



Alliance Business Park
275 O'Herns Road, Epping:
Matted Flax-lily Translocation Plan

Prepared for MAB Corporation

20 September 2013

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Biosis matter no.: 16630

Version/date	Internal review by	Date sent to client
Draft version 01	JY	22/05/2013
Final version 01	SGM	11/06/2013
Final version 02	SGM	20/09/2013

File name: 16630.275 OHerns Rd.MFL.Translocation.200913.docx

Citation: Biosis (2013). Alliance Business Park, 275 O'Herns Road, Epping: Matted Flax-lily Translocation Plan. Report for MAB. Author: Steve Mueck, Biosis Pty Ltd, Melbourne.

Acknowledgements

Biosis Research acknowledges the contribution of the following people and organisations in undertaking this study:

- MAB Corporation: Matt Planner & Mike Martin
- Department of Environment and Primary Industries for access to the Victorian Biodiversity Atlas

The following Biosis staff were involved in this project:

- Jeff Yugovic for review of the draft plan
- Sally Mitchell for mapping

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Summary

Biosis Pty Ltd was commissioned by MAB Corporation to prepare a Matted Flax-lily *Dianella amoena* Translocation Plan for the salvage of two plants recorded within the Alliance Business Park at 275 O'Herns Road, Epping. The site is proposed to be developed into an industrial estate.

The two Matted Flax-lily within the development footprint of Alliance Business Park are proposed to be translocated to the Epping North Conservation Reserve (ENCR) at 100 Lyndarum Drive Epping.

MAB is responsible for implementing the actions outlined in this plan until the relocated individuals of Matted Flax-lily are considered to be established at the translocation recipient site.

Each plant will be considered established at the recipient site when a minimum of three of the four plant clones have survived for a minimum period of five years. This is expected to occur in 2019.

1. Introduction

1.1 Project background

1.1.2 Alliance Business Park

The approval for the development of Alliance Business Park at 275 O'Herns Road Epping was subject to a number of conditions under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Planning Permit 713586 (Whittlesea Planning Scheme). These are outlined in the approval document associated with Referral 2012/6298 to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPac). These conditions include that the development not disturb more than two Matted Flax-lily (MFL) and the two known plants within the development footprint will be translocated to a site in consultation with the Victorian Department of Sustainability and Environment (now the Department of Environment and Primary Industries - DEPI) (Referral 2012/6298).

DEPI required the council permit have a condition stating:

"Prior to the removal of native vegetation, a Matted Flax-lily Translocation Plan must be prepared to the satisfaction of the Department of Environment and Primary Industries and implemented accordingly".

A total of 2 individuals of MFL are to be salvaged from the Epping site (Figure 1). Salvaged plants will be propagated and maintained at an appropriate nursery. This nursery will maintain 10 clones of each of the two plants salvaged (i.e. 20 plants) in a manner that allows the clones of each individual to be identified. These clones will be supplied to the translocation program in accordance with this plan.

The locations of the two MFL within Alliance Business Park are documented in Biosis Research (2012).

1.1.3 Nominated Recipient Site

Two options are proposed for the recipient site including the Edgars Creek corridor within the Alliance Business Park (Figure 1) and the Epping North Conservation Reserve (ENCR) at 100 Lyndarum Drive Epping. While the Edgars Creek corridor does support habitat for this species, it is a relatively rocky environment which is considered more difficult to plant and re-establish salvaged individuals. While the Edgars Creek corridor will be managed to control both biomass accumulation and weeds it is considered to be a higher risk environment to establish translocated Matted Flax-lily. Biosis would therefore recommend the Epping North Conservation Reserve (ENCR) at 100 Lyndarum Drive Epping as the recipient site for the MFLs salvaged from Alliance Business Park. This site is approximately 22 kilometres north of the Melbourne CBD, and 2.2 kilometres north east of Alliance Business Park (Figure 2).

While ENCR is the recommended recipient site for the MFLs salvaged from Alliance Business Park, the management actions and strategies identified in this translocation plan can be applied to any site selected by DEPI.

1.1.4 Suitability of Recipient Site

ENCR supports a remnant of Plains Grassy Woodland within the Victorian Volcanic Plain bioregion. The reserve supports a number of rocky rises and a scattered cover of mature River Red-gums *Eucalyptus camaldulensis*. The site is managed as a conservation reserve by the City of Whittlesea. Ongoing management activities include weed control and ecological burning.

MFL is known from the site as both a small natural population (>10 plants) and other translocated plants (>10 plants). The reserve therefore supports suitable habitat for MFL and has a number of areas considered to be unoccupied habitat which require some level of rehabilitation.

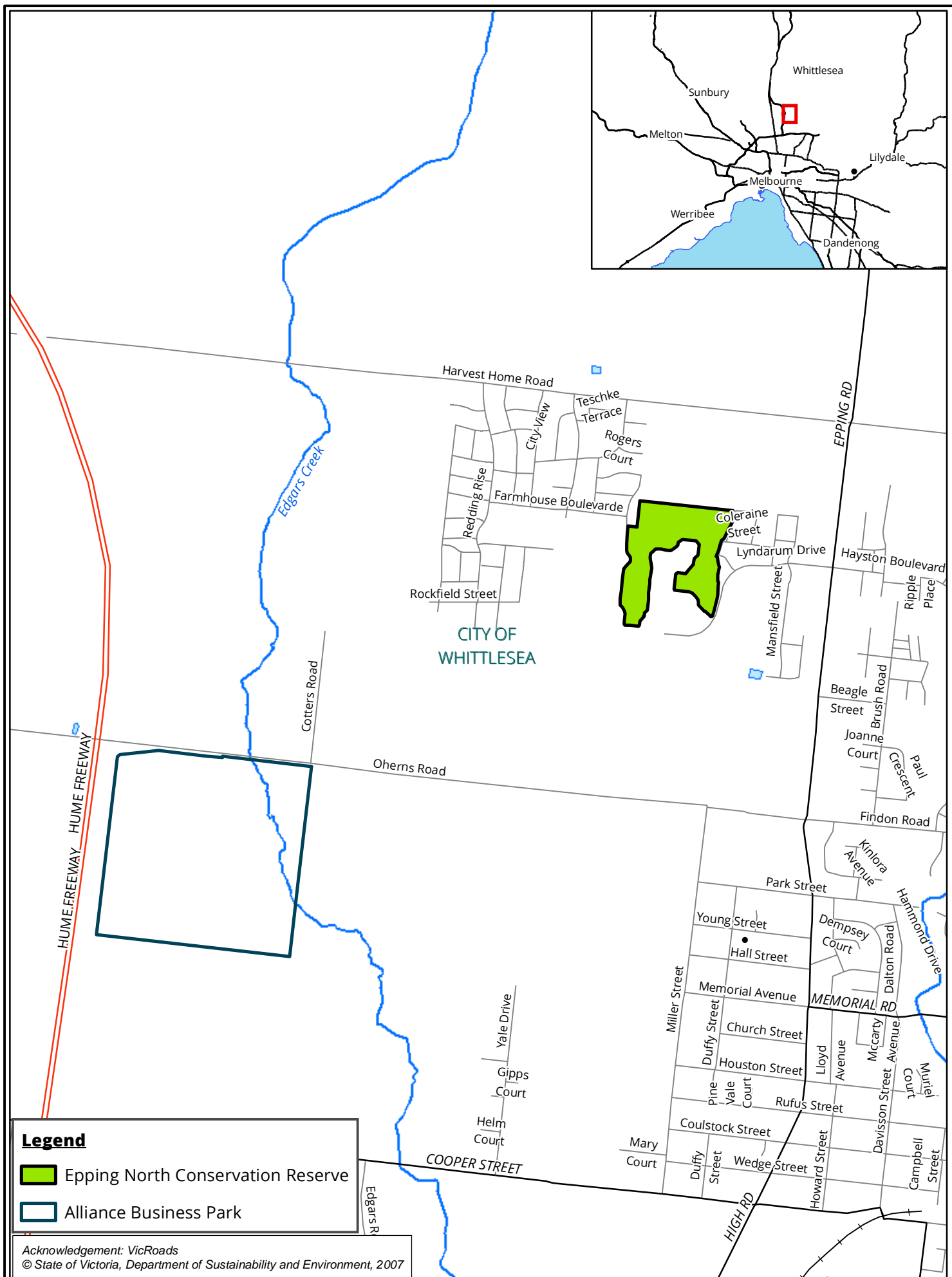


Figure 2: Epping North Conservation Reserve - the translocation recipient site for Matted Flax-lily plants to be salvaged from Alliance Business Park

Figure 2: Epping North Conservation Reserve - the translocation recipient site for Matted Flax-lily plants to be salvaged from Alliance Business Park

1.2 Summary of the Translocation Proposal

Details of the translocation proposal are provided in this plan, however key points are summarised below:

Material from both plants salvaged from the Alliance Business Park will be replanted within the Epping North Conservation Reserve. Plants will be salvaged from the two plants outside the Edgars Creek Corridor (Figure 1) and will be propagated in a nursery to provide 10 clones from each plant (20 tube-stock plants).

From this material, 4 clones (tubes) sourced from each of the original 2 plants will be planted in pairs into the selected reserves in an attempt to establish three clones from each plant. For each plant the remaining six clones will be retained in a nursery as a backup to replace any translocated clones which die.

Where a clone from the nursery backup is used to replace plants within a reserve, the remaining nursery plant will be divided to maintain the backup of six clones per plant.

The establishment of three clones from each plant using the salvaged material will be taken as the successful translocation of that individual. An individual clone will be considered established if the planted material survives within the planting area for a period of five years.

The translocation program will be considered completed when both translocated plants are represented by three established plants. These plants will be subject to a MFL monitoring program until they are considered to be established.

1.3 Recipient site (Description)

The Epping North Conservation Reserve is located on the northern side of Lyndarum Drive in Epping North. It is currently bounded to the north by undeveloped land and is otherwise surrounded by urban development. Other adjacent roads include Stonebridge Rise, Loughton Avenue, Echuca Way and Country Fields Boulevard.

The reserve is managed as a remnant of the ecological vegetation class (EVC) Plains Grassy Woodland (EVC 55). The site supports some remnant indigenous understorey although it also supports significant infestations of exotic grasses such as Chilean Needle-grass *Nassella neesiana* and Toowoomba Canary-grass *Phalaris aquatica*.

On going management activities conducted by the City of Whittlesea include weed and biomass control works.

Specific areas for planting the MFL salvaged from Alliance Business Park will be selected in consultation with the relevant Parks Environmental Manager. Site selection will focus on weed dominated areas in close proximity to areas supporting more native vegetation. Areas will be selected in close proximity to the base of rocky rises.

1.4 Timeframe and implementation

The translocation program will commence as soon as this plan is approved (anticipated to be June 2013) and will follow the timetable outlined in Table 1. Preparation of the proposed recipient site within the selected Conservation Reserve will also begin as soon as this plan is approved, with selection of planting sites and initial weed control.

The required 8 plants (4 clones of each plant) will be held at a nursery until required. Once the translocation plan reaches the defined success rate (survival of three clones from each plant for five years) then the nursery

plants will no longer be required. Excess plants that may be transferred to other projects will no longer be the responsibility of the MAB Corporation.

Table 1. Summary of actions and timing

Step	Timing	Action
1	June 2012	Preparation of recipient sites within the ENCR commences.
2	February 2014	Preparation of Conservation Reserve recipient site completed.
3	April 2014 (when soil moisture conditions are appropriate)	Planting of salvaged plants into ENCR.
4	April 2014	Ongoing weed control, weekly monitoring and other management actions as specified continued in EPCR. Water plants as required. Replace any clones that die.
5	May 2014 to April 2015	Monthly monitoring of translocated plants in the ENCR. Water plants as required and increase the frequency of monitoring if considered necessary. Replace any clones that die.
6	May 2015 to April 2019	Monitoring every two months of translocated plants in the ENCR. Monitoring of plants established for two years will be incorporated into an annual MFL monitoring program. If at the end of April 2019 three clones from each of the original plants have survived then the translocation program is considered successful and this translocation plan will be considered completed. If some clones have died then monitoring of replanted individuals needs to return to Step 5 until the five year survival goal is achieved.
7	November / December each year from 2016.	Include translocated plants into an annual MFL monitoring program conducted in December of each year. Submit annual report to DEPI on the outcomes of the Translocation Plan.
8	April 2019*	Submit final report to DEPI on the outcomes of the Translocation Plan with recommendations.

* another report may be required after this if it takes longer to establish these plants.

2. Translocation Requirements

This translocation plan must be approved by the Department of Environment and Primary Industry (DEPI) prior to its implementation.

The translocation recipient site must provide a similar environment/habitat type to that at 275 O'Herns Road Epping and ongoing conservation management is required to provide habitat security. These requirements include:

- The site needs to be managed on an ongoing basis to maintain the populations indefinitely;
- Long term management arrangements need to be identified;
- The sites will be located on the Victorian Volcanic Plains within the Whittlesea or Hume municipalities;
- Should be on public land or land with sympathetic management agency or structure;
- Be of gentle relief (plains) or stony knolls with well-drained or moderately draining soils (surface rocks should be a prominent feature and gilgai soils may be present)
- Soils should be moderately friable, cracking clays;
- Vegetation should be Plains Grassland, Plains Grassy Woodland or Stony Knoll Shrubland;
- Grazing by domestic stock should be excluded;
- Sites should be fenced for protection;
- Weed control is a requirement for site preparation and is also an ongoing management requirement; and
- Plant must be monitored to ensure their establishment.

The translocation site selected within the ENCR and the associated management protocols defined within this plan and the Lyndarum Estate, Epping Conservation Management Plan (Ecology Australia 2007) satisfies all of these requirements.

3. Translocation Proposal

The successful translocation of the plants salvaged from Alliance Business Park will be achieved as follows:

Sound and detailed translocation planning

Details of the translocation plan are provided in Section 4.

Commitment and Expertise

Biosis Pty Ltd (or an equivalent consultant) will provide ecological expertise to the translocation project from the initial planning stages through to ongoing monitoring and site management. All work will be undertaken by qualified ecologists, supervised by senior staff with previous experience in translocation and vegetation management.

Biosis has designed and supervised a number of projects for translocation and management of threatened flora besides Matted Flax-lily. These projects include:

- Salvage of Matted Flax-lily, re-establishment of propagules, and ongoing management and monitoring at Larundel Grassland reserve, Bundoora (Mueck 2004, Brown and Mueck 2006);
- Salvage, direct translocation and ongoing management of Matted Flax-lily at South Morang Flora and Fauna Reserve, South Morang (Yugovic 2005);
- Machine salvage and direct translocation of Spiny Rice-flower at the former Laverton RAAF Base, Laverton (Mueck 2000);
- Tree-spade salvage and direct translocation of Spiny Rice-flower and mixed grassland species at Cairnlea, the former Albion Explosives Factory (Costello unpublished data);
- Salvage by hand and propagation of rare or threatened cranesbills (*Geranium* sp. 1, *Geranium* sp. 3, *Geranium* sp. 14, *Geranium solanderi*) and Arching Flax-lily *Dianella* sp. aff *longifolia* (Benambra), from the Broadmeadows to Craigieburn Railway Reserve, Broadmeadows (Costello 2004, Costello and Koehler 2004);
- Salvage by hand for direct translocation and propagation of grassy wetland species and tree-spade salvage and direct translocation of Smooth Rice-flower *Pimelea glauca* and mixed grassland/grassy wetland species into Epsom Conservation Reserve, Mordialloc (Costello 2000, 2002, 2005).

The on-ground aspects of the project will be undertaken by indigenous vegetation management specialists and include ecological burning, weed control and the control of pest animals. Appointment of these management specialists is via a tender process. Tenders will be requested periodically and appointees selected on both cost and reliability criteria.

Funding

The manager of the ENCR (City of Whittlesea) has committed to management of the selected reserve guided by a comprehensive reserve management plan (Ecology Australia 2007). The reserve is within an urbanised environment which excludes the presence of domestic stock and has been otherwise fenced to exclude non-management vehicles. ENCR has been managed by the City of Whittlesea since 2008 and ongoing funding for the ecological management requirements of the reserve is provided by this municipality.

Funding arrangements for the management of the plants in accordance with this plan will be provided by MAB and will subject to negotiation with the City of Whittlesea.

Removal and ongoing control of threatening processes

The most immediate threats to the viability of the recipient site are as follows:

- Weed invasion, particularly by tall-growing perennial grasses such as Toowoomba Canary-grass *Phalaris aquatica* and Chilean Needle-grass *Nassella neesiana*;
- Inappropriate burning regimes/biomass control (i.e. biomass accumulation outside that defined by the approved management plans); and
- While grazing by domestic stock is no longer a threat, grazing by Eastern Gray Kangaroos and rabbits may become a threat in future. Rabbits are currently being controlled in the reserve by baiting.

Management of the Conservation Reserve is detailed in Ecology Australia (2007) and summarised in Section 4. This active ecological management will continue to be undertaken by experienced native vegetation management contractors.

Management actions include fencing of the reserve, installation of signage and pathways for controlled public access, weed control and biomass control.

Management of the Conservation Reserves is an ongoing and permanent requirement.

Timing

This translocation plan will apply until three clones from the two salvaged plants have become established. Establishment is defined as the survival of a planted clone for a period of two years. However management of the conservation reserve and the salvaged plants will continue in perpetuity, albeit at a lower intensity. After plants are established, management will comprise periodic biomass reduction as needed, weed control and maintenance of fencing, gates, pathways and signage. Once established the translocated plants will be incorporated into an annual MFL monitoring program conducted within the reserve.

4. Translocation Process

4.1 Introduction

Matted Flax-lily is a tufted, mat-forming perennial lily, which spreads vegetatively by underground rhizomes. The species is fully described in Carr and Horsfall (1995). Each plant consists of sparse to dense tufts of leaves, which are narrow, 4–12 mm wide (Carr and Horsfall 1995), blue-green in colour, and usually have small ‘teeth’ on the upper edges and mid-rib. The leaf tufts may be widely spaced along the rhizome (up to 30 cm), making it difficult to accurately determine the number of individual plants within an area. Matted Flax-lily flowers during late spring – summer. The flowering inflorescence is a spreading panicle, often 50–60 cm in height, with scented pale mauve to blue flowers. Blue fleshy berries containing the seeds are produced after flowering.

The species is known from grassland and grassy woodland in Victoria, and there are historic records from Tasmania, where the species may still occur (Carr and Horsfall 1995). There are believed to be approximately 1400 plants remaining, in 120 separate populations (Carter unpublished). This is likely to underestimate the actual total population, as additional populations continue to be recorded as further survey is conducted in areas of suitable habitat on the urban fringe of Melbourne.

A recovery plan for the species is being prepared (Carter unpublished).

Carr and Horsfall note that recruitment for Matted Flax-lily is believed to be non-existent. Populations are clearly fragments of much larger populations that have persisted in highly degraded vegetation. Seedlings have not been seen in the wild (Carr pers. comm. in Carter unpublished). Buzz pollination by native bee species is required for seed production, hence the habitat requirements for these species is important. The species is self-compatible.

Matted Flax-lily is readily propagated by division and seed, although it may be difficult to collect large quantities of seed, as the berries are often sparse and drop quickly once ripe. The plants proposed to be salvaged from Alliance Business Park are small but could still be divided to form many new plants after plants are established and grown in a nursery.

4.2 Recipient Site

The ENCR has been identified as the primary recipient site.

The initial planting in the Reserve will include four plants (clones) from each of the salvaged parent plants.

The most intact areas of the conservation reserve will not be used as a recipient site, given the potential for disturbance that can result from transplant operations and ongoing management. Instead, a moderately disturbed area within the reserve has been identified as the primary receptor area. This area will be subject to intensive weed control and revegetation works with an objective of re-establishing a native Plains Grassland community incorporating the translocated population of MFL. Weed control works will commence as soon as possible with the objective of planting the MFL in April 2014.

Broad recipient areas include all land within the area specified in Figure 2. Within this area, particular planting sites will be identified and marked on-ground by a botanist in consultation with the relevant council Parks Environmental Manager. These will be located to avoid disturbance to any existing indigenous plants.

4.3 Translocation Stages

The following stages and issues in translocation are discussed below:

- Preparation of nursery clones
- Site preparation
- Replanting
- Management
- Monitoring
- Performance targets

4.3.2 Preparation of Nursery Clones

Direct translocation into the reserve is not proposed, given the need to prepare the recipient site and the potential for re-introduction of weeds in the salvaged material. Plants will be held in a suitable nursery for maintenance and growing on.

A minimum of ten clones is required for each plant. Of these ten, four will be planted out to contribute to the wild population and six will be held in the nursery as a security measure.

The nursery holding the plants required for this translocation will be responsible for maintaining the security plants as long as required. The total length of time for holding plants will be determined by the time taken to identify and prepare all recipient sites and for the plants to become established. Once the plan is deemed successful the excess nursery plants will no longer be required. Any additional plants remaining after the translocation plan has been completed will no longer be the responsibility of MAB Corporation.

Detailed actions are as follows:

1. Plants will be hardened off before planting into the conservation reserve.
2. Clones from each original salvaged plant will be planted into the nominated reserve with the aim of these plants providing a new wild population or augmenting an existing population of MFL.

4.4 Site preparation

The recipient site within the ENCR will be identified by a botanist in consultation with the relevant ENCR manager. Preparation of these areas will begin within one month of the approval of this translocation plan (no later than September in any year before the translocation occurs). Each site will be large enough to allow eight clones to be planted, for ease of monitoring and ongoing management and to provide for potential cross-pollination. Sites have been selected such that access for planting, management and monitoring is possible without trafficking more intact sections of the reserve. The sites will be marked with star pickets or similar to allow translocated plants to be easily monitored and protected during management works.

Weed control in the planting areas will be satisfactorily completed before plants are installed. The cover of perennial weeds within a minimum one metre radius of each planting site will be <1%.

Land within five metres of the receptor site will be subject to extensive revegetation works using locally indigenous species with the objective of establishing the vegetation as an area of Plains Grassy Woodland dominated by indigenous species over a period of five years.

4.5 Replanting of MFL

1. Replanting will occur during the cooler months (autumn to mid-spring). Planting sites will be accessed with minimal disturbance to the reserve from vehicles and equipment.
2. The minimum spacing between plants and between plants and the reserve boundary will be 5 metres, to allow for vegetative expansion.
3. At each recipient site, the planting hole will be dug by hand with minimal disturbance to the surrounding soil, and any excavated soil will be removed from the reserve. Watering of the planting hole is recommended before planting.
4. Each plant will be planted with the final soil level approximately equal or slightly lower than the natural surface and will be thoroughly watered.
5. Each plant will be labelled (with a durable metal label) and numbered for record keeping and monitoring purposes.
6. The location of the recipient site will be recorded using GPS and the data transferred onto the reserve map.

Additional relevant data will be recorded including the name of the person undertaking the work, date, time of day and prevailing climatic and other conditions (e.g. temperature, recent rainfall, frosts, fires, natural soil moisture and any other features that might affect the survival of the plant).

4.6 Management and Monitoring

Reserve management actions and issues are described by this plan and the Lyndarum Estate, Epping Conservation Management Plan (Ecology Australia 2007).

Monitoring and specific management guidelines are as follows:

1. The planted flax-lilies will be inspected weekly for at least the first month (as determined by the supervising botanist), then monthly for a total of one year and then every two months for two years post planting. This will allow for prompt management actions as necessary to maximise the chance of survival. Records of inspections will be kept and include descriptions of the condition of the plants, and will include inspections of the naturally occurring plants for comparison. Translocated plants will be photographed every six months for two years and then annually until plants are considered established.
2. Watering may be required periodically during the first summer, as determined by monitoring. If the plants are deemed to be declining in health due to moisture stress, hand watering will be organised promptly. Additional monitoring may be required if watering is required over a prolonged period. Records of watering events will be kept.
3. Vegetation competition (native or exotic) will be controlled for a minimum of one metre around each plant.
4. Weed control works will be conducted throughout the receptor sites to facilitate the establishment of a native vegetation community;
5. Revegetation works will incorporate a variety of techniques including direct seeding and planting tube-stock with a goal of establishing a minimum 25% cover (as a percentage of total vegetation cover) within five metres of each planting at the end of five years.

6. Any competing vegetation will be regularly controlled using appropriate techniques. These may include hand weeding, brush-cutting or careful application of selective herbicide. Removal of weeds may require action each month during the spring growing season.
7. Any other threats, such as grazing by rabbits or kangaroos will be monitored and managed as required. Any control activities undertaken will be recorded.
8. Any decline in the population will be reported to DEPI within two months with an explanation of the remedial management actions planned and taken.
9. In addition to the regular inspections to assess management requirements, the plant survival and growth will be assessed annually, at the same time each year (between 1 October and 1 March) up until plants are considered established. The dimensions of each patch and number of leaf tufts will be recorded, and production of flowering stems noted. Observations of seed set, germination of Matted Flax-lily plants and the fate of seedlings will be recorded.
10. Any dead plants will be promptly replaced from the nursery with clones from the same parent plant. The nursery plant will also be replaced as back up.
11. Plants are considered established and independent after surviving for five years.
12. Once three clones from each plant is considered established then this translocation plan will no longer apply to any clones of that plant and that plant will be managed in line with the ongoing Reserve Conservation Management Plan and be incorporated into an annual MFL monitoring program.
13. Replaced plants will be monitored until three clones from that plant are considered established.

4.7 Performance Targets

The over-riding objective of this translocation plan is the long term conservation of genetic material from the salvaged population and a long-term increase in the local population of the species. Based on previous translocation exercises associated with this species it is anticipated that the large majority of plants will be able to successfully establish within the reserve within the nominated establishment period.

The translocation program will be deemed a success if it meets the following criteria:

1. When both of the salvaged plants become established. This is achieved when three clones from that plant have survived after planting out for a period of five years;
2. Weed cover within five metres of each clone within the receptor site is maintained at an acceptable level, such that competition from weeds does not reduce the potential expansion of each transplanted flax-lily and other native ground flora increase in cover;
3. The receptor sites have been revegetated to the extent where the cover of indigenous species is greater than 25% of the vegetation cover present within five metres of each planted clone; and
4. The success of the translocation project has been regularly reviewed and management adjusted as required to maintain the health of plants.

In the unlikely event the criteria for success have not been met within 10 years from the date of approval of this plan then MAB will provide the DEPI with an assessment of the translocation program that examines the reasons why the program was unable to meet its performance targets. This assessment will be provided within 10 years and 6 months from the date of approval of this plan.

Reporting

The results of the translocation process and ongoing monitoring will be reported to the relevant authorities (DEPI) by MAB on an annual basis. The final report will include an evaluation of the success of the program, methods used and recommendations for future programs. The report will also provide recommendations for the ongoing management of the translocated Matted Flax-lily plants.

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