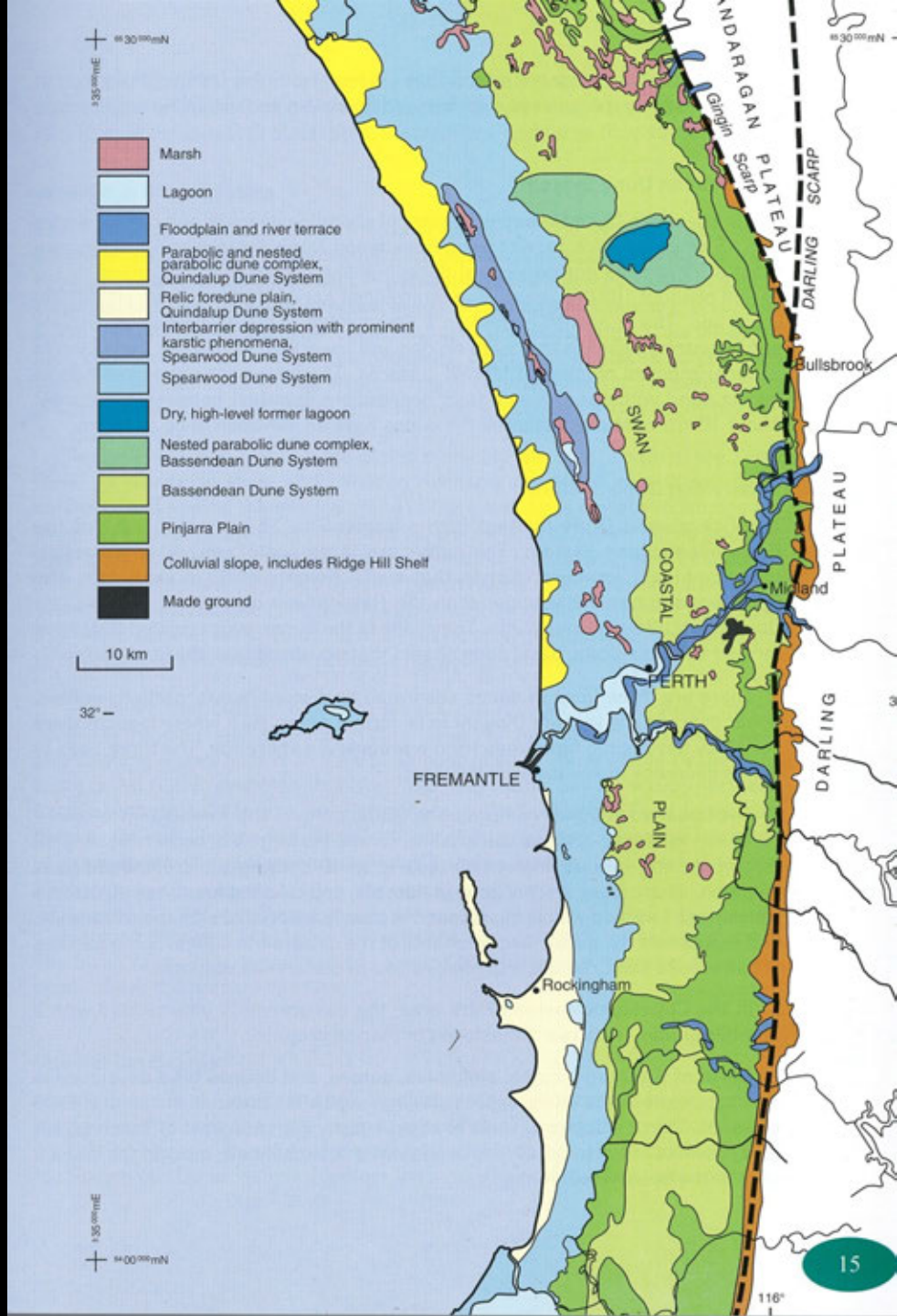
Weed control followed by summer wild fire facilitates restoration of seasonal clay-based wetlands in south-west Australia

Kate Brown & Grazyna Paczkowska

Department of
Environment and Conservation

On the Southern Swan Coastal Plain approximately 240 hectares of clay-based wetlands remain, considerably less than 10% of their original occurrence.



Generalised geomorphology of the Perth region (from; Gozzard, J.R. 2007)


Rhodanthe pyrethrum.


Eleocharis keighery


Craspedia argillicola ms


Chamaescil
gibsonii.


Hydrocotyle lemnoides


Aponogeton hexatepalus.

- 609 taxa recorded from the clay-pans of south-west Australia
- 16 are endemic to the clay-pans
- 20 have their distribution centered on the clay-pans

(Gibson *et al.* 2005)

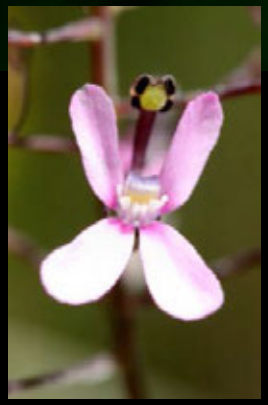
Amphibromus neesii (Swamp Wallaby Grass)

Eryngium pinnatifidum subsp. *palustre* ms

Stylidium obtusatum









Centrolepis aristata

Tribonanthes longipetala

Chorizandra enodis

Meeboldina cana (female)

Meeboldina cana (male)

Meelon Nature Reserve

Meelon - Watsonia 2006

Legend

- Meelon_watsonia_less66%.shp
- Meelon_watsonia06_more76%.shp
- Bush_forev01_config.shp
- Hydro_minor.shp
- Hydro_major.shp
- Roads_unsealed.shp
- Roads_sealed.shp

CALM Estate (statewide)

- State Forest
- Timber Reserve
- Misc Reserve
- Ex Dir Freehold
- National Park
- Nature Reserve
- Conservation Park
- S(DG) Reserve
- S(DH) Reserve
- Marine Park
- Marine Nature Reserve
- Ex Dir Leasehold

N

Scale 1:12,600
1cm represents 126m

0 100 200 Meters

Projection : Universal Transverse Mercator,
MGA Zone 50. Datum : GDA84

GDA

Locality Map

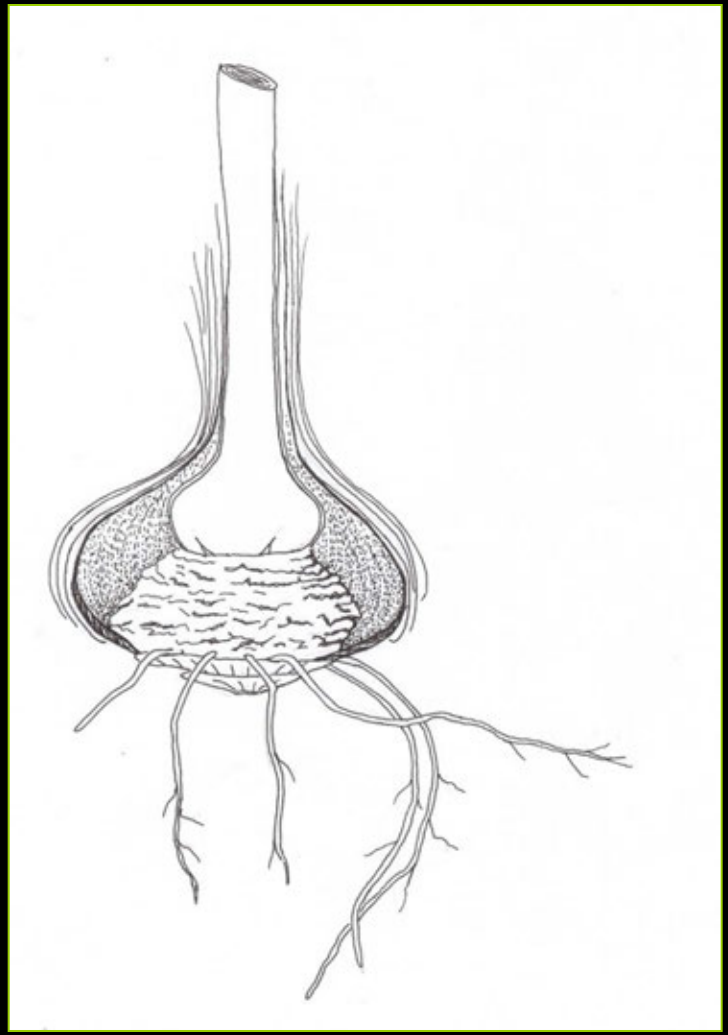
Department of Environment and Conservation

Produced Under the Direction of
Kieran McNamara Executive Director
Department of Conservation & Land Management.

Graticule shown at 1 minute intervals.
Grid shown at 1000 metre intervals.

Produced at 10:58 on September 21, 2006

In September/October each year, just before flowering, on corm exhaustion Watsonia was spot sprayed with the herbicide Dalapon (2.2DPA) at 10g/L + the penatrant pulse.



•Does the native flora of these wetlands have the capacity to regenerate following control and removal of an invasive geophyte?

•Is there a role for fire in that restoration process?

September 2005

(before treatment)

- 5 transects, 30 1x1m quadrats

- Recorded cover of native and introduced taxa in each quadrat

Following wildfire in February 2007

September 2005 before treatment with 10g/L 2-2 DPA (Dalapon)

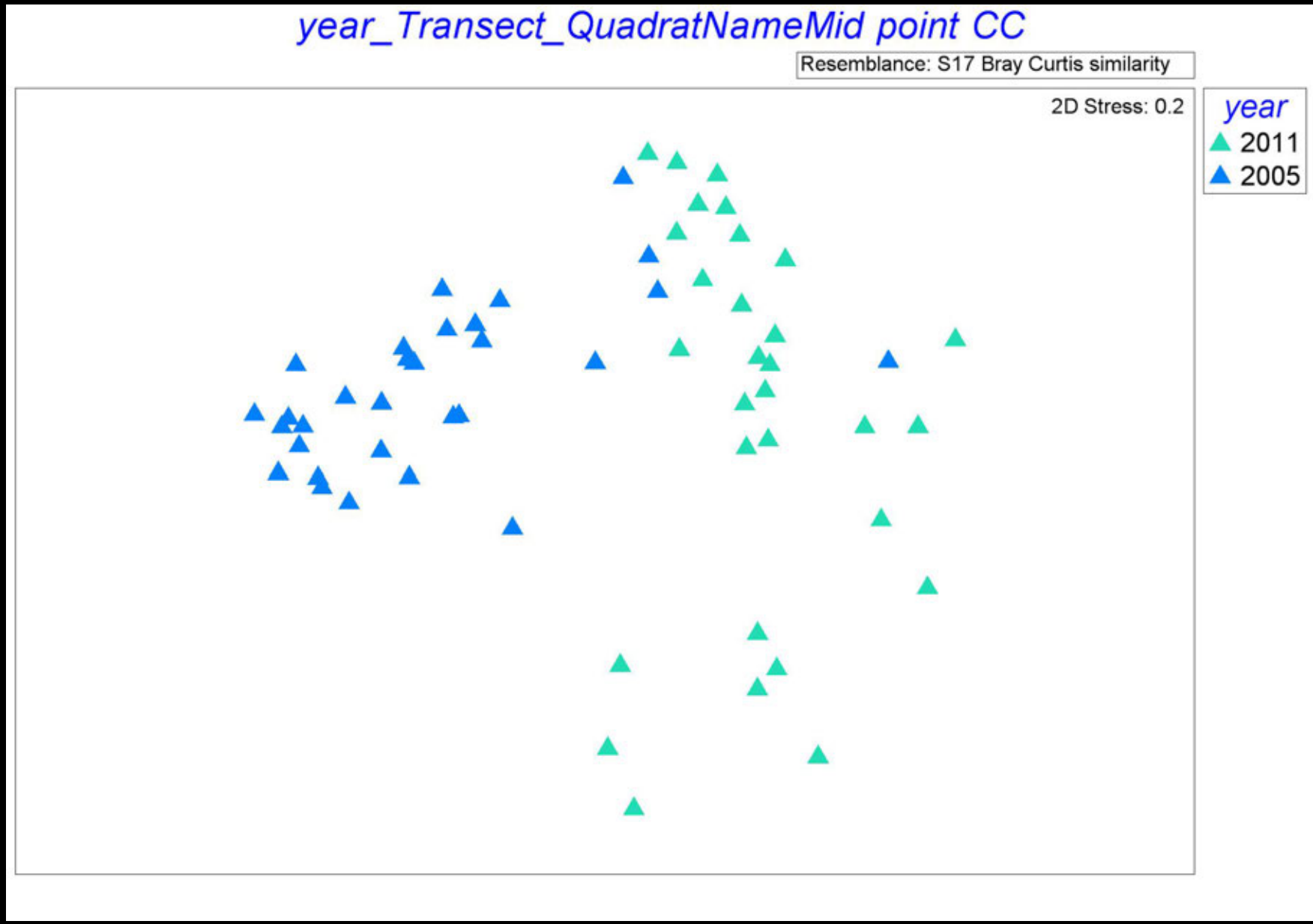
September 2006

February 2007

September 2007

Meelon Nature Reserve

September 2011


year_Transect_QuadratNameMid point CC
Resemblance: S17 Bray Curtis similarity
2D Stress: 0.2
year
2011
2005

Species	2005 Average abundance	2011 Average abundance
**Watsonia meriana var. bulbillifera*	62.4	0.2
Cyathochaeta avenacea	10.0	23.5
Chorizandra enodis	2.3	15.7
Viminaria juncea	2.1	15.4
Caesia micrantha	2.6	2.7
**Briza spp*	3.2	2.9
Eucalyptus wandoo	0.0	3.0
Austrodanthonia acerosa	0.4	1.8
Hypoxis occidentalis	0.0	1.9
Lepidosperma sp. WT2Q5	0.1	1.3
Meeboldina sp.	0.2	1.4
Dichopogon preissii	0.0	1.3
Drosera rostulata	1.5	0.2

Anosim comparing 2005 & 2011 (Global R): 0.6, P< 0.001


Cyathochaeta avenacea


Dichopogon preissii


Hypoxis occidentalis


Chorizandra enodis

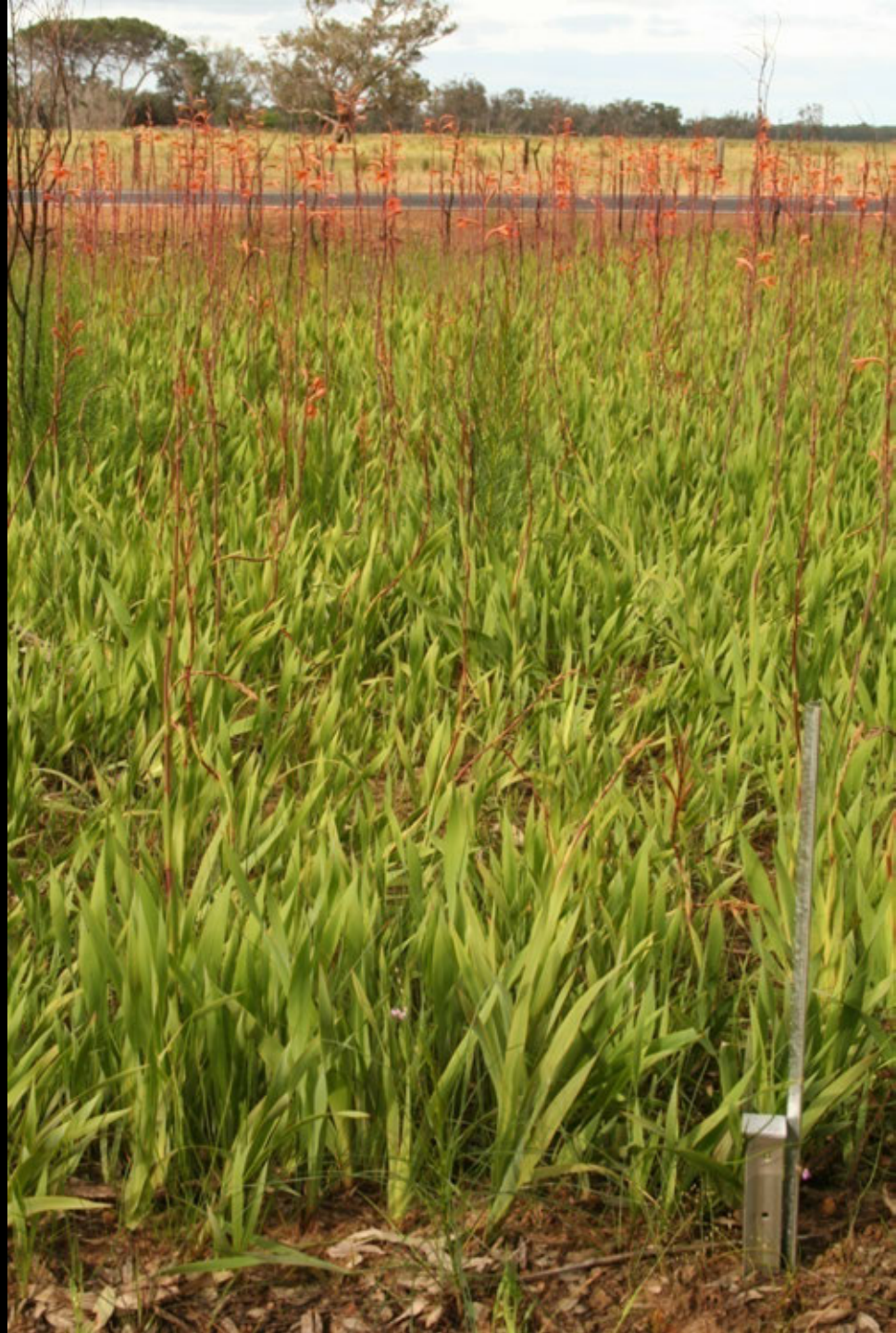

Meeboldina cana


Viminaria juncea


Drosera rostulata

Watsonia meriana var. *bulbillifera* flowering September 2007 in Meelon Nature Reserve following summer wildfire

Prolific flowering and seed set facilitates invasion of Watsonia into bushland following fire.



Species	2008 Average abundance	2011 Average abundance
**Watsonia meriana var. bulbillifera*	33.9	46.1
Viminaria juncea	17.0	9.7
Cyathochaeta avenacea	19.4	14.7
Dichopogon capillipes	7.6	10.8
Hakea lissocarpa	5.3	5.6
Lepidosperma sp. WT2Q5	4.3	1.6
Chorizandra enodis	5.1	2.0
Xanthorrhoea sp. WC1	1.8	3.5
Hypoxis occidentalis	1.3	2.9
**Romulea rosea*	2.0	1.6
Microlaena stipoides	2.3	0.5
**Avena barbata*	2.0	0.8


Cyathochaeta avenacea

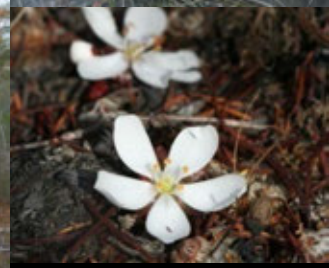

Dichopogon preissii


Hypoxis occidentalis


Chorizandra enodis


Meeboldina cana


Viminaria juncea


Drosera rostulata

Summary

- The communities of these wetlands do have the capacity to regenerate once *Watsonia meriana* var. *bulbillifera* has been controlled

- Summer fire can play a role in the restoration process

- Fire also plays a significant role in the invasion of *Watsonia meriana* var. *bulbillifera* into these plant communities in the first place

Thanks