



KCGM

SIGNIFICANT SPECIES MANAGEMENT PLAN

FLORA

FIMISTON GOLD MINE OPERATIONS EXTENSION (STAGE 3)
FIMISTON SOUTH PROJECT
v6 November 2024

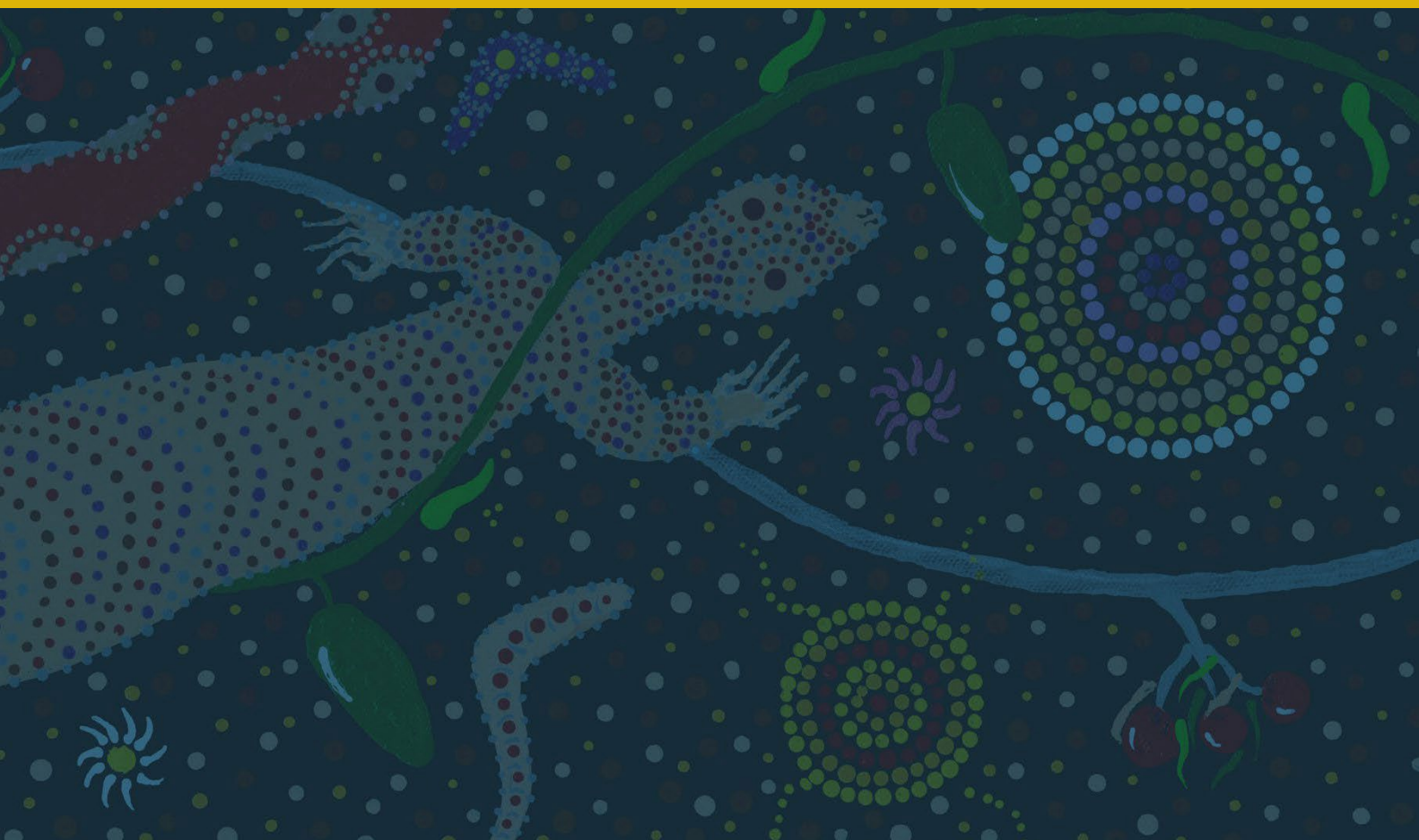


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VERSION CONTROL

| Version | Date | Document Changes |
|---------|----------|---|
| 1 | Oct 2022 | New Document. Specific Species Management Plan (SSMP) developed to meet the requirements of the Western Australian Environmental Protection Agency. |
| 2 | Mar 2023 | Updated in Response to RFI to include more comprehensive management actions and monitoring |
| 3 | Mar 2024 | Updated in response to Revised Proposal - ERD Response to Submissions second RFI |
| 4 | Jul 2024 | Document updated to address clarification from the Revised Proposal - ERD Response to Submissions consultation. |
| 5 | Oct 2024 | Document updated in response to Response to Submissions RFI and subsequent consultation |
| 6 | Nov 2024 | Document split into two – flora and fauna – to assist with conditioning |

1. SUMMARY

Kalgoorlie Consolidated Gold Mines Pty Ltd (KCGM) is the proponent for the Fimiston South (FS) Project (the Proposal). The objective of the proposal is to continue the ongoing operations of the Fimiston Gold Mine and enable uninterrupted mining and mineral processing until approximately 2034. The Revised Proposal is summarised in Section 2.1 of this Significant Species Management Plan (SSMP) for ease of reference.

This SSMP was prepared in accordance with the *'Instructions on how to prepare Environmental Protection Act 1986 – Part IV Environmental Management Plans'* (version 2.0, 2021) published by the Western Australian (WA) Environment Protection Authority (EPA). This SSMP details the measures that are required to manage potential impacts to conservation significant species from the Proposal. Table 1 summarises the information contained in this SSMP.

Table 1 Management Plan Summary

| | |
|---|---|
| Title of Proposal | Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning: Revised Proposal |
| Proponent | Kalgoorlie Consolidated Gold Mines Pty Ltd |
| Ministerial Statement Number | A Ministerial Statement and associated conditions are yet to be issued. |
| Purpose of the WFMP | The WFMP is submitted to fulfil the requirements of <i>'Instructions on how to prepare Environmental Protection Act 1986 – Part IV Environmental Management Plans'</i> (version 2.0, 2021). |
| Key Environmental Factors and Objectives | <u>Key Environmental Factors:</u> Flora and vegetation, Terrestrial fauna <u>EPA Objectives:</u> <u>Flora and vegetation:</u> 'To protect flora and vegetation so that biological diversity and ecological integrity are maintained' (EPA, 2022). <u>Terrestrial fauna:</u> 'To protect terrestrial fauna so that biological diversity and ecological integrity are maintained' (EPA, 2022). |
| Condition Clauses | NA |
| Proposed Construction Date | Continuation of existing operations |
| EMP requirements pre - construction | Yes – this document |

2. CONTEXT, SCOPE, AND RATIONALE

2.1 The Project

KCGM manages and operates the following assets for the owner, Northern Star Resources Limited (NSR):

- Fimiston Open Pit: open pit mining and waste rock disposal.
- Mt Charlotte Underground Mine: underground mining.
- Fimiston Processing Plant: crushing, mineral processing, refining and tailings disposal.
- Gidji Gold Processing Plant: mineral processing and tailings disposal.
- Exploration: mineral resource definition drilling and core processing.

The following operational areas are incorporated within the revised FS Project submission package directly as the proposed activities include active open pit mining by traditional methods and continued mineral processing:

- Fimiston Open Pit;
- Fimiston Tailings Storage Facilities (TSFs);
- Fimiston Processing Plant; and
- Fimiston Waste Rock Dumps (WRD).

2.1.1 Location of the Fimiston Operations

The Fimiston operations are located adjacent to the City of Kalgoorlie-Boulder (CKB) approximately 600 kilometers (km) east of Perth, Western Australia. On average KCGM produces 500,000 ounces of gold each year and has a current operating mine life until 2034 (via the FS Project).

Currently, up to 80 million tonnes (Mt) of ore and waste rock material are currently mined from the Fimiston Open Pit per annum through traditional truck and shovel methods. Ore is then continuously processed through the Fimiston Processing Plant, whilst waste rock material is transported to various designated WRD, or marginal or low-grade ore is stockpiled adjacent to the open pit operations. The current footprint of the Fimiston Open Pit extends approximately 1.5 km wide by 3.5 km in length, making it one of the largest open pit gold mines in Australia.

2.2 The Revised Proposal – FS Project

The Revised FS Project submission package supports the Fimiston Gold Mine Operations Extension (Stage 3) and Mine Closure Planning: Fimiston South Project (FS Project) application which details the mining out of the Ivanhoe cutback at the southern extent of the pre-existing Fimiston Open Pit. Proposed future mining activities would continue to utilise traditional mining methods currently employed within the open pit. The cutback will amend the overall pit design by both additional widening and deepening of the pit. The works will extend the current operational life of open pit to approximately 2034.

The Revised Proposal includes:

- A cut back of the Fimiston Open Pit, the Ivanhoe cutback
- Additional Fimiston II Extension Tailings Storage Facility (TSF) cell;
- Construction of the new Fimiston III TSF;
- An extension to the existing Southern WRD; and
- Development of areas for supporting infrastructure and services are also required.

Fimiston Operations will continue to operate under currently approved Ministerial Conditions and existing FAQMP and approved management practices.

2.3 Key Environmental Factors

This SSMP specifically addresses the 'Flora and Vegetation' and 'Terrestrial Fauna; environmental factors, as defined within the EPA's *Statement of Environmental Principles, Factors and Objectives and Aims of EIA* (EPA, 2022).

The environmental objective of the Flora and Vegetation factor, as defined within the EPA's Environmental Factor Guideline: Flora and Vegetation (EPA, 2022), is:

To protect flora and vegetation so that biological diversity and ecological integrity are maintained.

The environmental objective of the Terrestrial Fauna factor, as defined within the EPA's *Environmental Factor Guideline: Terrestrial Fauna* (EPA, 2022), is:

To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.

2.3.1 Activities affecting Key Environmental Factor – Flora and Vegetation

Potential threats on flora and vegetation potentially resulting from the FS Project are:

- direct loss of flora and native vegetation due to clearing 1,868 ha of vegetation, and;
- indirect impacts on flora and vegetation from construction and operation of expanded pit, new TSF and WRD including:
 - dust deposition on vegetation.
 - impact to flora and vegetation from water used for dust suppression.
 - changes to vegetation structure and composition due to altered surface drainage flow patterns resulting in changes to hydrology.
 - alteration of groundwater regimes due to clearing, and water from the TSF entering groundwater.
 - indirect impacts from altered fire regimes.
 - invasion of introduced flora.

2.4 Condition Requirements

The current MS 782 limits on the total area to be cleared.

The Environmental Protection Act 1986 (EP Act) and Biodiversity Conservation Act 2016 (BC Act) has been considered in preparation of this SSMP for *Eremophila praecox* (Priority 2) and *Jalmenus aridus*

(Priority 1). Regional surveys completed by KCGM support significant growth in species knowledge, home range and understanding of these two species.

The Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) is not applicable to

E. praecox and *J. aridus* as these species are not listed under federal legislation.

The Malleefowl, *Leipoa ocellata* (Vulnerable) is listed under the EPBC Act, and is potentially found in the area, based on generalised information obtained from a national vegetation mapping tool. To provide more information on this species, a targeted Malleefowl habitat condition and mound survey was completed in March 2023 by Alexander Holm and Associates.

This targeted survey resulted in the identification of small areas of marginal foraging area along the eastern boundary of a proposed tailings dam and confirmed that there are no recently active mounds. The targeted survey and assessment concluded that *L. ocellata* (Malleefowl) are unlikely to utilise these small areas for breeding or mound construction due to unsuitable soils.

As a consequence of these findings, management actions and targets for *L. ocellata* (Malleefowl) have not been included in this SSMP. Approvals would be sought if tailings storage development was to extend further east, but this is not currently envisaged by KCGM.

To acknowledge the importance of *L. ocellata* under Federal regulatory requirements, NSR have developed and released a “NSR – Malleefowl Awareness Training” (2023) session online (INX network learning system) to all personnel who are working on NSR sites that are located near areas of known or potential *L. ocellata* (Malleefowl) populations.

2.5 Rationale and Approach

The FS Project has been designed to avoid, where possible, impacts to key environmental factors located within the design footprint, including the location of *E. praecox* in relation to key landform placement.

Adjustments to designs have been undertaken to ensure there is the best possible balance between environmental values and project requirements.

The location of the significant species were considered when selecting a preferred location for landforms. Whenever possible, these locations were avoided or landform designs were adjusted.

2.6 Survey and Study Findings

2.6.1 Flora

The results from several botanical surveys have been used to support the assessment and identification of potential impacts of the FS Project implementation on the Environmental Factor of flora and vegetation. The most recent consolidated flora and vegetation assessment report was prepared by Phoenix Environmental Sciences (2024c). This revised and updated version includes a summary of consolidated historical and recent survey findings into one document.

Local and regional surveys are planned to occur each spring to further knowledge on the priority species in the area and to provide more detailed regional knowledge to use as reference for species monitoring.

Known remnant *E. praecox* shrubs on KCGM's tenements will be monitored over time to evaluate long term resilience to indirect impacts to maintain viable populations throughout and beyond the mine life. This remnant population will be compared with reference sites in Lakewood Timber Reserve (Appendix B).

Existing assessment reports which document regional flora and vegetation within the surrounding area of the mine development area MDE (<100kms) were reviewed and are included within the revised consolidated assessment mentioned above (Phoenix, 2024c), as outlined in Table 2.

Table 2 **Vegetation and Flora Surveys**

| Report | Survey Description | Survey Date |
|--|--|--|
| Level 1 flora and vegetation survey for the Fimiston Waste Rock Dump Extension. Draft 1. Botanica Consulting, 2015. | Level 1 flora and vegetation survey for the Fimiston Waste Rock Dump Extension | 2015 |
| Flora and vegetation, and fauna surveys for proposed infrastructure within the Development Envelope of the Fimiston Gold Mine Operations, Phoenix, 2018. | Investigation of proposed infrastructure areas in the floodway and north of the Fimiston II TSF. | 6-8 September and 11-12 November 2017. |
| Regional flora, vegetation and terrestrial fauna survey for the Gidji Operations, 2019. | Flora and vegetation followed by a second phase flora and vegetation. | 10–11 November 2017 & 15-16 November 2018. |
| Targeted flora and short-range endemic invertebrate study for the FIM IIE Project, Phoenix, 2019a. | Targeted <i>E. praecox</i> and general short range endemic survey for the Fimiston II Cell E TSF Project, December 2019. | 13-14 November 2018. |
| Regional survey for <i>E. praecox</i> for the FIM IIE Project, Phoenix, 2019b. | Survey for the State listed Priority 2 flora species <i>E. praecox</i> in the broader Kalgoorlie region. | 9-15 August 2019. |

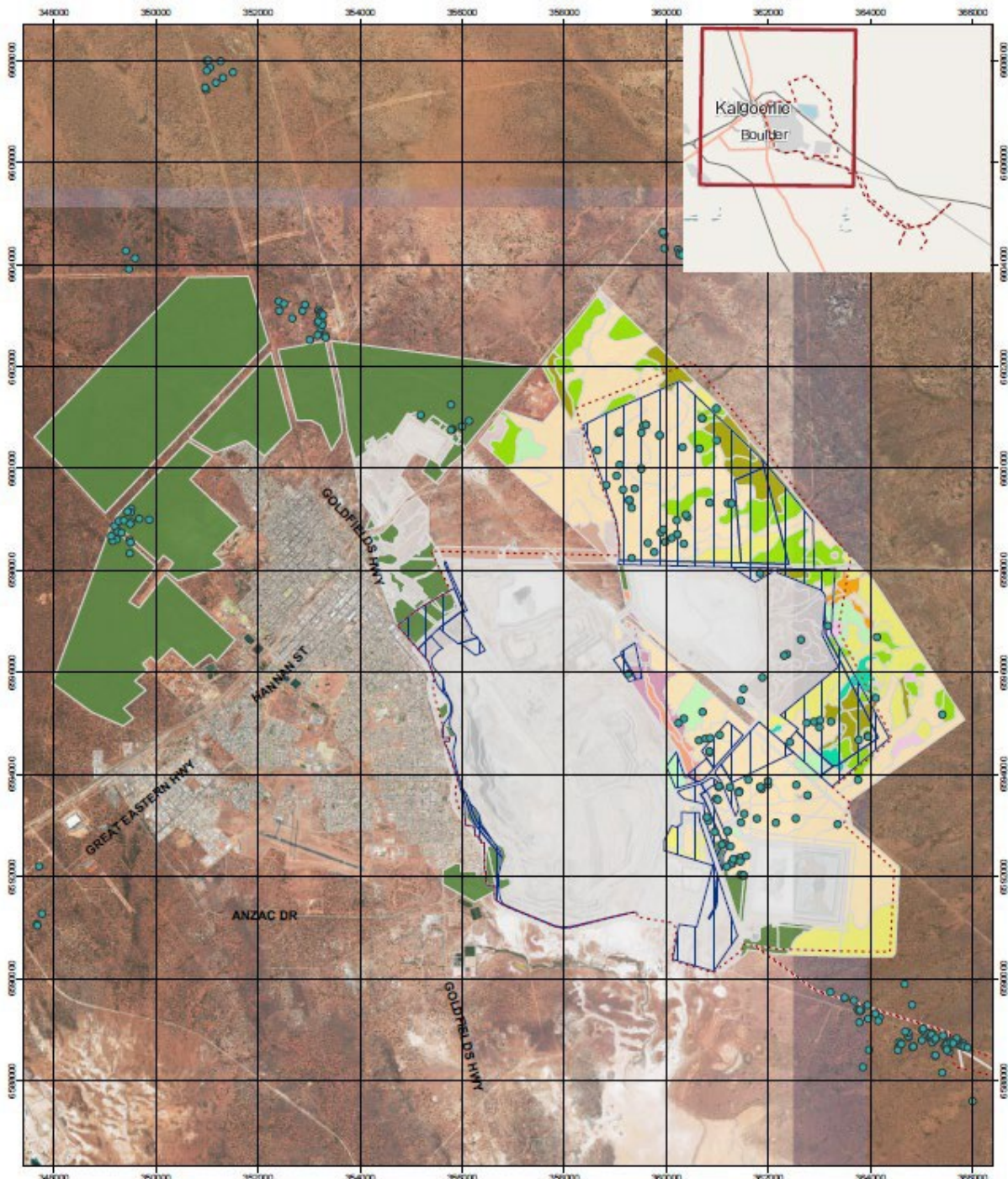
| | | |
|--|--|--|
| Flora and vegetation assessments for the Fimiston Gold Mine Operations, Phoenix, 2022a. | Gap analysis of botanical values at the Fimiston Operational Area and botanical survey in areas where survey was insufficient, including the Floodway North and Floodway South areas, Fimiston II Cell E TSF, Cell G and Fimiston III TSF study areas. | Floodway North and Floodway South – 19-21 May 2021 Fimiston IIE TSF and Cell G – 4- 8 October 2021. Reconnaissance survey for Fimiston III TSF – 13-16 December 2021. |
| Targeted habitat assessment for <i>L. ocellata</i> within the FS Project DE. Alexander Holm & Associates, March, 2023. | Assessment of habitat condition and ability to support a targeted species preferred requirement/s. | Habitat mapping and assessment of FS Project MDE March 6-9, 2023. |
| Revised Flora and vegetation assessments for the Fimiston Gold Mine Operations Phoenix May 2023. | Revised and updated consolidated report. Included with the EPA referral as Appendix H. | Multiple |
| Revised Flora and vegetation assessments for the Fimiston Gold Mine Operations Phoenix February 2024. | Revised and updated consolidated report. | Multiple |
| Regional survey for <i>E. praecox</i> for the FIM IIE Project, Phoenix. | Survey for the State listed Priority 2 flora species <i>E. praecox</i> in the broader Kalgoorlie region. | 9-12 July 2024 |
| Regional survey for <i>E. praecox</i> for the FIM IIE Project, Phoenix. | Survey for the State listed Priority 2 flora species <i>E. praecox</i> in the broader Kalgoorlie region. | 24-25 July 2024 |

Eremophila praecox

One Priority 2 species, *E. praecox*, is present within the MDE, of which 13 populations or 126 plants may be impacted by clearing activities. The total overall population size is 729 known plants (updated dataset July 2024). From regional survey work it is evident that there are more individuals in the regional that have not been counted yet (pers comm Phoenix botanist).

As a proportion the FS Project clearing of 126 plants of 729 known plants equates to 17% of the known population of *E. praecox* (refer to Figure 1). Based on the mapping, there are 75 regional populations, with total of 75 known populations (62 regional + 13 at Fimiston). Populations were delineated by proximity of records to other records Plants located more than 500 m apart were assigned to different populations in line with Stack (2010). Some exceptions were applied to occasional isolated records that were slightly further apart from or where they were considered likely to be connected to the population. Some consideration was also given to barriers, i.e. drainage lines (*E. praecox* rarely occurs in drainage areas) and roads.

The *E. Praecox* species is most frequently recorded in clay loam soils in Eucalyptus and/or Allocasuarina woodland with a variable understorey, frequently with Acacia. *E. praecox* has previously been recorded in Conservation Reserves in particular the Kurrawang Nature Reserve, Bullock Holes Timber Reserve and Lakewood Timber Reserve. 193 plants (26% of known plants) were identified in Reserves during surveys conducted for the FS Project. This indicates that the species is likely more common than previously known and is present in Reserve areas outside of and independent from the Fimiston Operational MDE.



DISCLAIMER: CDM Smith has endeavoured to ensure accuracy and completeness of the data. CDM Smith assumes no legal liability or responsibility for any decisions or actions resulting from the information contained within this map.
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Figure 1 Significant Flora Records at Fimiston Operation

2.6.2 Weeds

Weeds are usually opportunistic plant species that are not native to an area, but once introduced, are able to compete effectively for resources (often out competing and displacing native vegetation). They can also be inadvertently or intentionally introduced and spread past their intended range, such as garden plants or even commercial crops.

The Fimiston Operational area has been altered and degraded from 'natural' conditions by historical mining, pastoral, livestock farming and other agricultural activities as well as urbanisation. Impacts include disturbance and alteration of the ground surface, higher rates of erosion by water and wind and recreational activities.

Vegetation in the regional area surrounding Kalgoorlie Boulder has also been substantially altered by clear felling for wood (firewood, mining timber, boiler feed) in the 1900s, with most trees in the region considered regrowth.

As a result, many weed species have been introduced to the area and have become widespread. The region's low annual rainfall restricts weed populations to a large extent.

Weeds which have been found on the KCGM lease area, are considered a significant environmental or agricultural risk and are targeted for control and eradication include:

- *Rumex vesicarius* - Ruby Dock
- *Echium plantagineum* - Paterson's Curse (Declared Weed (DW))
- *Opuntia strict* - Prickly Pear (Weed of National Significance (WoNS))
- *Silybum marianum* - Milk Thistle, Variegated Thistle
- *Carthamus lanatus* - Saffron Thistle (DW)
- *Lycium ferocissimum* - African Boxthorn (WoNS)
- *Datura stramonium* - Thornapple (DW).

The WA Biosecurity and Agriculture Management Act 2007 requires removal of declared weeds.

Weed management at KCGM is controlled as per the Northern Star Weed Management Procedure (Appendix A).

2.7 Key assumptions and uncertainties

A number of assumptions and uncertainties based on surveys undertaken to date form the basis of the proposed management approach, as set out below.

2.7.1 Assumptions

Key assumptions include:

- Utilising areas of existing disturbance to minimise clearing and implementing progressive rehabilitation throughout the life of the project will minimise the impacts of the Proposal on conservation significant species.
- Surveys to date provide sufficient information to confirm the presence of *E. praecox* within the MDE area and suggest a numerous healthy populations exist within the surrounding region.
- The MDE and broader regional areas have been adequately surveyed for terrestrial fauna, flora and vegetation and no other significant species identified that could be affected by the proposed mine development activities.

2.7.2 Uncertainties

Key uncertainties include:

- The extent to which dust generated from implementation of the Proposal will travel from the source to receptor.
- Occurrence of extreme rainfall events, drought or fire during the proposed life of mine and post-closure time frames.
- The resilience of conservation significant flora species to dust deposition.

2.8 Management approach

Management measures to minimise the intensity of the potential effects of implementing the proposed mine waste storage development activities are necessary to ensure the proposed activities will not have a significant detrimental impact on key environmental factors.

Specific application of the mitigation hierarchy for the implementation of the proposed mine waste storage development activities is as follows.

2.8.1 Avoid

Where practical, mapped occurrences of *E. praecox* from field surveys were included into KCGM GIS data base and have influenced the design by avoiding 60 known plants within the MDE (retained without any disturbance).

2.8.2 Minimise

Impacts on conservation significant species (*E. praecox*) and the supporting conditions unique to each species have been managed through field ground proofing, review of surveys and discussions with Project team/s to influence modification of design where possible to minimise the potential or the risk likelihood; this has resulted in minimising the total area identified for clearing.

Potential impacts on vegetation and fauna habitat from dust deposition will be managed via the implementation of the KCGM-ENV-010 Dust Monitoring and Management Procedure (DMMP), a subcomponent of the Fimiston Air Quality Management Plan (FAQMP).

Potential indirect impacts to native fauna due to disruption or disturbance to fauna as a result of noise, vibrations, light and dust emissions are managed to minimize any impacts. The KCGM Noise and Vibration Monitoring and Management Plan (NVMMP) includes control measures and operational Specific controls include:

- Maintain implementation of Fimiston Weed Management Procedure (Appendix A), with spraying or other suitable action when weed species are identified on KCGM leases or in rehabilitation areas.
- Minimise dust generation from mining and road use that could cause temporary disturbance to flora and fauna as per the FAQMP.
- Use of additional dust control measures where practical, such as application of saline water on an as needs basis dust suppression as per the FAQMP.
- Continue to implement the Seepage and Groundwater Management Plan (SGWMP) to minimise indirect impacts on vegetation from rising saline water.
- Ensure a fire management and emergency response plan is available at key locations and firefighting equipment is readily available on all vehicles and all facilities.
- Maintain existing procedures for feral animals, including cat trapping when numbers are identified as increasing (usually spring).
- Clearing activities will not be undertaken when the Fire Danger Rating is severe or higher.

2.8.3 Remediate

Rationale for choice of indicators and/or management actions

Monitoring indicators and triggers have been developed based on recent individual species knowledge has been successfully collected and verified as representative and acceptable to subject matter experts within specialist areas of science and regulatory departments (DBCAs). KCGM is currently leading the collection of representative individual species baseline information within Western Australia and Australia (for *E. praecox*).

This new species data can be used to develop meaningful and practical individual species management indicators (trigger levels and threshold limits). Specific studies where KCGM is assisting the scientific community to understand these species include:

- *E. praecox*: confirmation of overall distribution and confirmation of habitat definition to

- aid conservation management strategies.
- Lead development of understanding and aid identification of conservation management strategies.

2.9 Management-based Provisions

The following management actions will assist in meeting the Trigger criteria and Threshold criteria in the outcome-based provisions (Section 3.1.1.1 Outcome-based Provisions). These actions will be reviewed as part of the monitoring and reporting processes, and changes made where required.

The management actions for this SSMP, as detailed in Table 5, are summarised as:

- Clearing management.
- Hydrology Management
- Weed management.
- Traffic management.
- Fauna exclusion zones
- Dust management
- Fire management
- Introduced predator management.

The management objectives for this SSMP are:

- Avoid direct and indirect impact on *E. praecox*.
- Minimise the potential risk of impact on *E. praecox* from clearing activity.
- Minimise the potential risk of a decline in *E. praecox* populations.
- Minimise the potential risk of a decline of *E. praecox* populations due to dust, weeds and displacement.
- Minimise the potential risk of a decline in *E. praecox* habitat condition due to a change in fire regime.

Triggers and thresholds have been established for management targets and are detailed in 3.1 Triggers, Thresholds and Contingency Actions. These triggers and thresholds are initial estimates for early warning triggers. These will be modified and updated over time as more information is available on the species and habitats. Any modifications and adaptive management will be to improve on protections for the species and will be discussed with stakeholders prior to implementation.

Table 3 Management-based Provisions

| Management Actions | Target | Monitoring | Reporting |
|--|---|--|---|
| <p>Clearing Management</p> <ul style="list-style-type: none"> • Implementation of an internal clearing permit procedure, including onsite demarcation and notification procedures. • <i>E. praecox</i> within close proximity to operational areas to be delineated with flagging tape, signage or similar to alert all personnel of their location. • Inductions of all site personnel to include information on significant species, management targets, measures and expectations. • Undertake progressive clearing, minimising the amount of active disturbance present. • Progressively rehabilitate areas as appropriate. | <p>Minimise the potential for incidental damage to priority flora and shrub habitat</p> | <p>Annual vegetation and butterfly surveys</p> | <p>Annual reporting.</p> <p>Flora and Vegetation health reporting.</p> <p>Incident reports.</p> |
| <p>Hydrology Management</p> <ul style="list-style-type: none"> • Design surface hydrology to avoid changes in hydrology to sensitive areas. • Maintain the supernatant pool size, under normal operating conditions, below a maximum of 15% of the total surface area of the paddock in which deposition is occurring on the Fimiston TSFs to mitigate the seepage rate. • Maintain Groundwater level to >4 mBGL to keep water below plant root level in the soil profile to protect the Eucalypt woodland vegetation in the vicinity of the Fimiston TSFs as per the Part V Licence (L6420/1988/14) | <p>Maintain groundwater levels to >4 mBGL through seepage recovery. Minimise the normal operating supernatant pool size to <15%</p> | <p>Daily monitoring of supernatant pool. Quarterly Groundwater Monitoring as per Licence</p> | <p>Quarterly Groundwater Monitoring Report to DWER</p> <p>Annual Audit Report of the SGMP in the Annual Environment Report,</p> |



| Management Actions | Target | Monitoring | Reporting |
|---|---|--|---|
| <p>Weed Management</p> <ul style="list-style-type: none"> • Surveys to be undertaken to identify and record the presence of any significant weed species prior to topsoil stripping to reduce contamination of rehabilitation materials • Weed management information, such as location and species is saved within the secure KCGM drives and spatially analysed using a Geographic Information system where required • Posters displaying common weeds in the Kalgoorlie area have been developed and are available on the document management system for display in work areas where appropriate. • Weed control is considered when mobilising earthmoving equipment to site / during contractual discussions. • Vehicles and tools are cleaned free of weed seed and vegetative material before arrival on site, to stop the spread of weeds to new areas. • Weed control is undertaken using physical and chemical control by licenced practitioners. The method used will depend on the type of weed, area of weeds to be managed, what the land is used for and physical characteristics. • Particular attention is paid to areas which are made available for topsoil stripping, topsoil stockpiles and rehabilitated areas. Measures applied to these areas include separate stockpiling of weed contaminated materials, herbicide spraying of stripped soils/stockpiles and/or rejection of contaminated soils. | <p>Weeds are managed across the site.</p> <p>Declared weeds are controlled in accordance with legislative requirements.</p> | <p>Topsoil stockpiles are periodically inspected for weed populations.</p> <p>Weeds are recorded during annual vegetation surveys.</p> | <p>Annual reporting.</p> <p>Flora and Vegetation health reporting.</p> <p>Incident reports.</p> |
| <p>Fire Management</p> <p>Ensure a fire management and emergency response plan is available at key locations and firefighting equipment is readily available on all vehicles and all facilities.</p> | <p>Minimise decline in habitat condition due to changed fire regimes.</p> | <p>Annual vegetation and butterfly surveys.</p> | |



| Management Actions | Target | Monitoring | Reporting |
|--|--|---|---|
| <p>Traffic Management</p> <ul style="list-style-type: none"> • Avoid accidental disturbance to fauna and habitat by enforcing strict traffic management rules: <ul style="list-style-type: none"> ○ keeping to designated tracks with no off-road driving permitted ○ driving to road and weather conditions ○ reduced speed limits within suitable habitat. • All sightings and interactions to be reported to Environmental personnel. • Worker awareness training. | <p>Minimise the potential for incidental damage to priority flora and shrub habitat</p> | | <p>Internal audit reporting for speeding and off-road driving.</p> |
| <p>Dust, noise, vibration and light emissions Management</p> <ul style="list-style-type: none"> • Implement the KCGM-ENV-010 Dust Monitoring and Management Procedure • Minimise dust generation from mining and road use that could cause temporary disturbance to flora and fauna • Undertake dust suppression measures that include good house-keeping practices for vehicles, cleared areas, and active stockpiles. • Implement dust suppression measures such as the use of watercarts will be used during dry and windy conditions, as required. • Implement the KCGM Noise and Vibration Monitoring and Management Plan (NVMMP) which includes control measures and operational strategies that contribute to reducing noise and vibration emissions. | <p>Minimise the potential for decline in population due to dust, light, noise, vibration and displacement.</p> | <p>Annual vegetation and butterfly surveys. Dust, flora and vegetation health monitoring.</p> | <p>Annual reporting. Flora and Vegetation health reporting. Incident reports.</p> |

2.9.1 Implementation

Implementation of this SSMP will be assisted through KCGM’s Environmental Management System (EMS) incorporating systems, processes, procedures and work instructions relating to the management, monitoring and reporting components of this SSMP.

KCGM is committed to conducting its activities for the Project in an ecologically responsible manner. The key personnel involved in implementation of this SSMP, and their roles and responsibilities are listed in Table 6.

Table 4 Roles and Responsibilities

| Role | Responsibility |
|---|--|
| KCGM | KCGM has the overall responsibility for implementation of this SSMP. If any roles are delegated to a contractor or consultant, KCGM has the responsibility to audit compliance and ensure any contingency actions are implemented. |
| Environmental Superintendent | Overall accountability for auditing and compliance assessment of the SSMP during operation to ensure it is maintained and meets objectives and targets. Provide technical support to all Project personnel to ensure the SSMP is implemented correctly and complied with. Implement and maintain the SSMP, review its effectiveness and review the implementation as required. Obtain relevant approvals from regulatory agencies for disturbance as required. Ensure all personnel involved in the Project are inducted and will adhere to the SSMP requirements. Implement monitoring programs and documenting results. Liaise with stakeholders and technical experts for advice and resolution of management aspects/objectives as required. Review and close out contingency actions as required. Report as required to regulating authorities. May delegate all or part responsibility to an appropriately qualified person. |
| Construction Manager / Registered Manager | Overall accountability for auditing and compliance assessment with the SSMP during construction and operations to ensure it is maintained and meets objectives and targets. Overall accountability to ensure the SSMP is implemented, reported and maintained on-site. Ensure personnel attend inductions, have sufficient resources and training to meet the requirements of the SSMP. Support KCGM’s fauna and flora management initiative and culture. Comply with all legal requirements and the requirements of the SSMP. Seek advice when in doubt about requirements. Appoint appropriate consultants to undertake specific activities set out in the SSMP if required. |
| All personnel | Must receive induction prior to commencement of work on site. Comply with all legal requirements and the requirements of the SSMP. Attend area specific environmental inductions/ briefings and any other training required. Participate in toolbox meetings and encourage personnel to suggest improvements. |

2.10 Monitoring

Monitoring will be undertaken in accordance with best-practice techniques and a summary of actions is outlined in Table 7.

Table 5 Monitoring Program Summary

| Monitoring Event | Monitoring Action | Frequency | Responsibility |
|--|---|--|------------------------------|
| Pre-clearance Surveys/ desktop | To be undertaken prior to disturbance activities to confirm the locations of <i>E. praecox</i> shrubs Monitoring of clearing register for compliance to approvals. Review of Indicative Site Layout to determine clearing proximity to habitat shrubs. Add new occurrences of <i>E. praecox</i> shrubs to monitoring inventory and install buffers for protection. | Prior to clearing | Environmental Superintendent |
| Significant flora and fauna habitat Monitoring | Annual monitoring of health of vegetation that is habitat for significant flora. Monitoring to detect dust impacts on vegetation | Annually in Spring | Environmental Superintendent |
| Inspections of supernatant pond | Inspection to maintain <15% of pond area to mitigate seepage. | Daily visual check Survey twice weekly | Environmental Superintendent |
| Groundwater Monitoring | To maintain groundwater levels >4 mBGL of vegetation. | Quarterly as per Licence | Environmental Superintendent |

A detailed monitoring program has been prepared for *E. praecox* (located in the Appendices) based on the findings of recent surveys. KCGM is consulting with Phoenix Environmental Sciences in the preparation and implementation of the monitoring program.

Eremophila praecox

By their nature *E. praecox* populations are frequently sparse comprised of a low number of individuals spaced hundreds of meters apart. Subsequently, to monitor for potential indirect impacts within the MDE the condition of the vegetation surrounding *E. praecox* individuals will be conducted and compared to the condition of vegetation surrounding regional *E. praecox* populations that occur outside of the area of potential impact. Two sites will be used as reference sites for comparison (Appendix B).

Surveys will be conducted in spring with vegetation health monitored in 10 x 10 m quadrats per monitoring site. The health of each canopy level present will be assessed utilising measures from Casson et al. (2009) (Appendix B). As far as is practical, the regional populations selected will occur in the same vegetation type as those within the MDE.

2.10.1 Triggers and Threshold Rationale

Thresholds and triggers are outlined in Table 8 to Table 11.

Table 6 Rationale for *E. praecox* outcome-based provisions

| Threshold | Rationale |
|--|---|
| Change of habitat health (more than 20% difference of vegetation cover or species diversity or increase in weed cover) in areas containing <i>E. praecox</i> in comparison to control sites. | <p>If a decline in health is identified during vegetation health monitoring, the response actions in Table 6 will allow investigation to determine if the causes are attributed to the Proposal and, if necessary, allow for early intervention of further management measures to prevent impacts on <i>E. praecox</i>.</p> <p>It is widely known that all plants experience a natural rate of mortality. If host plants and/or nectaring vegetation are experiencing higher foliage loss than control sites, then the cause of this should be investigated utilising environmental impact assessment methodology.</p> <p>The triggers for species health decline will be compared with control monitoring to allow consideration for climatic variation such as rainfall and factors outside of the proponent's control.</p> |
| Threshold | Rationale |
| Conservation significant species within the MDE but outside areas of clearing experience a statistically significant higher foliage cover loss rate than that of control sites. | <p>The objective is for no proposal-related indirect adverse impacts to uncleared flora and vegetation within the MDE. 'Adverse' is defined as an impact likely to change the conservation status or significantly change the local population's numbers of a species.</p> <p>It is widely known that all plants experience a natural rate of mortality. By comparing the rate of mortality of the areas containing <i>E. praecox</i>, it may be deduced if the area is experiencing natural rates of mortality. If the rate of mortality appears higher than control sites, it should be investigated, reported and corrective actions implemented if it is attributable to proposal related indirect effects.</p> <p>However, it should be noted that the extent of mortality will determine if the key environmental outcome is not being achieved as it may not mean the impact can be defined as 'adverse'. By reporting a difference, the proponent is adopting a precautionary approach. Through monitoring any significant foliage cover loss of conservation significant species, any potential degradation of individual health can be identified, investigated and potentially rectified prior to mortality.</p> |
| Statistically significant reduction in number of <i>E. praecox</i> present compared to control sites without attributable cause. | <p>A reduction in <i>E. praecox</i> numbers compared to control sites is an indicator of a negative impact that may represent a significant change to the local population of the species. If changes to numbers relative to host plants are noted, then the cause of this should be investigated utilising environmental impact assessment methodology.</p> |

Table 7 Rationale for *E. praecox* objective-based provisions

| Management | Rationale |
|--|--|
| Clearing procedure and authorised internal permit process for all clearing activities to prevent unauthorized clearing within the Development Envelope (DE). | The means by which a direct proposal-related impact may occur to Priority flora is vegetation clearing. If clearing occurs which has not received an approved internal clearing permit within the MDE, it is considered a non-compliance or failure of the procedure which is in place to prevent vegetation clearing of Priority flora. |

3. EMP PROVISIONS

The key objectives of the SSMP are to review and ensure compliance against the “*Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans*” (EPA version 2.0, 2021) and ensure that once approval of the FS Project (s38) is received that the impending activities of that Project will not inadvertently impact on Environmental Factors regarding flora and vegetation and terrestrial fauna, as per “*Statement of environmental principles, factors, objectives and aims of EIA*” (EPA version 4.1, 2022).

To meet this objective, management provisions have been established to assist implementation of practical and safe mitigation measures to minimise the potential impacts as summarised in Section 2.6. Environmental impacts incorporate quantifiable and non-quantifiable impacts, outcome-based and management-based provisions (included in this SSMP).

Early response triggers (thresholds) for management-based provisions are detailed in the tables below:

- Outcome-based provisions are performance-based and may be used where part of the environment is able to be objectively measured and reported. Therefore, outcome-based provisions have been established to specify triggers and thresholds of direct impacts and to ensure the Proposal achieves acceptable environmental outcomes.

Management-based provisions relate to management actions and may be used where the part of the environment is not capable of being objectively measured and reported. Therefore, management-based provisions have been established to specify management actions and targets, particularly for indirect impacts that are non-quantifiable. As monitoring is undertaken and additional population data is gathered, the management targets are expected to be reviewed and quantifiable outcome-based provisions established.

3.1 Triggers, Thresholds and Contingency Actions

The Trigger criteria have been developed with reference to the information available from the baseline surveys and initial monitoring. It is expected that once sufficient monitoring data is collated over time (i.e. 3 years) that Trigger criteria and Threshold criteria will be reviewed by an appropriate fauna specialist and revised as necessary, with this SSMP.

Contingency actions for *E. Praecox* include:

- Review all monitoring data (including control sites) in relation to management measures and any other available data such as weather and climate to determine if the decrease is due to proposal related impacts.
- Review dust, weather and weed monitoring to compare *E. praecox* and control sites. Determine whether the changes observed in the impact sites are comparable to the observations in the reference sites.
- Investigate potential causes for the observed decline in vegetation health which may include but are not limited to:
 - seasonal conditions (e.g., rainfall and temperatures)
 - effectiveness of weed control

- spatial variation (near-impact areas) versus sites located further from impact
- Develop strategies based on the outcomes of the investigation to prevent a recurrence and, if necessary or possible, reverse the decline in health of the *E. praecox* habitat. Management measures may include the following:
 - Change monitoring frequency if issues arise
 - Implement engineering controls if deemed effective.

3.1.1 Eremophila praecox

3.1.1.1 Outcome-based provisions

Purpose of EMP: EMP to comply with EPA Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans

Table 8 Outcome-based provisions for *E. praecox*

| EPA factor/s and objective/s: Flora and Vegetation. To avoid direct and minimise indirect impacts to <i>E. praecox</i> to the maximum extent practical. Outcome/s: No significant impact to <i>E. praecox</i> outside the approved clearing areas. Key environmental values: Presence of Priority 2 species <i>E. praecox</i> Key impacts and risks: reduction in presence of <i>E. praecox</i> | | | | |
|--|--|--|---|---|
| Outcome-based | | | | |
| Criteria: <ul style="list-style-type: none"> Trigger criteria Threshold criteria | Response Actions: <ul style="list-style-type: none"> Trigger level actions Threshold contingency actions | Monitoring | Timing / Frequency of Monitoring | Reporting |
| Trigger criteria Change of habitat health (more than 30% difference of vegetation cover or species diversity or increase in weed cover) in areas containing <i>E. praecox</i> in comparison to control sites. attributable natural cause. | Trigger level actions Review all monitoring data (including control sites) in relation to management measures and any other available data such as weather and climate to determine if the decrease is due to proposal related impacts. Change in frequency of vegetation health monitoring. | Assessment of vegetation health, condition and weed presence in permanent quadrats located in areas containing <i>E. praecox</i> and control sites away from the FS Project. | Continue to collect field data. Following the development of a more complete dataset over a three year period, the monitoring methodology, frequency and monitoring sites will be reduced to every three years. | Annual Compliance Assessment (CAR) Report to DWER/EPA (MS782). The Annual Environment Report (AER) to DMIRS. |

| | | | | |
|---|---|---|---|--|
| <p>Threshold criteria Change of habitat health (more than 20% difference of vegetation cover or species diversity or increase in weed cover) in areas containing <i>E. praecox</i> in comparison to control sites.</p> | <p>Threshold contingency actions Review all monitoring data (including control sites) in relation to management measures and any other available data such as weather and climate to determine if the decrease is due to proposal related impacts. Review dust, weather and weed monitoring to compare <i>E. praecox</i> and control sites. Determine whether the changes observed in the impact</p> | <p>Monitoring and reporting of areas cleared and/or rehabilitated in the previous 12 months.</p> | <p>Annual to coincide with MRF reporting. Following the development of a more complete dataset over a three year period, the monitoring methodology, frequency and monitoring sites will be</p> | <p>Annual Compliance Assessment (CAR) Report to DWER/EPA (MS782). The Annual Environment Report (AER) to DMIRS.</p> |
|---|---|---|---|--|

EPA factor/s and objective/s: Flora and Vegetation. To avoid direct and minimise indirect impacts to *E. praecox* to the maximum extent practical.
 Outcome/s: No significant impact to *E. praecox* outside the approved clearing areas.
 Key environmental values: Presence of Priority 2 species *E. praecox*
 Key impacts and risks: reduction in presence of *E. praecox*

| Outcome-based | | | | |
|--|---|--|---|---|
| Criteria: | Response Actions: | Monitoring | Timing / Frequency of Monitoring | Reporting |
| <ul style="list-style-type: none"> Trigger criteria Threshold criteria | <ul style="list-style-type: none"> Trigger level actions Threshold contingency actions | | | |
| | sites are comparable to the observations in the reference sites. | | reduced to every three years. | |
| Change of habitat health (more than 20% difference of vegetation cover or species diversity or increase in weed cover) in areas containing <i>E. praecox</i> in comparison to control sites. | <ul style="list-style-type: none"> Investigate potential causes for the observed decline in vegetation health which may include but are not limited to: <ul style="list-style-type: none"> seasonal conditions (e.g., rainfall and temperatures) effectiveness of weed control spatial variation (near-impact areas) versus sites located further from impact Develop strategies based on the outcomes of the investigation to prevent a recurrence and, if necessary or possible, reverse the decline in health of the <i>E. praecox</i> habitat including: <ul style="list-style-type: none"> Increase in frequency of vegetation health monitoring <ul style="list-style-type: none"> If decrease is due to changes attributable to the project then engineering and operational controls will be investigated to stop indirect impacts. Alert relevant stakeholders and confirm measures are being undertaken. Increase in staff training and | Assessment of vegetation health, condition and weed presence in permanent quadrats located in areas containing <i>E. praecox</i> and control sites away from the FS Project. | Annual monitoring for the first three years and if no adverse impacts are detected the monitoring can reduce to three yearly. | Annual Compliance Assessment (CAR) Report to DWER/EPA (MS782). The Annual Environment Report (AER) to DMIRS. |



| | | | | |
|--|--|--|--|--|
| | awareness on factors which have implications to vegetation health for example dust, changes to hydrology | | | |
|--|--|--|--|--|

EPA factor/s and objective/s: Flora and Vegetation. To avoid direct and minimise indirect impacts to *E. praecox* to the maximum extent practical.
Outcome/s: No significant impact to *E. praecox* outside the approved clearing areas.
Key environmental values: Presence of Priority 2 species *E. praecox*
Key impacts and risks: reduction in presence of *E. praecox*

| Outcome-based | | | | |
|---|---|--|--|---|
| Criteria: | Response Actions: | Monitoring | Timing / Frequency of Monitoring | Reporting |
| <ul style="list-style-type: none"> • Trigger criteria • Threshold criteria | <ul style="list-style-type: none"> • Trigger level actions • Threshold contingency actions | | | |
| <p>Conservation significant species within the MDE but outside areas of clearing experiences a statistically significant higher foliage cover loss rate than that of control sites and that foliage cover loss is not attributed to natural causes.</p> | <p>Threshold response:</p> <ul style="list-style-type: none"> • Report internally as an incident. • Investigate cause and extent of mortality and if it is likely to result in the key environmental outcome not being achieved. • If necessary (deemed to be proposal- related) consider measures to prevent a re-occurrence of the incident and/or remediation strategies to address the impact. • Engagement with key stakeholders including DBCA, and relevant specialists where required to determine key actions. | <p>Assessment of vegetation health, condition and weed presence in permanent quadrats located in areas containing <i>E. praecox</i> and control sites away from the FS Project. Maintain current vegetation mapping with continuous improvement filling in gaps within GIS layers.</p> | <p>Continue to collect field data annually. Following the development of a strong dataset over this period, the monitoring methodology, frequency and monitoring sites will be reduced to every three years.</p> | <p>Annual Compliance Assessment (CAR) Report to DWER/EPA (MS782).</p> <p>The Annual Environment Report (AER) to DMIRS.</p> <p>Engagement with DBCA – lodgement of IBSA data packages.</p> |

3.1.1.2 Objective-based EMPs

Purpose of EMP: to comply with EPA Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans.

Table 9 Objective-based conditions for *E. praecox*

| EPA factor/s and objective/s: Flora and Vegetation. To avoid direct and minimise indirect impacts to <i>E. praecox</i> to the maximum extent practical. Objective/s: To avoid clearing and impacts to <i>E. praecox</i> Key environmental values: Presence of Priority 2 species, <i>E. praecox</i> Key impacts and risks: Reduction in presence of <i>E. praecox</i> | | | | |
|---|---|--|---|--|
| Objective-based | | | | |
| Management targets | Management actions | Monitoring | Timing / frequency of actions | Reporting |
| Objective Management of clearing boundaries to prevent unauthorised clearing by implementation of permitting process and procedure | Management Actions <ul style="list-style-type: none"> Train staff in clearing procedures Survey and mark boundaries of areas prior to clearing Environmental Officer to confirm boundaries prior to clearing occurring. Maintain clearing buffer of 20 m for known remaining <i>E. praecox</i> shrubs Clearing only with an authorised internal permit within the Mine Development Envelope (MDE). Contingency actions <ul style="list-style-type: none"> Report internally as an incident in accordance with internal procedures. Review management strategies and implement changes to prevent future occurrences which may include the following: Audit and review of training and staff inductions i.e. Increase in staff training and awareness to include information on legislative requirements, appropriate clearing procedures). | Internal audit of recorded <i>E. praecox</i> against areas approved for clearing. Utilisation of GIS in machinery or other survey techniques for clearing activities to monitor active progression. | Annual auditing of internal clearing permits and documentation of contingency actions. | Annual Compliance Assessment (CAR) Report to DWER/EPA (MS782). |
| | | | Annual report cycle to assist annual fees and calculation of disturbance footprint. Monitoring and reporting of areas cleared and/or rehabilitated in the previous 12 months. | The Annual Environment Report (AER) to DMIRS. |

| EPA factor/s and objective/s: Flora and Vegetation. To avoid direct and minimise indirect impacts to <i>E. praecox</i> to the maximum extent practical. Objective/s: To avoid clearing and impacts to <i>E. praecox</i> Key environmental values: Presence of Priority 2 species, <i>E. praecox</i> Key impacts and risks: Reduction in presence of <i>E. praecox</i> | | | | |
|---|---|------------|-------------------------------|-----------|
| Objective-based | | | | |
| Management targets | Management actions | Monitoring | Timing / frequency of actions | Reporting |
| | <ul style="list-style-type: none"> • Ground Disturbance Permit competency training • Review impact on species report and non- compliance. • Review impact of unauthorised clearing and report any noncompliance to DWER within 7 days of identification. • Installation of signage where appropriate. • Undertake rehabilitation of unauthorised clearing (i.e. disturbance from vehicle tracks, vegetation clearing) by appropriately qualified personnel as required, in accordance with rehabilitation procedure. | | | |

4. ADAPTIVE MANAGEMENT AND REVIEW OF THE SSMP

KCGM operations recognises the dynamic nature of both natural ecosystems, man-made work areas and changing legislative environment and supports adaptive management under this SSMP.

Adaptive management involves:

- Monitoring and evaluation against management targets (including trigger thresholds) and environmental criteria (trigger limits);
- Implementing mitigation measures, reviewing and assessing new technologies or survey techniques; and
- Systematically adapting management of change to assist maintaining the under pinning environmental factor objectives of the EP Act.

Any changes to a Project will instigate a review and consideration of risks, mitigation controls and management actions. Assumptions and uncertainties will be evaluated against collected monitoring data on a recurrent basis in a process of continual improvement and establishing early response indicators/criteria. Any review and consideration of management actions or additions to this plan made in relation to adaptive management/continuous improvement may be made available to DBCA and/or DWER on request.

Examples of adaptive management include:

- The introduction of a different / alternative species-specific monitoring technique;
- The identification of potential trigger criteria to aid identification and development of conservation management strategies;
- Change to conservation status of a species triggers a review in the requirements of this SSMP;
- Changes to state or national regulatory or other standards triggering a review of this SSMP;
- Early identification of new proposal/projects which may pose potential risk, whether actual or frivolous, and complete environmental impact assessment if unclear identification or magnitude of impact/s.

5. STAKEHOLDER CONSULTATION

KCGM has undertaken extensive stakeholder engagement with regards to the development of the Revised Proposal. Reflecting the diverse range of stakeholders, their needs and engagement preferences, KCGM has employed a range of strategies to inform stakeholders of the Fimiston South Revised Proposal over the last two years and collate their feedback.

The consultation and engagement process involved:

- Identifying key stakeholders and interests
- Developing and implementing the consultation and engagement program
- Recording stakeholder feedback.

The outcomes of consultation are recorded in a Stakeholder Consultation Register. Consultation to date has been comprised predominately of meetings and correspondence with a number of State agencies, Local Government, Traditional Owners and non-government organisations and interest groups.

KCGM is committed to ongoing stakeholder identification, communication, engagement and consultation through the expansion planning and approval phase, and through to construction, operational and closure phases of the Project.

The relevant stakeholders for this SSMP are:

- Department of Biodiversity, Conservation and Attractions (DBCA): Conservation of Priority Species.
- Western Australian Environmental Protection Authority (EPA): Assessment of the proposal under Part IV of the EP Act and assessment of this SSMP.
 - All comments received during the assessment period from decision-making authorities and the public that relate to this SSMP will be considered and changes made as/where required.
 - Provision of technical reports and field opportunities have been arranged with DBCA.
- Community: Part of public consultation phase under Revised Proposal assessment.

The community have not been consulted specifically about the SSMP as it is considered confidential information in order to protect the species. The community has been consulted about the Fimiston Project.

6. DOCUMENT HISTORY

| | | | |
|---|---|--|--|
| Complexity of changes | Minor revisions <input type="checkbox"/> | Moderate revisions <input checked="" type="checkbox"/> | Major revisions <input type="checkbox"/> |
| Number of Key Environmental Factors | One | 2-3 <input checked="" type="checkbox"/> | > 3 <input type="checkbox"/> |
| Date of revision for submission to EPA: 31/10/2024 | | | |
| Proponent's operational requirement timeframe for approval of revision | < One Month <input checked="" type="checkbox"/> | < Six Months <input type="checkbox"/> | ≥ Six Months <input type="checkbox"/> |
| Reason for Timeframe: | None <input type="checkbox"/> | | |

| Item no. | EMP section no. | EMP pg no. | Summary of change | Reason for change |
|-----------------------------------|-----------------|------------|---|--|
| 1 | General | A ll | Overall framework amended | Comply with 'Instructions on how to prepare Environmental Protection Act 1986 - Part IV Environmental Management Plans, (version 2.0; 2021)' |
| 2 | | i v | Document History/Version control | More suitable to be at the front of the document. |
| 3 | Section 1 | 2 | Present background of the project | To provide the purpose of the SSMP and update the Management Plan Summary as per the EPA guidelines |
| 4 | Section 2 | 3 | Inclusion of Priority 1 and 2 species (<i>Jalmenus aridus</i> and <i>Eremophila praecox</i> respectively), and the Vulnerable Malleefowl (<i>Leipoa ocellata</i>) ^{2.4} | Shows knowledge/awareness of Significant Species within the area and ability to plan around this |
| 5 | | 5 | Update to survey and study findings (Section 2.6) | Included to align with EPA guidelines and give new in sight to the extent of significant species prevalence. |
| 6 | | 1 1 | Update to the Management approach (Section 2.8) | Section and sub-section included to describe rationale of the management approach against the potential impacts on the environment as per EPA EMP template and guideline |
| 7 | | 1 3 | Inclusion of Monitoring Program (Section 2.8.4) | Section and table included to describe the rationale for the management actions against the potential impacts on the environment as per EPA EMP template and guideline. |
| 8 | Section 6 | 4 8 | Included Changes to EMP | Updated to align with EPA EMP template |
| Version 13 as of July 2024 | | | | |
| 9 | 2.6.1 | | Update of reference | The reference by Phoenix (2023) in relation to the last sighting of <i>J. aridus</i> at the Lake Douglas location has been amended to |

| | | | | |
|---|-----------------|--|---|--|
| | | | | R.P. Weir pers.com to R. Eastwood, (2022). |
| 10 | 2.7.1 | | Typo | Included the word 'not' when referencing the likely impact to flora and vegetation, and fauna to. |
| 11 | 2.7.2 | | Clarification of role of <i>S. artemisioides</i> subsp. <i>filifolia</i> . | <i>S. artemisioides</i> subsp. <i>filifolia</i> as a host plant, and not a feed plant as previously noted. |
| 12 | 2.9 | | Clarify timeframes for clearing. | Address comment from DBCA for the ERD consultation period. |
| 13 | 2.9 | | Included reference to the Translocation Protocol. | Address comment from DBCA for the ERD consultation period. |
| 14 | 3.1.2 | | Amend the reference of habitat shrub to breeding shrub for <i>J. aridus</i> . | Clarification required to demonstrate accurate use by the species. |
| 15 | 5 | | Update of reference to published research papers. | Research has now been published and peer reviewed. |
| Version 14 as of 31 October 2024 | | | | |
| | 2.6.1 and 2.6.2 | | Added in reference to regional surveys for both <i>E. praecox</i> and <i>J. aridus</i> and updated population numbers based on recent surveys | To confirm that these will be undertaken |
| | 2.7.1 | | Removed reference waste storage | Not relevant |
| | 2.9 | | Added adaptive management for triggers. | As requested by DBCA |
| | 2.10 | | Committed to adding newly found shrubs to the monitoring program. Added references to the monitoring program appendices | As requested by DBCA |
| | 3.1 | | Additional actions included in adaptive management | As requested by DBCA |
| | 3.1.1 | | Updates to response actions. Removed reference to changing monitoring frequency | As requested by DBCA |
| | 3.1.2 | | Updated triggers and thresholds and actions Removed reference to changing monitoring frequency | As requested by DBCA |
| | Appendix B | | New/ updated <i>E. praecox</i> monitoring plan | As requested by DBCA |
| | Appendix C | | New/ updated <i>J. aridus</i> monitoring plan | As requested by DBCA |

7. GLOSSARY

| Term | Explanation |
|------------|--|
| DBCA | Department of Biodiversity, Conservation and Attractions |
| DE | Development Envelope |
| DWER | Department of Water and Environmental Regulation |
| EMP | Environmental Management Plan |
| EPA | Environmental Protection Authority (Western Australian) |
| EP Act | Environmental Protection Act 1986 (Western Australian) |
| Fimiston | KCGM's Fimiston gold mine |
| FS Project | Fimiston South Project |
| KCGM | Kalgoorlie Consolidated Gold Mines Pty Ltd |
| Mt | Million tonnes |
| NVCP | Native Vegetation Clearance Permit |
| p.a | Per annum |
| SSMP | Significant Species Management Plan |
| TSF | Tailings Storage Facility |
| WRD | Waste Rock Dump |

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9. APPENDIX B: *E. praecox* Monitoring

9.1 Personnel

The monitoring will be conducted by experienced personnel with at least 5 years' experience undertaking flora surveys.

9.2 Timing

The surveys will be undertaken during spring, between September and November.

9.3 Reference sites

Based on survey data, two reference sites in Lakewood Timber Reserve have been selected considering the large size of the *E. praecox* population, accessibility, tenure, and proximity to Fimiston. These sites are also in the same drainage system and should show comparable climate impacts.

The two sites are:

- Bore Road 1
 - potentially large population
 - 2 km south of Fimiston.
- Bore Road 2
 - Potentially large population
 - 2.5 km south of Fimiston.

Both of these sites are relatively close to the remnant floodway *E. praecox* population at Fimiston, therefore any local conditions or changes are likely to be reflected in all three populations.

9.4 Shrub Health Assessment

The locations of shrubs selected for health assessment are recorded on a GPS unit with a peg marker placed under or within 0.5 m of the shrub to enable identification on future monitoring surveys.

A health score utilising the Tree Health Scale of Casson et al. (2009) is used to assess shrub health. The scale is inverted so that higher scores reflect greater health, allowing for easier interpretation (Table 1). The mean, median and range of scores will be used to determine changes in health in relation to the threshold criteria.

The survival rates of the *E. praecox* shrubs at all three sites be analysed using the Kaplan-Meier survivorship method with staggered entry (Pollock et al 1987). This would enable analysis to be undertaken (and any impacts to be detected) as the data accumulates.

Table 1 Tree Health Scale (Casson et al. 2009)

| Tree Health rating | Description |
|--------------------|--|
| 6 | Healthy, no dead leaves |
| 5 | Occasional dead leaves |
| 4 | Epicormic shoots (therefore stressed |
| 3 | Tips of branches stressed or dying |
| 2 | Entire or whole branches dying or dead (some lower branches excluded from this assessment) |

| | |
|---|--------------------------|
| 1 | More than half tree dead |
| 0 | Tree dead |

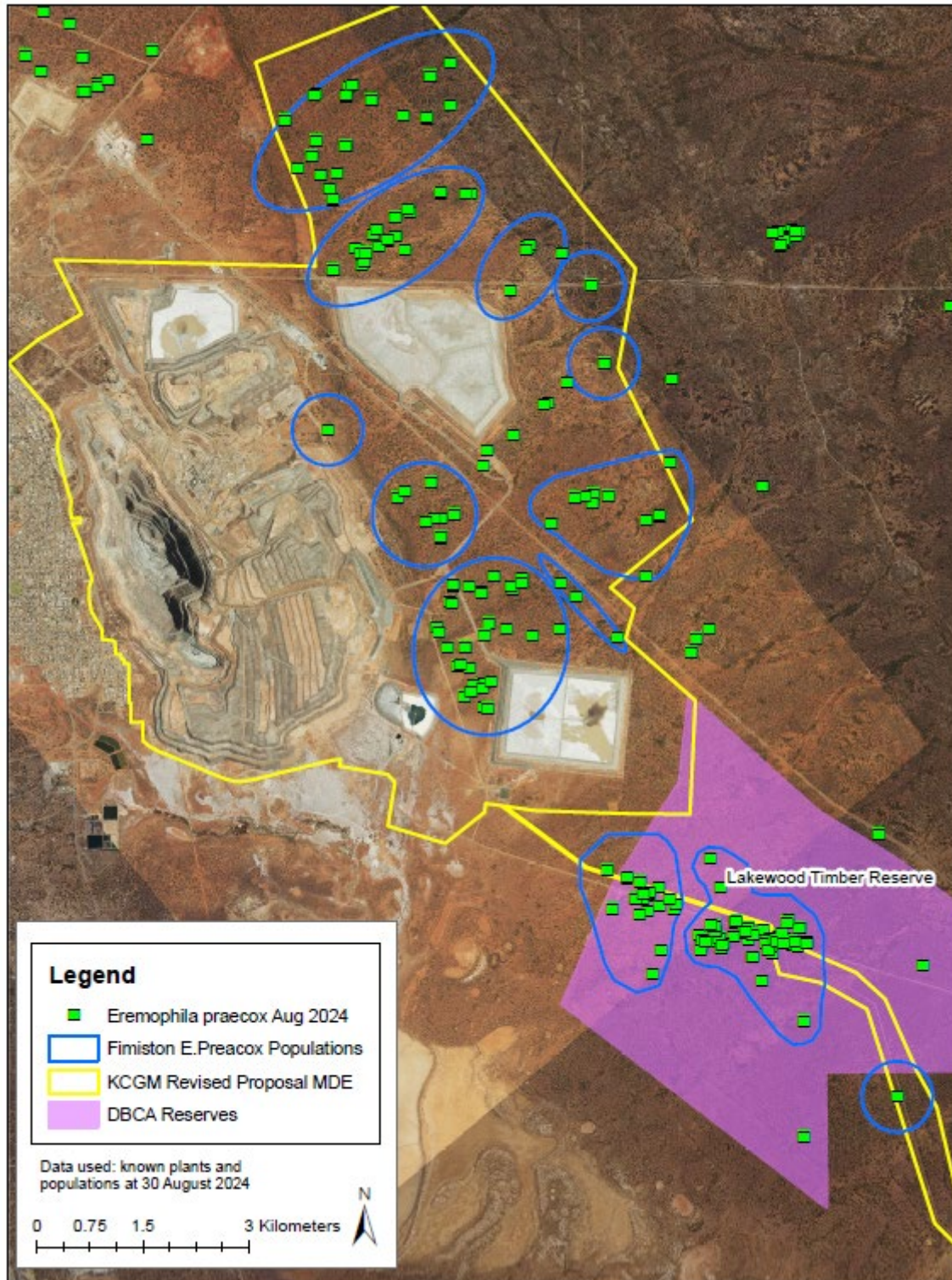


Figure 1 *E. praecox* populations within the Fimiston MDE

9.5 Vegetation Health Habitat Assessment

One 10 x 10 m quadrat will be set up at each site.

Vegetation health will be assessed using the Casson et al. (2009) Vegetation Health Scale (Table 2), where the quadrat is scored as a single unit and given a single score of one of the ratings.

Table 2 Vegetation Health Scale Casson et al. (2009)

| Health rating | Description |
|---------------|---|
| 4 | Healthy no signs of stress |
| 3 | Some early signs of stress, a few individuals, likely one species |
| 2 | Signs of stress in several individuals, one or more species |
| 1 | Signs of stress in many individuals, several species |
| 0 | Advanced decline and/or death of many individuals and several or most species |

9.6 Data Analysis and Reporting

Data from the monitoring surveys will be compared between sites at the time of survey, rather than variance between years, as activity is expected to be represented across all three sites concurrently.

Interpretation of monitoring results will consider the findings for all factors as a whole, rather than in isolation. A report outlining the findings and recommendations will be published within 2 months of monitoring. If the trigger criterion thresholds are reached (ie. a significant reduction in vegetation health or shrub health) these will be communicated immediately after the survey to determine if further investigation is required.

10. APPENDIX A: Weed Management Procedure

1. PURPOSE

The purpose of this document is to provide control and management actions to minimise the impact of weeds on the natural environment located within and surrounding all Northern Star Resources Ltd (Northern Star or the Company) tenements.

A list of weeds commonly found on Northern Star tenements can be found in Appendix I.

2. SCOPE

This procedure applies to all Northern Star's Australian Operations and covers the management of weeds.

3. ROLES AND RESPONSIBILITIES

| Role | Key Responsibilities |
|--------------------------------|--|
| Environmental Manager | <ul style="list-style-type: none"> Communicate all requirements to site. Ensure resources are available to implement this procedure. |
| Environmental Personnel | <ul style="list-style-type: none"> Communicate all requirements to site. Assist site departments to comply with this procedure. Review and update this procedure as required. Work collaboratively with Department Heads/Managers to ensure up to date information is provided to all concerned parties with respect to weed management and hygiene practices. Plan and perform weed management programs when required. Educate staff and contractors of obligations relating to weed management and control when working for the Company. Maintaining the Weed Register. |
| Operations Manager | <ul style="list-style-type: none"> Provide the resources and time for personnel to comply with this procedure. Ensure this procedure is implemented on site. |
| Managers | <ul style="list-style-type: none"> Ensure investigations and corrective actions are carried out according to Northern Star minimum standards. |
| Superintendent and Supervisors | <ul style="list-style-type: none"> Maintain awareness of this procedure applicable to their area of responsibility. Ensure awareness is provided to personnel regarding their obligations under this procedure. Ensure all weed hygiene certification requirements are in place for vehicle/machinery movements. |
| Site Personnel and Contractors | <ul style="list-style-type: none"> Comply with this procedure. Report suspected weed infestations to their immediate supervisor/site contact and the appropriate Environmental Representative. Follow instructions from Superintendents and Supervisors. |

4. DEFINITIONS AND ACRONYMS

| | |
|-----------------------------|--|
| Declared pests – weeds (DW) | Plants which have been declared as a Declared Pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i> . These plants are prevented entry into Western Australia or have control or keeping requirements. |
| SDS | Safety Data Sheet: a document that outlines the health and safety information about hazardous chemicals. |
| Weed | An environmental weed is a non-native or non-locally occurring plant that invade native ecosystems and adversely affect the survival of native flora and fauna. |

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|--------------------------------------|---|
| Weed of National Significance (WoNS) | A weed which has been identified by the Federal Government as a problematic plant species in Australia. |
| Weed Hygiene Certificate | An internal certificate required for all new machinery coming to site or vehicles that have been in areas with potential weeds, to ensure they are weed free. |

5. PROCEDURE

5.1 Notification and Reporting

Weed infestations identified by employees or contractors are to be reported as hazards through the Northern Star site incident reporting system to ensure controls are followed up. The following information should be included in the hazard report:

- GPS coordinates or a clear description of the location.
- A clear description of the suspected weed (and photo if available).
- Approximate number of weeds or area of coverage.

Actions are to be sent out via INX and the Environmental Department are responsible for controlling introduced weed species on Northern Star tenements.

All weeds identified as Declared Pests or Weeds of National Significance (WoNS) should be reported to The Department of Agriculture and Food, Western Australia (DAFWA) using the MyWeedWatcher app or contacting DAFWA's Pest and Disease Information Services (info@agric.wa.gov.au). Declared Pests and WoNS are identified in Appendix I, and can be found on the Department of Primary Industries and Regional Development Website.

5.2 Record Keeping

The Environmental Department is responsible for maintaining weed maps and the GIS-based weed register. All reported infestations will be entered in the weed register and include the following information:

- Site.
- Project EGS.
- GPS coordinates.
- Weed species.
- Weed category (significance status – WoNS, Declared or general).
- Date Identified.
- Control implemented (yes/no).
- Control Type (spray, hand pulling ect).
- Control implementation date.
- Person Responsible.

5.3 Monitoring Schedule

Areas that pose a higher risk to weed infestation, such as rehabilitated areas, topsoil stockpiles, drainage lines, areas close to site boundaries, previously infested or controlled areas and any area where material has been brought in should be inspected periodically to ensure potential weed infestations are managed and controlled. These inspections can be included as part of routine vegetation monitoring, or general housekeeping monitoring.

Prior to topsoil stripping, surveys should be undertaken to identify and record the presence of any significant weed species to reduce the risk of contaminating rehabilitation materials. In addition, topsoil stockpiles should be periodically inspected for weed populations and control measures put in place to remove any weeds prior to use in rehabilitation.

Weed monitoring should also be included in the scope of annual waste dump monitoring conducted by a qualified consultant.

Any weeds that are identified during any monitoring activities should have their location noted, and a control program arranged as soon as practical.

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5.4 Control Methods

There are a number of control methods used to manage and remove weeds across Northern Star sites, including but not limited to, preventative, physical and chemical. In some circumstances, external providers may be brought onto site to assist with the management of weeds.

5.4.1 Preventative Weed Control

Preventative methods such as minimising soil disturbance, using established tracks, limiting vehicle access to rehabilitation areas and practicing vehicle weed hygiene can help in reducing the spread of weeds across Northern Star operations.

Weed hygiene refers to preventing the spread of weeds or invasive plant species by actively inspecting and thoroughly cleaning any vehicle or equipment prior to and post entry to areas that harbour weed species or present an opportunity for weed species to propagate.

Weed transportation opportunities:

- As seeds stuck in tyres/rims, radiators, seats, grills etc.
- As pieces of plant trapped in bash plates, suspensions, bar work, earthmoving attachments.
- In dirt or soil in air filters, foot wells and trays of vehicles.
- In mud stuck to the vehicle underside or wheel arches, chassis rails, running boards etc.

5.4.2 Vehicle Movements

All vehicles and equipment will arrive onsite clean and leave site clean. Contractors will be advised of Northern Star's commitment to weed hygiene and if possible, ensure vehicles and equipment have been weed checked and cleaned prior to arriving onsite. Where this is not practical, vehicles will need to be inspected on arrival.

Where vehicles have been working in areas of known weed infestation, inspections should also be done at the completion of such works.

5.4.3 Inspections

All vehicles and equipment that are planned to be used in natural bush areas or areas of ground disturbance where weeds are established or may establish, should be inspected for signs of seed, soil, mud or other vegetative material. Where inspections determine that there is material that poses a weed hygiene risk, the vehicle should be cleaned and certified to be able to enter the work site. Vehicles and equipment should be thoroughly inspected in any areas that are deemed a potential trap for vegetative material, but particularly in the following areas:

- Engine bay, including radiator and areas that can trap seed.
- Underbody, including wheel arches and areas that can trap mud or vegetation.
- Interior, including floor mats, foot wells, seats etc.
- Buckets, cutting edges, tracks etc.
- Toolboxes, spare wheel carriers, tyre and rims etc.

5.4.4 Cleaning

- Cleaning should be undertaken at a purpose-built wash down facility where debris is trapped in a sump for suitable disposal.
- If a wash down facility is unavailable, the vehicle should be washed where there is no possibility of seed entering waterways or the environment.
- Cleaning may involve the use of high-pressure water or air.
- A sheeted drill pad or laydown area would be considered acceptable as an alternate wash down area. Additional bunding may be required to prevent contaminated water dispersal.
- For remote area works, a portable firefighting unit may be required to assist with weed hygiene.
- Earthmoving equipment should be unloaded from floats or low loaders before washing down to prevent the float and deck becoming contaminated.

5.4.5 Certification

Inspection personnel should inspect and certify vehicles and equipment are clean and issue the appropriate clearance document (NSR-ENV-COR-002-FOR Weed Hygiene Clearance). Please note that all Exploration related activities should refer to NSR-EXP-COR-025-PRO Weed Hygiene Certification Procedure and use the NSR-EXP-COR-025A-FOR Weed Hygiene Certificate.

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Should a vehicle present for inspection after being cleaned and still be found to have a weed hygiene risk, the inspector should note the unclean areas on the certificate and instruct the representative to re-clean these areas before submitting for a final inspection.

Certificates are only valid for entry to a single project. If, for example, a drill rig is to head to another prospect after drilling at a local prospect, it should be re-certified as clean before entering the second prospect. Please contact your Site Environment Department if you have any questions regarding Weed Hygiene Clearance.

Once a vehicle has been certified weed free, it can remain so only whilst it travels on sealed or well-maintained graded gravel roads that are free from weeds and other vegetation.

5.4.6 Chemical Weed Control

Chemical control involves the use of herbicides to control weeds. Herbicides are an important and effective component of the weed control programme as, in some situations, herbicides offer the only practical, cost-effective and selective method of managing certain weeds. As herbicides reduce the need for cultivation or ground disturbance, they can prevent soil erosion and water loss.

Herbicides should be applied using a dedicated vehicle mounted spray tank or backpack weed sprayer (Figure 1). When applying herbicides, all Northern Star personnel and contractors should follow the Herbicide Spraying for Weed Management Safe Work Procedure NSR-EXP-COR-024-SWP. Weed sprayers and herbicides are to be used in line with the manufacturers' instructions and safety requirements of the herbicide SDS.



Figure 1 Backpack weed sprayer

5.4.7 Physical weed control

Physical control methods often depend on the type and size of the area of weeds to be managed, what the land is used for, physical characteristics and the value of the land. Physical control methods can include:

- Hand pulling.
- Mowing.
- Grazing.
- Mulching.
- Tilling; or
- Burning.

5.4.8 Engaging External Contractors

Where required, an external contractor may be engaged to control a weed infested area. In these cases, Northern Star personnel are required to follow the WHSMS – Contractor Management Framework Manual NSR-OHS-103-MAN.

6. LEGISLATION AND REGULATORY REQUIREMENTS

- *Biodiversity Conservation Act 2016*
- *Biosecurity and Agricultural Management Act 2007*
- *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*
- *Conservation and Land Management Act 1984*
- *Environmental Protection Act 1986*
- *Mining Act 1978*

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In addition to the above legislation, all sites should adhere to any conditions against tenements, licences, approvals, Mining Proposals and Ministerial Statements.

Further information and guidance about weeds in Western Australia can be found on the Department of Biodiversity Conservation and Attractions (DBCA) website.

7. RELATED DOCUMENTS

| Document Name | Document Number |
|--|----------------------|
| Weed Hygiene Clearance | NSR-ENV-002-FOR |
| Herbicide Spraying for Weed Management Safe Work Procedure | NSR-EXP-COR-024-SWP |
| WHSMS – Contractor Management Framework Manual | NSR-OHS-103-MAN |
| Weed Hygiene Procedure | NSR-EXP-COR-025-PRO |
| Weed Hygiene Certificate | NSR-EXP-COR-025A-FOR |

8. REVISION HISTORY

| Revision Number | Date | Changes made to document |
|-----------------|------------|---------------------------|
| 1 | 01/08/2023 | New standardised document |
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9. APPENDICES

APPENDIX I - Weeds Commonly Found on Northern Star Tenements

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|--------------|---------------------|-----------------------|----------------|
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9.1 APPENDIX I – Weeds Commonly Found on Northern Star Tenements

| Species | Description | Suggested Methods of Control | Image |
|--|---|--|---|
| Agave americana (Century Plant) | A rhizomatous, perennial tree-like monocot that grows to 6 m high. The leaves are fleshy & spine-tipped. Has yellow flowers in Jan or Apr. Grows in sand. Found in cultivated, occasionally naturalised around old habitations & along roadsides. | Needs to be removed mechanically by hand. |  |
| Alhagi maurorum (Camel-thorn) Declared Weed | A rigid, spiny shrub, that grows up to 1.5m high. Has yellow & red & purple pea flowers. | Hand remove isolated plants & small populations. Apply Grazon® (triclopyr & picloram) when plant is actively growing. Because of the plants extensive root system, a close watch must be kept on treated areas for several years to detect any regrowth. Consult product's information sheet on herbicide application. |  |
| Amaranthus viridis (Green Amaranth) | An erect or ascending annual herb that grows up to 1 m high. Has green flowers from Nov to Dec or Jan to Aug. Found in disturbed areas. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |




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| Species | Description | Suggested Methods of Control | Image |
|--|---|--|--|
| <p><i>Arctotheca calendula</i> (Cape Weed)</p> | <p>A decumbent or ascending, annual herb that grows up to 30cm high. Has yellow flowers from Aug to Nov. It is a weed of roadsides, waste places & cultivated land.</p> | <p>For large infestations apply Lontrel® in early growth stages. Spraying glyphosate will control cape weed at all growth stages. A combination of chemical and physical control with follow up treatment provides optimal control. Consult product's information sheet on herbicide application.</p> |  |
| <p><i>Argemone ochroleuca</i> (Mexican Poppy)</p> | <p>An erect prickly shrub that grows up to 1-1.5m high. The flowers have six petals, are pale yellow and roughly 3-7cm in diameter.</p> | <p>Hand removal, slashing or mowing of plants prior to seed formation. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Gramoxone® (paraquat) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application.</p> |  |
| <p><i>Asclepias curassavica</i> (Redhead Cottonbush)</p> | <p>An erect shrub that grows up to 1.5m high. Has orange & red flowers. Grows in sandy soils.</p> | <p>Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application.</p> |  |




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| Species | Description | Suggested Methods of Control | Image |
|---|---|---|---|
| Brassica tournefortii (Mediterranean Turnip) | An annual herb that grows up to 60cm high. Has yellow-cream-white flowers from Jun to Nov. Grows in sandy soils. Is an aggressive weed of disturbed ground, roadsides, cultivation & seaside. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Buglossoides arvensis (Corn Gromwell) | An annual herb that grows up to 60cm high. Has white flowers from Jul to Nov | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Capsella bursa- pastoris (Shepherd's Purse) | An erect annual herb that grows up to 40cm high. Has white flower from Jul to Nov. Found in lawns & disturbed sites. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |




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| Species | Description | Suggested Methods of Control | Image |
|---|--|---|---|
| Carrichtera annua (Ward's Weed) | An erect annual herb that grows up to 40cm high. It has yellow flowers from Sep to Nov. Found in semi-arid regions. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Carthamus lanatus (Saffron Thistle) Declared Weed (NT only) | An erect, spiny, annual herb that grows up to 70cm high. The leaves are rigid with spiny lobes and it has yellow flowers in Dec or Jan to Apr. Grows in a variety of soils & is a weed of crops, pastures & waste grounds. | Hand remove isolated plants through spring and early summer. Apply glyphosate (e.g. Roundup®) or alternatively spot spray with Lontrel® Best controlled at rosette stage. Consult product's information sheet on herbicide application. |  |
| Cenchrus ciliaris (Buffel Grass) | A tufted or sometimes stoloniferous perennial, grass-like or herb that grows up 1.5m high. Has purple flowers from Feb to Oct. Grows in white, red or brown sand, stony red loam & black cracking clay. | Cut out and physically remove small populations and seedlings. Entire plants with dormant buds must be removed. Spray with Verdict® or spot spray with glyphosate six weeks after heavy rain. Follow-up with seedling control. Consult product's information sheet on herbicide application |  |




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| Species | Description | Suggested Methods of Control | Image |
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| Centaurea melitensis (Maltese cockspur) | An erect annual or biennial, herb that grows up 1m high. Has yellow flowers from Sep to Dec or Jan to Mar. It is a weed of roadsides, cultivated areas & other disturbed areas. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Chenopodium murale (Nettle- leaf Goosefoot) | An erect, much- branched annual herb, that grows up to 1m high. Has green flowers from Apr to Dec. An agricultural weed found in cultivated & disturbed areas & coastal sites. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Cichorium intybus (Chicory) | A perennial herb that grows up to 1.5 m high. Has blue flowers from Nov to Dec or Jan to May. Found at road verges & waste areas. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |




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| Species | Description | Suggested Methods of Control | Image |
|--|--|---|---|
| Citrullus lanatus (Pie Melon) | A trailing annual herb or climber. It has yellow flowers from Jan to Dec. Grows in sandy gravelly soil, loam & clay. Found in plains, river banks, centres of dry lakes, drainage areas & disturbed areas. | Hand removing isolated plants including most of the tap root is effective for small infestations. If fruits have formed, they should be collected and destroyed. Metsulfuron is effective on young plants, otherwise spot spray with Garlon®. Consult product's information sheet on herbicide application. |  |
| Conyza bonariensis (Flaxleaf Fleabane) | An erect annual herb that grows up to 1.5 m high. Has white flowers from Jan to Dec. Variety of soils. Weed of cultivation, waste places & roadsides. | Generally, more difficult to control than other species of Fleabane. Hand remove small and/or isolated infestations prior to seed set. Re- sprouts from basal buds after top removal. Timing of application is key to the efficacy of any herbicide treatment. Most susceptible to glyphosate at the rosette stage and least susceptible at flowering. Consult product's information sheet on herbicide application. At later stages, it is difficult to control with any single herbicide treatment. |  |
| Cucumis myriocarpus (Prickly Paddy Melon) | A prostrate annual herb. Has yellow flowers from Jan to Feb or Apr to May. Grows in disturbed areas. | Hand remove isolated plants before flowering. Has a high tolerance to glyphosate. Metsulfuron applied by backpack is effective, otherwise spot spray with Garlon®. Consult product's information sheet on herbicide application. |  |




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| Species | Description | Suggested Methods of Control | Image |
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| <p><i>Datura ferox</i> (Fierce Thornapple) Declared Weed</p> | <p>A bushy annual plant, growing to approximately 1m high. Leaves are broadly oval to triangular in shape and bright green, flowers are white trumpet shaped. Fruits are egg shaped and prickly. WARNING: Fierce Thornapple is poisonous to humans and toxic to livestock.</p> | <p>Small plants are susceptible to herbicide; however, this treatment may be ineffective for mature plants. Mechanical removal is best for small infestations. Larger infestations should be removed by ploughing or tilling the soil and followed up with removal of seedlings.</p> |  |
| <p><i>Datura innoxia</i> (Downy Thornapple) Declared Weed</p> | <p>A stout, bushy, hairy annual herb that grows up to 1 m high. Has white flowers in Dec or Jan to Aug. Found in disturbed areas. WARNING: Thornapple is a poisonous plant and contact may cause headaches, nausea and dermatitis.</p> | <p>Hand remove isolated plants & small populations in early stages of growth (WARNING: PPE must be worn). Apply glyphosate (e.g. Roundup®) in early stages of plant's growths. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control.</p> <p>Consult product's information sheet on herbicide application.</p> |  |
| <p><i>Dittrichia graveolens</i> (Stinkwort)</p> | <p>An erect, bushy, viscid, aromatic, annual herb that grows up to 0.5m high. Has yellow / yellow - white flowers from Jan to Nov. Grows in a variety of soils and is a weed of waste grounds, along rivers & roadsides.</p> | <p>Hand remove isolated plants before flowering. Slash close to ground otherwise plants can resprout. Any treatment should be applied twice, early and then late summer. Apply glyphosate (e.g. Roundup®) when plants are small, or up to flowering. Clean equipment, clothing spread of seed. Consult product's information sheet on herbicide application.</p> |  |




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| Species | Description | Suggested Methods of Control | Image |
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| <p>Echium plantagineum (Paterson's Curse) Declared Weed</p> | <p>An erect annual or biennial herb that grows up to 60cm high. Has blue / blue – purple / pink / white flowers mainly from Sep to Dec or Jan. It is a weed of roadsides, vacant lands & disturbed grounds.</p> | <p>Plants are best treated when young. Spot spray in late autumn/winter when most seed has germinated for the year with chlorsulfuron, this will also help prevent further germination. Glyphosate (e.g. Roundup®) applied at early flowering will control existing plants. Consult product's information sheet. Grubbing and cutting are suitable for young plants if 20 to 40 mm of taproot is removed. Slashing or mowing can cause out of season flowering and seed production.</p> |  |
| <p>Ehrharta villosa (Pyp Grass)</p> | <p>A slender rhizomatous, perennial grass-like or herb that grows up to 1.5 m high. Has purple- green flowers from Oct to Dec or Jan. Grows in sand & found in coastal sand dunes & limestone.</p> | <p>Spray with Verdict® or glyphosate (e.g. Roundup®). Several sequential applications will likely be required. Consult product's information sheet on herbicide application.</p> |  |
| <p>Erodium aureum</p> | <p>A spreading, short-lived perennial herb that grows up to 20cm high. Has pink-purple flowers from Jul to Oct. Grows in sand, sandy clay & loam.</p> | <p>Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application.</p> |  |




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| Species | Description | Suggested Methods of Control | Image |
|---|--|---|---|
| Erodium cicutarium (Common Storksbill) | A decumbent, ascending or erect annual or biennial, herb that grows up to 20cm high. Has pink-white flowers from May to Oct. A weed of wasteland, crops & pastures. | Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Erythrostemon gilliesii (Bird of Paradise Flower) | An erect shrub that grows up to 3m high. Has yellow & red flowers from Mar to Apr or Oct. Often cultivated. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Galenia pubescens var. pubescens | A prostrate perennial, herb (semi-woody at base) that can grow up to 10cm high & to 2 m wide. Has white-pink flowers in Apr or Nov to Dec. Grows in sandy soils and found in disturbed sites. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |




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| Species | Description | Suggested Methods of Control | Image |
|-------------------------------------|--|---|---|
| Gazania linearis | Clump-forming perennial, herb that grows up to 30cm high. Has yellow-orange-red flowers from Jun to Dec. Found in coastal areas & roadsides, wasteland around settlements. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Helianthus annuus (Sunflower) | An erect, woody annual, herb that grows up to 3m high. Has yellow flowers from Aug to Dec or Jan to Apr. Weed of habitation, roadsides & waste land in dry places. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Hordeum leporinum (Barley Grass) | A tufted annual, grass- like or herb that grows up to 40cm high. Has green-cream flowers in Sep to Oct. Grows in white, grey or red clayey sand, sandy loam & clay. | Prevent seed set. Hand pull or spray with Fusilade® Fortet 4-6 weeks after opening rains. Consult product's information sheet on herbicide application. |  |




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| Species | Description | Suggested Methods of Control | Image |
|--|---|---|--|
| <p><i>Lycium ferocissimum</i> (African Boxthorn) WoNS</p> | <p>Intricately branched, spiny shrub, 0.5- 2.5(-4) m high. Fl. white-purple-blue, Apr to May or Aug to Dec. Found in waste grounds.</p> | <p>Hand pull or dig out small seedlings ensuring removal of all roots. For mature plants cut and paint with glyphosate (e.g. Roundup®) and follow up treatment on regrowth. Consult product's information sheet on herbicide application.</p> |  |
| <p><i>Lysimachia arvensis</i> (Pimpernel)</p> | <p>A hairless spreading annual herb. Has red & blue flowers in spring. It is a weed of horticulture, crops, pastures, granite rocks and gardens.</p> | <p>Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application.</p> |  |
| <p><i>Malva parviflora</i> (Marshmallow)</p> | <p>An erect or decumbent, annual or perennial herb, that grows up to 1.2m high. Has blue-purple/pink/white flowers in Mar or Jul to Nov. Grows in sandy & clayey soils. Found in disturbed areas.</p> | <p>Hand remove isolated plants. Chemical control is only effective at early growth stages, it is naturally tolerant to glyphosate and difficult to control due to substantial taproot. Able to regrow after cutting or defoliation, although plants may be killed if the tap root is cut below the crown. Weed control measures carried out after flowering are unlikely to prevent viable seeds entering the soil seed bank.</p> |  |




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| Species | Description | Suggested Methods of Control | Image |
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| Medicago laciniata var. laciniata | A prostrate or ascending, annual herb that can grow up to 40cm high. Has yellow flowers from Aug to Oct. Grows in red clay and sand, loam over granite and found in flats & road verges. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Medicago minima (Small Burr Medic) | A prostrate annual herb that grows up to 10cm high. Has yellow flowers from Jul to Sep. Grows in grey loamy sand, red- brown clay loam, granite & ironstone. Found in hills, valley slopes, rangelands & roadsides. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Medicago polymorpha (Burr Medic) | A prostrate or ascending annual herb that grows up to 20cm high, to 50cm wide. Has yellow flowers from Jan to Feb or May or Jul to Nov. Grows in black, brown, white, yellow or grey sand, ironstone gravel, orange-brown sandy clay, granite. Found in flood plains, valley slopes, dunes, clay flats & roadsides. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |




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| Species | Description | Suggested Methods of Control | Image |
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| Mentha suaveolens (Apple Mint) | An aromatic rhizomatous, perennial herb that grows to 1m high. Has pink/white/blue flowers from Jan to Mar. Grows in damp areas. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Monoculus monstrosus | An erect annual herb that grows up to 70cm high. Grows in red- brown loams or sandy clays, yellow-white or grey-brown sandy loam, brown clay loam, limestone & granite. Found in undulating sandplains, hills and slopes, valley slopes, creek beds & saline watercourses. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Nicotiana glauca (Tree Tobacco) | An erect, spindly shrub or tree that grows between 1-6m high. Has yellow flowers in Mar or May or Aug to Dec. Grows in sand, clay & clay loam. | Hand remove isolated plants & small populations. Apply Grazon® (triclopyr & picloram) to provide some selective control. Consult product's information sheet on herbicide application. |  |




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| Species | Description | Suggested Methods of Control | Image |
|---|---|---|--|
| Oligocarpus calendulaceus | An open, prostrate to decumbent annual herb that grows 6cm high. Has yellow flowers in Feb or Apr to May or Oct. Grows in calcareous loam, red clay loam, sandy clay, ironstone. Found in flat marine plains, depressions, disturbed sites & road verges. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Oncosiphon suffruticosum [Previously: Pentzia suffruticosa] (Calomba Daisy) | An erect, spreading, aromatic annual herb that grows up to 1m high. Has yellow flowers in Sep to Oct or Dec. Grows in red clay loam, red-brown gravelly clay loam, granite & limestone. Found in seasonally inundated areas, clay pans, paddocks & road verges. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Opuntia stricta (Prickly Pear) Declared Pest / WoNS | A spreading to erect shrub that grows up to 2m high. Has yellow flowers. Grows in sandy soils. | Physical removal and burning of plants are the most effective method of control. All dislodged segments and fruit must be collected and destroyed. |  |




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| Orbea variegata (Starfish Cactus) | A prostrate, succulent herb. Grows in calcareous soils. Found in plains above salt lake & highly disturbed site. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Oxalis bowiei (Bowie Wood Sorrel) | | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Oxalis pes-caprae (Soursob) | A bulbaceous and rhizomatous, perennial, herb, that grows up to 30cm high. Has yellow flowers from Jun to Oct. It is a common weed. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |




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| Species | Description | Suggested Methods of Control | Image |
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| Pennisetum villosum (Feathertop) | A rhizomatous, tufted perennial, grass- like or herb, that grows up to 1m high. Has yellow/purple flowers from Feb to Oct. Grows in sand, loam, sandy clay. Cultivated in gardens but also a weed of disturbed habitats. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Phyla canescens (Lippia) | A procumbent or ascending, perennial herb. Has blue-purple-white-pink flowers. Mainly known from moist plains. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Polygonum aviculare (Wireweed) | A prostrate, sprawling annual, herb that grows up to 10cm high. Has green-white-pink flowers from Oct to Dec or Jan to May. Grows in sandy clay, clay loam. A weed of cultivation & waste places. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |




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| Portulacaria afra (Jade Plant) | An erect shrub that grows up to 1.5m high. Grows in sand, clay, loam & found in flats. | Needs to be removed mechanically by hand. |  |
| Rostraria pumila | A tufted annual, grass- like or herb that grows up to 20cm high. Has green flowers from Jul to Oct. Grows in grey, black or red sand, sandy clay, clay & limestone. Found at roadsides, sand dunes & cliff slopes. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Rumex hypogaeus [Previously: Emex australis] (Doublegee) Declared Pest | Prostrate annual, herb. Fl. green, Jan to Dec. Sand, loam or clay. Disturbed areas, weed of cereals, road verges. | Control of doublegees should occur shortly after emergence and should continue for a number of years. Herbicides will give poor results applied to plants with more than 12 leaves at the time of spraying. Spot spray plants with 1% Grazon® or glyphosate at 0.5-0.7% to kill existing plants. Alternatively wipe actively growing plants with 50% glyphosate. Read the manufacturers' labels and material safety data sheets before using herbicides. |  |




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| Rumex vesicarius L [Previously: Acetosa vesicaria] (Ruby Dock) | An erect, stout, fleshy, hollow-stemmed, annual herb that grows up to 1m high. Has red- pink flowers in Jul to Sep. Grows in sandy alluvial soils & gravelly ironstone soils. Found along roadsides & in disturbed areas. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Salvia reflexa (Mintweed) Declared Pest | A hoary, aromatic annual herb that grows up to 6m high. Has blue flowers from Oct to Dec or Jan to Apr. Found in margins of water-courses. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) when plants are seeding or actively growing. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Salvia verbenaca (Wild Sage) | A slightly aromatic, perennial herb that grows up to 1m high. Has blue-pink-purple flowers in Apr or Jul to Oct. Often found along roadsides. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |




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| Species | Description | Suggested Methods of Control | Image |
|--|--|---|---|
| Schinus molle var. areira (Pepper tree) | A tree that grows up to 5m high. Has white- cream flowers. Grows in red, sandy loam, alluvium & granite. Found in old mine sites & rubbish tips, drainage lines & creek banks. | Needs to be removed mechanically by hand. |  |
| Schismus arabicus (Araby Grass) | A tufted ascending annual grass-like or herb that grows up to 25cm high. Has green/purple flowers in Sep. Grows in sand & loam. Found on roadsides & sandplains. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Schismus barbatus (Kelch Grass) | A tufted ascending annual grass-like or herb that grows up to 25cm high. Has green/purple flowers in Aug to Nov. Grows in sand, limestone, clay. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |




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| Species | Description | Suggested Methods of Control | Image |
|--|---|--|---|
| Sisymbrium irio (London Rocket) | An erect annual or biennial herb that grows up to 60cm high. Has yellow flowers from Jul to Dec. Grows in sandy & clayey soils. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Sisymbrium orientale (Indian Hedge Mustard) | An erect annual or biennial herb that grows up to 1m high. Has yellow flowers from Mar to Nov. Found in disturbed areas. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Solanum nigrum (Black Berry Nightshade) | An erect, perennial herb or shrub (short-lived) that grows up to 1m high. Has white flowers from Jan to Dec. | Prevent seed set for several years. Hand weed small infestations. In bushland situations, manually remove plants before flowering. For large infestations use Starane® when actively growing in summer, will provide reasonably selective control. Do not use in or near wetlands. Control infestations within 5 km of the target area to reduce dispersal of seed by birds. Consult product's information sheet on herbicide application. |  |




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| Species | Description | Suggested Methods of Control | Image |
|---|--|---|---|
| Sonchus oleraceus (Common Sowthistle) | An erect annual herb that grows up to 1.5m high. Has yellow flowers from Jan to Dec. Grows in a variety of soils. Is a weed of waste places & disturbed ground. | Remove small and/or isolated populations manually prior to seed set. Slashing is often ineffective as flowers continue to be produced. Spot spray Lontrel® preferably at the rosette stage. Consult product's information sheet on herbicide application. |  |
| Sorghum halepense (Johnson Grass) | A rhizomatous, tufted perennial, grass- like or herb that grows up to 2m high. Has brown flowers from Aug to Dec or Jan to Feb. Grows in loam & sand. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Spergularia diandra (Lesser Sand Spurry) | A recumbent to ascending annual or perennial herb that grows to 25cm high. Has pink flowers from Sep to Nov. Grows in sandy & clayey soils. Found on roadsides, railway tracks & cleared land. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |

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| Species | Description | Suggested Methods of Control | Image |
|--|---|---|---|
| Tribulus terrestris (Caltrop) | A prostrate annual herb. Has yellow flower from Jan to Dec. Often found on sandy soils and waste places. | Exclude people and close tracks to stop spread. Hand remove small/isolated populations, pulling plants from the root crown. Apply herbicide to prevent seed set. Glyphosate (e.g. Roundup®) is effective on seedlings. |  |
| Urtica urens (Small Nettle) | A monoecious annual herb (with stinging hairs) that grows up to 60cm high. Has green flowers from Jul to Nov. Grows in sandy soils. | Hand remove isolated plants & small populations. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |
| Xanthium spinosum (Bathurst Burr) Declared Pest | Coarse annual herb that grows to 1 m high. Has flowers from Jan to Jun. It is a weed of disturbed & cultivated land. | Hand remove isolated plants. Apply glyphosate (e.g. Roundup®) in early stages of plant's growth, before burrs have formed. Grazon® (triclopyr & picloram) can be applied in later stages of plant's growth to provide some selective control. Consult product's information sheet on herbicide application. |  |

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