STRATEGIC VEGETATION MANAGEMENT PLAN

JANUARY 2023

TASRAIL

CONTENTS

1. INTRODUCTION

Tasmanian Railway Pty Ltd (TasRail) owns and controls a substantial land and rail asset portfolio, including operational and non-operational rail corridors, railway yards and depots. TasRail-managed lands contain various forms of vegetation and are exposed to continual vegetation re-encroachment from and within adjacent lands. It is essential for TasRail to manage vegetation for a range of reasons, including the maintenance of rail assets, to facilitate safe rail operations, for maintaining public safety (e.g. rail crossing safety and bushfire risk reduction) and for compliance with the *Rail Infrastructure Act 2007* (RI Act).

1.1 PURPOSE

The purpose of this Vegetation Management Plan (VMP) is to outline TasRail's rationale for, and approach to, vegetation management, and to establish a strategic framework and systematic program for TasRail's vegetation management activities. TasRail's vegetation management activities will be managed in accordance with this VMP.

This VMP satisfies TasRail's statutory requirement under section 26(1) of the RI Act to prepare, periodically review and revise, and implement a vegetation management plan.

1.2 SCOPE AND LIMITATIONS

This VMP applies to all land for which TasRail has management responsibility, including both operational and non-operational rail corridors. TasRail's network map is shown at Figure 1.

This VMP represents a major strategic review and revision of the previous VMP, and thus has an initial currency period of 12 months from approval, during which time a first-year review of this VMP will be undertaken. On completion of the first-year review, subsequent VMP versions will be subject to a rolling two-yearly review cycle. To the extent that any VMP review is delayed, the existing VMP will remain in force.

Figure 1: TasRail Network Map

1.3 COMPLIANCE REQUIREMENTS

Under section 26(1) of the RI Act, TasRail is required to prepare, periodically review and revise, and implement a vegetation management plan.

In preparing or reviewing and revising its VMP, TasRail is required under section 26(2) of the RI Act to have regard to the following:

(a) the overall safety and operational requirements of the rail network;
(b) the need to prevent vegetation from becoming established in, encroaching on or overhanging the rail network;
(c) the need for train drivers and road users to have good lines of sight in and around the rail network, particularly near railway crossings;
(d) the need to prevent weeds from spreading onto adjoining land from the rail network;
(e) the need to eliminate or minimise fire hazards in and around the rail network;
(f) the need for a regular, effective and sustainable vegetation inspection and monitoring regime;
(g) plans, standards, orders, declarations or other things that from time to time may be in force under the *Rail Safety Act 1997, Weed Management Act 1999, Threatened Species Protection Act 1995* or prescribed Acts;
(h) the vegetation management provisions, if any, of relevant council planning schemes;
(i) prescribed requirements, if any;
(j) any directions that it is given by the Shareholder Minister.

TasRail is required to publish its VMP electronically.

1.4 TASRAIL ASSET MANAGEMENT AND BUSINESS CONTEXT

TasRail is a vertically integrated, short haul, freight rail business.

TasRail was created in 2009 by combining the Below Rail assets (for which the State had assumed responsibility in 2007) with all of the Above Rail and Business Assets purchased from Pacific National, including the Emu Bay Railway on the North West Coast.

Administration of rail funding from the Australian Government was transferred from the Rail Management branch of the former Department of Infrastructure, Energy and Resources to TasRail late in 2009. This completed the amalgamation of the whole operating rail network in Tasmania, along with responsibility for future upgrading of the Below Rail and Above Rail segments of the business.

TasRail's Below Rail segment comprises its Engineering, Planning, Signals and Infrastructure teams. The segment is responsible for the management and maintenance of the Tasmanian Rail Network, including rail, sleepers, ballast, points, formation, bridges, culverts, tunnels and level crossings. The team also maintains TasRail's land tenure (including vegetation management), comprising both operational and non-operational land corridors of more than 1500 kilometres. The rail network runs through highly fertile lands and, because Tasmania's climate and soils provide some of the best growing conditions in Australia for vegetation, vegetation management on the rail network is a perpetual and continuous task.

The Above Rail business is the commercial arm of TasRail and provides rail logistics to Tasmanian industry across three market categories: intermodal (containers), bulk, and forestry. TasRail's modernised contracts require high levels of service delivery for industry, and these can only be achieved by maintaining TasRail's rollingstock fleet (including locomotives and wagons) to exacting standards. As TasRail's rollingstock operates on the rail network, achieving high standards of service delivery depends critically on the condition and performance of the rail network, including vegetation management within rail corridors.

As an integrated business, TasRail is committed to delivering transport and logistics solutions that are safe, reliable, and sustainable.

2. VEGETATION HAZARDS AND TASRAIL RISKS

The presence of vegetation along TasRail's rail network poses a dynamic hazard, and therefore source of risk, to rail operations on the network. It can also contribute to the degree of risk to road users at rail crossings and to public safety. For example, if track-side vegetation provides a combustible fuel source (which can, under certain conditions, be ignited by sparks), it could potentially contribute to ignition of a bushfire. Further, vegetation can compromise the condition of rail assets (eg. weeds becoming established in ballast or obscuring visibility of signalling equipment), and therefore requires maintenance to facilitate proper functioning of the asset.

A key issue associated with vegetation is that it is a dynamic hazard that undergoes growth cycles, changes in condition (eg. non-flammable to flammable; stable to unstable) and can deteriorate over time or in response to damage from environmental factors (storms, droughts, insect attack, disease), potentially transitioning from a safe to a hazardous condition. Further, it can be the case that there are no external indicators that particular vegetation has become hazardous (eg. a branch or tree with compromised structural integrity due to internal damage). Hence, managing vegetation-related risks requires ongoing monitoring, and/or cyclic treatment to prevent hazardous conditions developing.

In general, conditions in Tasmania are highly favourable for vegetation growth, particularly in high rainfall areas across the north and south of the State. A number of Tasmanian tree species grow very quickly and produce very high volumes of biomass in a single year and many woody shrub/understorey tree species, such as wattles, are also capable of very fast growth and prolific establishment.

Tasmania's favourable soils and climate also support vigorous seasonal grass growth (particularly through the winter/spring period). Exceptional growth rates are possible in years with favourable rainfall and temperatures. In some seasons standard cycles for grass slashing may be insufficient to maintain line of sight and may necessitate additional slashing treatments.

2.1 KEY VEGETATION TYPES AND HAZARDS

Vegetation comes in a variety of structural forms and a great variety of species, both native and introduced. In a rail network management context, vegetation forms can be classified into the following broad structural groups:

- grass and groundcover vegetation
- non-woody weeds
- woody weeds and invasive native woody vegetation
- trees and tall shrubs.

2.1.1 GRASS AND GROUNDCOVER VEGETATION

Grasses and groundcover vegetation, including annuals and perennials, are relatively low-growing plants. They typically reproduce on an annual or short cycle and thus can quickly re-establish and grow after cutting treatments. Grasses in particular grow quickly, flower and set seed, dying off and/or curing and becoming flammable once they have set seed. The fine nature of grassy vegetation makes it one of the more easily ignited vegetation forms once it is sufficiently dry.

Grassy vegetation typically responds to being slashed or mowed by vigorously regrowing in an attempt to reach maturity and reproduce. Slashed grass can recover to full mature height in as little as a few weeks in favourable growing conditions.

Areas with grassy groundcover often comprise multiple species, with different grasses and groundcovers going through their growth and reproduction cycles at different times. From a bushfire prevention perspective, grass maintained in a short, green condition is a much lower hazard than grass in a mature, cured and dry condition. From an asset maintenance and track visibility perspective, it is desirable to keep grass short to prevent accumulating prolific seed sources.

Accordingly, management of grass cover in a low-hazard condition will typically require at least two slashing or mowing treatments a year. In Tasmania, the optimal timing of such treatments will be a spring treatment (to delay and slow grass reaching full mature height, setting seed and curing), and again in autumn to retard development of winter-growing species. An important ancillary benefit of slashing treatments is that woody weeds, shrub, and tree species in nearby areas, which may disperse seed into slashed zones, are prevented from becoming established by the recurrent slashing. However, if slashing cycles are disrupted or paused, woody vegetation can become established and, in favourable growth seasons, can reach a size where slashing is no longer a practical treatment option. This then necessitates expensive, potentially multiple-phase treatment regimens to remove advanced woody growth and restore a 'slashable' grass cover condition.

2.1.2 NON-WOODY WEEDS

Non-woody weeds can be incorporated within grassy areas or can be the main vegetation source in some locations such as within track ballast. Typical features of many weeds are that they are fast-growing, prolific reproducers, can out-compete other local plant species and, in some cases, may thrive where other local plants do not.

Successful suppression and treatment of weeds typically entails breaking their reproductive cycle, which means killing weeds before they can reach maturity and set seed. Treatments to kill weeds commonly involve application of herbicide, typically using boom spray delivery systems or manually operated backpack sprayer apparatus. Different weed species have different growth and reproduction timing, which means that they may respond differently to different timing of herbicide application. Furthermore, different weed species respond differently to particular herbicides.

Accordingly, selection of herbicide type or composition and spray treatment timing is a highly technical endeavour involving assessment of weed species that require control, as well as selecting the most effective herbicide and treatment timing. Historically, TasRail has applied a two-passes-per-year weed spraying program, with a spring and autumn pass. Investigations are underway to determine if there is a suitable one-pass weed spraying option suited to TasRail's requirements.

2.1.3 WOODY WEEDS AND INVASIVE NATIVE WOODY VEGETATION

Woody weeds and invasive native woody vegetation can encroach into formerly open grassy areas, potentially precluding slashing treatment options and necessitating more expensive manual removal or targeted spraying options. Once woody vegetation becomes established, it can be difficult to remove, as regeneration from soil-stored seed or re-shooting from surviving root material or vegetation fragments can occur. Accordingly, adherence to effective slashing cycles/regimes can prevent problematic woody weed infestations.

In locations where line-of-sight maintenance is required (such as at approaches to level crossings), patches of nearby invasive woody vegetation can be a recurrent source of encroachment into line-of-sight areas. In such cases, it may be more cost-effective to remove an entire patch, or clear beyond line-of-sight limits to optimise treatment cost over the medium to long term.

2.1.4 TREES AND TALL SHRUBS

Tasmania provides some of the best conditions for tree growth in Australia, hence the high prevalence of plantation forestry in Tasmania. Many Tasmanian tree species have particularly vigorous growth rates. In their pursuit of fast and tall growth, many Tasmanian tree species are vulnerable to large-branch fracture in storms, and trees that have developed stem defects during their life can become vulnerable to stem failure, particularly where decay or wood-boring insect attack reduces structural integrity.

Two categories of hazard can arise from trees in or closely adjacent to rail corridors.

Hazardous trees

Hazardous trees are dead, dying or dangerous trees or structural branches (with visibly apparent structural defects) which, due to their direction of lean or crown extension, would be likely to fall onto the tracks if failure occurred. Such trees have a higher-risk profile than healthy trees and therefore need to be identified and made safe.

Overhang

Tree branches extending laterally towards, or overhanging, tracks are a potential hazard. If they break and fall, they have a high likelihood of falling onto tracks. Even overhanging branches with no visible structural defect have an elevated risk profile, as many branches that fail and fall into rail corridors are apparently healthy branches with no externally visible defect.

2.1.5 CURRENT STATE OF VEGETATION HAZARDS

Vegetation management programs on TasRail's operational rail network currently focus on ensuring that on-track areas remain free of long grasses and weeds. Prolific long grass in the danger zone (within 3 metres of tracks) can cause issues for trackside maintenance, undermining of ballast formation and other safety issues. Woody vegetation, including saplings, is also targeted in off-track areas as it can also pose a safety risk if allowed to encroach.

These intensive remediation programs, along with a program of hazardous tree risk management, will eventually establish themselves into a refreshed systematic cyclic spraying, slashing and assessment program.

TasRail is also responsible for vegetation management on a number of non-operational lines around the State, excluding those that have been removed as Strategic Infrastructure Corridors. The condition of the remaining corridors is highly variable as TasRail's primary point of focus remains the operational network. Vegetation management works on non-operational lines have been largely restricted to around the Hobart region, principally for good neighbour and reputation risk management purposes in urbanised areas. Increasingly however, works are also being undertaken in the Wiltshire and Maydena regions.

2.2 VEGETATION-RELATED RISKS

The principal risks posed by vegetation hazards along the rail network include the following.

2.2.1 'ON-TRACK' AREA ENCROACHMENT

The area between and immediately adjacent to rail tracks (3.5 metres either side of the rails) is designated as the 'on-track' area. The on-track area comprises the track ballast and clear ground area alongside the ballast. It is a safety requirement that the on-track area is kept clear of vegetation to maintain ballast condition and function and prevent vegetation establishment to ensure a physical and visual obstruction-free on-track area for safe operation of rollingstock.

TasRail's track network currently comprises 611 route kilometres of operational track and 147.79 route kilometres of non-operational track. Operational track areas are subject to a systematic, cyclic herbicide spray treatment application along the on-track area to prevent vegetation encroachment, while the non-operational track areas are subject to a condition-based assessment and treatment process.

TasRail does not collect data on the occurrence of vegetation within the on-track area, and such data is not practical to capture as part of current track inspection and vegetation control treatment processes. However, evidence regarding the efficacy of the risk reduction program can be seen from the on-track vegetation difference between operational track sections (where a cyclic on-track vegetation control program is applied), and non-operational track sections (where vegetation establishment within track ballast and other parts of the on-track area has occurred).

2.2.2 LINE-OF-SIGHT ENCROACHMENT

Visibility towards crossings from rail and road approaches is an essential safety requirement. Clear line-of-sight assessments at level crossings based on sighting distance are undertaken as prescribed in TasRail's INF-WI-228 Sighting Distance Assessment at Level Crossings and are conducted at 12-month intervals on all the operational lines in the network. TasRail's line-of-sight requirements are guided by Australian Standard AS 1742.7:2016, which provides mandatory sight distance provision at railway crossings. During inspections, vegetation encroaching line of sight is identified and reported for clearance.

TasRail has around 230 railway crossings on public roads. Some 109 of these are Active Level Crossings that are protected with flashing lights and bells. The balance is Passive Level Crossings that are protected with static warning signs. There are also many private level crossings and livestock crossings. Accordingly, line-of-sight inspection and vegetation management works make up a significant, mandatory, proportion of TasRail's annual vegetation management works program.

2.2.3 BUSHFIRE IGNITION POTENTIAL

While asset management programs for both above and below track asset classes serve to minimise the potential for defects which may cause hot sparks during rail operations, dead or dry vegetation in the on-track area can also contribute to bushfire risk. Accordingly, the on-track vegetation control works program, in combination with asset management and maintenance, serves to mitigate bushfire ignition risk in TasRail's rail corridors.

The vegetation outcomes achieved through the on-track spraying program (sparse, highly discontinuous vegetation cover in the on-track zone) are consistent with very low-fuel conditions that Tasmania Fire Service recommend to reduce the risk of fire.

2.2.4 OBSTRUCTION OF TRACKS BY FALLEN TREES OR BRANCHES

Trees or large branches that fall across rail lines (or onto rollingstock during rail operations) are a potentially significant rail safety hazard. TasRail is not able to eliminate such hazard by removing all trees tall enough to reach the on-track area if they fall in the direction of tracks, as many of these trees are situated outside of TasRail-managed corridors. Only a very small fraction of tree populations within or adjacent to rail corridors fail and fall onto tracks or shed branches onto tracks.

Accordingly, elimination of this risk is not practical. Risk management is the only reasonable approach. Trees and large branches that have their structural integrity compromised due to death, natural aging processes, physical damage or disease, pose an increased risk of failure. Accordingly, programs aimed at identifying hazardous trees and branches before they fail are a part of prudent vegetation risk management.

Not all vegetation that fails and falls onto rail tracks has visible indicators of being hazardous, and even apparently healthy trees and branches can fail during storms and damaging wind events. It may therefore be prudent to trim or remove live branches that overhang tracks unless otherwise assessed by a qualified arborist.

The population of trees within potential falling distance of TasRail's track network is difficult to quantify. Only a very small fraction of the total tree population would be classifiable as a hazard to the network. The potential for hazardous trees will vary around the rail network, influenced by external factors such as local tree failure event history, and events that can cause or lead to elevated occurrence of hazardous trees, such as bushfire-damaged areas and areas which have been impacted by major storm events. Thus, targeted hazardous tree inspection programs can be prioritised to areas of potentially higher risk and to areas with more failure-prone species (e.g. some acacia species).

Hazardous tree removal works can be reasonably expected to influence a reduction in the incidence of trees with visible defects failing and falling onto tracks.

The current vegetation management strategy incorporates a hazardous tree program targeting hazardous tree removals across the network in locations where track inspectors, drivers or a vegetation management team have identified hazardous tree occurrence.

2.2.5 INVASIVE WEED SPECIES RISK

Some introduced weed species and invasive native woody vegetation can pose a risk of infestation to rail corridors and adjacent lands. In some cases, risk may be more an environmental, economic, or reputational risk than a safety risk; however, these are all valid risks to be addressed under a vegetation management program.

Problematic weed species that currently attract TasRail control efforts include:

- English broom
- Spanish heath
- Blackberries
- Chilean needle grass
- Gorse
- Fennel
- Pampas

TasRail plans declared weed control and eradication works in cooperation with external stakeholders, including local Weed Action Fund groups.

3. ENVIRONMENTAL CONSIDERATIONS AND APPROVALS FOR VEGETATION MANAGEMENT WORKS

The range of vegetation management works undertaken pursuant to the VMP take place within TasRail's rail corridors. These contain a wide range of ecosystems, and native and introduced flora and fauna. Land within rail corridors varies widely in its biodiversity values, from highly modified landform areas dominated by exotic vegetation with no threatened species, through to environmentally sensitive areas of high-value remnant vegetation containing or providing habitat for State-listed threatened flora and fauna, and/or Commonwealth-listed threatened ecological communities and species. Unavoidably, vegetation management works undertaken pursuant to rail safety and asset management objectives will involve varying degrees of interaction with native vegetation and fauna habitats, even where native vegetation may only be a minor component of primarily exotic vegetation.

State and Commonwealth legislation for the protection of environmental values, has been considered by TasRail in the context of its application of vegetation management programs. TasRail's policies and procedures regarding environmental management are set out in TRL010 Policy and Procedures – Environmental Management (July 2020).

The key elements of TRL010 relevant to vegetation management are summarised in the sections below.

3.1 TASMANIAN ENVIRONMENTAL LEGISLATION

Rail Infrastructure Act 2007

Under the RI Act, TasRail is excluded from the requirement to apply for a permit under local planning schemes when undertaking routine or emergency works. Section 19(1) of the RI Act states that:

A railway entity does not have to comply with the requirements of the *Land Use Planning and Approvals Act 1993* (LUPA Act) as regards –

(a) emergency railway works; or

(b) routine railway works that are carried out wholly within the rail network in order to maintain the rail network.

Works not deemed emergency or routine are not exempt from the requirement for a permit under local planning schemes. Section 19(2) states that:

All other railway works are taken to be developments that a planning authority has a discretion either to refuse or permit in accordance with section 57 of the *Land Use Planning and Approvals Act 1993*.

Under this VMP (preparation and maintenance of which is also an RI Act requirement), TasRail considers the following vegetation management programs are 'routine railway works carried out wholly within the rail network in order to maintain the rail network', and are therefore excluded from requiring a permit under the LUPA Act:

- cyclic spraying program (on-track)
- cyclic on-track slashing program
- line-of-sight (off-track) slashing program
- hazardous tree management program

All other vegetation management activities, such as declared weed control works, and non-cyclic works, such as ad hoc works on non-operational lines, would not be classifiable as 'routine' works. However, under the interim planning schemes, there are several other exemptions that may apply to vegetation planting, clearing and modification works, which are not deemed emergency or routine. This includes an exemption for works done in accordance with an approved or endorsed vegetation management plan, unless works involve threatened species.

Threatened Species Protection Act 1995 (TSP Act)

The TSP Act provides mechanisms for protecting listed species from threatening processes through the implementation of 'recovery plans', 'threat abatement plans', 'land management plans', 'public authority agreements', and 'interim protection orders'.

TasRail's vegetation management programs are subject to the provisions of the TSP Act. Accordingly, TasRail maintains a spatial database recording the location and details of environmentally sensitive sites, known as the TasRail Sensitive Area Listing (SAL) database. The SAL (approx. 2,500-line items) records include observation records within 500 metres of the rail network of threatened vegetation communities, threatened flora, threatened fauna and habitats such as nests, dens and the like. This data is periodically updated from the Tasmanian Natural Values Atlas maintained by the Department of Natural Resources and Environment Tasmania (NRE Tas.) and is used to inform TasRail managers of potential impacts associated with development and maintenance works being undertaken within the rail corridor.

Vegetation management works such as spraying, and in some cases slashing, are restricted from occurring in SAL areas (through application of 'no spray' or 'ballast spray only' or 'hand spray only' zones). Procedural controls are also applied to ensure vegetation adjacent to the rail corridor is not impacted. The SAL is TasRail's primary means by which TasRail aims to avoid adverse impacts to environmental values.

Nature Conservation Act 2002 (NC Act)

The NC Act incorporates provisions for the protection of native flora and fauna, and for the declaration of reserved land. The taking of all wildlife is prohibited by the NC Act without a permit. The NC Act includes a schedule of threatened vegetation communities and mechanisms for their voluntary conservation. It does not include formal protection of threatened vegetation, but the schedule is used to inform other mechanisms that do regulate their clearance, such as the Forest Practices Regulations and local authority planning schemes.

An instance where the NC Act may apply to vegetation management works on the Tasmanian Rail Network would be the removal of hazardous trees where these are mature hollow-bearing trees. Mature hollow-bearing trees can provide nesting habitat for a variety of avifauna (including threatened species) plus shelter for arboreal mammals. The removal of trees supporting occupied nests would require a permit under the NC Act.

3.2 COMMONWEALTH ENVIRONMENTAL LEGISLATION

Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act is the principal national legislation that protects Australia's significant natural environment and heritage. The EPBC Act provides a mechanism for the protection of Australia's most important natural and cultural places along with biodiversity values of national significance.

This is achieved through a national environmental assessment and approvals process. The EPBC Act focuses on the protection of the environment through nine Matters of National Environmental Significance (MNES). Those of relevance to TasRail include nationally threatened ecological communities and species. The TasRail network intersects with habitat supporting species and communities listed in the EPBC Act and, in those cases vegetation management programs are subject to the provisions of the Act. Accordingly, TasRail's SAL database lists areas containing, or potentially containing, nationally listed threatened ecological communities or species.

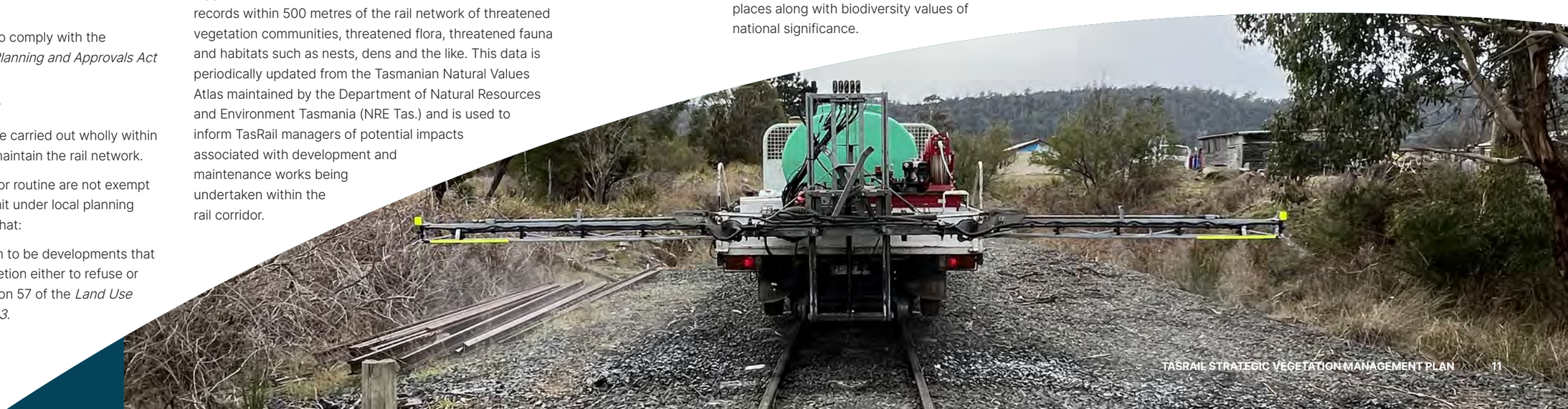
Vegetation management works such as spraying, and in some cases slashing, are restricted from occurring in SAL areas (through application of 'no spray' or 'ballast spray only' or 'hand spray only' zones). Procedural controls are also applied to ensure vegetation adjacent to the rail corridor is not impacted.

3.3 TASRAIL'S POLICY AND PROCEDURES

TasRail's Environmental Management policy and procedures aim to provide guidance on current environmental legislation, how and when permits are required, and a framework for developing policy and procedures to help in the planning and implementing of capital works projects, minor upgrades and routine maintenance activities, while promoting conservation of important ecological values.

Processes and specifications for TasRail's SAL process are also documented.

For clarity, to the extent that there is any conflict between the provisions of this VMP and established policy and procedures, the latter shall take priority.



4. VMP GOALS AND OBJECTIVES

The aim of this VMP is to establish a cost-effective and sustainable vegetation management strategy and annual works program which meets the requirements of section 26 of the Rail Infrastructure Act 2007 and TasRail's asset management objectives, while maintaining compliance with relevant State and Commonwealth environmental legislation.

4.1 VMP OBJECTIVES

The objectives of the VMP are:

- to manage vegetation within rail corridors in a condition conducive to the safe and effective operation of the operational rail network
- to maintain vegetation such that train drivers and road users have good lines of sight in and around the rail network, particularly near the approaches to railway crossings
- to prevent, as far as practicable, vegetation-caused degradation of TasRail's rail line assets
- to maintain vegetation within on-track rail corridor areas (within 3.5 metres of rails) in a condition that minimises the potential for bushfire.
- to reduce, as far as reasonably practicable, the risk of trees and/or tree limbs falling onto tracks or rollingstock
- to plan and implement a program of weed control works to control and prevent the spread of declared weeds in and from the rail network
- to design and implement vegetation management programs that maintain compliance with relevant environmental legislation
- to continuously improve efficiency in vegetation management program delivery through improved program design, innovation in vegetation management planning and delivery, and streamlining contractual arrangements for vegetation management services delivery.

4.2 VEGETATION MANAGEMENT STRATEGIES

In pursuit of TasRail's vegetation management objectives, the following strategies are applied.

1. Vegetation management investment and effort is prioritised to the operational network where commercial rail operations are undertaken on an ongoing basis. Vegetation management on the operational network seeks to achieve the full suite of TasRail's vegetation management objectives (see 4.1).
2. Within operational network areas, the highest intensity of vegetation management investment and effort is directed towards suppressing vegetation growth in the on-track zone, which incorporates the rail track and ballast, and immediately adjacent area out to 3.5 metres from the rails. The on-track area contains rail line and ballast assets, constitutes the envelope in which rollingstock operates, and is the highest priority area for rail safety and bushfire ignition prevention. Accordingly, as far as environmental controls allow, spray treatments are used in the on-track zone to minimise vegetation biomass and growth within the zone.
3. In off-track areas, the highest intensity vegetation management investment and effort is directed to line-of-sight maintenance, both at crossings (where members of the public cross through the on-track zone) and other areas where line-of-sight maintenance is required for safe train operation.
4. To reduce the risk of readily dispersible fast-growing vegetation encroachment into the on-track zone, vegetation control work in areas immediately adjacent to the on-track zone is undertaken where feasible, principally in off-track areas, accessible by slasher, within 5 metres of the rails. This serves to prevent the establishment of woody vegetation immediately adjacent to the on-track zone and reduce dispersal of weeds and fast-growing grasses into the on-track zone. Off-track vegetation control improves the safety of trackside works, increasing visibility of track-side hazards. This is mostly achieved through mechanical works, with brush-cutting works where slashing is not practical.
5. To reduce risks associated with trees and tree limbs falling onto rail lines, vegetation management investment and effort is directed to identifying hazardous trees (dead, dying or dangerous vegetation with externally apparent structural defects likely to impact on-track zone areas if fall) and making them safe.
6. To minimise the potential for vegetation management works to adversely impact biodiversity values protected by State and Commonwealth environmental legislation, TasRail maintains an SAL database which identifies areas where threatened ecological communities and/or species occur, as well as environmentally sensitive areas, so that control activities can be restricted to activities unlikely to have a significant impact.
7. To continuously improve efficiency in vegetation management program delivery, TasRail will monitor, research and develop improved vegetation control systems in search of program delivery options which improve vegetation management effectiveness and regulatory compliance, as well as seeking to streamline vegetation management work systems and contractual arrangements in order to realise efficiency gains in program delivery by vegetation management works contractors.

4.3 VMP PERFORMANCE MONITORING AND EVALUATION

It is extremely challenging to measure the performance of vegetation management programs, which have among their key objectives maintaining rail network safety, reducing bushfire risk, and improving safety at rail crossings. This is largely due to the fact that vegetation is not the only risk factor affecting rail safety; there are many other risk factors that influence such outcomes.

The following vegetation management performance measures are established and require annual monitoring for the operational network:

- number of crossings (annual basis) where vegetation is reported to be infringing line-of-sight specifications
- number of trees or tree limbs reported to have fallen onto tracks or ballast (excluding major storm event damage)
- number of vegetation fires reported (annual basis) as igniting within the on-track zone
- number of infringements (of environmental regulations) reported involving vegetation management works (annual)
- number of vegetation complaints relating directly to 'declared weeds' (applies to both operational and non-operational network).

5. STRATEGIC VEGETATION MANAGEMENT PROGRAMS

In response to the range of vegetation hazards and risks identified, TasRail designs, plans and implements a range of programs to manage vegetation hazards and reduce risks attributable to vegetation. The programs outlined in sections 5.1 to 5.4 are classifiable as 'routine' maintenance programs, noting that such programs constitute routine rail corridor maintenance activities, necessarily and historically applied to TasRail's rail corridor on a recurrent basis.

5.1 CYCLIC SPRAY PROGRAM

The cyclic spray program is an essential, routine annual program necessary for maintaining safe train operations.

5.1.1 CYCLIC SPRAY PROGRAM RATIONALE

The lowest risk tolerance for vegetation applies within the on-track area. This is due to the significant potential for vegetation to compromise safety through:

- becoming established in ballast and in direct contact with track
- impeding visibility of the track for operators
- impeding the operation of track stability monitoring equipment (Geowagon); and
- potentially providing a fuel source for bushfire ignition within the on-track area, the lowest risk tolerance for vegetation applies within the on-track area.

Accordingly, a chemical spray program is applied in this area to kill emergent and regenerating vegetation, including weeds, grasses and juvenile woody vegetation that can recruit into, or regenerate within, the area.

Due to the wide variety of plant species, including highly dispersible weeds, pasture grasses and other plants which readily spread from adjacent areas, no single chemical treatment or timing will be completely effective at killing all plants within the on-track area.

Soil-stored seed sources may evade spray application (noting that germination timing/conditions vary between different species, so there is no single application timing effective for all species) and some plants may be missed during spray application. Other plants may disperse into the on-track area after treatment, and some plants may be resistant to the chemical spray used. Thus, the aim is not to eliminate all plants within the on-track area, but to suppress plant recruitment, establishment, and growth within the area to a degree that maintains a tolerably low presence and volume of vegetation.

This involves restricting any plant establishment in the zone to a degree that any residual plant presence is sparse, short or non-hazardous and discontinuous so that it will not impede safe operations or support fire ignition, development and spread.

Due to chemical spray application being directly within the on-track area, mobile spray equipment operated from hi-rail trucks operating on the rail networks can only occur at times when sections of track are made available for access.

5.1.2 SPRAY PROGRAM DESIGN

In designing a spray program, there is a need to consider practicability, effectiveness and cost. Historically, TasRail's on-track spray program on the operational network has been a two-pass annual cycle, with a spring spray and an autumn spray, which achieves an acceptable mortality rate across different weed species with different germination and growth periods. TasRail regularly monitors the success of the spray programs and looks to improve, both from an effectiveness and a value for money perspective. A single-pass spray treatment with acceptable effectiveness is currently under investigation but is yet to be determined and operationally trialled.

Chemical spray application is principally carried out using a hi-rail truck-mounted boom spray operated by a two-person crew. Such units may carry up to 2,000 litres of the approved herbicide mixture and require periodic replenishment of water at identified water sources near the rail network.

The principal driver of work efficiency/inefficiency with spray operations is the frequency with which changes need to be made to sprayer operation to adjust for environmental restrictions, and frequency of stop/start for hand-spray work where the spray boom can't be used. Spraying work specifications that require frequent stop/start are slower to implement than more streamlined regimes.

5.1.3 EFFICIENCY IMPROVEMENT STRATEGY

Two key and current strategies for program efficiency improvement are:

1. To investigate the potential for reducing to a single-pass annual spray system (from the current two-pass program), and adopting an optimised chemical spray composition and spray application timing to achieve acceptable vegetation control results.
2. Review spray pattern restrictions in order to reduce the need for alternative manual spray work and make boom spraying operations more efficient, as well as provide a greater coverage.

5.2 ON-TRACK SLASHING PROGRAM

The on-track cyclic spray program is reinforced by a routine annual on-track slashing program which, in conjunction with the spray program, provides an area of managed vegetation out to approximately five metres either side of tracks.

5.2.1 ON-TRACK SLASHING PROGRAM RATIONALE

The cyclic spray program is limited in how far either side of tracks it can reach by spray boom width and environmental considerations. While the cyclic spray program exerts a high degree of control over vegetation within the train envelope, for track visibility, access and maintenance, and bushfire risk reduction reasons, it is prudent to maintain managed (slashed) vegetation condition out to approximately five metres of the track where terrain allows.

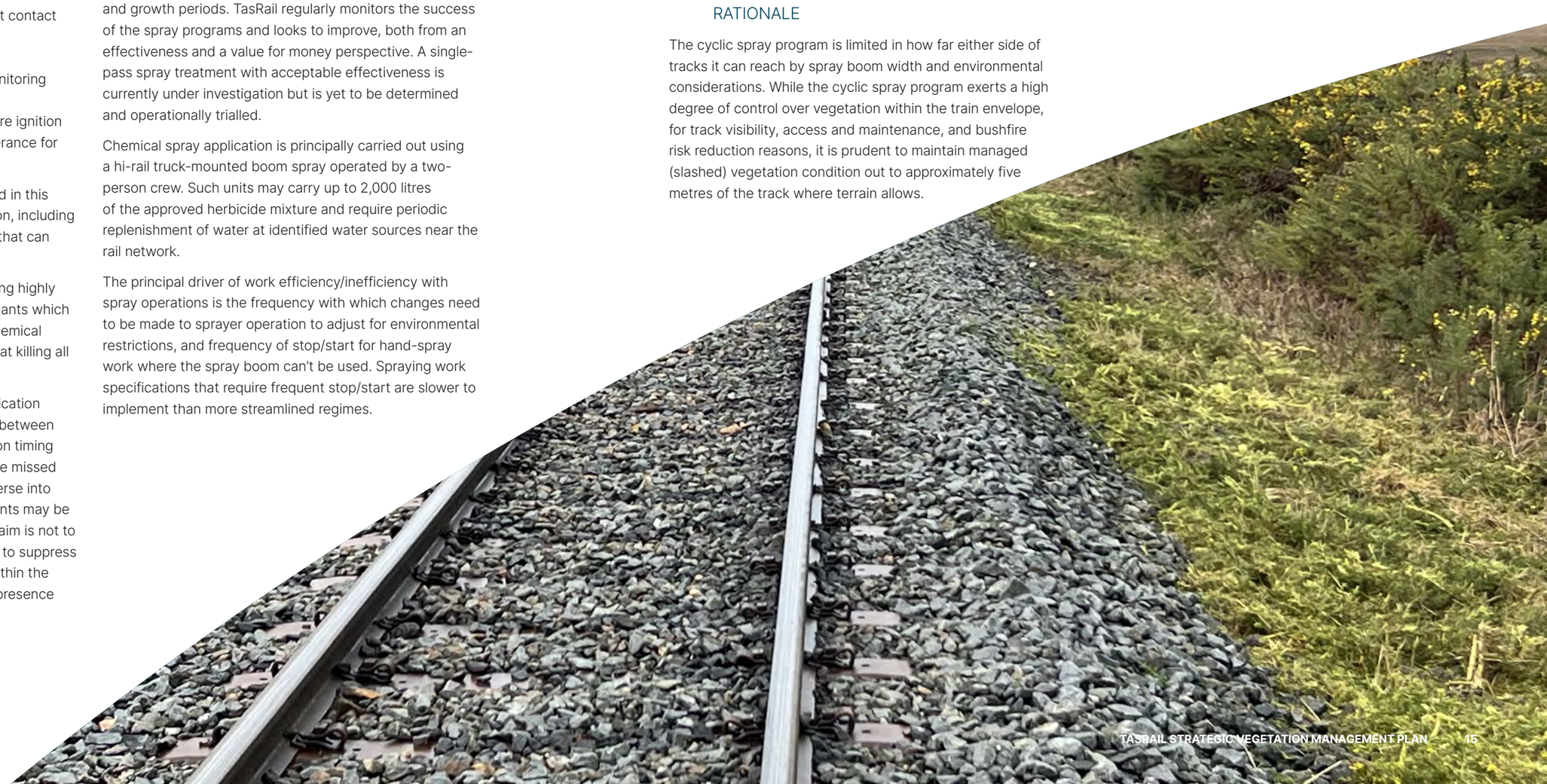
Accordingly, an on-track slashing program is applied adjacent to the cyclic spray program zone to control the height and condition of weeds, grasses and juvenile woody vegetation within the area.

5.2.2 ON-TRACK SLASHING PROGRAM DESIGN

This program involves mechanical slashing using conventional mechanical slashing equipment, adjacent to a spray-treated area. On terrain that is incompatible with slashing equipment other mechanical measures such as brush-cutting may be applied.

Some areas where grass vegetation is largely absent do not require slashing. The on-track slashing program is applied across approximately 80 per cent of the operational track network.

Depending on track operations and weather constraints, the general aim is to apply on-track slashing works approximately two to four weeks after recent on-track spray program works.



5.2.3 CURRENT SLASHING PROGRAM COST

The current on-track slashing contract period is set at five years, which is also inclusive of the on-track spraying program.

This does not include, and is distinct from, off-track line-of-sight slashing works implemented at rail crossings (see section 5.3).

5.2.4 EFFICIENCY IMPROVEMENT STRATEGY

There are limited opportunities to improve the efficiency of on-track slashing programs as there is little opportunity for technology-related efficiency gain. A reduced on-track slashing program extent/footprint would come with increased risk from reduced track visibility and would also be likely to adversely impact the effectiveness of the on-track spray program.

5.3 LINE-OF-SIGHT (OFF-TRACK) CLEARANCE PROGRAM

The line-of-sight clearance program is an essential annual program necessary for maintaining rail crossing safety and compliance.

5.3.1 LINE-OF-SIGHT (OFF-TRACK) CLEARANCE PROGRAM RATIONALE

Maintaining clear line of sight at the approaches to road–rail crossings is an essential safety requirement. It enables train drivers a clear view of approaching vehicles, motorcycles and cyclists and those stopped at crossings. Likewise it allows motorists/road users to see trains approaching the crossing. Grasses, weeds and other fast-growing vegetation can reach heights that can obscure line of sight at crossings. A recurrent slashing regime serves to keep grassy vegetation short and maintain clear line of sight and can also prevent or inhibit shrub or tree encroachment into the line of sight.

5.3.2 LINE-OF-SIGHT (OFF-TRACK) SLASHING PROGRAM DESIGN

Due to the areas and locations involved, chemical spraying of off-track vegetation for line-of-sight management is neither practical or required. Historically, application of slashing works has been found to be adequate for maintaining line of sight on off-track areas.

Grassy vegetation growth rates in Tasmania are such that at least two slashing treatment applications are required to keep grassy vegetation below a suitable height (nominally below 150 mm) for maintaining clear line of sight. In high rainfall years, such as in 2021-22, TasRail had exceptional grass growth which necessitated an additional mow run. These occurrences will need to be factored into contingency funds, as seasonal growth can vary from season to season.

In urban areas, TasRail proposes to implement a minimum of four line-of-sight (off-track) slashing treatments annually.

In rural areas, TasRail implements two line-of-sight (off-track) slashing treatments annually.

The higher population density in urban areas necessitates an increased slashing regime, particularly near level crossings. Higher treatment frequency in urban areas also helps to maintain TasRail's corridors consistent with other state landowners.

Clearance work is principally mechanical slashing, with mowing and brush-cutting works applied as appropriate to local terrain and vegetation conditions, with the most appropriate technique selected by the works contractor.

While the main vegetation treated during slashing works is grasses and non-woody vegetation, slashing also impacts emergent and juvenile woody plant species while they are in the early establishment phase, preventing them from becoming established in grassy areas. Thus, cyclic grass slashing prevents large woody vegetation establishment, which requires more expensive, manual methods to control and cannot be removed with grass slashing equipment.

5.4 HAZARDOUS TREE MANAGEMENT PROGRAM

The hazardous tree management program is an important recurrent program for reducing the risk of dead, dying and/or dangerous trees with structural defects from falling onto trains or tracks by identifying and removing such trees and branches before they fail. This routine program commenced in 2022 and is an important rail safety risk control.

5.4.1 HAZARDOUS TREE MANAGEMENT PROGRAM RATIONALE

Trees are dynamic living organisms, changing their physical size and spread as they grow and mature, shedding lower-shaded branches as crown height and spread extends. Their condition may also change due to damage from exposure to the elements, insect and fungal attack or decay, and undergoing natural senescing processes and decline ending in tree death. While the vast majority of the tree population adjacent to tracks will be healthy, structurally sound trees, a proportion of the population will be over-mature and senescing or be damaged, having significant structural defects.

Trees and limbs with structural defects, such have a higher likelihood than healthy trees of failing and falling onto trains or tracks if not identified and made safe. It should be noted that while treating hazardous trees reduces tree/branch failure risk, it cannot eliminate it, as even apparently healthy trees and branches can fail. This occurs periodically, particularly during storms or severe weather events. Accordingly, hazardous tree programs are about reducing visually apparent and identifiable tree hazards.

5.4.2 HAZARDOUS TREE MANAGEMENT PROGRAM DESIGN

Processes whereby trees transition from an apparently healthy and structurally sound state to a structurally unsound and potentially dangerous state typically occur over much longer timeframes than cycles applied for other types of vegetation management work such as track and line-of-sight clearance. Key exceptions include where bushfires or severe storms or winds (particularly from non-prevailing wind direction) impact trees, causing structural damage.

Accordingly, the inspection component of hazardous tree management programs can be applied over a longer cycle than programs based on fast-growth cycles.

Depending on fire intensity, it may be prudent to assess trees in bushfire-impacted sections of the rail corridor promptly after fires to identify any trees rendered structurally unsound by the impact of fire.

Depending on the severity and local impact of major storm events, it may be prudent to assess trees in storm or snow damaged sections of the rail corridor promptly after such events occur to identify any trees rendered structurally unsound.

Outside of fire or storm-damaged areas, sections of rail line which have recorded a higher-than-average occurrence of tree or branch fall incidents would be prioritised for hazardous tree program assessment.

In general, inspection for hazardous trees should seek to achieve a five-year cycle completion timeframe across the network.

Hazardous tree inspection should be undertaken by suitably qualified arborists, forest scientists or pathologists, or horticulturists with Tree Risk Assessment qualifications.

5.4.3 CURRENT HAZARDOUS TREE MANAGEMENT PROGRAM COST

The current cost of the hazardous tree management program across the operational network falls under the tree and shrub removal program budget.

This does not include hazardous tree assessment and treatment works in the non-operational network areas.

5.4.4 EFFICIENCY IMPROVEMENT STRATEGY

TasRail maintains a hazardous tree register that records, on a rail line-by-line basis, locations, defect types/descriptions and remedial actions required for all identified hazardous trees. This register, if consolidated into a live database, with additional columns for inspection dates, could be developed into a tool for monitoring trends for hazardous tree find rates on the different rail lines, inform decisions and provide trend indications on program performance.

As TasRail's hazardous tree management program strengthens there will also be further opportunity to assess and monitor for the potential for tree overhang (tree branches that grow into the rail corridor and extend over the rail lines) on the rail network.

5.5 NON-ROUTINE VEGETATION CONTROL WORKS

In addition to the above 'routine' vegetation management programs, the vegetation works types outlined at sections 5.5.1 to 5.5.3 are undertaken.

5.5.1 DECLARED WEED CONTROL WORKS

Tasmania is home to a wide range of introduced plants. Over 1,000 introduced plants have been recorded in Tasmania. Some of these are well established and widespread, while others are more recent introductions, occurring in small populations with varying levels of threat.

Thirty-nine of 138 declared weeds listed under the Tasmanian Weed Management Act 1999 (WM Act) have a presence within proximity of the railway corridors, and 12 of these are weeds of national significance (WONS). Weeds such as lovegrass, needle grass, ragwort, broom species, boneseed, gorse, blackberry, Spanish heath, and African boxthorn represent just some of the weeds posing significant implications for the railway. Some species are more recent introductions, with low distributions at present; however, their presence along the rail corridors means they threaten to extend their spread.

TasRail has developed a Tasmanian Rail Corridor Weed Management Strategy (NBES, 2020), which establishes weed management objectives and a five-tier system for prioritising weed management works. Category 2 and 3 weeds form the focus of the strategy.

Priority management areas have also been identified where areas of the railway are adjacent to, or in close proximity to, sensitive areas within the Tasmanian Reserve Estate.

TasRail's weed management works program will be prioritised and implemented in accordance with TasRail's Tasmanian Rail Corridor Weed Management Strategy 2020.

TasRail has also made commitments to three Weed Action Fund groups to assist in weed management over the next 3 years.

5.5.2 VEGETATION COMPLAINTS MANAGEMENT

As an element of its stakeholder engagement processes, TasRail maintains a public-facing web-based comments and complaints process. This enables the general public to ask questions, raise issues, seek information, and raise complaints about various aspects of TasRail's operations and asset management, including vegetation management. TasRail received an average of 55 vegetation-related queries/notifications/complaints annually (2016-17 to 2021-22).

Of the incoming vegetation-related queries/notifications/complaints that require vegetation management action, TasRail assesses, actions and responds to these complaints. Not all of these complaints are directly related to vegetation; some relate to rubbish or other materials dumped in TasRail's corridors, and others may relate to graffiti within corridors.

5.5.3 NON-OPERATIONAL LINES VEGETATION MANAGEMENT WORK

TasRail manages approximately 147.79 route kilometres of non-operational track. These track sections are not in current use and in many cases have been disused for many years. The state of vegetation within these non-operational rail corridors is highly variable. These are not subject to the routine vegetation management programs outlined in sections 5.1 to 5.4 (noting TasRail is currently assessing the feasibility of an increase to vegetation management programs on the Hobart non-operational line and parts of the Wiltshire (North West) and Maydena (South) lines). Vegetation management works on the non-operational line sections is on a prioritised, case-by-case basis according to the need to manage hazards and visual amenity in these corridors.

6. TASRAIL VEGETATION RISK MANAGEMENT ORGANISATION

Vegetation management occurs as part of the asset management function, with rail corridors being an asset class containing other key assets such as the track system.

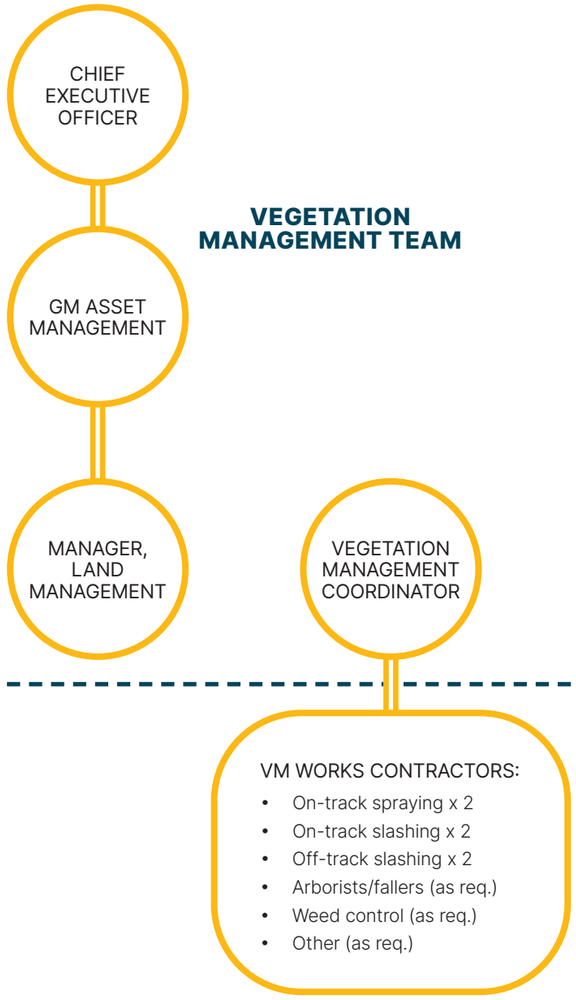


Figure 2: TasRail vegetation management team structure.

7. ASSET/ VEGETATION MANAGEMENT RISKS AND OPPORTUNITIES

In considering strategic risks and opportunities for strategic vegetation management, an asset management approach to vegetation management considerations is prudent. The following principles apply in considering strategic vegetation management under this VMP.

- TasRail's 'Below Rail segment' (e.g. ballast, sleepers, rails) is a business-critical asset, the performance of which can be compromised by vegetation. Vegetation control is essential for maintaining below rail segment asset performance.
- TasRail's rail corridors are assets. Vegetation can degrade the condition of these assets and thus vegetation requires control (through vegetation management activities) to maintain the performance of the rail corridor asset.
- Deferred asset maintenance can lead to accelerated depreciation. In a vegetation management context, this means that sub-optimal or deferred vegetation management can accelerate depreciation of rail assets.
- Safe and efficient rail operations depend on asset performance (condition and function), for which vegetation management is a key asset management activity.
- Tasmania's climate is highly favourable for vegetation growth; thus, vegetation on TasRail's network is highly dynamic and requires persistent and consistent management effort to maintain rail asset performance.

TASRAIL