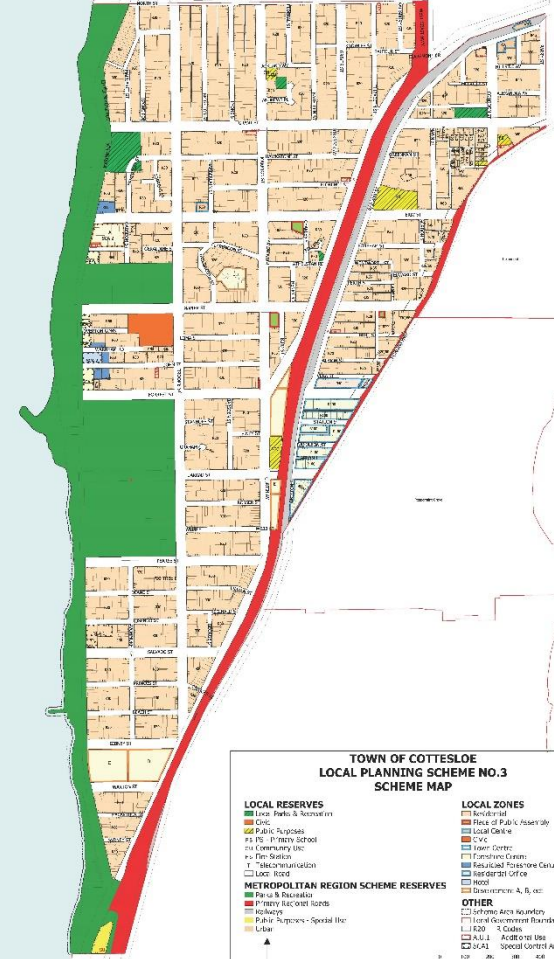
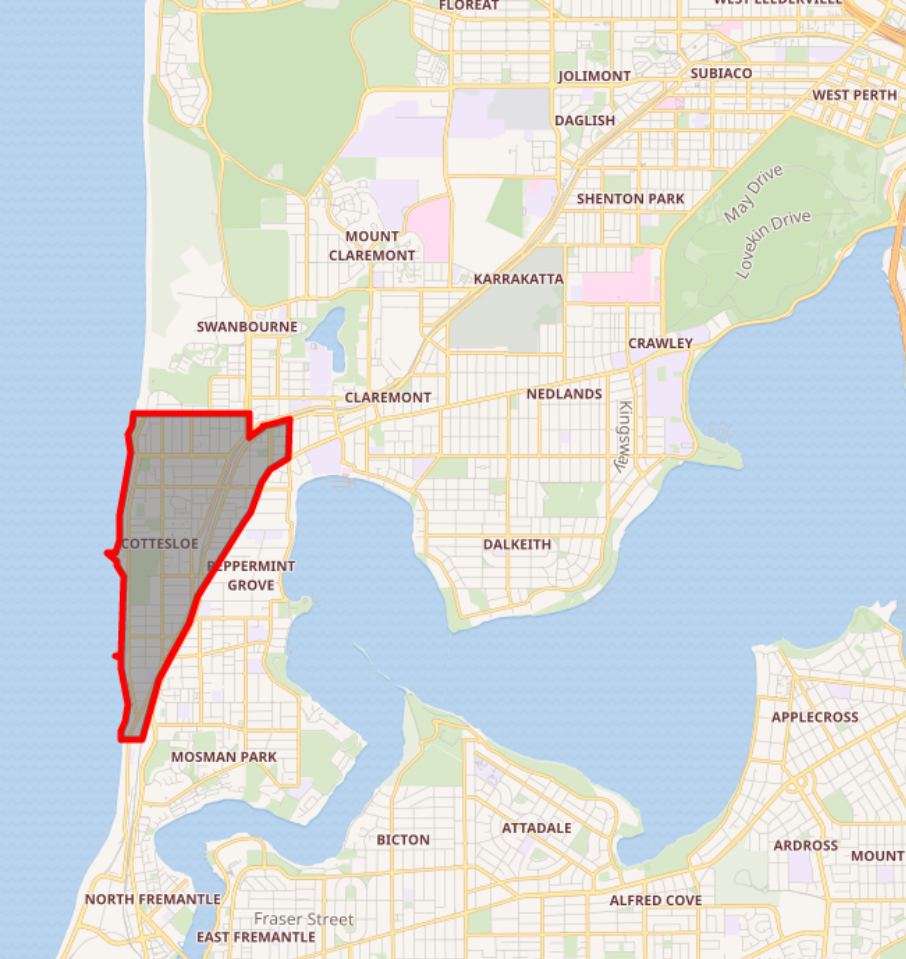


COTTESLOE
COASTCARE

Cottesloe Coastcare Association (CCA)

Our evolution and impact

Dr Mike Ewing - Chairperson



- Town of Cottesloe Area **390 ha**
- Natural Areas: **18.8 ha** (4.8% of the overall area)
- Zoned under as Parks and Recreation, Local Parks and Recreation and Primary Regional Roads

Mission

To restore vegetation of Town's Natural Areas by 2030 through:

- direct on ground efforts;
- our advocacy; and
- the support of the wider community

Motivation

The desire for sustainable natural ecosystems in our suburb.



Context for our efforts - what is special to our setting

- Hostile soils (infertile and non-wetting)
- Difficult terrain (sloping and eroded sand dunes)
- Hostile weather (erosive winds)
- Entrenched and diverse weed populations
- Lots of people (traffic) with diverse interests (require consultation consideration/accommodation)
 - Walkers/runners (access paths etc.)
 - Swimmers
 - Surfers
 - Fishers
 - Kite surfer/Paragliders (set up zones)
- CCA not the land manager – must partner with Town of Cottesloe

Weeds in many forms - requiring attention and well-timed actions



Phases of CCA evolution

1. Mid 1990s - Enthusiast, random and somewhat ineffective efforts but much experiential learning.
2. Early 2000s - Well organized and energetic but dispersed effort
3. Late 2000s - Strategic priorities established – focused effort with increased Town of Cottesloe support
 - Activities based on developed Cottesloe Natural Areas Management Plan (NAMP) undertaken by Ecoscape in 2008.
4. 2015 to present – focused and expanded operating scale and efficiency with CCA working in parallel with Town of Cottesloe increased support including contractors input.
 - expanded effort precipitated by a review of progress under NAMP (conducted by Rada who will provide more detail).
5. Current – Consolidation – shift in balance of effort from new initiatives to maintaining treated areas and rejuvenation of an ‘aging’ group.

Evolution of CCA groups approach

The group discussed and reached consensus on shared values including being:

- open, friendly, inclusive and supportive
- volunteers serving the public good
- strategic, focused and outcome oriented
- operationally well organized and efficient
- apolitical
- collaborative, considered and flexible



New issues emerge from time to time and are discussed and consensus is generally achieved.

Technical operational evolution

12 Key steps that require detailed and active multi-year management

- Site selection - flows from strategic plan
- Determine plant species - landscape position and soil type
- Source locally adapted plants - seeds/cuttings 12 months in advance
- Pre-planting weed control (remove perennial weeds and undertake seed set control of annuals can be in spring/summer/autumn prior to planting depending on the target species)
- Create planting niches (dig, fertilise and water holes)
- Plant tube stock into prepared holes
- Mulch around plants if feasible
- Post plant weeding - manually and/or herbicide
- Watering in first summer (typically 3-4 times depending on rainfall starting in early summer)
- Maintain weed control in year 2 and beyond (site specific)
- Infill plant to compensate for losses (typically 20% but seasonally driven)
- Continue active weed monitoring/control for 2-5 years



The plant
preparation cycle



New on-ground work – dune systems





Cottesloe Native Garden
(boundary of Sea View
golf course)

Having an impact
- 5 years makes a huge
difference!





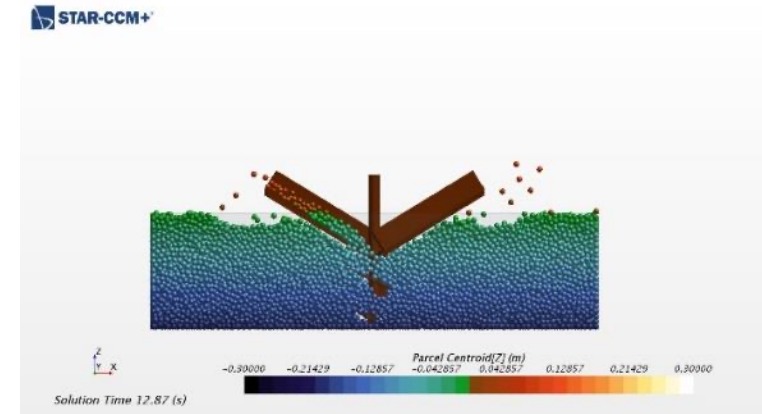
Vlamingh – an award-winning development

(Winner of the 2022 Parks & Leisure WA awards - the prize is for 2022 Best Playspace Award in WA - under half a million dollars category.)



Tool Development

- Several design ideas were mathematically modelled using the Discrete Element Method and one was shown to have good potential.
- Based on that work, Mark 1 prototype was constructed and successfully dug hundreds of holes in the 2019 planting season.
- Subtle improvements were made to the first model and the new Mark 2 version has proven even better during the recently completed 2020 plantings.
- It works best in wet or moist sandy soils but can be used when soils are dry.
- It will handle and eject small stones up to around tennis ball size but larger rocks, once exposed, may require hand removal from the hole.



DEM modelling of the Mark 1 design



Mark 1



Mark 2





Vegetation Condition Mapping of Town of Cottesloe's Natural Areas as a Measure of Management Success

BACKGROUND





1995



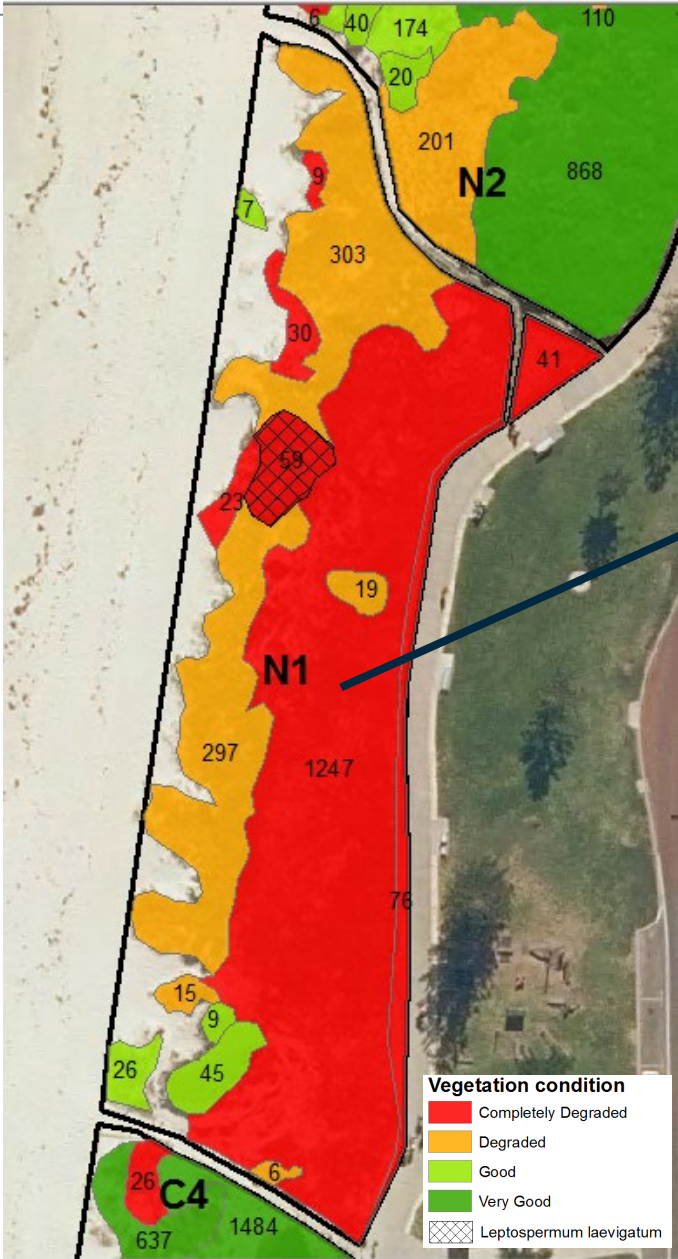


■ Vegetation Condition Assessment

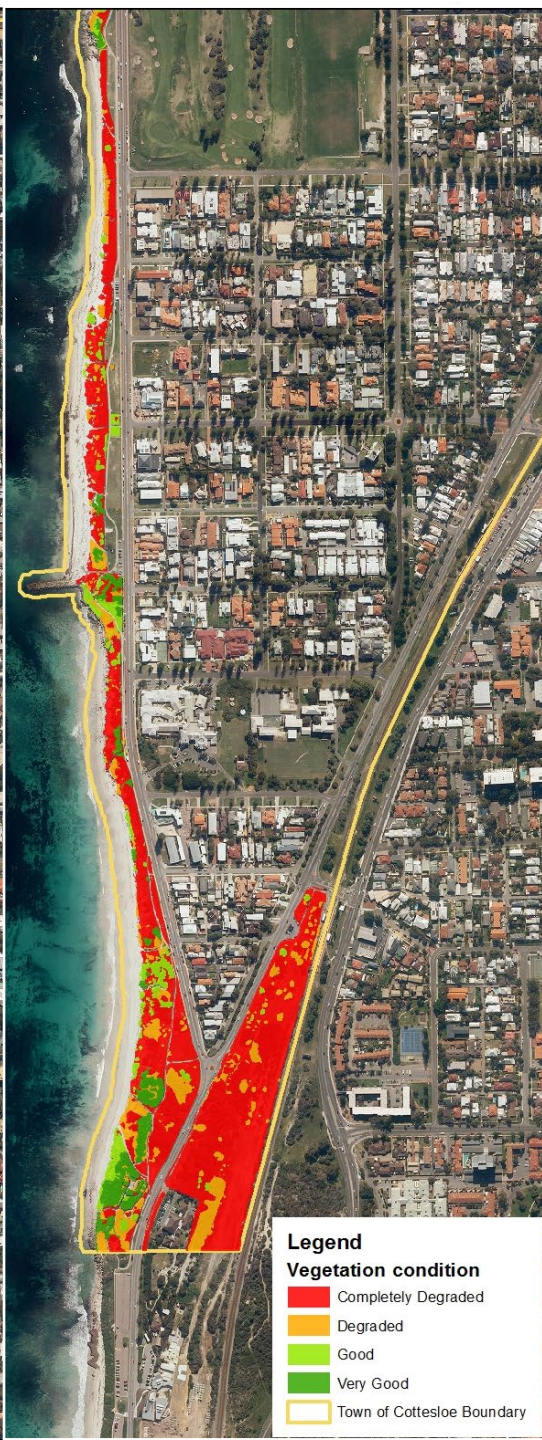
	Completely Degraded	Degraded	Good	Very Good
Keighery, B.J. (1994)	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Croft et al (2005) (modified) Native species diversity	0 to 5%	5 to 20%	20-60%	60-100%
Weed species abundance	60-100%	20-60%	5 to 20%	0 to 5%
General Health % plants with significant health problems	>70%	50-70%	30-50%	15-30%
Disturbance Soil and/or substrate disturbance. Such as trampling, tracks, erosion.	Disturbance incidence very high. Affecting 80-100% of the area.	Widespread high level disturbance affecting 60-80% of the area.	Widespread high level disturbance affecting 40 to <60% of the area.	Generally low-level disturbance. May be high in small patches. Affecting 20 to <40% of the area.

- Microscale assessment
- Newly revegetated areas with good plant health and low weed cover (<20%) within 2 years post planting – Degraded
- *Melaleuca lanceolata* cover – Good





ToC_ID	N1
Location	Cottesloe Beach
Area	1246.91
Condition	Completely Degraded
Notes	Couch, Sea Spinach and Kikuyu with sporadic Dune Onion Weed and small tufts of Spinifex longifolius (<20 clumps @2m2) Pelargonium present more on the lower slope after foredune
Type	Weed
Weed_cvr	95
FID	213
Id	240



Key Performance Criteria

- Percentage increase in good quality vegetation.
- Reduction in the number of high priority weeds.
- Reduction in feral animals / feral animal activity
- Reduction of use of old and creation of new access pathways.
- Improvements in drainage infrastructure
- Increase in funds for management of restored areas.

**TOWN OF COTTESLOE
NATURAL AREAS
MANAGEMENT PLAN
ADDENDUM 1**

**TO BE READ WITH 2008 NAMP
DOCUMENT**

JUNE 2015

**FOR
TOWN OF COTTESLOE**

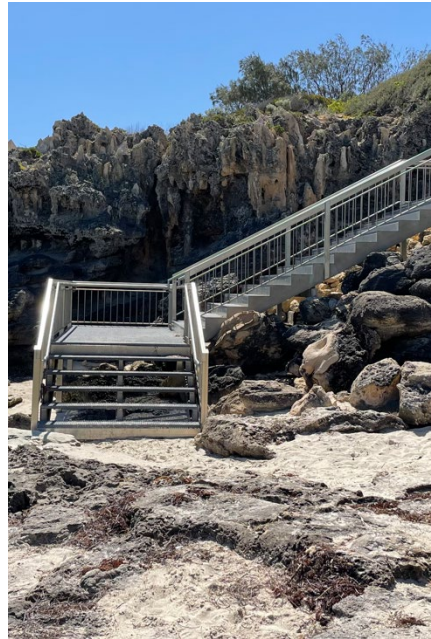


SYRINX
environmental ol

Perth
1/2 Manning Street
Perth WA, Australia 6000
t +61 81 51 52 27 5255
f +61 81 51 52 27 5253
ABN : 59 052 6136 410

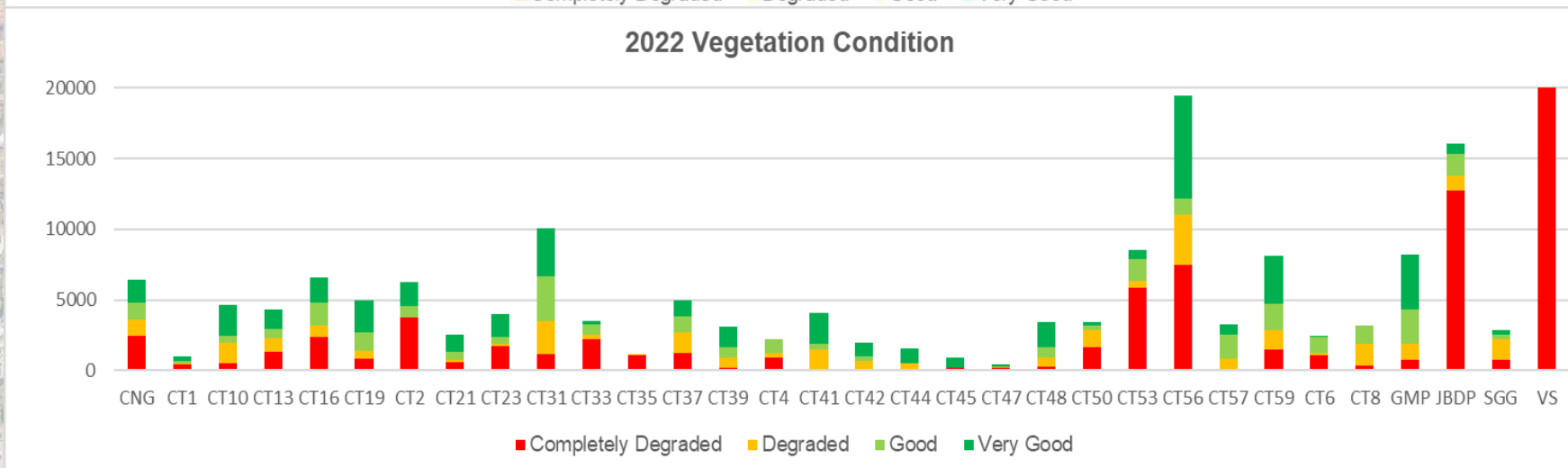
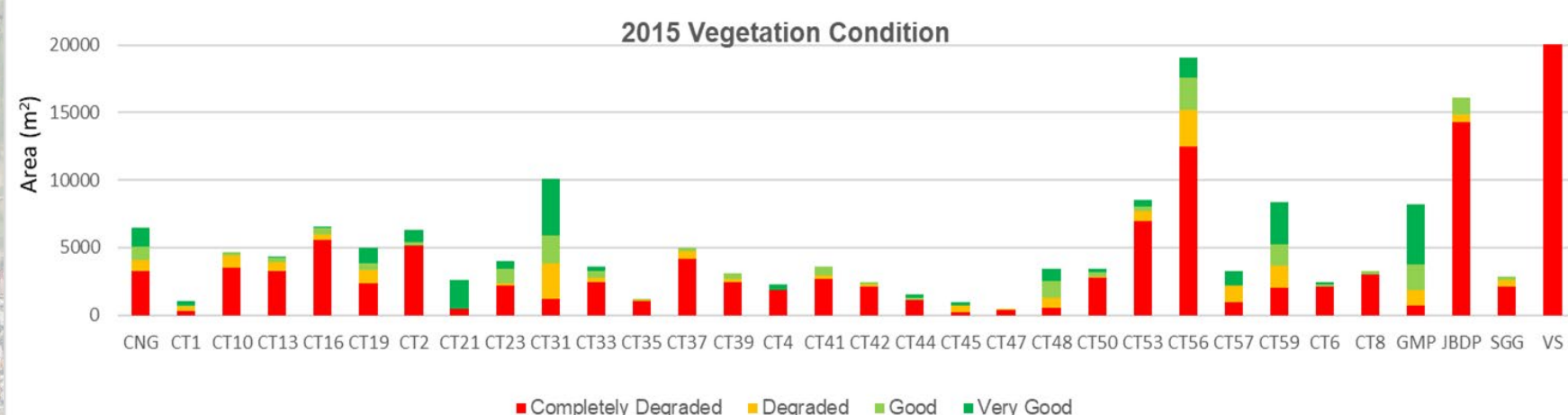
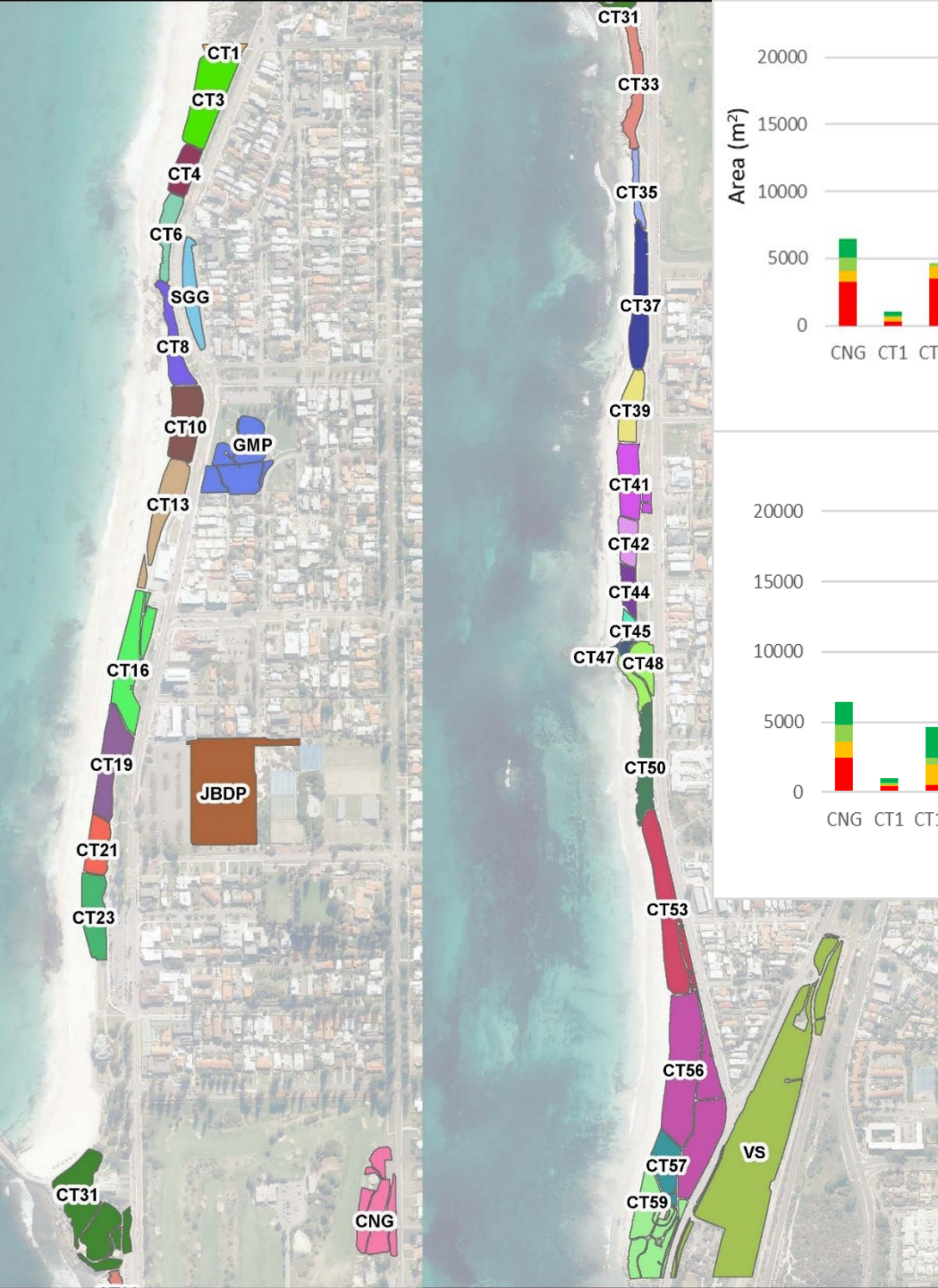
Melbourne
27/28-30 High Street
Melbourne VIC Australia 3001
t +61 31 51 52 27 5255
f +61 31 51 52 27 5253
www.syrinx.mel.au

- Baseline survey conducted in 2015 utilised natural area boundaries as per 2008 NAMP.
- 2022 survey noted a number of changes to NAs: NA's size, upgrades and closure of pathways, new infrastructure, restoration/revegetation and erosion.

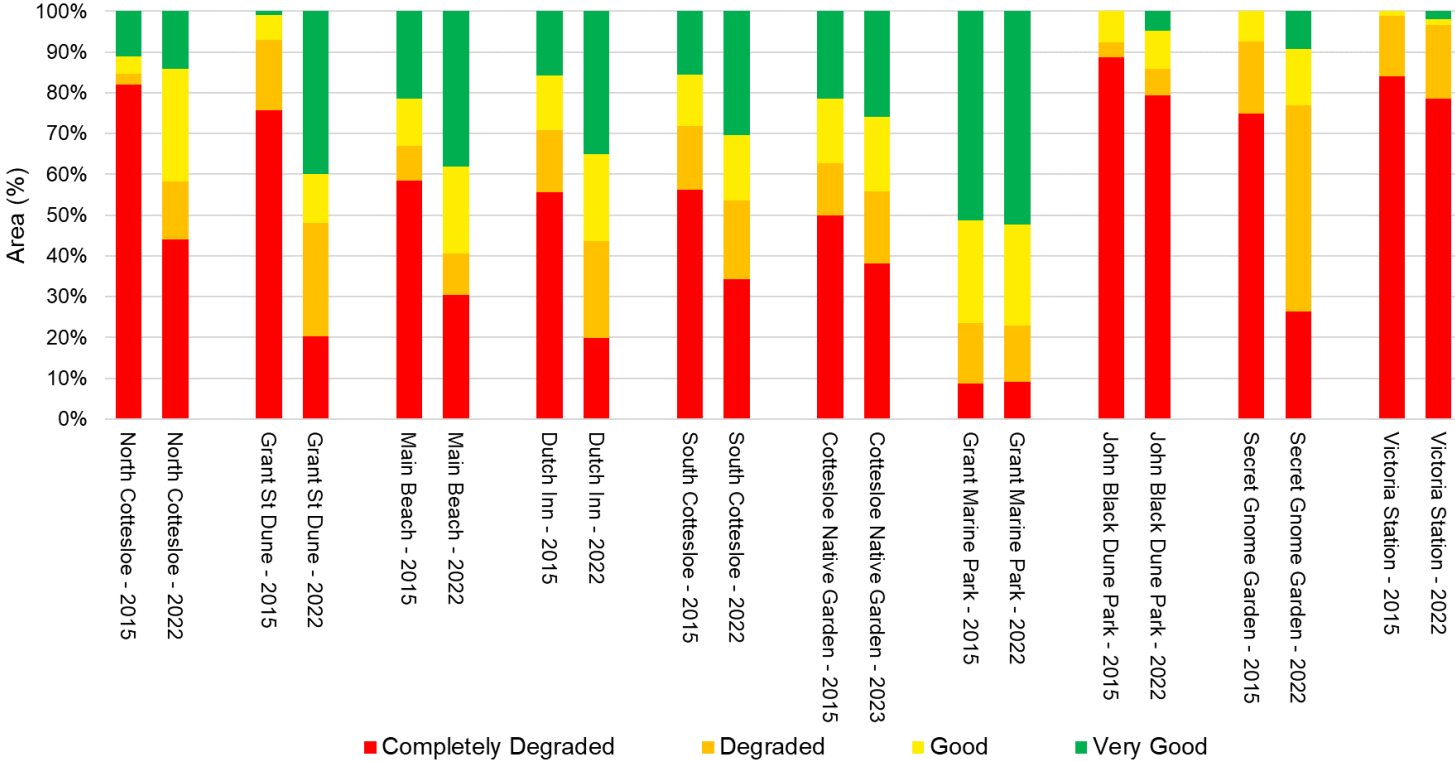




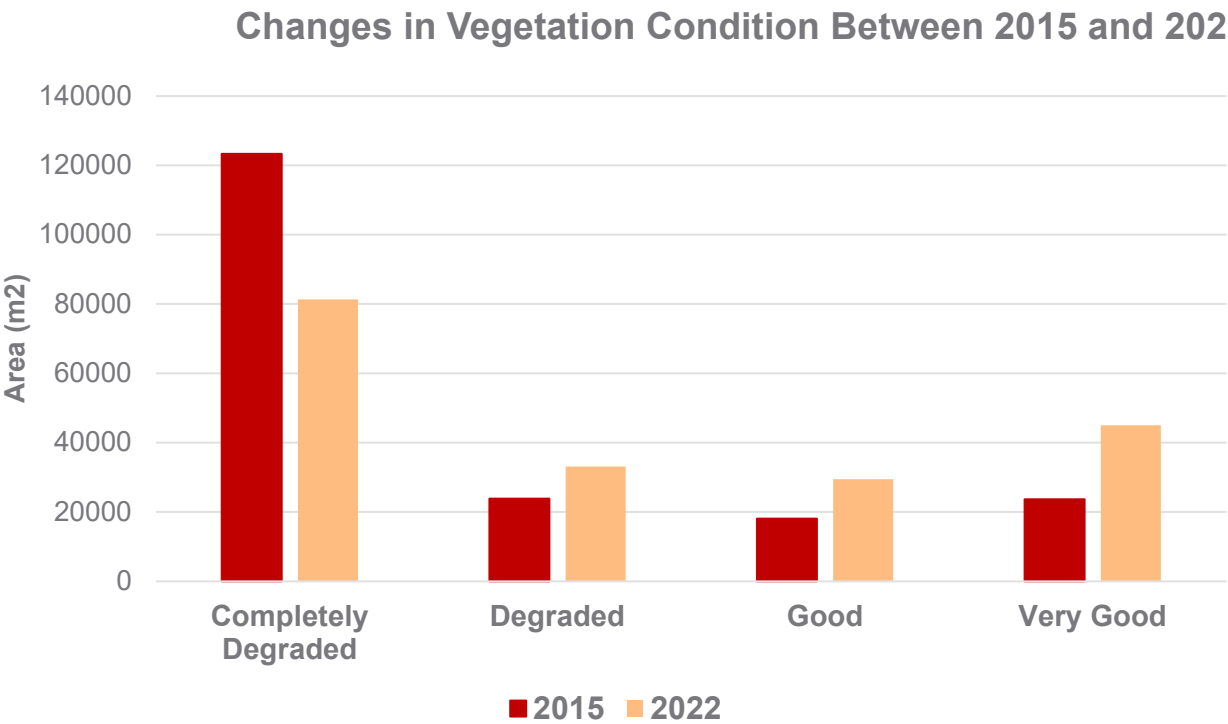
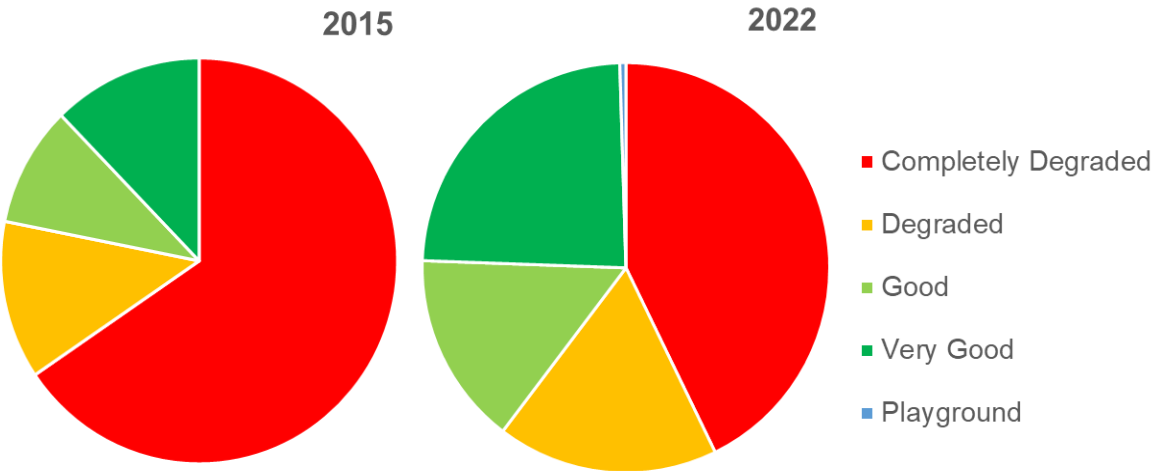




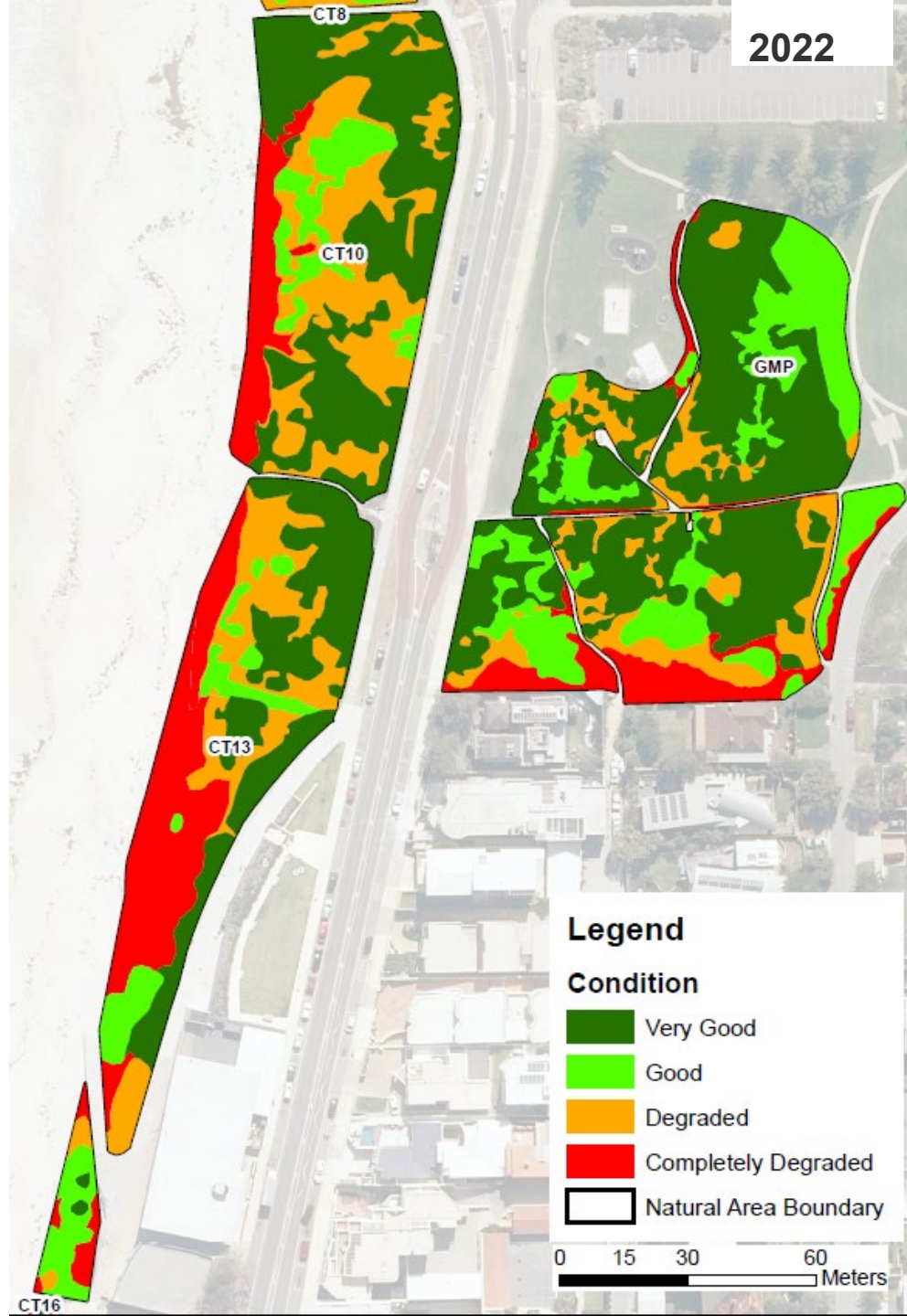
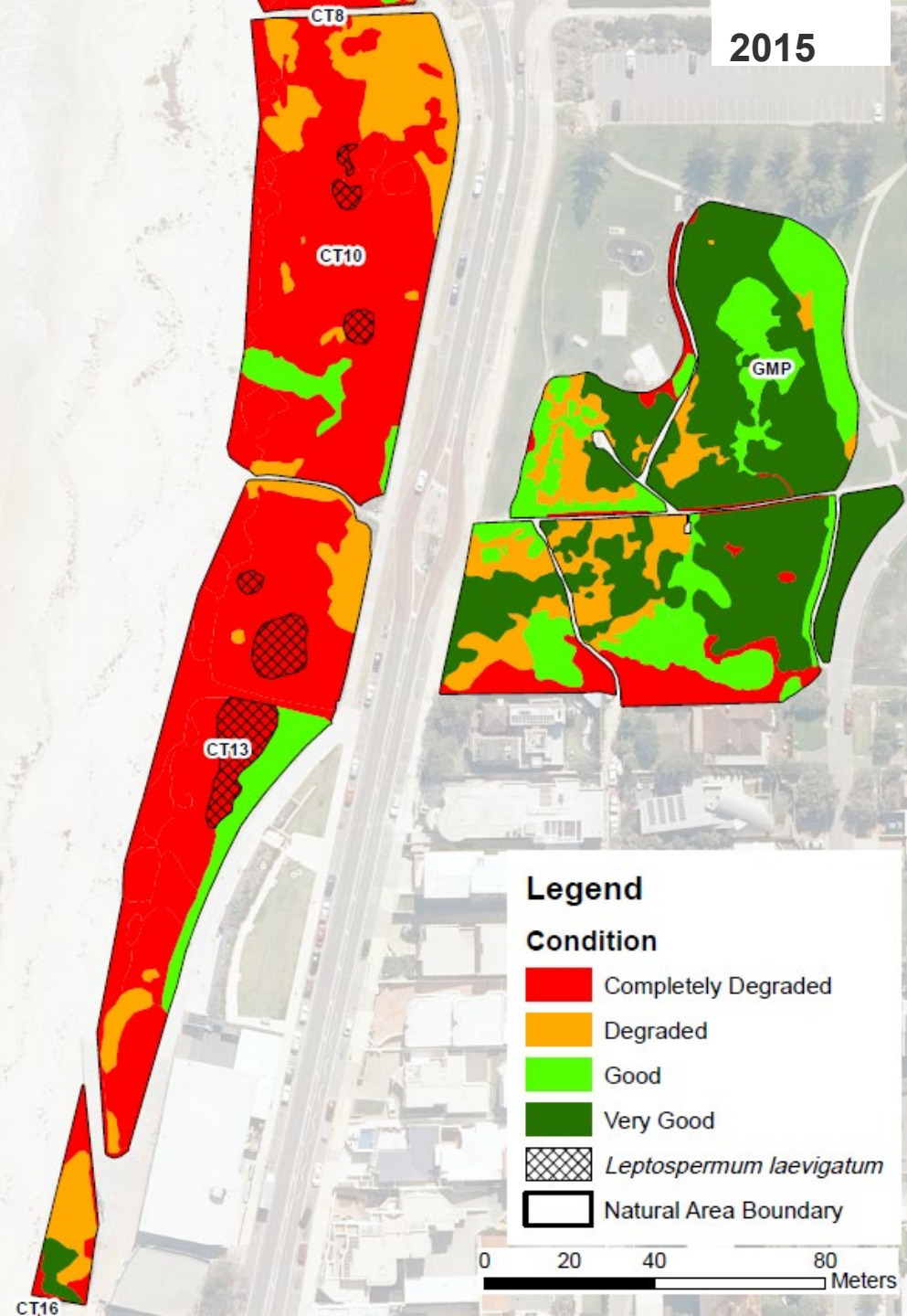
**NOTE: Victoria Street area(m²) is not fully shown due to the small scale of other sites.*



- Improvements made to **4.2 ha** or **22%** of the overall natural areas
- Weed cover – reduction in the priority weed extent and cover (e.g. Coastal Teatree and Sea Spinach, Marram Grass)
- Progress in improvements to infrastructure
- New weeds – mainly at Victoria Station



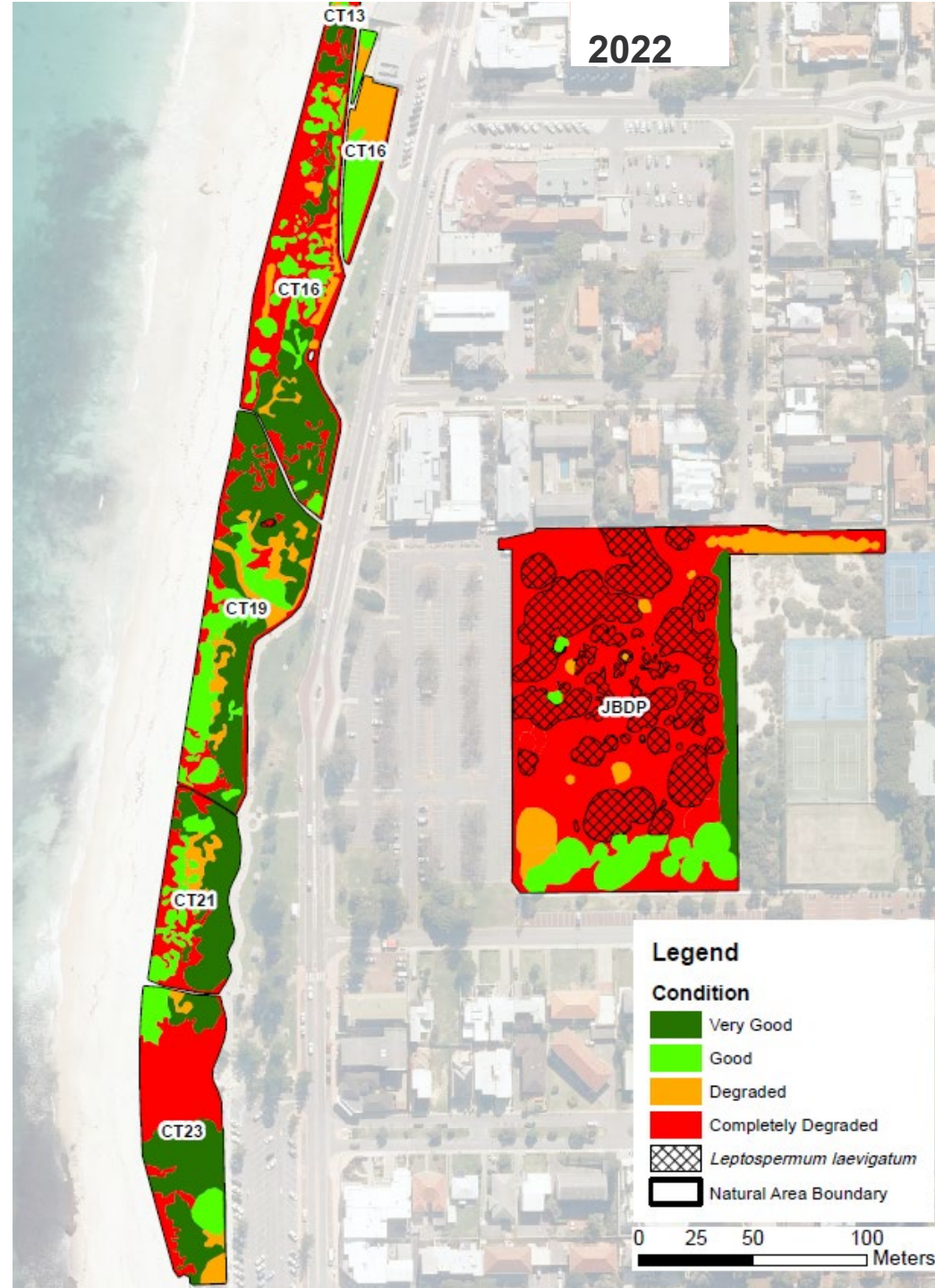
Year	Completely Degraded (ha)	Degraded (ha)	Good (ha)	Very Good (ha)	Total (ha)
2015	12.3	2.4	1.8	2.3	18.8
2022	8.1	3.4	2.8	4.5	18.8
Reduction or increase in condition between 2015 and 2022					
(ha)	-4.2	1.0	1.0	2.2	
%	-22%	5%	5%	12%	



2015



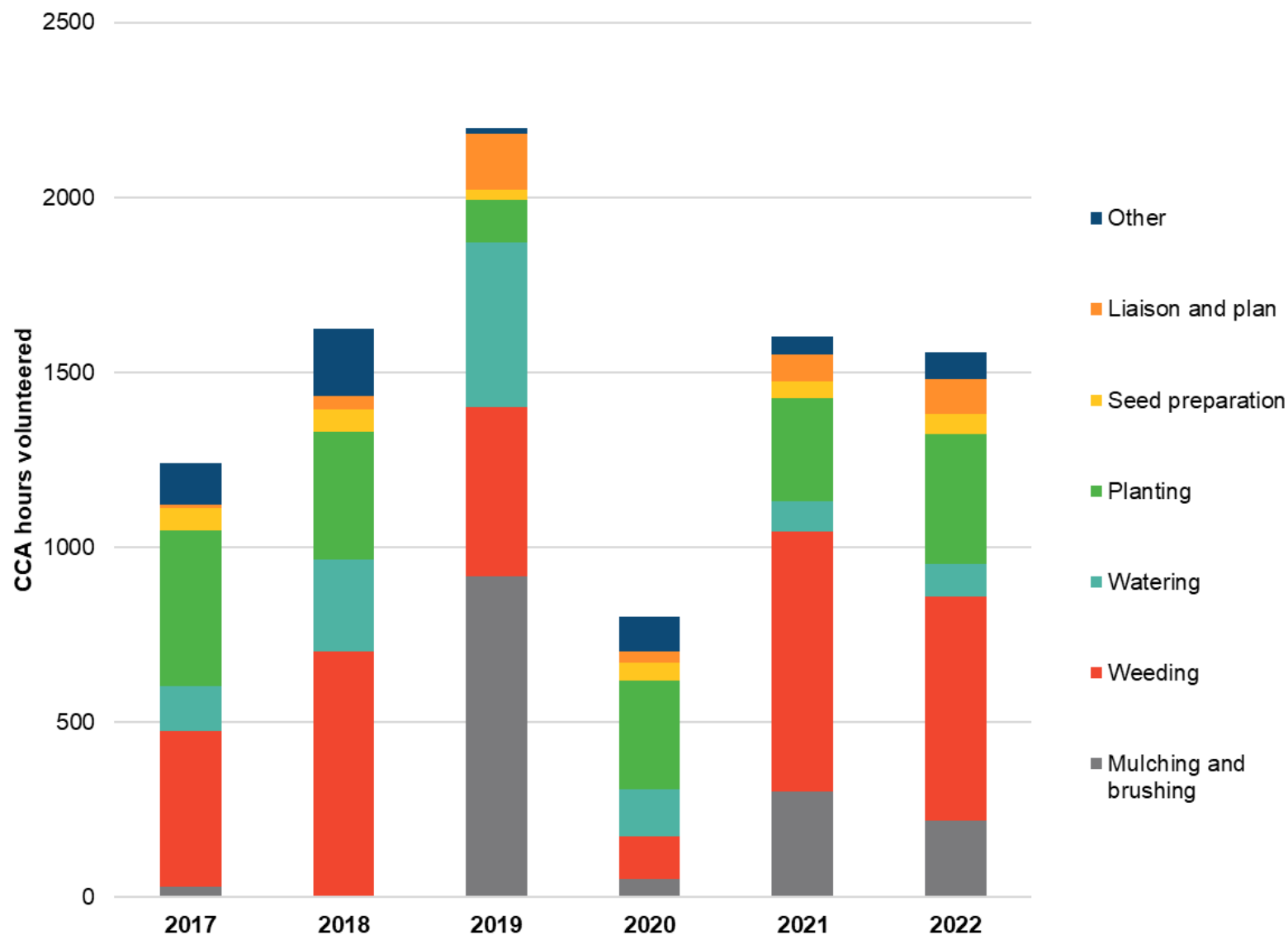
2022







EFFORT and COSTS



Volunteering category	Investment (hrs)
Planting	1911.5
Weeding	3136
Watering	1175.5
Seed preparation	313
Mulching and brushing	1520
Liaison and plan	416
Other	554
Total hours	9,026
Value	\$ 433,338.26
Extra (non CCA) hours	3887
	\$ 186,614.87

@ \$48.01 [Volunteering WA](#)

2017 – 2022 – Grants obtained

\$112,527

Town of Cottesloe Investment

- From 2017 – 2020 approximately \$630,000 or \$126,000 per annum was invested in the maintenance of natural areas (including Town's staff labour costs).
- Proposed current budget is \$90,000 pa.
- ~50% of costs would be for contractor weed control, with the remaining allocation for site preparation, erosion control and watering.

Key Performance Criteria Assessment

- Percentage increase in good quality vegetation - (22%) overall ✓
- Reduction in the abundance of high priority weeds. – Progress made
- Reduction in feral animals / feral animal activity - Progress made
- Reduction of use of old and creation of new access pathways. ✓
- Improvements in drainage infrastructure – Progress made.
- Increase in funds for management of restored areas. Progress made but insufficient for appropriate maintenance of NAs.

KEY RECCOMENDATIONS

- Employment of a full time field officer to maintain natural areas.
- Facilitate knowledge transfer between CCA, ToC and new staff.
- Continue working with CCA to increase funding for maintenance and restoration works.
- Ensure all new infrastructure is planned in a way that protects and enhances natural areas.
- Improve and or replace damaged drainage infrastructure.
- Select species most appropriate to the position in the landscape
- Implement CCA tested planting and weed management protocols.
- Ensure ongoing supply of *Spinifex longifolius* to encourage lower slope dune stabilisation. Add *Spinifex hirsutus* to foredune planting and ensure continual supply.
- Use only sustainable and biodegradable materials for slope stabilisation.





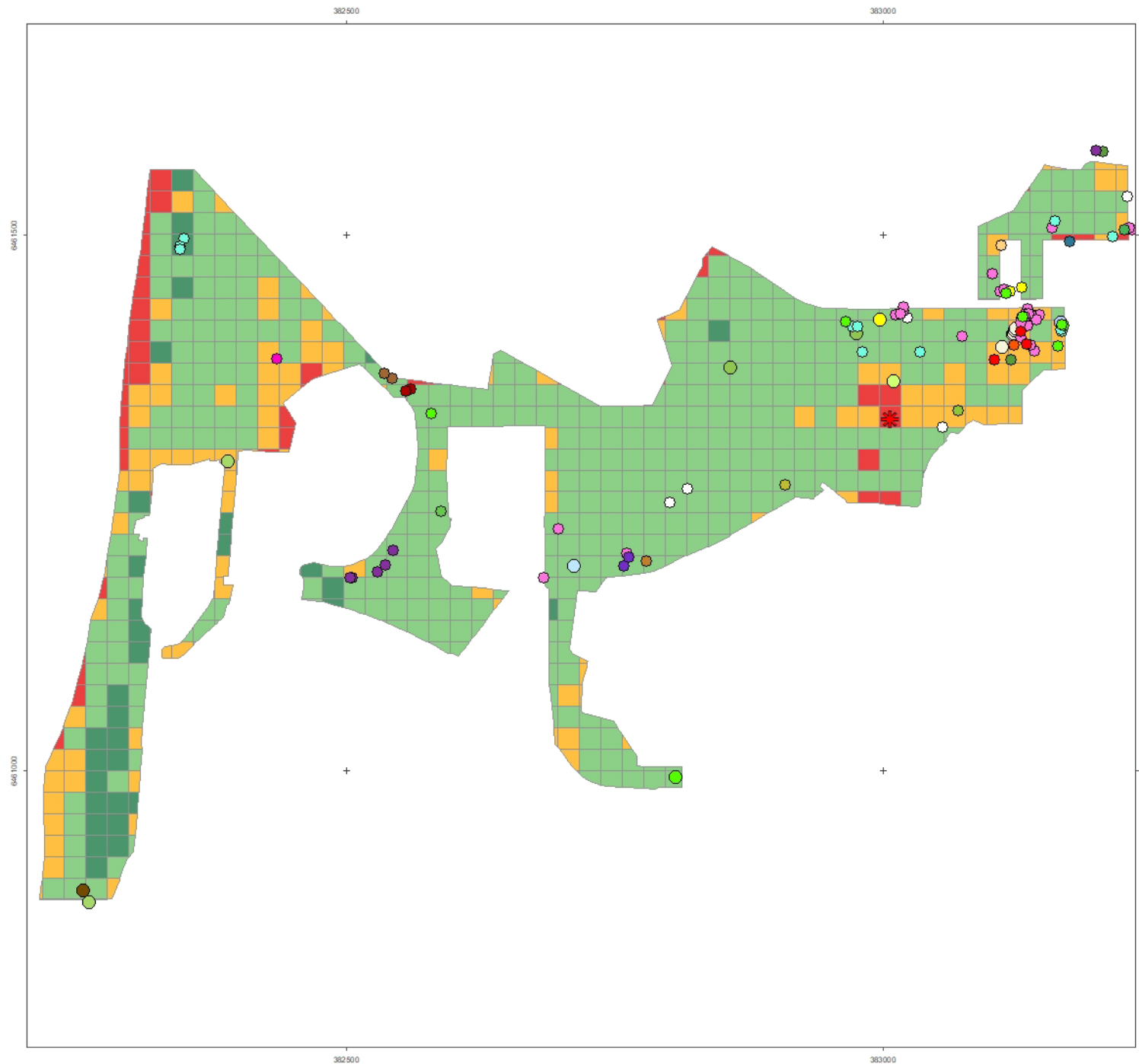
- 1 *Atriplex isatidea* mid isolated shrubs of over **Ammophila arenaria* and *Spinifex hirsutus* mid to low grassland with **Trachyandra divaricata* and *Senecio pinnatifolius* low isolated forbs
- 2 *Scaevola crassifolia*, *Olearia axillaris*, *Acacia rostellifera* and *Acacia cyclops* mid shrubland over *Spinifex longifolius* mid sparse grassland with *Senecio pinnatifolius*, *Carpobrotus virescens* and **Trachyandra divaricata* low open formland
- 3 *Melaleuca lanceolata* and *Callitris preissii* low isolated trees with *Acacia rostellifera* tall closed shrubland over *Rhagodia baccata* and *Scaevola crassifolia* low isolated shrubs over *Senecio pinnatifolius* and *Parietaria debilis* low isolated forbs
- 4 *Eucalyptus gomphocephala*, *Callitris preissii* and *Melaleuca lanceolata* mid isolated trees over *Acacia cyclops* and *Acacia rostellifera* tall shrubland with *Scaevola crassifolia*, *Rhagodia baccata* and *Grevillea crithmifolia* low open shrubland over *Carpobrotus virescens*, **Tetragonia decumbens*, *Acanthocarpus preissii* and *Senecio pinnatifolius* low sparse formland
- 5 *Acacia rostellifera*, *Agonis flexuosa*, *Callitris preissii* and *Eucalyptus gomphocephala* mid woodland over *Rhagodia baccata* and *Grevillea crithmifolia* low shrubland over **Oxalis pes-caprae*, *Acanthocarpus preissii* and **Fumaria capreolata* low open formland
- 6 **Tetragonia decumbens* low open Shrubland over **Oxalis pes-caprae* and **Ferraria crispa* low formland with **Pennisetum clandestinum* and **Cynodon dactylon* low grassland
- 7 **Eucalyptus utilis*, *Eucalyptus gomphocephala* and **Eucalyptus leucoxylon* 'Rosea' low open forest over *Rhagodia baccata*, *Acacia saligna* and *Melaleuca huegelii* low to mid open shrubland over **Oxalis pes-caprae* low formland
- 8 *Eucalyptus gomphocephala*, *Acacia rostellifera*, *Melaleuca lanceolata* and *Agonis flexuosa* mid open forest over *Jacksonia sternbergiana*, *Rhagodia baccata* and *Grevillea crithmifolia* mid to low isolated clumps of shrubs over **Oxalis pes-caprae*, *Parietaria debilis* and *Senecio pinnatifolius* low sparse formland and *Austrostipa flavescens* and mixed non-native annual low isolated clumps of grasses
- 9 **Tamarix aphylla* mid woodland over *Melaleuca huegelii*, *Rhagodia baccata* and *Scaevola crassifolia* mid to low shrubland over *Ficinia nodosa* low isolated clumps of sedges
- 10 **Araucaria heterophylla* and *Agonis flexuosa* tall open woodland over *Scaevola crassifolia*, *Grevillea crithmifolia* and *Olearia axillaris* low to mid shrubland over **Oxalis pes-caprae*, *Carpobrotus virescens* and *Senecio pinnatifolius* low sparse formland and *Austrostipa elegantissima* and mixed non-native annual with low isolated clumps of grasses
- 11 *Eucalyptus gomphocephala* and *Callitris preissii* low open woodland over *Banksia sessilis*, *Acacia rostellifera* and *Melaleuca systema* mid to tall shrubland over *Acanthocarpus preissii*, **Centranthus macrosiphon* and **Oxalis pes-caprae* mid to low formland over *Desmodcladus flexuosus*, *Ficinia nodosa* and *Lepidosperma* sp. low sparse sedgeland
- 12 *Eucalyptus gomphocephala*, *Callitris preissii* and *Eucalyptus utilis* mid to low woodland over *Banksia sessilis*, *Melaleuca systema* and *Templetonia retusa* mid to tall shrubland over **Oxalis pes-caprae*, *Acanthocarpus preissii* and **Centranthus macrosiphon* low formland with *Austrostipa elegantissima*, *Austrostipa flavescens* and **mixed non-native annual* low open grassland
- 13 *Eucalyptus gomphocephala*, *Agonis flexuosa* and *Callitris preissii* mid to low open forest over *Acacia rostellifera*, *Spyridium globulosum* and *Melaleuca systema* tall open shrubland over *Lepidosperma gladiatum* and *Ficinia nodosa* low to mid open sedgeland over **Oxalis pes-caprae*, *Acanthocarpus preissii* and **Ferraria crispa* low closed formland with *Austrostipa flavescens* and **mixed non-native annual* low sparse grassland
- 14 *Corymbia calophylla*, *Eucalyptus gomphocephala*, *Agonis flexuosa* and **Eucalyptus citriodora* tall open forest over *Rhagodia baccata*, *Acacia rostellifera* and *Spyridium globulosum* mid to low open shrubland over *Lepidosperma gladiatum* mid isolated sedges over **Oxalis pes-caprae* low sparse formland
- 15 **Eucalyptus utilis*, **Casuarina equisetifolia*, *Agonis flexuosa* and *Eucalyptus gomphocephala* mid open forest over *Acacia rostellifera*, *Melaleuca systema* **Chamaelaudium uncinatum* tall open shrubland over **Oxalis pes-caprae*, *Senecio pinnatifolius* and **Fumaria capreolata* open formland with isolated clumps of **mixed non-native annual* grasses



	Spinifex grassland		Olearia - Scaevola - Acacia shrubland	<i>Rhagodia baccata</i>	Species readily available at commercial quantities at nurseries
	Acacia - Scaevola - Rhagodia shrubland		Acacia rostellifera shrubland / woodland with isolated Tuart	<i>Tricoryne elatior</i>	Species currently not available at nurseries in commercial quantities / difficult to propagate
	<i>Banksia sessilis</i> shrubland		Tuart - Acacia - Banksia woodland	<i>Scaevola repens</i>	Species available at nurseries but need to pre-order at least a year ahead as difficult to propagate / expensive
	Tuart woodland with <i>Lepidosperma</i> understorey		Marri - Jarrah - Tuart woodland		

ALLEN PARK - EXTRAPOLATED VEGETATION TYPES
WITH SUGGESTED SPECIES LIST

Species Name	Common Name	Spinifex grassland	Olearia - Scaevola - Acacia shrubland	Acacia - Scaevola - Rhagodia shrubland	Acacia rostellifera shrubland / woodland with isolated Tuart	Banksia sessilis shrubland	Tuart - Acacia - Banksia woodland	Tuart woodland with <i>Lepidosperma</i> understorey	Marri - Jarrah - Tuart woodland
TREES									
<i>Banksia attenuata</i>	Slender Banksias						x		x
<i>Banksia grandis</i>								x	
<i>Banksia menziesii</i>	Firewood Banksia								
<i>Banksia prionotes</i>	Acorn Banksia						x		
<i>Callitris preissii</i>	Rottnest Island pine						x		
<i>Corymbia calophylla</i>	Marri								x
<i>Eucalyptus gomphocephala</i>	Tuart				x	x	x	x	x
<i>Eucalyptus marginata</i>	Jarrah								x
SHRUBS									
<i>Acacia cochlearis</i>	Rigid Wattle			x		x	x		
<i>Acacia cyclops</i>	Coastal Wattle			x			x		
<i>Acacia lasiocarpa</i>	Panjang			x		x	x		
<i>Acacia pulchella</i>	Prickly Moses								x
<i>Acacia rostellifera</i>	Summer-scented Wattle								
<i>Acacia saligna</i>	Golden Wreath Wattle								x
<i>Acacia wilkenowiana</i>	Grass Wattle								x
<i>Atriplex isatidea</i>	Coast saltbush	x	x						
<i>Allocasuarina humilis</i>	Dwarf Sheoak					x			
<i>Banksia dallanneyi</i>	Couch Honeyeater						x	x	x
<i>Banksia sessilis</i>	Parrot Bush					x	x	x	
<i>Daviesia divaricata</i>	Marmo								x
<i>Daviesia triflora</i>									x
<i>Gastrolobium capitatum</i>	Bacon And Eggs						x	x	x
<i>Gompholobium tomentosum</i>	Hairy Yellow Pea								x
<i>Grevillea crithmifolia</i>						x	x		
<i>Grevillea vestita</i>					x	x	x	x	x
<i>Hakea prostrata</i>	Harsh Hakea						x	x	
<i>Hemidra pungens</i>	Snakebush					x	x		
<i>Hibbertia racemosa</i>	Stalked Guinea Flower								x
<i>Hovea trisperma</i>	Common Hovea								x
<i>Hypocalymma robustum</i>	Swan River Myrtle							x	x
<i>Jacksonia furcellata</i>	Grey Stinkwood							x	x
<i>Jacksonia sericea</i>	Waldjumi					x	x		
<i>Jacksonia stembergiana</i>	Stinkwood						x	x	x
<i>Leucophyta brownii</i>	Cushion bush		x	x					
<i>Leschenaultia linarioides</i>	Yellow Leschenaultia					x	x		
<i>Macrozamia fraseri</i>	Zamia							x	x
<i>Melaleuca huegelii</i>	Chenille Honeyeater			x		x	x		
<i>Melaleuca systena</i>				x		x	x	x	
<i>Myoporum insulare</i>	Blueberry tree			x	x	x	x		
<i>Olearia axillaris</i>	Coastal Daisybush		x	x	x	x			
<i>Phyllanthus calycinus</i>	False boronia						x	x	x
<i>Rhagodia baccata</i>	Berry Saltbush		x	x	x	x			
<i>Scaevola canescens</i>	Grey Scaevola					x	x		
<i>Scaevola crassifolia</i>	Thick leaved fan flower		x	x	x	x			
<i>Spyridium globulosum</i>	Basket Bush			x		x	x	x	x
<i>Templetonia retusa</i>	Cookies tongues					x			
<i>Xanthorrhoea brunonis</i>								x	x
<i>Xanthorrhoea preissii</i>	Grass Tree						x	x	x
CLIMBERS									
<i>Clematis linearifolia</i>	Old man's beard			x	x	x	x		
<i>Hardenbergia comptoniana</i>	Native Wisteria							x	x
HERBS									
<i>Acanthocarpus preissii</i>	Prickle Lilly			x	x	x	x	x	
<i>Angiozanthos manglii</i>	Mangles kangaroo paw								x
<i>Conostylis aculeata</i>	Prickly Cottonhead							x	x
<i>Conostylis candicans</i>	Grey cottonheads			x	x	x	x		
<i>Corynotheca micrantha</i>	Tangle Lily					x	x	x	x
<i>Dianella revoluta</i> var. <i>divaricata</i>	Flax Lily					x	x	x	x
<i>Kennedia prostrata</i>	Scarlet Runner							x	x
<i>Lomandra maritima</i>						x	x	x	
<i>Threlkeldia diffusa</i>	Coast Bonefruit		x	x					
<i>Trachymene coerulea</i>	Blue lace flower			x		x	x		
SEDGES									
<i>Lepidosperma gladiatum</i>	Coastal Sword Sedge			x		x	x	x	
<i>Schoenus grandiflorus</i>	Large Flowered Bog Rush						x		x
<i>Tetraria octandra</i>								x	x
GRASSES									
<i>Austrostipa elegantissima</i>						x			
<i>Austrostipa flavescens</i>	Spear Grass				x		x	x	x
<i>Microstela stipoides</i>	Weeping Grass				x	x			x
<i>Spinifex hirsutus</i>	Hairy spinifex	x							
<i>Spinifex longifolius</i>	Long-leaved spinifex	x	x						



Woody Weeds

- ?Corymbia maculata
- Bougainvillea sp.
- Brachychiton sp.
- Chamelaucium uncinatum (Geraldton Wax)
- Cupressus sp.
- Erythrina x sykesii (Coral Tree)
- Ficus ?microcarpa
- Ficus carica (Fig)
- Ficus microcarpa
- Ficus sp.
- Leptospermum laevigatum (Coast Teatree)
- Lycium ferocissimum (African Boxthorn)
- Melia azedarach (White Cedar)
- Nerium oleander
- Olea europaea (Olive)
- Phoenix canariensis (Canary Islands Date Palm)
- Punica granatum (Pomegranate)
- Quercus sp. (Oak)
- Ricinus communis (Castor Oil Plant)
- Schinus terebinthifolius (Japanese Pepper)
- Tamarix aphylla (Athe Tree)

Weedy Herbs

- Aeonium arboreum (Aeonium)
- Agapanthus sp.
- Agapanthus sp.?
- Agave americana (Century Plant)
- Asparagus aethiopicus (Asparagus Fern)
- Asparagus officinalis
- Carpobrotus edulis (Hottentot Fig)
- Narcissus tazetta (Jonquil)
- Tetragonia decumbens (Sea Spinach)
- ✱ Zantedeschia aethiopica (Arum Lilly)

Vegetation Condition

- Very Good
- Good
- Degraded
- Completely Degraded

0 50 100 m

Author: RT
Job Number: 10045
CRS: GDA 1984 MGA Zone 50
Date: 25/04/2023

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