



Natural Area  
CONSULTING MANAGEMENT SERVICES

## Company Profile and Capability Statement

May 2016



Quality  
ISO 9001

SAI GLOBAL

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## Introduction to Natural Area

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Natural Area provide fast and efficient service to meet all our customer's needs. We have a strong focus on occupational health and safety and are dedicated to providing the best possible outcome for our clients and the environment alike. We are the largest provider of on-ground environmental services in Perth with a highly trained and experienced team.

Our main areas of focus are:

1. Building our reputation on proven results
2. Providing fast and efficient service
3. Developing and training our team
4. Completing projects to the highest possible standard
5. Providing sustainable advice

We are dedicated to enhancing and conserving the natural areas throughout the Perth Metropolitan Area. We are able to take on any project no matter what the size

### Our Mission

Value creation for our shareholders by:

- ▶ satisfying customer expectations
- ▶ demonstrating and sharing the community benefits of best practice natural area management
- ▶ training and developing new landcare and bush regeneration operators
- ▶ conducting an environmentally responsible and ethical business

### Our Vision

To provide commercial and community leadership, being regarded as the pre-eminent business in our chosen market.

### Our Values

To maintain:

- ▶ relationships ahead of opportunism
  - ▶ quality ahead of profit
  - ▶ fairness ahead of exploitation.
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## Company Profile

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Natural Area offers environmental consulting, management and services to Clients in Western Australia. We are a leading provider of on-ground environmental management; employing the largest full time environmental field crew in the state. Our team is as diverse as the projects we undertake, with our environmental consulting team, horticultural team, project management team and field team all working together to provide the high quality environmental outcomes we're reputed for.

At the core of our business is natural area restoration, conservation and enhancement. Our business has been developed on a reputation built over 12 years of providing excellent service to clients in local and State Government, in private and public industries, in the mining and resource sector and to private landowners and developers. Natural Area aims to provide and implement practical environmental management for biodiversity conservation. The range of services we provide along with the technical experience of our team means that we are able to provide a holistic approach to environmental rehabilitation and management. This includes initial consultation and provision of advice on environmental projects, preparation of project plans and proposals, supply of materials and labour for on ground environmental services as well as monitoring and reporting on outcomes.

We operate under a quality management system which is certified to ISO9001:2008 Quality Management which means our Clients can always expect excellence without compromising on efficiency and costs. Our environmental management system has been developed in line with ISO14001 (Environmental Systems) and we view safety as a responsibility rather than an obligation with our system being developed in line with AS/NZS 4801 Safety Management.

### Professional Associations

- ▶ Nursery and Garden Industry of Australia
- ▶ Australian Association of Bushland Regenerators
- ▶ Revegetation Industry Association of Western Australia
- ▶ International Plant Propagators Society
- ▶ Australian Network for Plant Conservation Inc.
- ▶ Environmental Consultants Association

### Professional Awards

- ▶ UDIA Award for Environmental Excellence for Cygnia Cove (2013)
- ▶ UDIA Presidents Award for contributions to Cygnia Cove (2015)
- ▶ UDIA Award for Residential Development Under 250 Lots for Cygnia Cove
- ▶ Nursery and Garden Industry of Australia, Best Small Production Nursery 2011 (WA)
- ▶ Nursery and Garden Industry of Australia, Best Small Production Nursery 2014 (WA)
- ▶ Swan Chamber of Commerce, 2011 Hanson Swan Business Award for Contribution to a Green Environment
- ▶ Australian Disability Enterprises, Interwork Inc., Regional Employer of the Year, East Region

## Natural Area: *Nursery*

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Integrated into the business is an award winning native plant propagation nursery, which received the Best Small Production Nursery Award in 2011 and again in 2014. The nursery is accredited by the Nursery and Garden Industry Association and the Nursery Industry Accreditation Scheme Australia. The nursery has the ability to propagate over 300 different native plant species including many recalcitrant species from endemic seed and cuttings. Average production rates are in excess of 700,000 plants per annum. Most of Natural Area's large scale revegetation works are carried out using plants grown in the nursery, which means we are able to guarantee the quality of plant stock being used. Natural Area also employs a specialist seed collection team and manages a substantial seedbank in a purpose built facility for seed storage, sorting and administration.

### Key Services

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|----------------------|-----------------------|
| ▶ Plant propagation  | ▶ Seed processing     |
| ▶ Germination trials | ▶ Seedbank management |
| ▶ Seed collection    |                       |

## Natural Area: *Consulting*

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An integrated approach is provided to our clients on matters relating to environmental management, investigation, auditing and monitoring. Natural Area focuses on providing cost effective and efficient services, tailored to individual needs for the sustainable and effective management of our natural environment. Our dedicated team includes environmental scientists, consultants, botanists and biologists, all of whom are highly experienced in providing a comprehensive range of environmental services and advice.

### Key Services

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| ▶ Biodiversity planning & management including revegetation planning           | ▶ Environmental risk assessment  |
| ▶ Preparation of clearing permits and offset plans including approvals and EIA | ▶ Environmental site investigations including fauna survey, flora and vegetation survey and weed mapping |
| ▶ Environmental auditing, monitoring, sampling and analysis                    | ▶ Bushfire planning  |
|  | ▶ Fire fuel load management planning.  |
|  | ▶ Mining consultation  |

## Natural Area: *Management & Services*

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As a leading provider of environmental management and services, we undertake on-ground contracting work in bushlands, rivers, coastal dunes, wetlands and conservation areas. Our team has demonstrated results on a broad range of rehabilitation, restoration and revegetation projects and provide fast, efficient service so projects are delivered on time and within budget. Our reputation has been built on providing quality environmental outcomes for our Clients over the years, working closely with commercial and community based groups.

### Key Services

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| ▶ On-ground ecological restoration including revegetation, fencing and waste management | ▶ Feral animal control                                       |
| ▶ Weed control  | ▶ Fire fuel load reduction                                   |
| ▶ Erosion control including gabion installation and rock work                           | ▶ Native landscaping, soft and hard works.                   |
| ▶ Dieback treatment   | ▶ Revegetation planning                                      |
|   | ▶ Environmental education for community and corporate groups |

## Quality Policy

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Quality  
ISO 9001



Natural Area Holdings Pty Ltd is a leading provider of environmental consulting, management and restoration services to a range of government and non-government clients in Western Australia. We recognise the importance of providing quality goods and services to our customers to ensure our reputation as a leader in the industry. All business units are committed to providing quality service and outcomes on all our projects for all our customers by meeting and exceeding the requirements of AS/NZS ISO 9001:2008 quality management standard.

To achieve this, Natural Area will:

- ▶ Ensure customer enquiries are dealt with efficiently and by the relevant personnel with knowledge and expertise.
- ▶ Achieve, maintain and exceed a level of quality to the satisfaction of customers which builds our reputation as a leader in the industry.
- ▶ Provide the necessary training and inductions for all personnel and encourage them to seek out training opportunities to continue their professional development.
- ▶ Ensure all personnel understand the level of quality expected from them in the day-to-day operations of the business.
- ▶ Ensure quality management is discussed at management meetings.
- ▶ Regularly review the NAH Quality Management Plan and Standard Operating Procedures to incorporate efficiencies, changes to legislation and changes to customer needs and to demonstrate our commitment to quality.
- ▶ Maintain documents to ensure records are kept and available for reference.

## Environmental Policy

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Natural Area is a leading provider of environmental consulting, management and restoration services to a range of government and non-government clients. We recognise the importance of the need to preserve and enhance natural environmental values on which life depends. As our business is directly linked to the natural environment, all divisions are committed to protecting and enhancing the environmental values at all operational sites, including client sites.

Our environmental objectives are to:

- ▶ minimise environmental disturbance, particularly during on-ground field activities through the implementation of appropriate procedures and practices
- ▶ minimise the spread of pathogens, particularly *Phytophthora cinnamomi* (Dieback), through the adoption and implementation of appropriate hygiene measures on client sites and in the nursery
- ▶ maintain and implement appropriate contingency plans relating the transportation, storage and handling of chemicals used for weed and pest animal control
- ▶ comply with all relevant legal and other requirements the organisation needs to adhere to, including licensing requirements and relevant industry codes of practice
- ▶ carry out all business activities in a manner that ensures the efficient use of materials, energy and resources
- ▶ minimise the production of waste and other forms of pollution, including carbon emissions
- ▶ constantly strive to improve our environmental performance through the adoption of best practice techniques where appropriate and the ongoing training and informing all personnel and subcontractors of our environmental commitments
- ▶ ensure all personnel have the appropriate knowledge, training and competence to carry out all works whilst minimising potential adverse environmental impacts, including pollution.



## Occupational Health & Safety Policy

The management of Natural Area Holdings Pty Ltd recognises and accepts that it has a legal obligation to provide a safe work environment for its employees and any visitors to its site(s). We also recognise that occupational health and safety is the responsibility of all personnel within the organisation, including employees and management. Accordingly, our occupational health and safety program relies on a consultative and team approach for its ongoing success.

A risk assessment approach has been adopted, with the risks associated with each work task assessed to determine the potential for injury and accident, along with strategies that can be implemented with the aim of accident and injury prevention, hazard control, health preservation and promotion. Consultation occurs regularly with occupational health and safety representatives and employees.

As our employees are our most important asset, Natural Area commits to:

- ▶ continuing to consult with employees about health and safety matters within the workplace
- ▶ providing training on OHS matters as required
- ▶ ensuring all personnel have the appropriate information about work activities that have the potential to result in accident or injury
- ▶ provide PPE for situations where no alternative means for reducing risks is feasible
- ▶ regularly reviewing and assessing risks associated with workplace activities and applying appropriate strategies to reduce those risks as far as is practicable to do so
- ▶ providing a range of communication and consultation options to employees.



## Capability Work Statements

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- ▶ Flora and Vegetation Survey
- ▶ Fauna Survey
- ▶ Weed Mapping
- ▶ Sampling, Monitoring and Analysis
- ▶ Environmental Site Assessments
- ▶ Environmental Management Plans
- ▶ Biodiversity Planning and Management
- ▶ Bushfire Management
- ▶ Environmental Impact Assessment
- ▶ Environmental Permits
- ▶ Environmental Auditing & Risk Assessment
- ▶ Revegetation
- ▶ Ecological Restoration
- ▶ Erosion Control
- ▶ Gabion Cage Installation
- ▶ Weed Control
- ▶ Feral Animal Control
- ▶ Dieback Management
- ▶ Fencing Installation
- ▶ Fire Fuel Load Management
- ▶ Seed Collection
- ▶ Seed Management
- ▶ Nursery Services



## Flora and Vegetation Survey



Our capability in the area of flora and vegetation includes undertaking flora surveys in accordance with DPaW standards, identification of native and non-native species, vegetation type assessment, identification of Declared Rare Flora (DRF) and Priority and Threatened flora, vegetation condition mapping and weed mapping.

Flora surveys are often required for:

- ▶ environmental approval processes
- ▶ revegetation planning
- ▶ response to planning conditions
- ▶ determining species baseline and changes over time.

A typical flora survey will include:

- ▶ checking relevant databases such as FloraBase or reviewing DPaW records
- ▶ undertaking field visits and setting up survey quadrats according to the number of vegetation types present
- ▶ mapping flora and vegetation assemblages, cover and distribution
- ▶ reporting outcomes.

In order to plan for conservation and rehabilitation, it is necessary to know what the current vegetation condition is at a site. Vegetation condition is mapped and assessed on site using the Keighery method which was used for assessment during the Bush Forever surveys. Maps produced in the field

are processed and digitised for inclusion in final reports.

### ▶ City of Joondalup, Marmion Coastal Foreshore Reserve Flora and Vegetation Survey

Natural Area undertook a comprehensive flora and vegetation survey of the Marmion Coastal Foreshore Reserve, which included the identification of flora species, vegetation type and condition mapping as well as weed mapping. A fauna and incidental fungi survey was also carried out during the project.

### ▶ Stockland, Annual Flora Monitoring

In 2012, Natural Area carried out the annual flora survey in accordance with Environmental Protection Authority guidelines for flora surveys. Natural Area was required to review previous flora monitoring results, carry out the surveys along nominated transects, compare outcomes to previous results and prepare a report outlining the results.

### ▶ Titan Energy, Environment Plan, Exploration Drilling Program, Warradarge

Natural Area undertook a flora survey in preparation of an environment plan for Titan Energy. The purpose of the survey was to identify any flora listed under the Wildlife Conservation Act 1950 and the Environmental Protection and Biodiversity Conservation Act 1999. The aim was to satisfy the environmental approvals requirements associated with the installation of a series of test wells to ensure drilling would not affect nearby significant flora populations.



## Fauna Survey

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Knowledge of the natural environment and Western Australia's ecosystems enable a greater understanding when undertaking fauna surveys. Fauna and flora have a unique relationship and habitat knowledge allows a greater understanding of fauna species that may be present in an area. Natural Area can undertake fauna surveys over a range of sites and for a variety of reasons including level 1 and level 2 fauna surveys.

A level 1 fauna survey includes a desktop study to determine fauna assemblages present in an area. It also involves a site assessment to ground-truth the information obtained during the desktop study, provide habitat descriptions and opportunistic observations of any fauna present. A level 1 survey will provide an indication of whether or not a level 2 survey is required.

A level 2 fauna survey is a targeted survey for one or more species. A variety of sampling techniques are utilised including, trapping, spot lighting, camera trapping and analysis of as scats and tracks.

Fauna surveys undertaken by Natural Area can involve:

- ▶ obtaining relevant approvals, licences and permits including permission for entry from the relevant land manager

- ▶ identifying likely rare, endangered, threatened or priority species that may be present in or around the site
- ▶ a desktop study
- ▶ on-ground field sampling surveys
- ▶ collation of data and data input
- ▶ recording trapping sites, transects and locations where fauna was found using GPS and presenting information graphically via GIS.

### ▶ Stockland, Annual Bandicoot Monitoring

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Annual monitoring of the bandicoot population within the Vale subdivision was required as an environmental approval condition to determine the status of the population at the site. Monitoring involved setting out a series of Elliot traps in locations where bandicoots were known or expected. The population of bandicoots at the site is steadily increasing with mothers and young noted during most of the monitoring periods.

### ▶ City of Melville, Harry Sandon and Ken Hurst Park Fauna Survey

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Natural Area undertook fauna surveys in order to assess the current populations of fauna within Harry Sandon and Ken Hurst Reserves. These surveys were designed to confirm the presence or absence of species, identify species at risk of local or regional extinction, make recommendations for management and to update the City of Melville species' inventory. These surveys involved installing trap lines incorporating pitfall and funnel traps as well as undertaking opportunistic surveys at dawn and late evening.

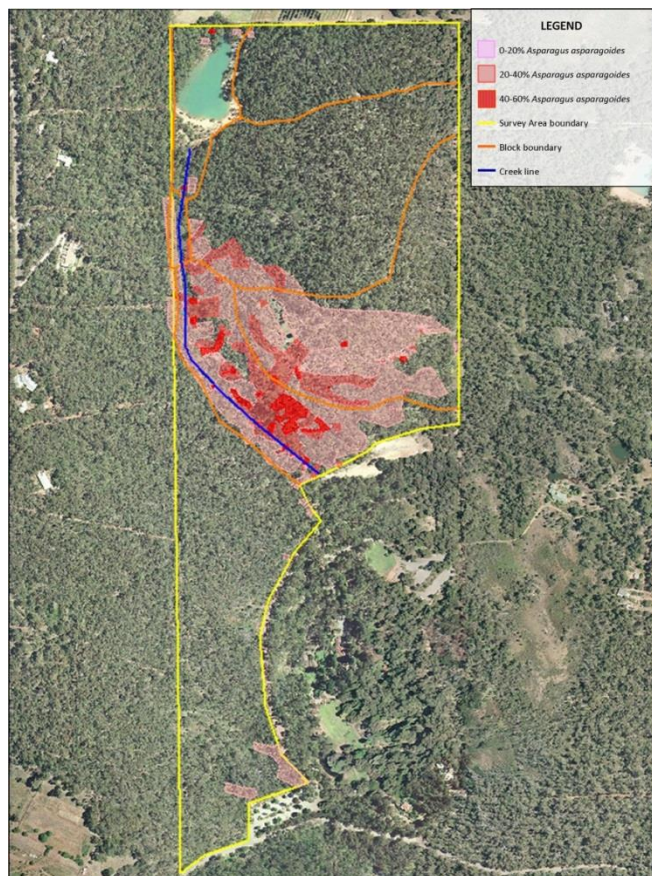
### ▶ Stockland, Kangaroo Aveley and Whiteman Edge Emu Population Management Monitoring

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Natural Area provided advice to the landowner relating to fauna management at the site as the land was planned for development for residential purposes. Natural Area undertook ongoing monitoring of the kangaroo and emu populations within the development boundary and liaised with DPaW regarding management options.



## Weed Mapping



Natural Area can undertake weed mapping across any type of site including coastal dunes, bushland, wetlands, foreshore areas, heath and shrubland. Our knowledge of weeds in WA is extensive due to our on-ground experience with natural area management works such as weed control and revegetation. Our personnel are highly experienced in the identification of all types of flora in WA (weed and native species) due to the experiences gained from working in the field. Identification skills are complemented by GIS and mapping skills.

Weed mapping work can be undertaken as a standalone project or as part of a larger project such as in the preparation of an environmental management plan. When undertaking weed mapping, the following activities are undertaken:

- ▶ familiarisation with the survey site using existing maps and online tools
- ▶ desktop study of the area including searching of online databases
- ▶ field survey to map the species, density and or distribution of a selected weed or a group of weeds
- ▶ preparation of geo-referenced maps in-house using GIS
- ▶ reporting on findings and summary of results including species lists
- ▶ recommended actions for weed control including treatment type and timing.

### ▶ Stockland, Aveley Weed Mapping

Natural Area undertook weed mapping at three reserves in Aveley for Stockland. All weeds within the three reserves were mapped using a handheld GPS unit. Grass and broadleaf weeds assigned a density rating from very low to high. Tree density was rated in relation to their relative maturity from very low to high also. A total of 56 different weed species were surveyed. A report provided details of the trends noted at each reserve, i.e. high density of weeds surveyed on reserve edges. A weed control treatment schedule and methodology were also provided to the client.

### ▶ City of Melville, Bateman Reserve and Brockman Park Weed Mapping

Natural Area undertook weed mapping at two bushland reserves located within the City of Melville. The works included mapping all weeds at both sites using handheld GPS, preparation of a summary report to detail the methodology and limitations of the survey, a summary of the weed infestations and provision of shape files and metadata to the client.

### ▶ City of Rockingham, Foreshore Assessment Report

Natural Area were appointed by the City of Rockingham to undertake various environmental site assessments to contribute to a review of the 2001 Foreshore Management Strategy. Natural Area undertook a weed survey of the entire Rockingham foreshore area (approx. 25 km) and mapped species present and density. A total of 59 weed species were surveyed, including 2 priority weeds. All weeds were rated according to the Invasive Plant Prioritisation Process for Department of Environment & Conservation (now DPaW).

## Sampling, Monitoring and Analysis

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Monitoring of revegetation works is usually carried out as a requirement of an associated revegetation plan. Monitoring programs are based on success criteria and targets that are established during revegetation planning, and will generally include photo monitoring and monitoring of permanent quadrats and transects marked out with GPS; recording species numbers, survival and diversity. Natural Area can monitor all aspects of ecological restoration projects including species richness, cover, health and condition, and percentage survival to determine if success criteria have been met.

Baseline and ongoing sampling activities can provide a useful indication of environmental health and condition. The sampling of groundwater, surface waters, and soil can reveal the presence of contaminants that need to be managed or can demonstrate the success of management activities.

Natural Area can collect representative samples from appropriate field locations in accordance with requirements of relevant Australian Standards, such as AS/NZS 5667.1.1998 – Water Quality Sampling.

Samples collected by Natural Area are stored and transported to NATA-accredited laboratories for analysis where required.

When results are received, they are compared with appropriate guideline documents for interpretation and implications for the project. Typical guideline documents include the ANZECC (2000) Fresh and Marine Water Quality Guidelines and the Assessment Levels for Soil, Sediment and Water published by the Department of Environment and Conservation (2010). A report outlining the results and implications, including any recommendations for further sampling is provided to the client.

### ► Rehoboth Christian College, Surface Water Monitoring

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As part of annual compliance reporting, Natural Area undertakes yearly surface water monitoring within the Conservation Category Wetland at the site as well as quarterly groundwater sampling from bores located in the immediate vicinity of the wetland. The wetland is adjacent to Brixton Street Wetlands in Kenwick and supports two Threatened Ecological Communities.

### ► Stockland, Annual Flora Monitoring

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In 2012, Natural Area carried out the annual flora survey in accordance with Environmental Protection Authority guidelines for flora surveys. Natural Area was required to review previous flora monitoring results, carry out the surveys along nominated transects, compare outcomes to previous results and prepare a report outlining the results.

### ► Town of Claremont, McKenzie Bush Soil Sampling

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The vegetation in McKenzie Bushland was showing signs of stress from an unknown cause. Soil sampling around affected vegetation was carried out to assist with identifying the cause. Natural Area had the samples tested and made suggestions to the client on appropriate management strategies.



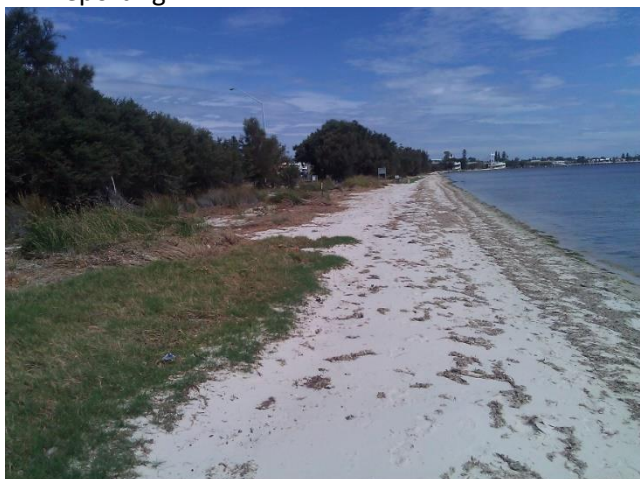
## Environmental Site Assessments

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Environmental site assessments can be undertaken for a wide variety of reasons and can be basic or complex from investigating plant species present to investigating flora, fauna, geology, hydrology, soils, groundwater, contamination and how all these factors interact. Environmental site assessments involve the following:

- ▶ desktop study of available literature, online databases and reports to gain a background understanding of the site
- ▶ field investigations including sampling if necessary
- ▶ formal field surveys including flora and fauna surveys which may require establishing quadrats, transects or photo monitoring points
- ▶ mapping features using GIS
- ▶ reporting.



### ▶ City of Joondalup, Marmion Coastal Foreshore Reserve Flora and Vegetation Survey

Natural Area undertook a comprehensive flora and vegetation survey of the Marmion Coastal Foreshore Reserve, which included the identification of flora species present, vegetation type and condition mapping and weed mapping of the 2.8 ha site. A fauna and incidental fungi survey was also carried out during the project.

### ▶ City of Rockingham, Foreshore Reserve Site Assessment

Natural Area were appointed by the City of Rockingham to undertake various environmental site assessments to contribute to a review of the 2001 Foreshore Management Strategy. The work included a flora and vegetation survey including identification of floristic species, vegetation type and condition and a weed survey of the entire foreshore area (approx. 25km) and mapping of species present and density. The information gained through the site assessments was used by the City of Rockingham to update their Foreshore Management Strategy.

### ▶ DPaW, Milyu Nature Reserve Revegetation Plan

Natural Area prepared a five year revegetation plan for the Milyu Nature Reserve, an A class reserve in the Swan Estuary Marine Park. The project included undertaking detailed site assessments to determine existing flora and vegetation composition, weed mapping, levels of erosion, bird usage of the area.



## Environmental Management Plans

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Natural Area has a broad capability in terms of preparing environmental management plans including:

- ▶ revegetation plans
- ▶ bushland management plans
- ▶ wetland management plans
- ▶ urban water management plans.

The area of revegetation planning is considered a specialty due to our extensive experience with on ground environmental works and practical hands on experience in the field, working closely with clients, environmental agencies (DPaW) and contractors. Our capability with environmental management plans extends to preparing plans in line with specifications and requirements established by the client, DPaW and local government - particularly when preparing plans for land developments. Importantly, Natural Area is able to develop realistic monitoring programs to assess environmental works as it progresses. Monitoring programs are based on success criteria and targets that are established during the planning phase.

Natural Area undertake the following when preparing environmental management plans:

- ▶ detailed site assessment including inventory of flora, fauna, fungi, soils and geomorphology
- ▶ review of relevant documents such as current local and regional management plans, guidance and position statements and management guidelines

- ▶ liaison with relevant local government authorities and government departments
- ▶ analysis of desktop studies and field studies
- ▶ prescribe management options or actions which are practical and feasible with measurable success criteria
- ▶ provide detailed works schedules and costings for implementation
- ▶ preparation of draft documents for review by client and other stakeholders
- ▶ incorporate comments, feedback and any changes requested by the client.

### ▶ DPaW, Milyu Nature Reserve Revegetation Plan

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Natural Area prepared a five year revegetation plan for the Milyu Nature Reserve, an A class reserve in the Swan Estuary Marine Park. The project included undertaking detailed site assessments to determine existing flora and vegetation composition, weed mapping, provision of specific restoration guidelines including species planting lists for planting zones, outlining erosion control measures, providing a detailed work plan for the five year period and providing an indicative budget for the works described. The plan was accepted in 2013, with the client planning to implement the plan over the next five years.

### ▶ Vasse Property, Conservation Area Management Plan

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Natural Area developed a Conservation Area Management Plan for a subdivision near Busselton that included an onsite-offset program for the enhancement of habitat and food sources for Carnaby's, Baudin's and Red-tailed black cockatoos. The plan described management actions to two areas at the site including weed control, revegetation, feral animal control, bushfire prevention and erosion control.

### ▶ City of Gosnells, Nicholson Road Revegetation Plan

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Natural Area prepared a revegetation plan for the City of Gosnells to offset loss of vegetation-associated with the widening of Nicholson Road. The project involved an initial site assessment to compile a revegetation species list for a dry land transitional and wetland planting zones.

## Biodiversity Planning and Management

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Natural Area have the capability to develop, review and implement various types of environmental management plans. This capability stems from many years of practical hands on experience in the field, working closely with clients, environmental agencies and contractors. Our capability in developing environmental management plans extends to preparing and reviewing management plans in line with specifications and requirements established by the client and or DPaW, implementing plans or managing contractors and monitoring and reporting.

Natural Area can prepare the following type of management plans:

- ▶ urban water management plan
- ▶ restoration management plan
- ▶ revegetation management plan
- ▶ fire management plan
- ▶ rehabilitation management plan
- ▶ wetland management plan
- ▶ fauna recover management plan
- ▶ coastal management plan.

Natural Area typically undertakes the following when preparing and reviewing management plans:

- ▶ detailed site assessment including inventory of flora, fauna and vegetation
- ▶ a review of relevant documents such as current regional management plans, guidance and position statements issued by the EPA and any management guidelines issued by DPaW
- ▶ client liaison at all stages
- ▶ liaison with relevant local government authorities and government departments
- ▶ risk assessments
- ▶ mapping
- ▶ preparation of draft documents for review by client and other stakeholders.

The general aim of any management plan is to describe the current site conditions, prescribe management actions with measurable criteria, and stipulate a timeframe for the management plan to be implemented.

### ▶ City of Stirling, Star Swamp Reserve Environmental Management Plan

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Natural Area prepared the Star Swamp Reserve Environmental Management Plan for the City of Stirling in 2013. The reserve, comprising almost 100 ha was surveyed for flora, fauna and vegetation complexes. The purpose of the plan was to review and document the current site conditions to guide ongoing management of the site for the conservation of flora and fauna whilst still allowing appropriate passive recreation.

### ▶ City of Joondalup, Marmion Coastal Foreshore Reserve Management Plan

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Natural Area prepared the Marmion Coastal Foreshore Reserve Management Plan for the City of Joondalup. The plan identified management strategies to assist the City with ongoing management of the site for 5 years from 2013 whilst maintaining the environmental and recreational values of the area. The objectives of the plan were to establish baseline descriptions of the environment to guide future environmental planning and management actions. Prior to developing the management plan, Natural Area undertook extensive flora, fauna and fungi surveys of the area to identify the ecological values of the site.

## Bushfire Management

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Natural Area provides a range of services relating to fire management for clients including local and state government agencies, planners and property developers. Natural Area's knowledge of the natural environment and Western Australia's ecosystems enable a greater understanding when preparing fire management plans and undertaking fire hazard, fuel load and risk assessments. With increasing capability in this area, Natural Area consider fire management to be an area of speciality.

The preparation of a fire management plan involves assessing the fire risk posed by vegetation in proximity to proposed or current developments and assigning appropriate bush fire attack levels (BAL) that influence building construction standards that will assist with reducing the risk to an acceptable level. Typical activities involved with preparing a fire management plan include:

- ▶ determining appropriate bushfire protection performance criteria and acceptable solutions for the proposed subdivision, taking into consideration the location, siting and design of the development, access to, from and within the development, and water available for firefighting purposes
  - ▶ liaising with various stakeholders, including local government fire control officers
  - ▶ preparing a fire management plan for endorsement by the local government authority.
- Bushfire management plans are prepared in accordance with the Planning for Bush Fire Protection Guidelines prepared by the Western Australian Planning Commission, the Department of Planning, the Fire and Emergency Services Authority and AS 3959 – 2009 Construction of Buildings in Bushfire Prone Areas. Visual or quantitative fire fuel load and risk assessments are carried out using the guidelines and tables to determine the fire fuel load present in tonnes per hectares. A field fire hazard assessment can be applied to determine the potential level of risk to nearby buildings and infrastructure and assist with determining management priorities for a particular site.
- ▶ City of Canning, Fire Fuel Load Assessments  
Several reserves within the City of Canning were assessed based on aspects such as fire fuel material including depth of leaf litter and bark hanging from trees. Vegetation type and community characteristics were also considered.
  - ▶ Department of Housing, Fire Management Golden Bay  
Natural Area prepared fire management plans to serve as overarching documents to guide the design and layout of the development. The plans covered preliminary BAL's and associated construction standards, the location of strategic fire breaks and emergency access ways whilst also recognising that detailed design work in the future will result in the reassessment of fire management requirements.



## Environmental Impact Assessment

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Natural Area has a broad capability in the area of environmental approvals and impact assessment and can assist with all aspects of work from coordinating baseline studies to preparing and submitting regulatory documents for approval by relevant authorities. We can consult with large mining companies on large-scale projects and individual landowners on smaller, local projects.

Natural Area can undertake the following:

- ▶ provide advice to clients in relation to environmental regulations specific to their projects and discuss the best strategy for seeking relevant approvals for work
- ▶ preparation of regulatory documents for submission to authorities, including proposals for mining, drilling, boring, clearing, environmental scoping documents and environmental referral documents
- ▶ preparation of formal Environmental Impact Assessment (EIA) documentation and liaison with the Department of Environment
- ▶ on-ground baseline surveys including flora and fauna, groundwater, and soil assessments.



### ▶ Downer EDI Works, Licence Amendment, Newman Asphalt Plant

Natural Area carried out an environmental site assessment at the Newman Asphalt Plant site for Downer EDI to support an amendment to their works approval licence. The Department of Environment & Conservation under Part V of the Environmental Protection Act 1986 issued the licence and the amendment was required due to an increase in production at the site. The amendment was granted in 2013 and production at the site increased by 50%.

### ▶ Titan Energy, Exploration Drilling Program, Warradarge Environmental Plan

Natural Area prepared an environmental plan for Titan Energy's exploration drilling program at Warradarge. The plan outlined how environmental impacts would be managed during the drilling of two petroleum exploration wells near Eneabba. The plan was required to satisfy WA petroleum legislation including the Western Australian Petroleum and Geothermal Energy Resources Act 1967 and the Petroleum (Environment) Regulations 2012. The plan was approved in early 2013.



## Environmental Permits

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Vegetation offsets involve the rehabilitation of an area to offset the clearing of native vegetation. Clearing permits are issued by the Department of Parks and Wildlife (DPaW). Natural Area have a broad capability in the area of vegetation offsets which includes the preparation of clearing permits, offset proposals and the preparation and implementation of offset site management plans. This capability stems from many years of practical hands on experience in the field, working closely with clients, environmental agencies and contractors. The preparation of vegetation offset proposals are undertaken in line with the specifications provided by the Client and DPaW to ensure successful project outcomes.

Works associated with the preparation of vegetation offset proposals and associated revegetation management plans include the following:

- ▶ detailed site assessments including flora and fauna surveys
- ▶ desktop studies and review of relevant documents such as guidance and position statements issued by EPA and management guidelines issued by DPaW
- ▶ review of revegetation specifications
- ▶ client liaison at all stages
- ▶ preparation of draft documents for review by client and other stakeholders

- ▶ reviewing the draft document to incorporate comments, feedback and any changes requested by the client.

### ▶ Telstra PITC, Vegetation Offset Packages

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Natural Area has been involved with vegetation offset programs for Telstra since 2008, producing several offset proposals, implementing on-ground works, undertaking monitoring and reporting outcomes to the client and DPaW. Through this process, more than 5 ha of land at the site has been restored to a similar or better condition than that of the surrounding bushland. This is mostly attributed to good planning and monitoring.

### ▶ Vasse Property, Conservation Area Management Plan

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Natural Area developed a Conservation Area Management Plan for a subdivision near Busselton that included an onsite offset program for the enhancement of habitat and food sources for Carnaby's, Baudin's and Red-tailed black cockatoos.

### ▶ Department of Finance, Busselton Health Campus and Tuart Forest Offset

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An offset program was required at the Busselton Health Campus as part of the redevelopment of the site due to the removal of peppermint trees and loss of Western Ring-tailed possum habitat. Natural Area were involved in preparing the offset and obtaining relevant approvals. An area of old pine plantation will be replanted to meet Ring-tailed possum habitat requirements.





## Environmental Auditing & Risk Assessment

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Environmental risk assessment involves assessing the relative risk of a certain threat to a specific environmental factor to aid decision makers with approvals and licences. Natural Area can undertake environmental risk assessments as standalone projects or as part of a larger project such as in Environmental Impact Assessment (EIA) or in the preparation of environmental management plans.

Environmental auditing is the process whereby compliance with environmental management systems are evaluated to ascertain if the proponent has undertaken the environmental actions and requirements outlined by the environmental management system. Natural Area can undertake compliance audits and management system audits for all types of clients. The auditing process involves reviewing the relevant management system, determining the environmental actions that are outlined and then determining if those actions have been undertaken.

Natural Area have undertaken environmental risk assessments as part of the preparation of various environmental management plans where the aim is to determine what action needs to be taken to minimise or eliminate the risk. Risk assessments are generally undertaken as part of the preparation of fire management plans where the threat of fire is obvious. Risk assessment in fire management is a three-step process:

1. Identify and document the potential risks and impacts associated with the occurrence of fire at the site
2. Qualitatively ranking the potential environmental impacts to establish relative significance
3. Establishing and documenting control measures to mitigate against potentially significant impacts.

Risk ranking is undertaken by assigning numeric likelihood and consequence levels to each identified risk issue. Once the level of risk has been determined, risks can be prioritised. For all significant risks, control strategies are established to ensure that the adequate controls are implemented.

### ► Department of Housing, Fire Management Plan

Natural Area prepared a fire management plan for a subdivision at Golden Bay for the Department of Housing. The plan was required to support environmental and planning approval processes. In part of the preparation of the plan, Natural Area undertook a risk assessment and identified seven risks with varying risk levels. Management strategies were prescribed to eliminate and or mitigate these risks.

### ► Titan Energy, Environment Plan, Exploration Drilling Program, Warradarge

Natural Area prepared an environmental plan for Titan Energy's exploration drilling program at Warradarge. The plan outlined how environmental impacts would be managed during the drilling of two petroleum exploration wells near Eneabba. The plan was required to satisfy WA petroleum legislation including the Western Australian Petroleum and Geothermal Energy Resources Act 1967 and the Petroleum (Environment) Regulations 2012. The plan was approved in early 2013. In preparation of the plan, Natural Area identified over 40 environmental risks through the risk assessment process, with risk mitigation strategies; the risk levels were considerable reduced for all risks

## Revegetation

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Revegetation can be a component of a large ecological restoration project or can be a once off, standalone activity. In either situation, Natural Area has the ability to provide an experienced planting team, tools and equipment, planting aids including plant guards, fertiliser and Terracottem® as well as plant stock. Our planting teams are trained and knowledgeable about Perth endemic flora species, which means the right plant positioning and density can be achieved if not provided by the client in detailed specifications.

Natural Area have undertaken revegetation projects for many clients over the past 10 years. This has included small scale planting (100 plants) to large scale planting (+50,000 plants). We have gained experience working over a variety of terrains and environments including coastal dunes, wetlands, bushlands, hills areas, parklands, median strips and gardens.

Natural Area can provide competitive hourly or per plant rate for planting, no project is too big or too small. Additionally, Natural Area can provide advice on species selection and are able to supply over 300 species of native plants through our accredited plant nursery.



### ► Watermark Enterprises, Dawesville Coastal Revegetation

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Natural Area was contracted by Watermark Enterprises, a small property developer, to revegetate several pockets of coastal dune vegetation that were cleared as part of a sewer line installation for a new housing estate. The on-ground works included site assessments, seed collection, plant salvage, plant production, dune stabilisation, revegetation, fencing, weed control and ongoing site maintenance for two years. Natural Area installed 7,500 native plants at the site over a two year period. The works were completed with the best possible outcome for the client and the environment; plant density and cover were nearing that of the surrounding vegetation at completion of the project due to appropriate species selection, the use of high quality plant stock and ongoing site maintenance.

### ► City of Wanneroo, Planting and Maintenance Contract

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Natural Area were contracted in 2012 and 2013 by the City of Wanneroo to undertake planting and maintenance works across five sites ranging in size from less than one hectare to over 50 ha. The planting component of the contract included annual planting at each reserve; 100,000 in 2012 and 65,000 in 2013. Planting requirements were different for each reserve i.e. the need for fertiliser, tree guards and watering. Natural Area was supplied with planting plans for each site and needed to coordinate delivery of all plants from the City's supplier over a six-week period to ensure all works was completed on time.





## Ecological Restoration

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Ecological restoration encompasses revegetation, rehabilitation and restoration of natural areas. Every year, Natural Area is involved in projects throughout the Perth Metropolitan Region and surrounds which include one or all elements of ecological restoration. The difference between the elements is important and reflected in customer objectives and goals. These types of projects usually involve the following key aspects:

► **Planning**

Planning involves the development of an ecological restoration plan. Natural Area are able to prepare these plans to meet standards defined by statutory bodies including the Department of Parks & Wildlife and the Swan River Trust. Having been involved with the implementation of many different plans, Natural Area understands the importance of having a holistic, practical, prescriptive, adaptable and fully costed plan. Our plans include management actions with monitoring actions to help determine the effectiveness of a plan once implemented according to the predefined success criteria.

► **Procurement of materials, resources and provenance plants**

Prior to the implementation of any management plan, there is always a requirement to procure certain materials and resources, particularly local provenance plants. Natural Area operates a native plant nursery in Whiteman and is able to grow

provenance plants specifically for projects if given enough lead-time. Other materials such as Jute Mat, coir mesh, plant guards, native fertiliser etc. that may be required are available from our warehouse operated by Envirowest Distributors

► **Implementation**

Natural Area employ the largest, full-time, paid, environmental field crew team in Perth. All our personnel have qualifications from TAFE or University and are trained by experts in the field. Our team include licenced herbicide technicians, licenced seed collectors, licenced 1080 technicians and operators who are trained and accredited in the use of small and large motors equipment. This combined experience means that Natural Area are able to implement projects on any scale. The various works required as part of a revegetation projects that Natural Area are able to undertake in-house could include:

- site preparation, manual or mechanical ripping, tilling, topsoiling
- weed control (herbicide or manual), initial and follow-up throughout the duration of the project
- native planting, using various planting aids, fertiliser, TerraCottem®
- feral animal control
- fencing
- site watering
- erosion control.

► **Monitoring & Reporting**

Ecological restoration projects usually involve a monitoring and reporting component as a means of evaluating the outcomes and success of the project. Natural Area are able to monitor sites using standard methodologies and report on the outcome of a project in quantitative and qualitative terms. Natural Area are then able to make recommendations on what additional works may be required to ensure any set completion criteria are met.

► **Plan E, Latitude 32 Restoration**

Natural Area began implementing the Wetland and Bushland Management Plan for the Latitude 32 parks and reserves in 2012. On-ground environmental restoration works included large-scale weed control to revegetation zones.

## Ecological Restoration

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### ► Western Power, Wanneroo Road Bushland Restoration

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Natural Area was contracted by Western Power in 2010 to undertake rehabilitation works over this six hectares site. Initial works included mechanical removal of woody weeds, site scalping and ripping, fence installation and rabbit control. DPaW (then DEC) organised to translocate topsoil from nearby Banksia woodland to the restoration site. This was undertaken on the assumption that the topsoil would provide native germinants and add to the diversity of the revegetated site. However, there was a low rate of native species germination and a high rate of weed species germination, in particular Castor Oil and Lupin. The translocation of topsoil and increased disturbance at the site also saw the establishment of new weeds species that had not previously been recorded. Natural Area implemented a highly successful, targeted and intensive weed control program over a two-year period, reducing the weed coverage to less than 10%. Revegetation planting started in 2011 and more than 50,000 seedlings were installed over a two-year period; most of these being protected with tree guards due to rabbit activity at the site. *Jacksonia seriata*, a Priority 4 species was also planted at the site and has established well.

After the high weed abundance was successfully controlled, revegetation at the site was very successful; monitoring data shows native species diversity increasing from 1 to 21 (since 2010) and weed species richness decreasing from 23 to 11 (since 2010). Weed coverage has decreased across the site and woody weeds are no longer present.

### ► Plan E, Cygnia Cove Restoration

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Natural Area was contracted to undertake restoration works along the foreshore and within a constructed wetland adjacent to a housing development. The wetland was constructed specifically as a swan breeding and habitat ground and required intensive revegetation using native sedges, rushes and shrubs. The foreshore area extended the length of the development and required revegetation and weed control.

Construction of the wetland began in January 2011 and included placement of large limestone boulders for amenity and habitat, site preparation and levelling, import of clean fill and grading of batters. Initial planting was undertaken in February 2011 in the riparian zone of the wetland. Temporary fencing was installed along the foreshore area to deter public access whilst revegetation plants were establishing. A permanent fence was installed around the wetland to provide a secure breeding ground for the swans, safe from foxes and dogs.

Major revegetation works were undertaken in winter 2011 with 40,000 tubestock being planted throughout the site; Natural Area propagated and supplied all tubestock for this project. Follow-up planting was undertaken in winter 2012.

Supplementary to this project, Natural Area also undertook extensive transplanting of wetland sedges from one wetland to another on the site as the former was marked for dewatering.

This project won an award for Land Management in relation to the treatment of the foreshore reserve, retained wetland and constructed wetlands from the Australian Institute of Landscape Architecture WA.



## Erosion Control

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Erosion can be a serious issue throughout various landscapes and environments, threatening infrastructure and vegetation, particularly in coastal and riverine environments along the Swan and Canning Rivers. Every year, Natural Area are involved with various types of erosion control projects and are well placed to offer general advice on site or detailed site-specific plans, complete with detailed drawings and engineering certifications if required. The type of erosion control required is always site specific and could include one or more of the techniques listed below.

### ► Brush mattressing

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A bioengineering approach, proven to mitigate erosion when installed correctly. The technique is suited for use on low gradient sites where the aim is to mitigate bank erosion and re-establish riparian vegetation. Natural Area has undertaken various erosion control projects using this technique and has developed efficiencies with the installation.

#### ► **Project: Point Walter Foreshore Restoration**

Natural Area installed brush mattressing to two separate areas along the foreshore at Point Walter Reserve. The first area was subject to strong tidal fluctuations causing large amount of sediment loss that meant that vegetation could not establish. A mattress was installed in an 'L' shape to function as a garden bed and trap sediments to facilitate plant establishment. In the second area, brush mattress was installed to approximately 20 linear meters of

foreshore, again functioning as a garden bed and sediment trap to allow vegetation to establish. Vegetation in both these areas is thriving and a marked difference was noted after the first winter.

### ► Coir logs

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Coir logs are biodegradable 'logs' made from the same material as coir mesh. Coir logs provide a toe protection on slight to moderate slopes and offer protection to establishing vegetation from tidal and boat wash. Placement and method of securing are key factors that will affect the effectiveness and longevity of the logs.

### ► Erosion control matting

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Erosion control matting is a broad term that includes various grades on synthetic materials (geotextile) as well as biodegradable products such as coir mesh and Jute Master®. Suitable application areas include embankments, drains and coastal dunes. Considerations with erosion control matting include the type of securing and anchoring methodology used. Natural Area can provide advice and full costings for all types of erosion control matting.

#### ► **Project: Daddow Road Embankment**

Natural Area installed 3,500 m<sup>2</sup> of jute mat (equivalent to 70 rolls) on the Daddow Road embankment. The embankment was created during the construction of the Daddow Road overpass and was at risk of serious erosion due to the steep gradient of the site and run-off from the road. The works involved using fall arrest equipment (due to the height and site gradient), as well as traffic management due to the proximity of the site to a major road.

## Erosion Control

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► Rock revetments & treatments

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Limestone rock can be incorporated into other erosion control techniques or used as an independent solution on many sites. Typically, limestone rock is used to form a revetment on steep, highly eroded sites where the protection of the bank and prevention of loss of soil and trees is the primary objective. Limestone can also be used to create large groynes or small rock toes. Natural Area have undertaken many projects along the Swan and Canning rivers using limestone rock and are familiar with the work permit requirements from governing bodies so projects are undertaken smoothly and according to schedule.

► **Project: Point Walter Reserve (Zone 1)**

Natural Area provided advice and plans to the City of Melville regarding a steep embankment at Point Walter Reserve. The embankment was highly eroded; there was a serious risk that further erosion would threaten the integrity of the adjoining road. The plan involved refilling the embankment with approximately 140 tonnes of sand and then protecting the embankment at the toe using 80 tonne of rock armour (600 mm - 1000 mm in diameter). An excavator and loader were required to complete the works, which were challenging due to the steep site gradient and inundation of the toe area. The embankment was revegetated with great success.

► Geosynthetic Sand Containers (GSC's)

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GSC's are commonly referred to as 'sand-bags' and are generally larger and longer-lived than traditional hessian sand bags. GSC's can be custom made by Natural Area to suit any application. The bags are made from heavy grade geotextile and individually stitched. Bags are generally filled with sand, sealed on site and then manoeuvred into position using heavy machinery; smaller bags can be moved by hand.

## Gabion Cage Installation



Gabion baskets and mattresses are manufactured from galvanised steel and are available in a variety of shapes and sizes, including varying wire thickness, wire type and aperture size. This means that gabion baskets can be custom built to suit any site. Gabion baskets are considered a hard-engineering approach to erosion control and are primarily used along the river in similar situations to river walls. Natural Area can design, supply and install gabion baskets for a variety of purposes.

### ► **Project: Point Walter Foreshore Restoration**

Natural Area installed brush matting to two separate areas along the foreshore at Point Walter Reserve. The first area was subject to strong tidal fluctuations causing large amount of sediment loss that meant that vegetation could not establish. A mattress was installed in an 'L' shape to function as a garden bed and trap sediments to facilitate plant establishment. In the second area, brush mattress was installed to approximately 20 linear meters of foreshore, again functioning as a garden bed and sediment trap to allow vegetation to establish. Vegetation in both these areas is thriving and a marked difference was noted after the first winter.



### ► **Project: Helm St, City of Melville**

The scope of works covered under this contract included works detailed on the design drawings and in technical specifications, including the following main items:

- Site preparation;
- Traffic Management;
- Site clean-up and removal of existing structures which interfere with new design;
- Construction of new foreshore protection including seedling planting;
- Reinstatement of the cycle pathway; and
- Maintain the structure, topsoil and vegetation for a period of 12 months starting from practical completion.

A major component of the works included the installation of gabion mattresses and a gabion wall structure, with limestone armour rock tie-ins, backfill, geocell and revegetation planting. Tides were challenging at this site due to the weather at the time of works occurring. The Natural Area works team overcame this issue by undertaking works at optimum times to take advantage of low tide, as well as the use of waders and other waterproof equipment to ensure required project outcomes were met.





## Gabion Cage Installation



► **Project: Walters Brook, City of Vincent**

Natural Area was contracted by the City of Vincent to design and implement the restoration of Walter's Brook, a Water Corporation open drain which flows through Banks Reserve, Mt Lawley, to the Swan River. Design involved surveys and mapping along with the preparation of plans. Liaison with stakeholders including the Swan River Trust, DPAW, DER and ATCO Gas. Implementation works begun in January 2014 and included recontouring of the banks to reduce the gradient, straightening of the channel and the installation of Gabion mattresses/cages to protect an area susceptible to erosion, scraping of the drain channel, installation of native tubestock, installation of rock rip rap, rock revetments and site fencing.



► **Project: HBF Stadium, MG Group**

Gabion cages was constructed as according to plans provided by MG Group. Natural Area supplied all materials (limestone, cages, c-ring clips, geotextile) and labour.





## Weed Control

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Invasive weed species are a serious issue throughout Western Australian's natural areas. Weed species out-compete natives, replace food sources of native fauna, alter the composition of natural habitats, potentially increase fire fuel loads and can dramatically affect the aesthetics of an area.

Natural Area are weed control specialists and have built a reputation on providing successful outcomes for customers and the environment since 2003. With over 10 years' of experience in the industry, Natural Area have been involved in numerous weed control projects for almost every local council in the Perth Metropolitan Region.

Weed control works are undertaken as a standalone service or as part of a larger ecological restoration project. In our experience, weed control is a key component to achieving successful outcomes in restoration works.

Natural Area employs at least 20 full time herbicide technicians year round, with additional personnel employed throughout the peak herbicide treatment period (winter) to meet seasonal contract requirements. All personnel undergo comprehensive training and are licenced by the Department of Health. Operating out of a north and

south depot, the vehicle fleet of motorised spray units can service the whole Perth Metropolitan Region with the capability to undertake regional works. Natural Area can supply and provide advice on all types of herbicides used in natural areas, particularly those that are safe for use around water bodies.

Natural Area implements stringent occupational, health, safety and environment policies and procedures and are fully insured. Our personnel are knowledgeable in the weeds they are treating and the herbicides they are using. Weed control should only be undertaken by a licenced and experienced operator.

### ► City of Stirling, Bushland Weed Control 2011 - 2013

Natural Area have been contracted by the City of Stirling since 2011 to control various weeds throughout various reserves within the municipality. This has included weed control for Typha, geophytes, annual weeds, perennial weeds and woody weeds e.g. Japanese Pepper. A large part of the contract has involved treating grass weeds throughout some of the more prominent reserves including Star Swamp and Lake Gwelup. There has been a noticeable decline in grass weed coverage at these reserves, and treatments are ongoing to reduce weed coverage.

### ► City of Wanneroo, Bushland Planting and Maintenance

Natural Area have been contracted since 2012 by the City of Wanneroo to undertake planting and maintenance works across five sites ranging in size from less than one hectare to over 50 ha. The maintenance component of the contract includes monthly weed control over a 6-month period to all the sites. Natural Area are required to provide advice to the City in regards to the type of weed control required which could include grass weed control, woody weed control etc.

## Feral Animal Control



Feral animal control is often required as part of a holistic approach to environmental restoration. Feral animals such as rabbits, foxes and cats can cause widespread damage to ecosystems, predating on local native fauna and destroying revegetation works through digging and plant predation. If left unchecked, Kangaroo populations can also cause damage to revegetation works, particularly through predation on seedlings during early stages of development.

Natural Area have developed significant experience in the monitoring and control of feral animals within restoration areas, including:

- ▶ application of 1080 baits to control foxes and rabbits
- ▶ application of Pindone treated oats to control rabbits
- ▶ manual animal control to remove kangaroos from fenced revegetation areas.

Feral animal control is undertaken by suitably licenced personnel, adhering to all relevant government regulations.

### ▶ Telstra PITC, Fox and Rabbit Baiting Program

The Telstra Perth International Telecommunications Centre is located in Gnangara and is surrounded by almost 300 ha of native bushland. Natural Area personnel have been involved with restoration and maintenance works at this site since 2007, including the application of 1080 treated oats and baits to control fox and rabbit populations at the site. Treatment requires approval by the Department of Parks and Wildlife as well as signage being displayed around the perimeter fences prior to and following 1080 treatment.

### ▶ Western Power, Wanneroo Road Restoration

Licensed Natural Area personnel have been involved with the application of Pindone treated oats at the Wanneroo Road Restoration site since 2012. Treatment has seen rabbit predation of seedlings and disturbance to soils substantially decrease. Baits are required to be stored in vehicle mounted locked storage boxes for transport to and from sites, with the Department of Parks and Wildlife issuing Natural Area permits for these works as they are required.

### ▶ City of Bunbury, Somerville Drive Offset Site, Kangaroo removal

As part of revegetation works at the Somerville Drive Offset Site, Natural Area personnel were involved in the passive removal of kangaroos from fenced areas of the site. Fencing had been damaged in sections, enabling kangaroos to enter the revegetation area. Fencing was removed in sections, the animals were corralled out of the site, and fencing was re-instated. Once the damaged sections of fence had been repaired, this method worked effectively at controlling predation of seedlings by Kangaroos at the site.





## Dieback Management

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*Phytophthora cinnamomi* (Dieback) is a serious environmental issue throughout Western Australian natural areas. Dieback is an introduced fungal pathogen with a wide distribution in areas of south-west Western Australia. The fungus acts by infecting the root, absorbing the carbohydrates and nutrients from the plant and causing root rot. This diminishes the plants ability to absorb water and nutrients from the soil; infections leads to the death of the plant in most cases.

Over 40% of Western Australian native plants are susceptible to Dieback infection. Once an area of bushland becomes infected the susceptible plants die off, causing a decrease in biodiversity within the area and altering the vegetation structure. Native fauna species that are reliant on susceptible species for food or habitat are impacted and can become locally extinct.

Currently there is no method of eradicating Dieback; management methods and objectives are focused toward minimising the spread of the infection.

Natural Area has extensive experience in the area of Dieback management and has completed Dieback management work for several local government authorities and private landholders. Natural Area can provide a range of Dieback management services including:

- ▶ phosphite treatment through foliar spraying and stem injection
- ▶ construction of foot cleaning stations at bushland entry points to promote good hygiene and minimise the risk of infection into the bushland
- ▶ mapping and monitoring of Dieback infected areas
- ▶ preparation of Dieback management plans

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### ▶ City of Kwinana, Dieback Treatment

Natural Area undertook Dieback treatment throughout five reserves for the City of Kwinana in 2013. The works included foliage spraying and stem injections along buffer zones in the reserves.

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### ▶ City of Gosnells, Gosnells Golf Course Bushland Dieback Treatment

Natural Area undertook phosphite treatment within the Gosnells Golf Course bushland, a Bush Forever site approximately 3.3 ha in size. Some stem injection was carried out on larger trees in a selected pocket of the bushland.

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### ▶ City of Melville, Dieback Assessment and Treatment

Natural Area undertook Dieback assessments throughout nine City of Melville reserves in 2014, the total area surveyed was approximately 40 ha. The bushland within each reserve was assessed for general vegetation health, death of indicator species, age range of deaths and identification of vectors that could have introduced or contributed to the spread of the disease. Soil samples were taken at each reserve to confirm field observations. Using the information collected from field surveys and laboratory analysis of soil samples, Natural Area produced treatment maps, specified the treatment type and made recommendations to the City. The treatment recommendations were then implemented by Natural Area.

## Fencing Installation

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Fencing can be required for a number of reasons within ecological restoration project including protection of a restoration site from public access, exclusion of unwanted pests such as kangaroos or rabbits, and delineation of accessible and non-accessible areas.

Natural Area has gained practical, hands on experience with installing various types of fencing as part of restoration projects and as standalone activities. We can provide advice and specifications for fence types to suit specific requirements, or draw on information in detailed plans to cost a fencing project. The following types of fencing available for supply and installation:

- ▶ ringlock and star picket, a cost effective and practical solution, often used as temporary fencing whilst vegetation establishment occurs
- ▶ PVC chain link with galvanised tubes, often used in parks and gardens, can be provided in a range of heights with access gates
- ▶ pine post, ringlock and wire, commonly known as 'conservation' style fencing, this can be found at many Local Government bushland reserves
- ▶ rural fencing
- ▶ rabbit/kangaroo proof fence, utilises several methods such as trenched mini-mesh or 1.8 m ringlock with outward facing top angle
- ▶ stocklock and Galstar posts, a unique new style of fencing product which are supplied in kit form.

Fencing works require an understanding of the terrain and knowledge of the mechanics of the type of fencing being installed. Natural Area work closely with reputable fence supplier to ensure the best price for materials can be passed on to our Clients.

### ▶ City of Melville, Point Walter Reserve

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As part of the Point Walter foreshore restoration works, Natural Area installed temporary and permanent fencing at the site. The temporary fencing consisted of Waratah Stocklock (7/90/30) and Galstar Extreme posts. The overall height of the fence was 1.1 m; posts were installed at 4 m centres. This fence was constructed to temporarily protect revegetation areas. The permanent fencing consisted of Waratah Stocklock (7/90/30) and pine posts. Height and spacing were same as the temporary fence. The permanent fence was constructed to delineate the foreshore bushland area from an adjoining footpath.

### ▶ Plan E, Latitude 32

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Natural Area installed almost 3 km of fencing at the Latitude 32 revegetation site. The fence consisted of galvanised Ringlock (7/90/30) with galvanised steel pickets used as intermediates and strainer boxes made from pine posts every 200 m. Several 'farm' gates were installed to enable service vehicle access, as well as several 'kissing gates' to act as pedestrian access points to pathways extending through the bushland reserve. Natural Area also designed and constructed two 'chicane' entrances to allow for bicycles and pedestrians with reduced mobility, whilst preventing access for motorised vehicles. These works were challenging due to limited access to the site; there was also a high-pressure gas pipeline and other services in the vicinity of the work area which required location prior to fence installation.

### ▶ Plan E, Cygnia Cove

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Natural Area installed a 1.5 m chain link fence around a constructed wetland as part of the Cygnia Cove restoration works. The chainwire was PVC coated and galvanised steel tubes were used for intermediates. Two gates were installed to allow access. The bottom of the chainwire was trenched .

## Fire Fuel Load Management

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Fire is an integral part of natural area processes in Australia; many Australian species do not germinate or set seed without fire to act as a trigger. However, natural areas within Perth are often surrounded by urban landscapes and fire can pose a risk to property and lives. The management of fire fuel loads and maintenance of firebreaks is a necessity for these areas and is a service Natural Area can provide. Integral to fire management is assessing, planning, on-ground management and maintenance:

► **Assessing**

Fire fuel load assessment is the mapping and assessment of areas to provide information on fire fuel loads present, the potential risks and management solutions.

► **Planning**

Fire management planning can be undertaken following site assessments and determination of fire fuel loads in an area. Fire management planning is prescriptive with defined actions to take in order to reduce fuel loads and manage loads into the future.

► **On-ground Management**

*Fire break construction and maintenance.* Natural Area can construct basic firebreaks by removing all the vegetation from a selected area and/or installing formal firebreaks using crushed limestone. The type of firebreak will always be site specific.

*Brush cutting*, which is the removal of nearly all above ground biomass to reduce fire fuel loads along site boundaries and buffer zones. Typically, tall grasses are brush cut to prevent ignition of bushland from embers.

*Track pruning*, the removal of overhanging branches and shrubs to maintain clear tracks and reduce the probability of fires 'jumping' across physical divides between bushland pockets. This also ensures safe egress through a bushland in the case of a fire.

*Thinning*, selectively removing branches from the canopy to reduce fuel load. Old and loose branches are generally targeted.

► **Maintenance**

Fire fuel load maintenance should be undertaken on an annual basis to ensure fuel loads are maintained at the desired level and to minimise the risk of fire.

Natural Area can provide all services associated with fire fuel load management to reduce the risk of fire in natural environments.

► **Telstra PITC, Annual Fuel Load Reduction**

Natural Area has been managing the fire fuel load at the Telstra Perth International Telecommunication Centre since 2011. The works include pruning trees to maintain the fuel load at specific levels in concentric rings around major infrastructure. In addition to the threat to infrastructure posed by fire, the location is also a Bush Forever site and needs to be managed accordingly. There have been no fires at the site since Natural Area started managing the fuel load

► **City of Swan, Gidgegannup Fire Management**

Natural Area undertook fire fuel load management works for the City of Swan at a site in Gidgegannup. The works were undertaken prior to a controlled burn in the area. Natural Area created access tracks along property lines, pruned overhanging branches, removed small trees within access track areas, and moved these to the burn area along with leaf litter and other combustible material.



## Seed Collection

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Seed collection is a vital step in all ecological restoration and revegetation projects. Having provenance seed stock from which to propagate native plants ensures the best possible conservation outcome for a project. Natural Area have over 10 years' experience in collecting native seed from areas in and around Perth. Our seed team are trained and licenced by DPaW and actively seek authorisation from landowners to collect seed.

Seed collection requires knowledge of species life cycles to ensure that seed is collected at the optimal time; our team are trained in this aspect and follow all best management guidelines for seed collection. We utilise specialist software to record and track collections. Our processing equipment includes automated seed sorting machines to provide better efficiency and higher yields of seed. All seed is stored in a purpose built, temperate controlled facility.

Natural Area can collect seed as part of a large restoration project or as a standalone activity or contract. Most of the seed we collect is used by our accredited nursery to propagate provenance specific plants for our clients.

### ► City of South Perth, New Norcia Seed Collection

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Natural Area undertook seed collection at New Norcia, a Benedictine Community 132 km north of Perth. The works included an initial reconnaissance visit to determine species available collection in order to determine best times for collection. A total of three days were spent on site, collecting seed with the objective to obtain as much seed as reasonable possible within the guidelines for best practice seed collection. A total of 670 g of seed was processed and packaged for the Client including *Acacia*, *Banksia*, *Orthrosanthos*, *Hakea* and *Melaleuca* species.

### ► City of Wanneroo, Contract Seed Collection

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Natural Area undertook contracted seed collection for the City of Wanneroo in 2011/12, 2012/13 and 2013/14. Collection activities occurred from November to April in each period, with seed being processed, packaged and delivered by May. Approximately 15 kg of seed was collected in 2011/12; 10 kg in 2012/13 and 11 kg in 2013/14. As part of the contract, Natural Area are required to provide monthly reports to the Client so any shortfalls in seed can be assessed and managed.

### ► Department of Parks and Wildlife, Seed Collection

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The Department of Parks and Wildlife (then DEC), contracted Natural Area to provide 20 days of seed collection services at three sites on the Perth Swan Coastal Plain. A total of 9 kg of seed was processed, packaged and delivered to the Client, consisting of *Banksia* Woodland species such as *Conostylis*, *Dasypogon*, *Eremaea* and *Petrophile* species.

## Seed Management

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Following seed collection activities, seed is processed, cleaned, stored, tested and administered by Natural Area in purpose built facilities at our operation base north of Perth.

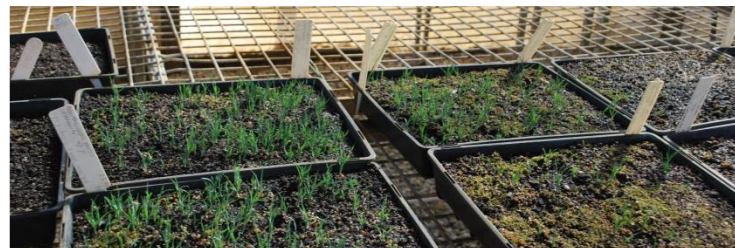
Seed processing is undertaken according to industry best practices such as RIAWA seed accreditation guidelines and includes the following steps:

- ▶ Seed drying, Natural Area utilise several areas for seed drying according to the type of seed being dried, we have a specific area for drying Banksia cones, seed collected for contracts and general purpose seed. Seed drying areas are protected from the elements and rodents.
- ▶ Seed sorting, after seed is adequately dried it is sorted. Natural Area utilise several methods for seed sorting according to seed type. An automated seed thresher and vacuum air separator is used to separate fine seed from chaff to ensure the highest purity of seed is obtained. Seed is also sorted manually using sieves of varying apertures.
- ▶ Seed packaging, after seed is sorted it is packaged ready for storage. All seed is packaged with a standard label to ensure relevant details are maintained with the seed lot.
- ▶ Seed storage, after packaging, seed is stored in our purpose built seed bank facility. Seed is kept here until passed onto the Client or needed for germination.

The majority of seed collected by Natural Area is utilised for revegetation projects managed in-house. This means we can guarantee the quality of the seed being used and quality of resultant seedlings. Seed is propagated and germinated in our purpose built propagation area where seed is treated using the appropriate methodology. Natural Area can undertake smoke treatment, heat treatment, scarification, stratification and weathering in order to break seed dormancy exhibited by many native seeds.

Once seed is propagated, it is moved to germination benches where it is watered, fertilised and monitored for growth. Successful germinants are potted on to allow further seedling establishment. The Natural Area nursery adhere to strict hygiene protocols to ensure outside pathogens and diseases are not passed onto to germinants and seedlings.

Natural Area can also undertake seed viability and germination trials of seed batches to ensure viability when propagated and germinated. Seed testing is undertaken following strict protocols with all germinants monitored and recorded.





## Nursery Services



Integrated into the Natural Area business is a plant production facility, accredited by the Nursery and Garden Industry Association (NGIA). The nursery has been awarded twice as the Best Small Production Nursery in the state by the NGIA. The nursery operates on a lease in Whiteman and has dedicated areas for seed sorting, plant propagation, germination, potting on and production. The nursery has the ability to produce 700,000 plants per annum, and has the ability to propagate over 300 different native plant species from endemic seed and cuttings.

The nursery prides itself in being able to produce difficult to propagate genera such as *Baumea sp*, *Hibbertia sp* and *Lepidosperma sp*; production of difficult to propagate species is possible due to the nursery's commitment to mastering propagation techniques. To ensure high stock quality and germination success rates our nursery team is comprised of a number of qualified environmental scientists and horticulturists who are passionate about native flora and the role it plays in the restoration of our natural environment.

Seed collection is a vital step in all ecological restoration and revegetation projects. Having provenance seed stock from which to propagate native plants ensures the best possible

conservation outcome for a project. Natural Area have over 10 years' experience in collecting native seed from areas in and around Perth. Our seed team are trained and licenced by DPaW and actively seek authorisation from landowners to collect seed.

Due to our seed collection works, Natural Area has built a substantial seedbank of native seeds from all over the Perth Metropolitan Region. Our seedbank is housed in a purpose built facility with is temperature controlled 24 hours a day. We use specialist seed management software to track our seedbank. The seed is available for purchase after all project seed requirements and contracts have been fulfilled.

With access to seed collected by the Natural Area seed crew, the quality and provenance of seed can be assured. The nursery has the ability to tailor plant orders to suit a client's requirements and the conditions of a site.



Best Small  
Production Nursery



## Case Study: Point Walter Foreshore Restoration

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Point Walter Reserve is an iconic recreational area located on the Swan River and is used for multiple purposes including kite-surfing, wind-surfing, fishing, passive recreation, swimming and picnicking. The foreshore area has been subject to substantial erosion over the last 10 years leading to considerable loss of beach and grassed areas as well as undercutting of tree roots.

Natural Area Management was contracted by the City of Melville in February 2012 to undertake large scale foreshore restoration works at Point Walter Reserve. Initial works were completed in early 2013 with subsequent works being completed in early-2014. The broad objectives of the project were to reclaim the beach areas by implementing various erosion control techniques and to improve the overall amenity and aesthetics of the area.

Initial works commenced in March 2012 and included regrading, removal of some non-endemic trees and rock work. Gabion cages were installed to help prevent further loss of grassed areas and brush-mattressing was placed along some lengths of the foreshore. Several timber decks and seating elements were installed to provide access and amenity to the general public. New turf was installed and is watered by an extensive irrigation system. A gross pollutant trap was also installed to prevent pollutants entering the River from the car park areas.



Natural Area worked with a consulting marine engineer to develop a plan to mitigate high levels of erosion in one of the restoration zones. The plan involved the installation of rock armour and Geosynthetic Sand Containers (GSC's) over three nodes as well as some clearing, trimming and filling to create a suitable gradient for the site.

Elcorock GSC's were filled on site and positioned using a 1.8 t excavator. Rock armour; being limestone rock boulders up to 0.5 tonnes each were also positioned using the 1.8 t excavator. Natural Area supplied and installed all materials and equipment for the project including the excavator. The biggest issue at the site was depth to groundwater and working in waterlogged conditions whilst trying to position geofabric, rock and GSC's.



As part of the works, a series of gabion cage walls were constructed to delineate the foreshore from the grassed area and to mitigate erosion on the beach. To aid with egress, five sets of steps were installed whereby users could traverse from the grassed area to the beach. The original design called for each set of steps to have three rungs each. Approximately 12 months after installation and due to continual washing out of sand from around the step's foundations it was evident that three rungs were insufficient in providing safe egress to the beach.



## Case Study: Point Walter Foreshore Restoration

Natural Area removed the existing steps and had an additional four rungs for each set of steps fabricated. These larger sets of steps were then reinstalled to allow better egress to the beach. The challenge on this aspect of the project was the depth to ground water and constant inundation of the work site which made it particularly difficult to install the footings for each set of steps

Project outcomes:

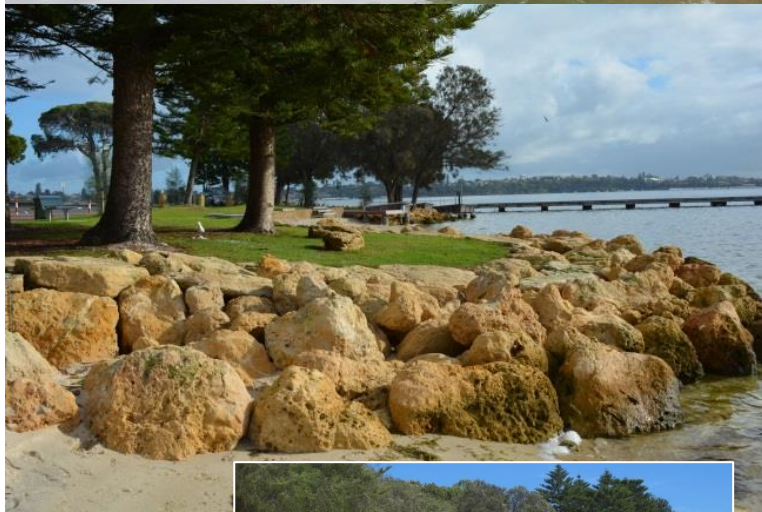
- ▶ increased amenity
- ▶ reduced safety risks to the public
- ▶ increased biodiversity
- ▶ use of biodegradable and soft engineering
- ▶ mitigation of erosion
- ▶ increased stability to the foreshore area.



Natural Area propagated 50,000 seedlings for planting in 2012 and 2013; this included tubestock and advanced trees for strategic revegetation. The majority of species were sedges and rushes for planting along the foreshore and these were salt hardened prior to planting to ensure adequate survival.

Key components of the project:

- ▶ propagation of 50,000 tubestock
- ▶ large non-endemic tree removal
- ▶ re-grading and site levelling
- ▶ supply and installation of gabion cages
- ▶ supply and installation of timber decks
- ▶ supply and installation of footpaths
- ▶ brush-mattressing
- ▶ limestone rock revetments
- ▶ revegetation
- ▶ supply and installation of Elcorock GSC's
- ▶ supply and installation of rock armour
- ▶ supply and installation of geofabric
- ▶ supply and installation of turf.





## Case Study: Walter's Brook Restoration



▲ October 2013: Initial site conditions

Natural Area was contracted by the City of Vincent to undertake planning, design and on ground restoration works at Walter's Brook, Banks Reserve. The brook had become degraded due to large sediment deposits washing in from drain outlets and severe bank erosion due to inappropriate alignment of the drainage channel (*pictured above*).

On-ground works followed restoration plans designed by Natural Area and Urban Serenity in 2013. Erosion in the area was mitigated with a combination of soft and hard engineered techniques. Straightening of the drainage channel with the installation of gabion walls and gabion mattresses to diffuse the impact of running water through the channel, thus reducing bank erosion. The installation of limestone spillway at the drain outlets, around the bridge and along the toe of the channel will help to reduce the impact of water flowing through the channel during high rainfall events. Sections of the bank were recontoured to create a low gradient slope; these banks have been covered in a biodegradable erosion control matting to prevent the establishment of weeds and to temporarily stabilise the soil whilst revegetation works establish. The maturation of these plants will help to stabilise the bank once the matting has deteriorated.

Works to date have involved:  
removing excess sediment from the channel  
recontouring the banks to create a suitable gradient  
installation of gabion walls and mattresses into the channel to mitigate erosion  
installation of a limestone spillway  
temporary fencing  
revegetation planting.



▲ March 2014: Installation of gabion wall



▲ April 2014



## Case Study: Yellagonga Regional Park

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▲ August 2010, initial site conditions

Yellagonga Regional Park is an area of high conservation value due to its unique lakes and wetlands that are some of the last remaining freshwater systems on the Swan Coastal Plain. The Park provides an important area for recreation, research and fauna including provision of a refuge and breeding area for waterbirds. Natural Area was contracted by the Water Corporation in 2010 to undertake large scale rehabilitation works within the Park as part of a vegetation offset. The rehabilitation was carried out in liaison with the Department of Parks and Wildlife (then DEC) to ensure high level restoration outcomes.



▲ November 2010, after initial Kikuyu treatment

Natural Area understood the importance of the Park and was committed to rehabilitating the areas which had been impacted by clearing to help restore the natural environment and enhance the biodiversity and amenity of the area. As part of the project, Natural Area provided the Principal with performance guarantees (bank guarantees), which are typically used in construction projects where results are measurable and defined. The use of performance guarantees in revegetation projects is not common because the results can be affected by means outside the contractor's control. Due to the collaborative and flexible nature of this project, the results that were achieved exceeded those that were required for practical completion.

Whilst the on-ground works were stipulated in the site Rehabilitation Management Plan, the approach taken was flexible to ensure the best rehabilitation result was achieved, this meant that the project risk was shared between Natural Area and the Principal (Water Corporation). Best practice methodology was used and the result speaks to this with the revegetation works being complimented by the regimented weed control activities.

Initial works included the removal of large non-endemic trees, site works, grading and the installation of a limestone path to provide access. A key component of the project initially, was weed control, targeting Kikuyu and herbaceous weeds that were constantly germinating at the site. The challenge was to eradicate these weed species prior to planting in 2012. The weed control proved effective and because of the removal of this above ground biomass, the site became damper and more difficult to work in. The planting plan needed to be adapted to the changing site conditions and the total area planted was a lot larger than initially planned.



▲ January 2011



## Case Study: Yellagonga Regional Park

Large scale revegetation commenced in winter 2012 and continued through until late spring with infill planting in 2013. Natural Area propagated 140,000 tubestock seedlings for this project using seed collected from within the Park. The plants were propagated in a purpose built propagation facility in Whiteman. The local Friend's of Yellagonga group was also involved with propagating and provided 4,000 seedlings for the project.

### Key Components

- ▶ seed collection and propagation of 140,000 tubestock
- ▶ removal of mature non-endemic trees
- ▶ reinstatement of swamp batters
- ▶ large scale weed control including treatment of *Arundo donax*, *Typha*, Castor Oil Plant
- ▶ revegetation
- ▶ monitoring and reporting

### Outcomes

- ▶ increased biodiversity
- ▶ habitat creation
- ▶ reduction in weed coverage
- ▶ increased amenity and aesthetics



▶ January 2013



▶ October 2013



▶ Planting works, July 2012 and seedling growth in March 2013



▶ April 2013



## Case Study: Yellagonga Regional Park

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March 2011



March 2013



March 2014



▲ Monitoring photos from 2011 - 2014

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