extinction in the wild is precited within 5–10 years in the absence of rescue efforts (SoS 2021).

In the *Operational Response Plan* for Scrub Turpentine's recovery in the wild, SoS (2021) made the following salient observations about current understanding of the impact of Myrtle Rust on Scrub Turpentine:

a) There are no pathogen-free 'refugia': the entire range of Scrub Turpentine is within the east coast distribution of Myrtle Rust.
b) It is possible that some Scrub Turpentine individuals possess alleles conveying some tolerance of Myrtle Rust infection. The fact that some mildly symptomatic infected individuals still survive in the wild in the presence of dead and almost-dead conspecifics suggests that these individuals possess some genetic resistance to infection.
c) Scrub Turpentine has declined across its entire range due to Myrtle Rust infection with many sub-populations lost and others greatly reduced in plant health and density.
d) Most large plants are now dead. Scrub Turpentine survives mainly as mid-sized shrubs (3–4 m). These are subject to seasonal attack by Myrtle Rust, with reduced growth rates, very little fruit and seed production, and continuing mortality.
e) Scrub Turpentine has largely stopped producing flowers and fruits, and hence seed, in most years over most of its range. The leaves of any seedlings that do germinate are ideal new growth for infection by Myrtle Rust and the seedlings usually fail to establish.
f) Scrub Turpentine has seed that is evolved to germinate rapidly when mature; there is no reservoir of older seed stored in the soil.
g) The declining density of adult plants and the reduction in flowering in most years means that pollen is less likely to be transferred between individuals, decreasing the rate of out-crossing, increasing the rate of selfing and inbreeding, and likely reducing the genetic health and fitness of any viable seed.
h) Given the documented decline of Scrub Turpentine due to Myrtle Rust infection across the whole of its range since 2010, effective extinction in the wild (decline to negligible levels of occurrence, or a total lack of recruitment) is likely within the next 5–10 years.
i) The conservation of Scrub Turpentine and its genetic diversity and any eventual reintroduction of rust-resistant genotypes into the wild, rests on the implementation of short-term emergency actions, and targeted research and development over the medium and longer terms.

3.4. RECOVERY EFFORTS FOR SCRUB TURPENTINE

The *Myrtle Rust National Action Plan* (Makinson et al. 2020) proposes actions for the recovery of susceptible native Myrtaceae under two overarching recommendations and five themes, for immediate implementation to minimise extinctions of native plant species and the consequent

social, environmental and economic impacts. The recommendations and themes are listed in Table 3.

Table 3: The overarching recommendations, themes, objectives and actions advocated for implementation over the period 2023–2025 in *Myrtle Rust in Australia: a National Action Plan* (Makinson et al. 2020).

a) Overarching recommendation 1: Establish momentum, funding and leadership for a coordinated national environmental response to Myrtle Rust
    a. Theme 1: Enabling the response
        i. Establish and resource leadership
            1. Establish and resource a steering committee
        ii. Establish a collaborative response
            1. Secure engagement and commitment from key stakeholders
        iii. Establish funding arrangements
            1. Identify funding needs and options
        iv. Expedite legislative mechanisms
            1. Expedite listing of species and ecological communities at serious risk from Myrtle Rust
            2. Consider expedited instruments to focus on the threat of Myrtle Rust (because legislative or policy recognition of 'key threatening processes' is not provided for in all jurisdictions)
    b. Theme 2: Awareness and engagement
        i. Maximise social commitment to and participation in response
            1. Raise awareness of Myrtle Rust and actions required
            2. Engage other key non-government stakeholders in the response (NGOs, NRM professionals, environmentalists, volunteers, etc.)
            3. Seek Indigenous stakeholder input and participation (employing appropriate protocols and 'right-way science')
b) Overarching recommendation 2: Adopt a coordinated and long-term national environmental response to Myrtle Rust
    a. Theme 3: Impact assessment
        i. Establish information hub and data validation protocols
            1. Establish Myrtle Rust data hub and information repository
        ii. Assessment of Myrtle Rust impact on priority species
            1. Standardise the impact assessment methods and monitoring protocols
            2. Identify the most effective potential monitoring sites
            3. Undertake rapid field surveys
            4. Undertake quantified field impact studies
        iii. Assess Myrtle Rust impact on ecological communities and function
            1. Continue and expand research programs in priority ecosystems
    b. Theme 4: Towards recovery
        i. Capture germplasm
            1. Secure future options for species in current or Projected decline through germplasm capture
            2. Enable seed storage research, and determine alternative germplasm storage options for storage-intolerant species
            3. Inventory priority Myrtaceae species in botanic gardens and other collections
            4. Scope potential locations for ex-situ and inter-situ live plant collections and/or seed production areas
        ii. Improve understanding of affected species
            1. Assemble host life history profiles for priority species
            2. Develop online atlas of authenticated Myrtaceae seedling images
        iii. Explore resistance and control
            1. Assess selected species for variation in levels of resistance and tolerance
            2. Augment knowledge of phylogenetic relationships within Myrtaceae

3. Review and identify priorities for resistance research
4. Review and identify priorities for silvicultural selection and breeding for resistance
5. Explore novel Myrtle Rust controls through reviews and scoping studies

iv. Explore reinforcement and reintroduction strategies for affected species
1. Explore recovery options for species and ecosystems in decline

c. Theme 5: Biosecurity
i. Prevention of arrival of new strains of Myrtle Rust
1. Continue pre-border and border vigilance for all strains of Myrtle Rust
2. Review potential pathways of entry of different strains of Myrtle Rust into Australia
3. Establish an Asia–Pacific Myrtle Rust network
4. Promote and contribute to coordinated international Myrtle Rust collaborative biosecurity and biological research network

ii. Maintain domestic quarantine
1. Vigorously maintain current quarantine arrangements for Western Australia and South Australia
2. Ongoing review and identification of potential risk pathways for entry of Myrtle Rust to WA and SA

iii. Monitor for changes in pathogen population
1. Develop strategies to monitor for changes in the Australian and regional Myrtle Rust populations

The specific threat posed by Myrtle Rust infection to the survival of Scrub Turpentine is the decline in health, death of plants and lack of seed-based recruitment or vegetative regeneration of the species (NSW OEH 2022). A targeted strategy for managing the rescue and recovery of Scrub Turpentine in the face of the Myrtle Rust threat has been developed by the NSW Government (DCCEEW) "Saving our Species" program (SoS 2021). Part of the vision for the eventual recovery of Scrub Turpentine in the wild is the identification of genotypes or traits that confer greater rust-tolerance (more resistance) or optimally full rust-resistance. At this stage of the program, it is understood that either outcome may be achievable. Both offer potential for the species' recovery in the wild.

The vision for the species' recovery effort is shown in Figure 2, and the short-term, medium-term and long-term priorities for action are detailed in Appendix B, Table B.1.

Figure 2: Vision for the long-term recovery of Scrub Turpentine in the wild (SoS 2021).Since the SoS's (2021) development of the *Operational Response Plan* for Scrub Turpentine and the other two species, the SoS Project team, led by DCCEEW and including researchers at the Research Centre for Ecosystem Resilience at the Botanic Gardens of Sydney (Sydney), the Australian PlantBank at the Botanic Gardens of Sydney (Mt Annan), Booderee Botanic Gardens (Jervis Bay), the University of New South Wales, Australian National University, and University of Sydney have achieved some of the short and medium-term priorities outlined in Appendix B, Table B.1 for Scrub Turpentine.

The work they have completed to date is summarised by Chen et al. (2024):

a) Ex situ collections of Scrub Turpentine have been augmented with the goal of preserving remaining genetic variation in the species.
b) Genetic diversity in Scrub Turpentine is distributed along a latitudinal gradient across the range of the species, with relatively high levels of genetic connectivity across the landscape, little evidence of strong differentiation and no conspicuous barriers to gene flow (Figure B.1, Appendix B). Therefore, there are unlikely to be genetic compatibility problems with mixing germplasm from widespread collection sites. Given the massive contraction in effective population size of Scrub Turpentine due to Myrtle Rust, it might be advantageous to promote genetic mixing for the recovery effort, although the broad latitudinal genotypic gradient could suggest some regional adaptation to environmental conditions in different parts of the range. Whole genome sequencing of Scrub Turpentine revealed a large historical effective population size (>100,000) with substantial gene flow across the landscape, and little evidence of deleterious genetic load hitherto. However, the large population contraction since 2010 suggests the risk of inbreeding depression, which future work should avoid.

c) Some 297 plants in ex situ collections at Mount Annan and Booderee Botanic Gardens were exposed experimentally to Myrtle Rust, some 55% displaying varying levels of resistance to infection. However, of 14 resistant individuals planted at experimental sites in northern NSW, only two were unaffected by rust with no dieback after two years; 10 plants developed substantial infection (severe dieback) and some died.

The team of researchers noted above is now working quickly on collecting further germplasm from remaining individuals in the wild, screening them genetically, growing up seedlings from controlled pollinations, further genetic assays of the progeny and the planting out of potentially resistant individuals in further field experiments (S. Yap & C. Stehn, pers. comm, December 2024). Time is of the essence with this work while surviving individuals remain in the wild that can be collected to augment ex situ germplasm collections.

What this collaborative R&D program demonstrates is that:

(1) there are tangible pathways to recovery for species that are highly susceptible to Myrtle Rust via a genetically informed breeding program, and

(2) there is a critical need to act quickly before the large amount of neutral genetic diversity in populations of rust-susceptible species throughout their natural range is lost.

The current recovery strategy for Scrub Turpentine in NSW (NSW Department of Planning and Environment, 2024) is designed to counter the decline and death of much of the global population in eastern Australia, and the lack of clonal regeneration or seed-based recruitment due to Myrtle Rust infection. The overarching strategy to secure the species' survival in the wild in the long term is to protect and preserve as much of the remaining genetic diversity as possible in ex situ collections and other methods of germplasm storage, while the breeding work continues to improve disease resistance, for eventual translocation of rust tolerant and/or resistant, climate-ready plants back into the wild throughout the species' range. The core of the current strategy is summarised in the seven actions in Table B.2, Appendix B.

The Commonwealth Threatened Species Scientific Committee (2020) identified acquiring resources for genetic and physiological research into the resistance and susceptibility of Scrub Turpentine to Myrtle Rust as a key conservation priority, and the Scrub Turpentine SoS Project team, (C. Stehn pers. comm, December 2024) identified capacity constraints at Mount Annan Botanic Gardens in maintaining the ex situ living collections of Scrub Turpentine and other Myrtaceae susceptible to Myrtle Rust. Funds are limited, the breeding resistance program having spent perhaps $1 million in recent years. The team (S. Yap pers. comm., December 2024) highlighted the desirability of being able to expand the recovery program for Scrub Turpentine and other susceptible Myrtaceae by:

- having more sites for ex situ collections to spread the risk (in case a site is lost) and increase the amount of experimental material to work with;
- developing seed production areas to increase production of resistant plant stocks; and
- having more staff and budget for field work (monitoring of wild populations, germplasm collection, planting out trials, etc.), maintaining the ex situ collections and carrying out resistance assays and controlled pollinations to increase living plant stocks; and the conservation genomics work (genetic sequencing, resistance screening, etc.) in the laboratory.

More details of the NSW and Commonwealth plans of action for species recovery and a map showing the genetic variability of the specimens stored in ex-situ germplasm collections is attached in Appendix B.

4.0 THE PROJECT AND ITS IMPACTS ON SCRUB TURPENTINE

4.1. THE PROPOSED PROJECT

Gloucester Coal proposes to redevelop a recently closed coal mine to construct a 300 MW x 12 hour pumped hydro electricity generation and energy storage facility. The facility would comprise a modified existing lower water storage and a new upper water storage, connected by an underground tunnel and serving a combined underground generation and pumping facility.

Gloucester Coal also proposes to construct a 320 MW solar farm, to supply electricity to help pump water back up hill within the hydro facility.

The purpose, benefits and anticipated impacts of the Project are set out in the EIS published on the NSW Major Projects website.

4.2. PROPOSED DIRECT IMPACTS ON THE SCRUB TURPENTINE

The Panel has been asked to provide advice on the potential impacts on Scrub Turpentine. This interim advice has been prepared to inform the RTS stage of the assessment process when further studies and consideration are typically undertaken.

The proposed impact of the Project on this species arises because the proposed upper reservoir would be located in an area of native vegetation that includes Scrub Turpentine. The flora surveys conducted for the Project's EIS identify the presence of 217 stems within an area of proposed disturbance of 145 ha of land that is habitat for the species (Figure 3). These would all be lost if the upper reservoir is constructed as proposed.

The Panel observed that the survey area is steep and difficult to traverse, and most examples of the species are very small with limited foliage and hard to locate. Further, the surveys undertaken by Gloucester Coal and their consultant were not able to access some areas. There are also some proposed impact areas not marked as inaccessible that have not yet been surveyed. Hence it is likely that there would be more stems than reported, although some reported stems may have already died.

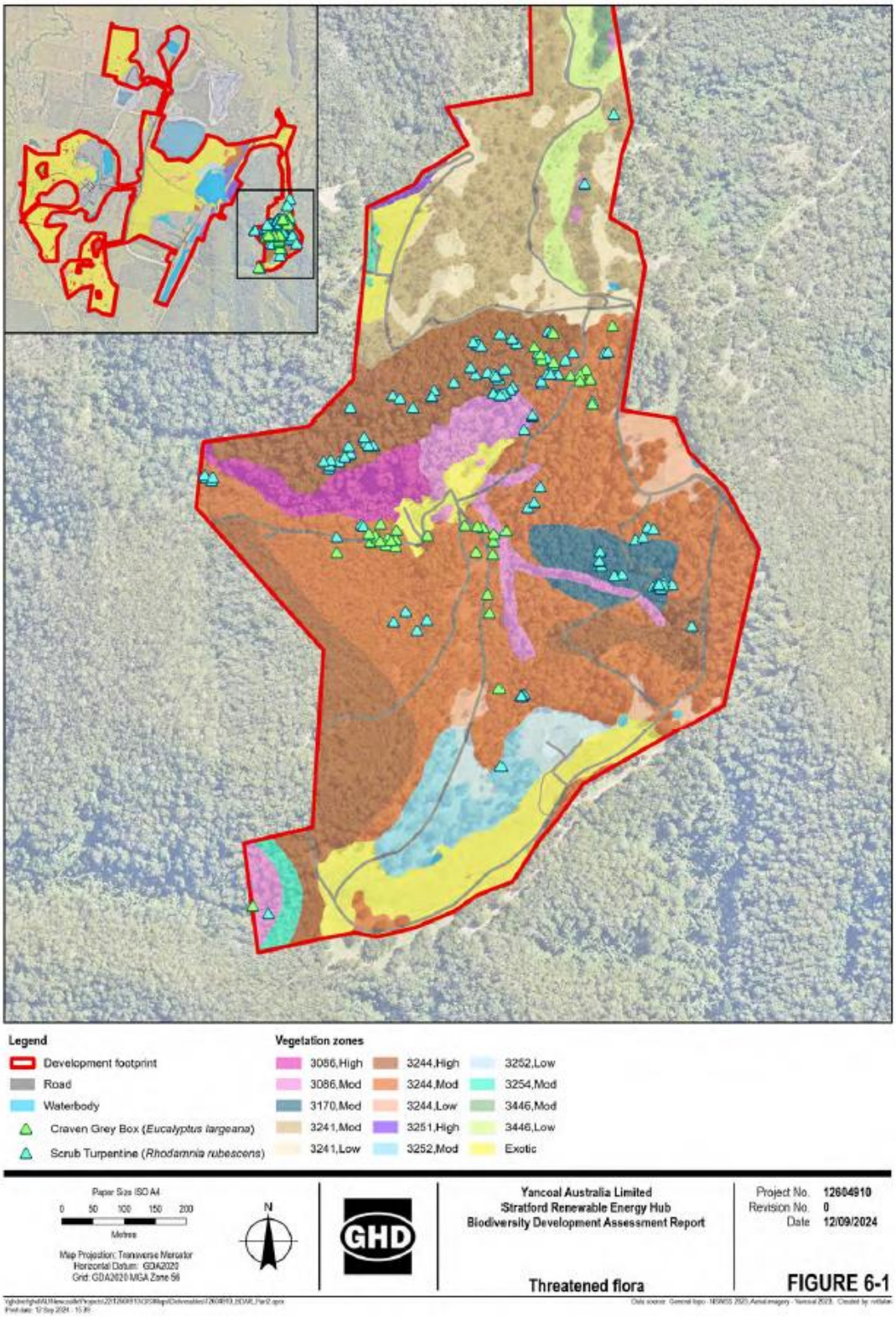

Figure 3: Scrub Turpentine records in the upper reservoir (Figure 6.1 of GHD 2024).

The BDAR flora survey reports that the population of the species is 'afflicted with Myrtle Rust disease'. It further reports that most examples presented as 'young suckers or saplings', rather than as 'healthy canopy/sub canopy trees'. It reported that there were some individuals with no visible signs of infection at the time of survey. These observations are consistent with the Panel's understanding of conditions across the species' range. At its site visit, the Panel observed these

impacts, with all observed specimens showing signs of infection, stunted size and lack of vigour. The Panel was unable to locate individuals at the site of some survey records, suggesting that wider patterns of local population loss are replicated at some parts of the site.

In its advice dated 13 December 2024, DCCEEW noted the following:

- BCS considers the surveyed Scrub Turpentine to be an underestimate as the assessor has not adequately surveyed for the species and the survey completed did not cover all areas of known habitat within the site.
- Gloucester Coal should be requested to undertake further survey to be able to determine the extent of the impacts for Scrub Turpentine.

4.3. THE LOCAL EXTENT AND TRAJECTORY OF THE SPECIES

The EIS and Appendix D (the BDAR) only include survey data for the proposed areas of impact. During the site visit, Gloucester Coal advised that it had conducted additional surveys nearby on the proponent's own land and in The Glen Nature Reserve, looking in sheltered gully locations, near the access road, likely to be suitable habitat for the species. The results, shown below (Figure 4), are by no means comprehensive but they do show that there is a relatively wide local distribution of Scrub Turpentine.

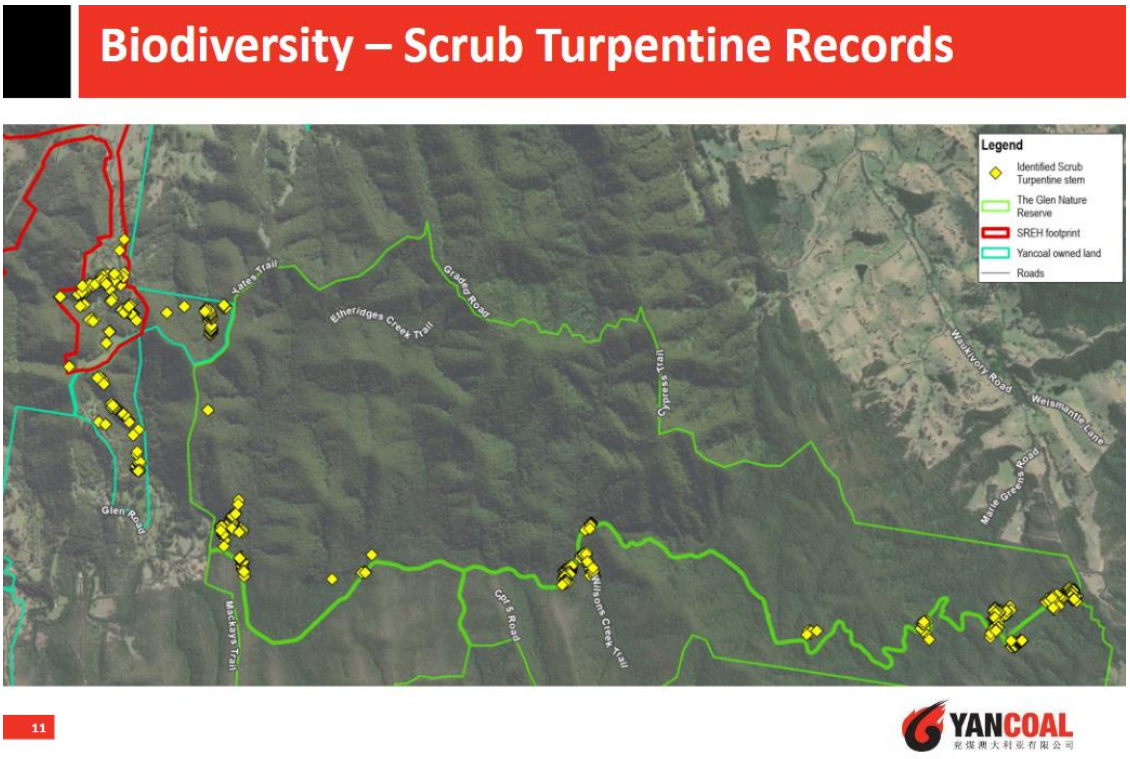

Figure 4: Scrub Turpentine records in proximity to the Project, including land owned by Gloucester Coal and in readily accessible parts of The Glenn Nature Reserve.

The likelihood of additional plants of Scrub Turpentine occurring on land owned by Gloucester Coal and other nearby public and private landowners is supported by Maxent modelling of Scrub Turpentine habitat suitability in eastern NSW, undertaken by Kavanagh et al. (2021) for the NSW Natural Resource Commission. Figure 5 shows a large area of forested suitable habitat, 30 × 15 km, stretching between Stratford in the north and Myall River and Bulahdelah in the south (Figure 5).

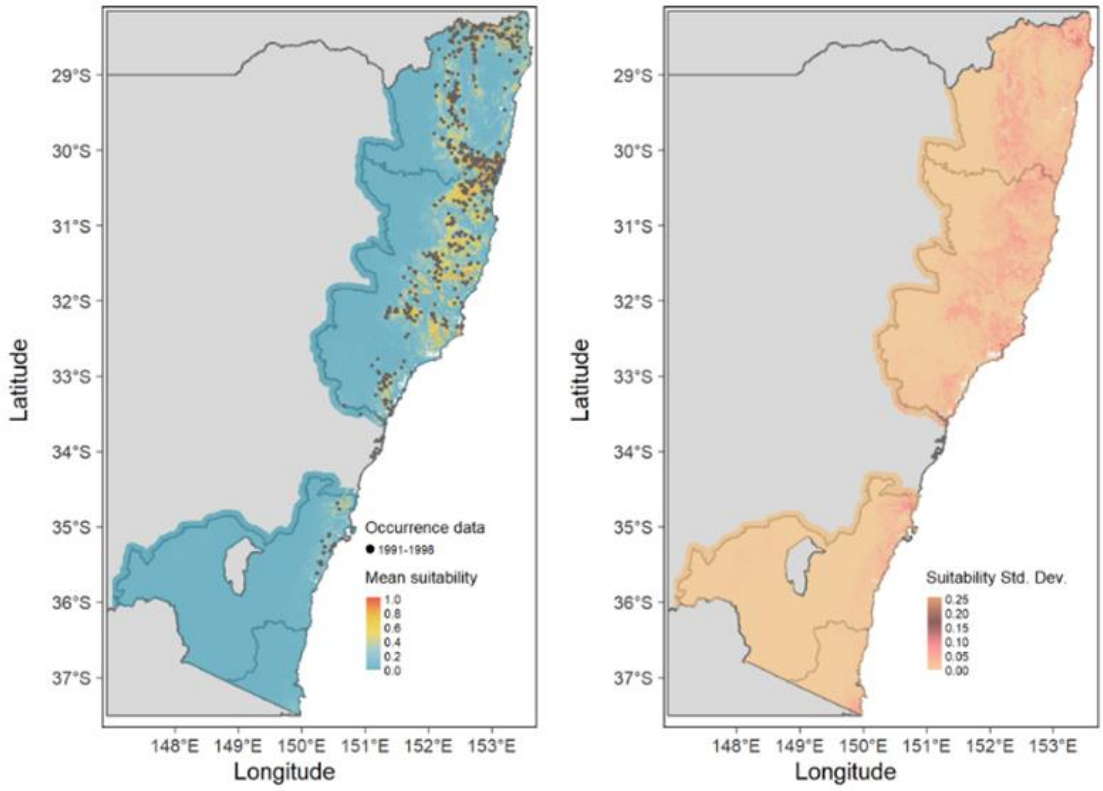

Figure 5: (a) Predicted mean habitat suitability (left) and (b) the standard deviation of habitat suitability for Scrub Turpentine (right), based on ten model runs of Maxent. The occurrence data span 1987–2000 for systematic survey data and 1991–1998 for presence-only data extracted from the Atlas of Living Australia (Kavanagh et al. 2021).

Moreover, Scrub Turpentine occurs as a single interconnected population across the species' range without major disjunctions (Saving our Species DCCEEW, pers. comm. December 2024; Figure B.1, Appendix B).

The survey records and the Panel's observations on site suggest that the pattern of distribution, infection and loss due to Myrtle Rust are similar in the area assessed by Gloucester Coal as is occurring across the range of the species. The Panel is not aware of any evidence that the area of proposed impact has any unusually favourable features conducive to survival of the species although the BDAR (GHD 2024) notes observations of young suckers and even larger stems to 3 m with no visible signs of infection. This suggests a possibility that there could be a small percentage of individual plants that are tolerant or resistant to Myrtle Rust, as appears to be the case across the species' range. The value of collecting samples of such individuals for inclusion in the recovery breeding program should be explored in consultation with the scientists who are leading the program.

5.0 INTERIM ADVICE

The Panel has been asked to provide very specific interim advice to be used by assessors and decision-makers when considering a much wider range of potential impacts and benefits arising from the proposal. The Panel's advice will be finalised following the assessment stage.

Advice on the two questions we have been asked is set out below.

5.1. THE EXTENT TO WHICH THE PROJECT IS LIKELY TO CONTRIBUTE SIGNIFICANTLY TO THE RISK OF EXTINCTION

a) The risk of extinction of Scrub Turpentine arises from the Myrtle Rust pathogen, which is now irreversibly distributed across the whole range of the species in NSW and beyond. The rust has led to a rapid reduction in population numbers across the species' wide range.

b) Clearing of habitat as proposed in this Project is not a factor adding to the risk of extinction. The proposed impacts represent an immaterial proportion of the range of the species and the likely number of extant individuals.

c) Refusing the Project to prevent the loss of 217 stems as reported would not increase the prospect of the species' survival. The stems observed by the panel on the site were heavily impacted by the disease and are very unlikely to be able to flower and reproduce to sustain the local population on-site or nearby. It is unlikely that there would be a viable seed bank in the soil on the site, as the species produces a fleshy fruit that does not persist in the soil.

d) The Panel noted that the surveys for Scrub Turpentine within the upper reservoir footprint and development zone are incomplete and that additional individuals are likely to be present and to be impacted. On the other hand, some previously surveyed individuals may already be lost. Additional survey may locate individuals resistant to Myrtle Rust that could potentially be used to contribute to the recovery program. These potential variations in further survey outcomes do not change our advice in a) or b) above.

5.2. THE APPROPRIATENESS OF GLOUCESTER COAL'S PROPOSED ACTIONS TO CONTRIBUTE TO THE SURVIVAL OF THE SPECIES

a) The NSW Government-led (DCCEEW) Save our Species program has established a research and recovery program that appears to employ the only credible strategy for preventing the extinction of Scrub Turpentine in the wild. This is to find and reproduce genetic variants of the species that are tolerant or resistant to the disease.

b) The program has collected samples and researched the genetic features of the species. It has examined the patterns of genetic diversity within the species across NSW and acquired what it believes is a sufficiently diverse collection to begin a selective breeding program. It has established an ex situ collection to preserve living individuals under controlled conditions and is now screening and trialling potentially resistant individuals in the field to determine their resilience. If these are successful, the final step for recovery will be to breed, distribute and plant resistant individuals across the species' range in the wild.

c) Gloucester Coal has offered to provide additional genetic material from suitable specimens within its proposed development site. The BDAR references the existence of some healthy individuals and these may be suitable candidates for addition to the ex-situ collection (and more may be located if additional surveys are undertaken). The priority of utilising these additional samples should be determined by the researchers, in the context of their priority needs, available resources, and the findings of the genetic analysis that they have already completed.

d) The scale of the research and recovery program is constrained by limited resources, whereas the need for action is urgent and important. Available public sector funding is limited and the $0.25 million that Gloucester Coal has proposed to contribute would be a valuable addition in the context. The offered additional funding would enable screening and reproduction of more candidate individuals and trialling them at a wider range of sites more quickly. If the trials are successful, there will be a need for further

expanded resources to produce large volumes of resistant individuals to be distributed across the species' range for replanting on suitable public and private landholdings.

e) Section 391 (2) of the EBPC Act requires the Commonwealth Minister to take into account the precautionary principle. In this context the Panel notes that while the Project proposes to cause the loss of 217 or more stems, it is unlikely to contribute to the risk of extinction. The Panel considers that the lack of full scientific certainty should not be used as a reason for postponing the proposed measures, namely the financial and (if requested) genetic material contributions to the Save our Species program. This is because the identification, propagation and distribution of rust resistant strains of the species across its range appears to be the only available strategy with a reasonable prospect of preventing extinction in the wild.

f) Conventional land-based offsets would not be an effective strategy for this species. This is because there are no practical management options that could increase the health or longevity of existing populations affected by Myrtle Rust in the wild.

g) A commitment from Gloucester Coal to participate as a host for replanting resistant germplasm of the species and overseeing ongoing management of the field experiments would be an additional useful contribution.

5.3. SUMMARY OF ADVICE

The Panel advises the following:

a) The Project, if approved, is very unlikely to contribute significantly to the risk of extinction of the species Scrub Turpentine in NSW. Neither avoidance of impact by refusal of the Project, or proceeding with the Project (causing the loss of 217 or more stems) would lead to a material change in the survival prospect of the species.

b) Gloucester Coal's proposed actions to contribute money and (if requested) genetic material to the DCCEEW-led Save our Species program are appropriately directed because the identification, propagation and distribution of rust resistant strains of the species across its range appears to be the only available strategy with a reasonable prospect of preventing extinction.

c) Prior to determination, Gloucester Coal should be requested to undertake further surveys to be able to determine the likely full extent of the impacts for Scrub Turpentine, as identified by DCCEEW (BCS) in their advice to the Department (dated December 2024), subject to any alternative arrangements made between Gloucester Coal and DCCEEW that could efficiently further reduce the risk of extinction.

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APPENDIX A – DPHI PLANNING ASSESSMENTS REQUEST FOR ADVICE

Department of Planning, Housing and Infrastructure

Request for Advice

Our ref: (SSI-73368213)

Mr Simon Smith

Chair, Independent Expert Advisory Panel for Energy Transition

By email: smithsaysay4@gmail.com

19 November 2024

Subject: Request for Advice – Stratford Renewable Energy Hub – Serious and Irreversible Impacts to Scrub Turpentine (*Rhodamnia Rubescens*)

Dear Simon,

I am writing to you to request advice from the Independent Expert Advisory Panel for Energy Transition (the Panel) in relation to the Stratford Renewable Energy Hub (SSI-73368213).

Gloucester Coal Ltd (a wholly owned subsidiary of Yancoal) is seeking approval for the construction and operation of a 300 megawatt (MW) pumped hydro energy storage, 320 MW solar farm and associated supporting infrastructure on the site of the Stratford Mining Complex, a former open-cut coal mining operation in the upper Hunter region of NSW (the project).

The Environmental Impact Statement (EIS) was exhibited from 2 October to 29 October 2024 and the Department is now coordinating its whole-of-government assessment of the project.

The Department considers that one of the key technical biodiversity issues for the project is the potential serious and irreversible impact (SAII) to the Scrub Turpentine (*Rhodamnia Rubescens*) due to the proposed clearing of remnant vegetation for the upper reservoir of the pumped hydro energy storage. The project proposes the removal of 217 stems and 145.08 ha of suitable habitat for the species.

The Department understands that it is the decision maker's role to determine whether or not a proposal is likely to result in a SAII. An impact is regarded as serious and irreversible if it is likely to contribute significantly to the risk of a species becoming extinct based on the four principles set out in Clause 6.7 of the *Biodiversity Conservation Regulation 2017* (BC Regulation). Scrub Turpentine is listed as an entity at risk of SAII on the basis of principles 1 and 4 in the BC Regulation. These principles are:

Principle 1: "It will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline, or"'"

Principle 4: "The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable."

The Department notes Clause 7.6(2) of the BC Regulation, which states that that "*an impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct*". Neither this phrase nor the individual words are defined within the *Biodiversity Conservation Act 2016* or BC Regulation. Whether a project would cause SAII to a specific ecological community or species is a matter of fact and degree, and there is no simple 'rule' or 'formula' that can be applied to all ecological communities and species. However, the Department considers that the above phrase should be interpreted to mean a real chance or possibility that the development would be an important or significant contributor to the chance or possibility that one of the relevant species or communities will become extinct. Further, the Department notes that none of the relevant statutory documents relating to SAII state that 'any loss' of a species or ecological community would necessarily contribute significantly to the risk of extinction.

The Department understands that Yancoal's Biodiversity Development Assessment Report (BDAR), which was lodged as part of the EIS, made the following observations regarding potentially serious and irreversible impacts to Scrub Turpentine from the project:

- the loss of 217 stems due to the project would represent a reduction of 1.22% in the 17,843 stems previously recorded within NSW;
- the loss of 145.08 ha of suitable habitat due to the project would represent a 0.04% reduction in the 3,360 km² area of occupancy and no reduction in the 147,340 km² extent of occurrence for the species within NSW;
- the species as a whole is projected to experience a population reduction of >80% over three generations or 10 years, largely due to the effects of the exotic fungus *Austropuccinia psidii* and subsequent onset of myrtle rust disease. The population of Scrub Turpentine within the project disturbance footprint is already impacted by myrtle rust disease from *Austropuccinia psidii* infection and is unlikely to remain viable long-term; and
- notwithstanding the long-term impacts from myrtle rust disease, the population of Scrub Turpentine is considered likely to occur and persist in retained vegetation adjoining the project disturbance footprint.

Yancoal has also committed to undertaking several actions that would contribute to the survival of the species, including:

- providing the Saving our Species (SoS) program with germplasm material of potentially resistant individuals of the Scrub Turpentine within the development footprint to aid in the establishment of ex situ collections that capture the genetic variation of the species; and
- contributing $250,000 to independent research programs that aim to produce positive outcomes for the species – this could include contribution to relevant PhD candidates research or otherwise that specifically aim to increase the understanding of myrtle rust on the species and/or potential management strategies.

With consideration of the above, and the additional details provided in Yancoal's EIS and BDAR and advice from BCS, the Department is seeking advice from the Panel to inform the Department's assessment of the following:

1. the extent to which the project is likely to contribute significantly to the risk of Scrub Turpentine becoming extinct; and
2. the appropriateness of Yancoal's proposed actions to contribute to the survival of the species.

The Panel should not commence advice preparation until the Department has provided the advice from BCS and confirms this request, and should feel free to provide any other advice it considers would assist the Department in its deliberations regarding potential SAII from the project.

To assist the Panel, relevant documentation, including the EIS and BDAR, can be downloaded from the Department's Major Projects website: https://www.planningportal.nsw.gov.au/major-projects/projects/stratford-pumped-hydro-and-solar-0

It would be appreciated if the Panel can prepare initial advice within 21 days of receiving the BCS advice, and then prepare final advice following the preparation of a Response to Submissions by the Proponent.

Please contact me on (02) 9274 6374 or email Nicole.brewer@planning.nsw.gov.au if you have any questions or require additional information for your review.

Yours sincerely

Nicole Brewer

Director

Energy Assessments

APPENDIX B – EXHIBITS FROM NSW AND COMMONWEALTH RECOVERY PROGRAMS

Table B.1 The NSW short-term emergency actions and medium and longer-term targeted research and development required to rescue the genetic diversity of Scrub Turpentine, native guava and Lenwebbia sp. 'Main Range' and eventually return rust-resistant individuals to the wild (SoS 2021).

Short-Term Priorities (Years 1 – 2)

Action Type	Action Description
Field Surveys and Monitoring	Active field survey for plants or populations exhibiting unusual levels of tolerance of the rust.
Germplasm Collections and Management	Capture and ex situ storage of genetically representative germplasm of all three species.
	Establish dispersed collection framework.
Research	Identify level of genetic structuring within the target species in relation to natural population clusters.
Resourcing	Establish on-going support and resourcing for medium- and long-term actions.
Communications	Develop an education and engagement strategy about the distribution and management requirements of the species.

Medium-Term Priorities (Years 3 – 5)

Action Type	Action Description
Germplasm Collections and Management	Develop and maintain documented collections of genetically diverse live plants suitable for research and breeding purposes, preserving the full range of adaptive potential.
Research	Research on ex situ collections and wild populations to identify rust-tolerant lineages, genetic and physiological bases of resistance and susceptibility, and heritability of resistance-related traits. Continue research on seed storage requirements of target species.
Communications	Initiate scoping studies and community engagement for potential contentious issues of long-term recovery strategy, including use of selective breeding, wild-genotype reinforcement, and augmentation /reintroduction to the wild.

Long-Term Priorities (Years 5-10+)

Action Type	Action Description
Reinforce and Reintroduce	Selective breeding for rust resistance, and/or resistance-trait transfer.
	Deployment of reinforced wild-types for augmentation or reintroduction in the wild.

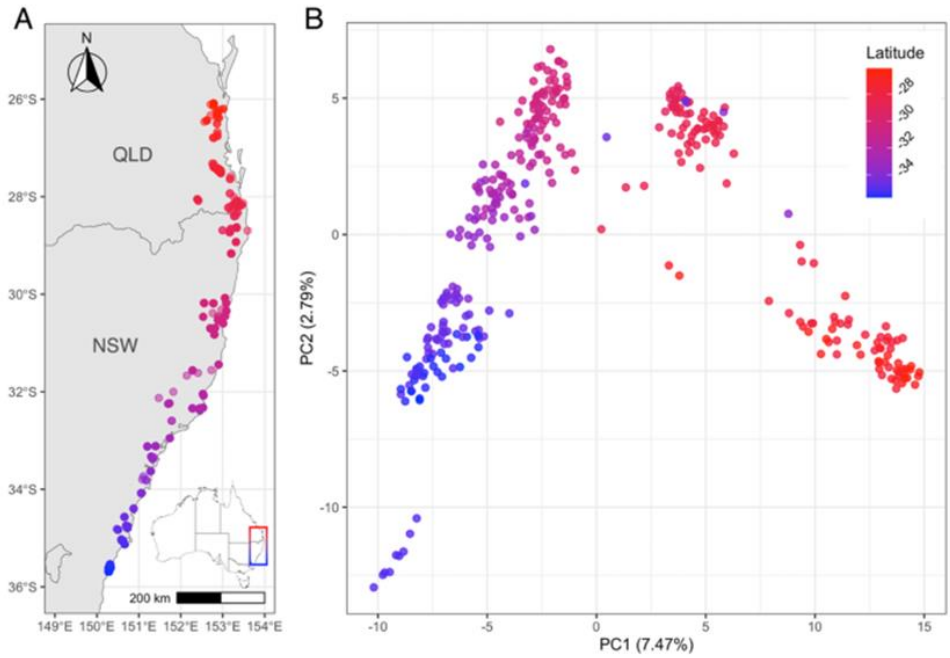

Figure B.1. Distribution of genetic variability in individual plants stored in ex situ germplasm collections of the Critically Endangered Scrub Turpentine along a latitudinal gradient (from Chen et al. 2024). (A) Comprehensively sampled distribution in coastal and subcoastal eastern Australia, and (B) ordination of genotyped individuals against axes 1 and 2 from a principal components analysis of single nucleotide polymorphism data, with points coloured by latitude.

Table B.2 Summary of actions proposed by the NSW Government's 'Saving our Species' program to mitigate the threat posed by Myrtle Rust to the survival of Scrub Turpentine in the wild. The actions purport to mitigate the decline in health and loss of mature plants, as well as the lack of seed-based recruitment and vegetative resprouting due to Myrtle Rust infection (NSW DCCEEW 2024).

No.	Action
1	Continue field surveys across species' range to determine species distribution and rust impact, identify rust-resistant populations, sites or individuals. Maintain monitoring using standardised protocols or recording Myrtle Rust incidence, severity and demographic impacts
2	Continue to augment ex-situ collection, targeting sites that have not been previously collected from, and prioritising collections from individuals showing phenotypic resistance
3	Identify rust-tolerant lineages from wild plants and ex situ collections of this species as well as other closely related species. Investigate reproductive biology of the species as an aid to resistance breeding. Work towards an eventual translocation-based recovery program proposal, including via liaison with other stakeholders
4	Liaise with relevant state and Commonwealth departments to share information and complementary management strategies
5	Maintain existing safe custody ex-situ living collections. Maintain genetically representative core collections to supply dispersed collections. Maintain and develop partnerships with other botanic gardens, non-government organisations and nurseries to establish and maintain dispersed collections
6	Maintain stratified monitoring sites to monitor ongoing Myrtle Rust incidence, severity and symptomology over time. If possible, choose sites with pre-Myrtle Rust baseline data and with co-occurring myrtaceous species. This is conducted as part of the overarching management of the Myrtle Rust Key Threatening Process
7	Support Traditional Owner groups to better identify and manage the impacts of Myrtle Rust

APPENDIX C – PANEL MEMBER PROFILES

Simon Smith (Chair) (BA Hons)

Simon has over 20 years' experience in regulation, program delivery and policy development in connection with environment, energy and economic development. He served in NSW as Secretary of the Department of Industry and as deputy in the Premiers Department and in Environment. Early in his career he had extensive involvement in developing frameworks and tools to better quantify environmental impacts to support objective decision-making on impact avoidance, mitigation, offsetting and management measures. He left the public sector in 2018 and then worked in the private sector in consulting and for a technology firm. He also currently serves as a Director of RACE for 2030, a Cooperative Research Centre established to help Australia make a successful transition to renewable, affordable and clean energy. He was appointed as a part time Commissioner of the NSW Independent Planning Commission in November 2024.

Em. Prof. Nick Reid (FRSN, BSc Hons, PhD)

Nick has 45 years' experience in academia and as an environmental consultant. He specialises in terrestrial ecology, sustainable land and vegetation management, ecological restoration, biodiversity conservation and managing flora, fauna, fire, pests and weeds in agricultural and wild land environments. Nick is a Fellow of the Royal Society of NSW. He is also an Emeritus Professor in ecosystem management and the former head of the School of Environmental and Rural Science at the University of New England (UNE). Nick is a former chair of the Scientific and Technical Advisory Committee of the Gondwana Rainforests of Australia World Heritage Area. His current consultancies and research Projects are funded by Agrifutures Australia and the National Environmental Science Program's Resilient Landscapes Hub. Nick recently completed work for the NSW Natural Resources Commission. He chairs the board of Southern New England Landcare Ltd and is a director of the New England Landcare Network Inc. Nick was the principal editor of the 2024 book Managing Biodiversity in Agricultural Landscapes: Conservation, Restoration and Rewilding.

Nathan Garvey (FEIANZ, BSc)

Nathan is an experienced ecologist with over 20 years' practice in biodiversity assessment and approvals across eastern Australia. Nathan holds a Bachelor of Science and Graduate Diploma in Biological Science from the University of NSW and is a Certified Environmental Practitioner and a Biodiversity Assessment Method accredited assessor under the Biodiversity Conservation Act. Nathan is also a Fellow of the Environment Institute of Australian and New Zealand for his contribution to the field of environmental science and management.

Nathan has experience across a diverse range of sectors including mining, oil and gas, linear infrastructure, renewable energy and residential development, including biodiversity assessment for major projects, offsetting and Environment Protection and Biodiversity Conservation Act referrals. He has strong expertise and experience in the assessment of impacts to biodiversity arising from subsidence, as well as impacts to groundwater dependent ecosystems arising from groundwater drawdown. He is one of NSW's leading experts in biodiversity approvals and offsetting.

Terry Bailey (BSc, MBA, MPPA)

Terry is an experienced public policy and Project delivery practitioner in the fields of heritage, environment, tourism, government and public administration. Terry has over 35 years of relevant experience including roles across different government jurisdictions including as Chief Executive of the Office of Environment and Heritage, senior roles in National Parks and Wildlife Services and the Commonwealth Environment Department's reviews and new environmental legislation in NSW and the Commonwealth. Terry holds several tertiary qualifications including a Bachelor of Applied Science (Environmental Assessment and Land Use Policy), a Master of Business Administration and a Master of Public Policy and Management.

Terry is currently the Executive Dean, College of Sciences and Engineering University of Tasmania and a former Executive Director of the Institute for Marine and Antarctic Studies. He has led significant public policy development such as new coastal legislation, new biodiversity conservation legislation, heritage legislation and new climate change policy for NSW. Terry is also recognised as one of Australia's leading world heritage experts, engaged by Western Australia, South Australia and Queensland and has extensive experience working with First Nations Peoples in conversation, resource management, and economic development.

APPENDIX D – DECISION-MAKING CONTEXT

Critical state significant infrastructure

The critical state significant infrastructure (CSSI) provisions of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) allow the Minister for Planning to determine that a Project is essential for the State for economic, environmental or social reasons. In addition to the normal provisions for State Significant Infrastructure (SSI) Projects, the CSSI provisions of the EP&A Act have the effect of 'turning off' certain aspects of the EP&A Act and other NSW legislation, including:

a) development control orders cannot be issued for CSSI Projects;

b) certain directions, orders or notices cannot be made or given so as to prevent or interfere with the carrying out of an approved CSSI Project;

c) third-party appeal provisions do not apply to breaches of the EP&A Act, a breach of conditions of approval or breaches of other Acts.

A CSSI Project must be determined by the Minister for Planning and Public Spaces and cannot be delegated to other parties.

On 19 June 2024, the Minister for Planning and Public Spaces declared the Project to be CSSI, citing:

a) the contribution of the Project to the NSW Government's pipeline of up to 3 gigawatts (GW) of pumped hydro Projects;

b) the assistance the Project would provide in meeting NSW's target of net zero by 2025;

c) injection of capital expenditure into the region;

d) the benefits of the NSW Government's Electricity Infrastructure Roadmap.

CSSI Projects are assessed under Part 5, Division 5.2 of the EP&A Act. This requires the preparation of an EIS in accordance with Secretary's Environmental Assessment Requirements (SEARs) and approval of the Project NSW Minister for Planning and Public Spaces.

Threatened species, key threatening processes and recovery

Threatened species are species of plants or animals, native to the state of NSW or known to periodically or occasionally migrate to NSW which, in the opinion of the NSW Threatened Species Scientific Committee (Scientific Committee) are at risk of extinction. Threatened species can be listed as critically endangered, endangered or vulnerable depending on the level of risk of extinction.

Division 4.1 of the Biodiversity Conservation Regulation 2017 (BC Regulation) sets out the eligibility criteria for determinations by the Scientific Committee of threatened species listings. Threatened species are listed in Schedule 1 of the BC Act.

Scrub Turpentine was listed as critically endangered under the BC Act on 1 February 2019. The Scientific Committee (TSSC 2019) determined the species was eligible for listing as critically endangered because it is Projected to experience a population reduction of greater than 80% over three generations or 10 years due to the effects of Myrtle Rust.

The legislation (as did the preceding *Threatened Species Conservation Act – (TSC Act)*) also provides for listing of key threatening processes (KTPs) which, in the opinion of the Scientific Committee, adversely affect threatened species or ecological communities or could cause species

or ecological communities that are not threatened to become threatened. KTPs are listed in Schedule 4 of the BC Act. The Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae was listed as a KTP under the TSC Act on 15 April 2011. The Scientific Committee (TSSC 2011) determined that exotic disease-causing rusts, such as Myrtle Rust, constitute a major threat to native Australian plants in the family Myrtaceae.

Assessment of biodiversity impacts

Assessment under the EP&A Act is subject to Part 7 of the BC Act. This part sets out the process for biodiversity assessment and approval under the EP&A Act. Section 7.9 of the BC Act requires the preparation of a Biodiversity Development Assessment Report (BDAR) for SSI Projects assessed under Division 5.2 of the EP&A Act.

The BDAR must assess the biodiversity values and potential impacts to those values in accordance with the Biodiversity Assessment Method (BAM) (DPIE 2020), outline measures to avoid or minimise these impacts and specify the number and class of biodiversity credits required to offset the residual impact of the Project (after all measures to avoid and minimise impacts).

In determining the Project, the Minister must take into consideration the likely impact of the Project on biodiversity values. If the Minister decides to grant approval, the conditions of the approval may require a proponent to retire biodiversity credits to offset any residual impact of the Project, as set out in the BDAR or another number and class. The Minister may also require additional measures to avoid and minimise impacts.

Strategies for avoiding, minimising or offsetting impacts generally

The requirement to avoid and minimise impacts is established by Section 6.12(c) of the BC Act, which requires a BDAR to set out the measures that a proponent will take to avoid or minimise impacts on biodiversity values. As set out above, the Minister must take this into account when determining a Project and may require additional measures.

Guidance on avoiding and minimising impacts on biodiversity values is set out in Section 7 of the BAM (DPIE 2020) with additional measures to mitigate impacts set out in Section 8.4 of the BAM**.**

Serious and irreversible impacts

SAII are impacts that are likely to contribute significantly the risk of a threatened species or ecological communities becoming extinct. Under Section 6.5 of the BC Act, a determination of whether a Project will result in a SAII is to be made in accordance with the four principles prescribed in Section 6.7 of the BC Regulation:

a) it will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline, or

b) it will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size, or

c) it is an impact on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution, or

d) the impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.

These principles broadly align with the criteria established by the International Union for the Conservation of Nature (IUCN) (IUCN 2017, Keith et al. 2013) to assess the extinction risk of species and ecological communities.

The BAM (DPIE 2020) requires the BDAR to identify threatened species and communities at risk of a SAII and evaluate the extent and severity of the impact on an entity at risk of a SAII in accordance with the criteria set out in Section 9.1.1 of the BAM for impacts on threatened communities and in Section 9.1.2 of the BAM for impacts on threatened species. The NSW Threatened Biodiversity Data Collection is used by accredited assessors to determine whether a threatened species or community is at risk of SAII.

Whether a Project will result in a SAII is determined by the decision maker; not by the proponent or the accredited assessor preparing the BDAR. In considering whether a Project will result in SAII the penultimate test is established by Section 6.7(2) of the BC Regulation:

> *"it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct . . ."*

Under Section 7.16 of the BC Act, if the Minister decides that a Project is likely to have a SAII on biodiversity values, the Minister must take those impacts into consideration and is required to determine whether there are any additional and appropriate measures that will minimise those impacts.

Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

A delegate of the Commonwealth Minister determined on 11 April 2024 that the Project is a "controlled action" and, therefore, the Project also requires approval under the EPBC Act.

The Project is to be assessed pursuant to the Assessment Bilateral Agreement with the NSW Government. Therefore, the Project EIS provides an assessment of potential impacts on the following controlling provisions under the EPBC Act considered by the Commonwealth Minister (or delegate) to be relevant to the Action:

- threatened species and communities (sections 18 and 18A); and
- migratory species (sections 20 and 20A).

Section 391 (2) of the EBPC Act requires the Commonwealth Minister to take into account the precautionary principle when making decisions that could impact the environment. The precautionary principle states that when there is a risk of serious or irreversible environmental damage, a lack of scientific certainty should not be used as a reason to delay action.