

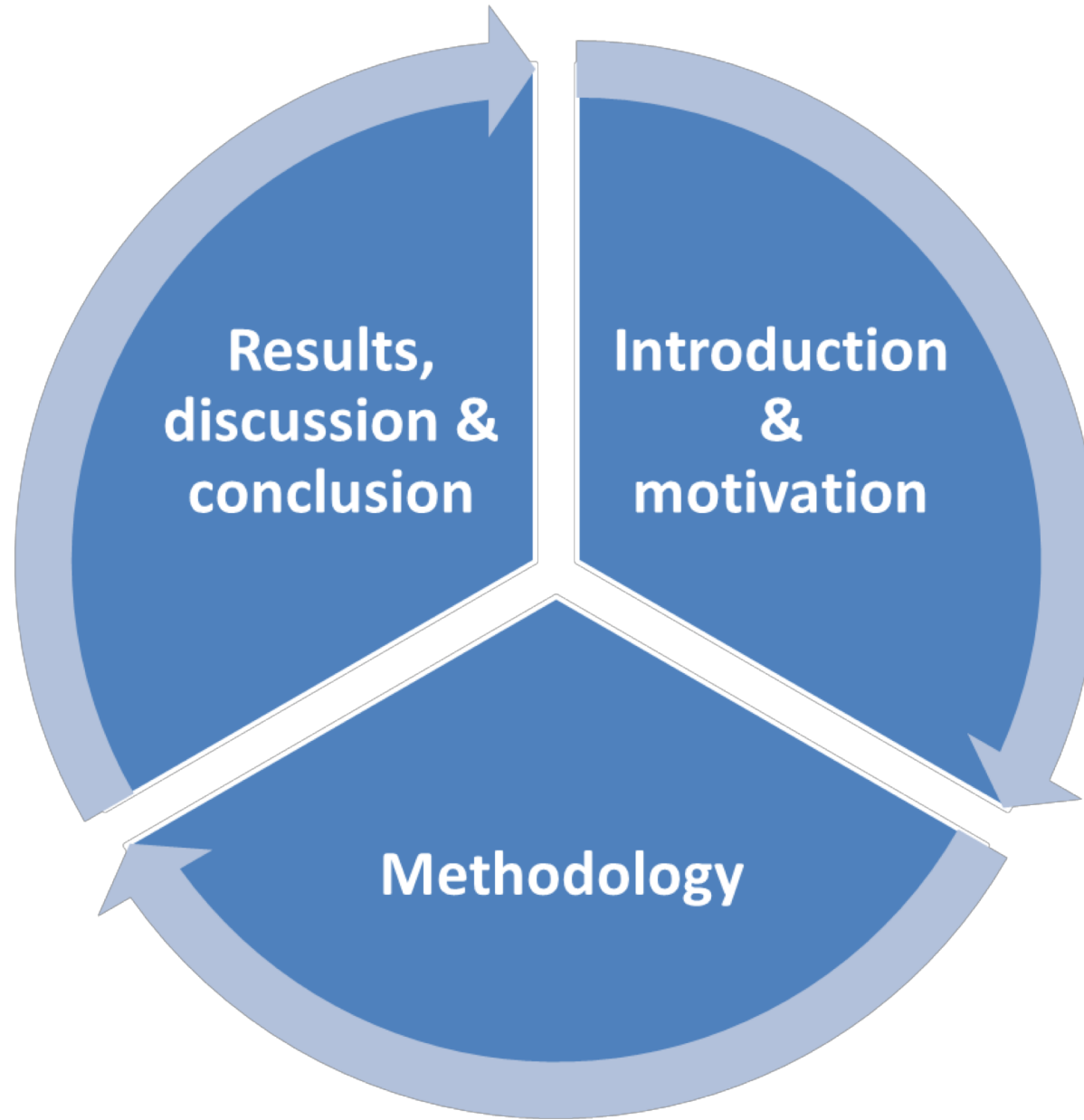


Application of a hydrozone based amenity landscape plant database for South Africa

IPPS conference

March 2019

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Introduction & motivation

- Undertaken as part of a larger PhD study to produce an ALWUMSA
- Context of the need for this aspect of the study
 - Population growth and urbanisation
 - Droughts
 - Climate change
 - Water scarcity
 - Water restrictions
 - Amenity landscapes
 - Aesthetics
 - Watered above baseline
 - One viable solution = hydrozoning

Introduction & motivation cont....

- Hydrozoning
 - placing plants of similar water needs in the same area of the landscape
 - Categories of hydrozones (H/M/L/No)
 - Same valve & irrigation system
 - Applies to indigenous & exotic plants alike
 - Water requirement of plants
 - Differing Eto rates based on plant & plant adaptations
 - Several indigenous plant species have adapted to different environments/ecosystems. This doesn't eliminate need for less water.
 - Site management practices - numerous
 - Watering for establishment (12-24months)

Introduction & motivation cont....

- Plant databases
 - Databases & models & plant factors
 - Species/crop factors - lengthy, time consuming and costly and involves the use of complex instruments/methods
 - Plant factor - acceptable function and appearance
 - Linked to hydrozones
- Plant databases linked to hydrozones
 - Hydrozones linked specific water requirements is promoted by some organisations
 - SA has no comprehensive and agreed database of readily available plants used by the amenity landscape industry that is linked to hydrozone data

Methodology

**SAGIC
Associa-
tions**

**Hydrozone
definition**

**SANA
TRADE
SHOWS**

**August 2015
March 2016,
August 2016
&
March 2017**

**36 sales/
availabili
ty lists
obtained**

**Used
these lists
as basis
for
comparis
on**

Methodology

**17 Grower
nurseries**

16 internet sites

32 books

**Link to
hydrozones**

20 to 672 plants

Hydrozone definition used

Hydrozone	Summer Rainfall region.		Winter rainfall region	
	Detailed definition	Annualised definition	Detailed definition	Annualised definition
No water	No watering required unless in extreme cases.	Receives less than 300 mm effective watering per annum.	No watering required unless in extreme cases.	Receives less than 300 mm effective watering per annum.
Low	<ul style="list-style-type: none"> • Summer - 12 mm/week. • Spring/Autumn - 7 mm/ week • Winter - 12 mm every second week (including lawns but not if dormant). 	Receives annual effective watering of between 300-500 mm.	<ul style="list-style-type: none"> • Winter - 12 mm/ week. • Spring/Autumn - 7 mm/ week. • Summer - 12 mm every second week (including lawns but not if dormant). 	Receives annual effective watering of between 300-500 mm.

Hydrozone definition used

Hydrozone	Summer Rainfall region.		Winter rainfall region	
	Detailed definition	Annualised definition	Detailed definition	Annualised definition
Medium	<ul style="list-style-type: none"> • Summer - 15mm/ week. • Spring/Autumn - 12mm/ week. • Winter - 7mm/ week. 	<p>Receives between 500-750 mm of effective watering a year.</p>	<ul style="list-style-type: none"> • Winter - 15mm/ week. • Spring/Autumn - 12mm/ week. • Summer - 7mm /week. 	<p>Receives between 500-750 mm of effective watering a year.</p>
High	<ul style="list-style-type: none"> • Summer - 25mm/ week. • Spring/Autumn - 15mm/ week. • Winter - 12mm /week. 	<p>Receives over 900 mm of annual effective watering.</p>	<ul style="list-style-type: none"> • Winter - 25mm/week. • Spring/Autumn - 15mm/ week. • Winter - 12mm /week. 	<p>Receives over 900 mm of annual effective watering.</p>

Methodology

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Link to
hydrozones

Data base
cleaned up

20 to 672 plants

“Cleaning up” the plant list

Same species listed with a number of subspecies all with the same hydrozone weighting were reduced using the suffix varieties

Plant name	Plant category	Reduced/join ed to in the final list
<i>Antirrhinum majus</i> 'CANDY SHOWERS'/'MADAME BUTTERFLY'/'ROCKET'	Annual	<i>Antirrhinum majus</i> varieties
<i>Antirrhinum majus</i> 'MADAME BUTTERFLY'	Annual	
<i>Petunia Supertunia</i> TM Sangria Charm TM var. 'USTUN34803' (N)	Annual	<i>Petunia</i> 'Supertunia TM ' varieties
<i>Petunia Supertunia</i> TM Vista Bubbelum TM var. 'USTUN16001' (N)	Annual	

“Cleaning up” the plant list

Incorrect spelling name	Corrected spelling accepted for database
<i>Aspidistrus</i> "variegated"	Aspidistra “variegated
<i>Brachycome</i>	Brachyscome
<i>Cordelia africana</i>	Cordyla africana
<i>Haplocarpa scaposa</i>	Haplocarpha scaposa
<i>Protorhus longifolia</i>	Protorhus longifolia
<i>Syncolestemon densiflorus</i>	Syncolostemon densiflorus

“Cleaning up” the plant list

Incorrect name (Genus and/or species)	Corrected name accepted for database
<i>Thuja</i>(all references)	Platycladus ...(All references)
Geranium Zonal	Pelargonium zonale
Almond Nu Plus Ultra	Prunus dulcis
<i>Rosmarinus</i> "McConnell's Blue"	<i>Rosmarinus officinalis</i> 'McConnell's Blue'
<i>Lavandula</i> 'Margaret Roberts'	<i>Lavandula</i> x <i>intermedia</i> var. 'Magaret Roberts'

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Link to
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Data base
cleaned up

Allocate
hydrozone
weighting

20 to 672 plants

Allocating of weighting and final plant list produced

Scientific name	Plant category	No Water hydrozone	Low water hydrozone	Med water hydrozone	High water hydrozone	Final category awarded
<i>Abelia grandiflora</i>	Shrub & Sub-shrub	0	4	4	0	Medium
<i>Acanthus mollis</i>	Perennial	0	4	4	7	High
<i>Asparagus falcatus</i>	Vine/ Climber	1	1	1	2	High
<i>Bauhinia natalensis</i>	Shrub & Sub-shrub	0	3	2	2	Low
<i>Bougainvillea glabra</i> varieties	Vine/ Climber	1	0	0	0	No
<i>Cassinopsis ilicifolia</i>	Shrub & Sub-shrub	0	4	3	3	Low
<i>Echeveria</i> varieties	Succulent	2	2	0	0	Low

Methodology

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Link to
hydrozones

Data base
cleaned
up

Allocate
hydrozone
weighting

Finally:
Allocate
plant
factor

20 to 672 plants

Results



Zantedeschia pentlandii

Medium

Agapanthus africanus

Medium



Low

Gazania rigens

Aloe dawei

No



Begonia x hybrida

High

Results.....summarised

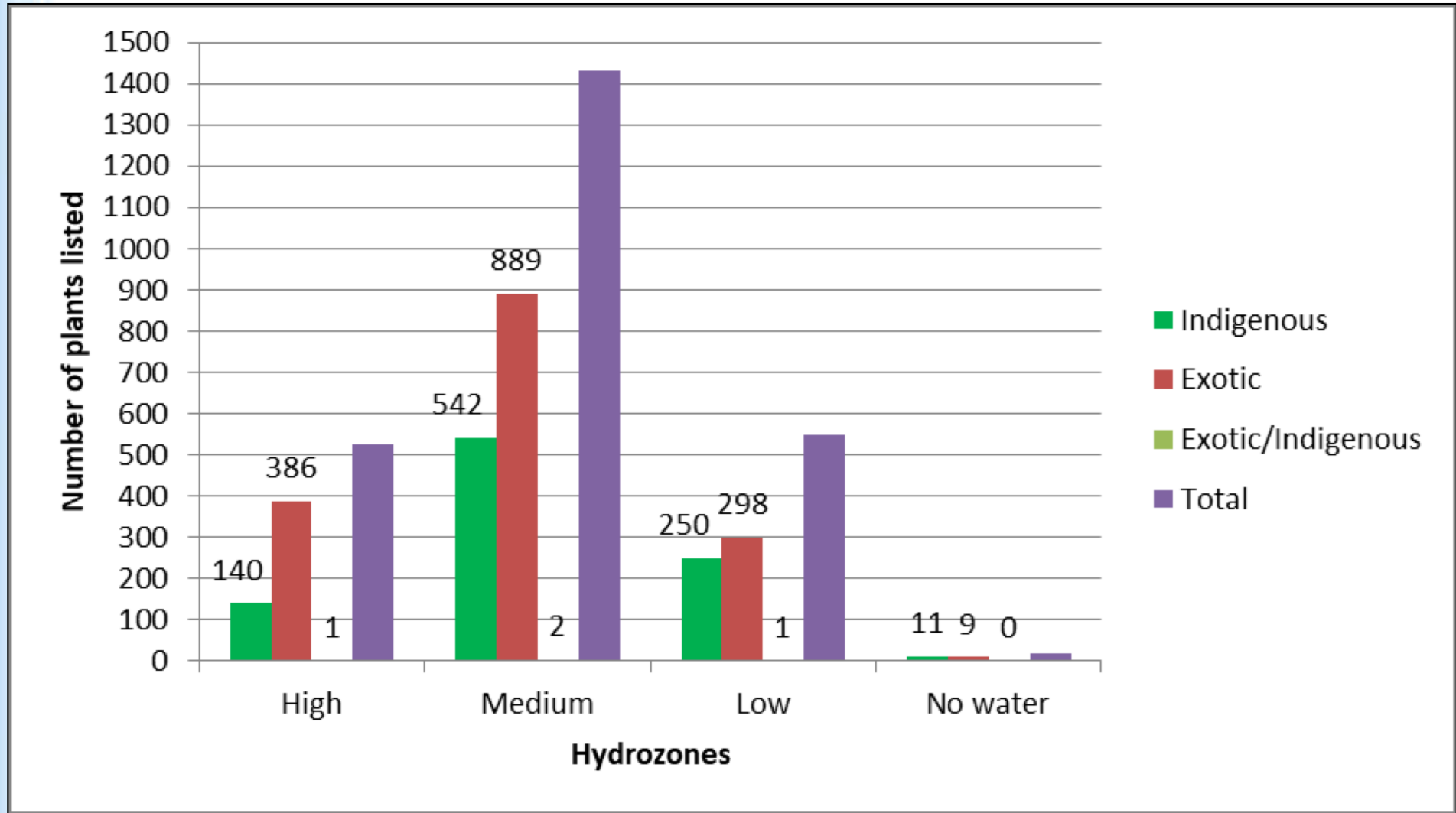
2529

18 different categories

63% Exotic & 37% indigenous

<u>HIGH</u>	<u>MEDIUM</u>	<u>LOW</u>	<u>NO WATER</u>
386 – Exotic	542 – Exotic	250 – Exotic	11 – Exotic
140 – Indig	889 – Indig	298 – Indig	9 – Indig
1 - Both	2 - Both	1 - Both	0 - Both
TOTAL - 527	TOTAL - 1433	TOTAL - 549	TOTAL - 20

Indigenous versus exotic plants in each category



Exotic /Indigenous = reference to genus that could be both

SCIENTIFIC NAME	PLANT CATEGORY:	GENUS	SPECIES	COMMON NAME	INDIG/ EXOTIC	Hydroz one
<i>Abelia chinensis</i>	Shrub & Sub-shrub	<i>Abelia</i>	<i>chinensis</i>	Chinese Abelia	Exotic	Med
<i>Aloe amudatensis</i>	Succulent	<i>Aloe</i>	<i>amudatensis</i>		Indig	No
<i>Aloe arborescens</i>	Succulent	<i>Aloe</i>	<i>arborescens</i>	Krantz aloe	Indig	Low
<i>Aloe chabaudii</i>	Succulent	<i>Aloe</i>	<i>chaboudii</i>	Chabaud's Aloe	Indig	Medium
<i>Aloe marlothii</i>	Succulent	<i>Aloe</i>	<i>marlothii</i>	Mountain Aloe	Indig	Low
<i>Begonia x hybrida</i>	Annual	<i>Begonia</i>	x hybrida	Begonia	Exotic	High
<i>Betula alba</i>	Tree	<i>Betula</i>	<i>alba</i>	Silver birch	Exotic	High
<i>Bulbine frutescens</i>	Bulb like	<i>Bulbine</i>	<i>frutescens</i>	Stalked Bulb likeine	Indig	Low
<i>Buxus sempervirens</i>	Shrub & Sub-shrub	<i>Buxus</i>	<i>sempervirens</i>	Box	Exotic	Med
Celosia Spp	Annual	Celosia	Spp		Exotic	High

SCIENTIFIC NAME	PLANT CATEGORY:	GENUS	SPECIES	COMMON NAME	INDIG/EXOTIC	Hydrozone
<i>Celtis africana</i>	Tree	<i>Celtis</i>	<i>africana</i>	White Stinkwood, Witstinkhout	Indig	Med
<i>Combretum molle</i>	Tree	<i>Combretum</i>	<i>molle</i>	Velvet Bushwillow	Indig	Med
<i>Dianthus</i> Spp Mix	Perennial	<i>Dianthus</i>	Spp		Exotic	Low
<i>Dietes bicolor</i>	Perennial	<i>Dietes</i>	<i>bicolor</i>	Wild Iris	Indig	Med
<i>Disa uniflora</i>	Orchid	<i>Disa</i>	<i>uniflora</i>		Indig	High
<i>Erica</i> Spp	Shrub & Sub-shrub	<i>Erica</i>	Spp	Heather	Indig	Med
<i>Feijoa sellowiana</i>	Shrub & Sub-shrub	<i>Feijoa</i>	<i>sellowiana</i>	Pineapple guava	Exotic	Low
<i>Freesia</i> hybrids	Bulb like	<i>Freesia</i>		Freesia	Indig	Med
<i>Gaura lindheimeri</i>	Perennial	<i>Gaura</i>	<i>lindheimeri</i>	Butterfly / Gaura	Exotic	Low
<i>Geranium</i> Spp	Perennial	<i>Geranium</i>	Spp	Geranium	Indig	Med
<i>Hypoestes aristata</i>	Shrub & Sub-shrub	<i>Hypoestes</i>	<i>aristata</i>	Ribbon Bush	Indig	Med

SCIENTIFIC NAME	PLANT CATEGORY :	GENUS	SPECIES	COMMON NAME	INDIG/ EXOTIC	Hydroz one
<i>Impatiens</i> 'New Guinea' hybrids	Annual	<i>Impatiens</i>		New Guinea	Exotic	Med
<i>Impatiens</i> Sunpatiens varieties	Annual	<i>Impatiens</i>			Exotic	Med
<i>Kniphofia uvaria</i>	Grass like	<i>Kniphofia</i>	<i>uvaria</i>	Red hot poker, Torch lily	Indig	Low
<i>Lavandula dentata</i>	Perennial	<i>Lavandula</i>	<i>dentata</i>	French Lavender	Exotic	Med
<i>Melianthus major</i>	Shrub & Sub-shrub	<i>Melianthus</i>	<i>major</i>	Large Honey Flower	Indig	Med
<i>Mentha x villosa</i>	Herb	<i>Mentha</i>	<i>x villosa</i>	Apple Mint / Appelment	Exotic	Med
<i>Olea africana</i>	Tree	<i>Olea</i>	<i>africana</i>	Wild olive tree	Indig	Low
<i>Pelargonium peltatum</i>	Perennial	<i>Pelargonium</i>	<i>peltatum</i>	Ivy Leaf Geranium	Indig	Low
<i>Petunia grandiflora</i> varieties	Annual	<i>Petunia</i>	<i>grandiflora</i>		Exotic	High
<i>Plectranthus neochilus</i>	Perennial	<i>Plectranthus</i>	<i>neochilus</i>	Dogbane / Spur Flower	Water Indig	Low

SCIENTIFIC NAME	PLANT CATEGORY:	GENUS	SPECIES	COMMON NAME	INDIG/ EXOTIC	Hydroz one
<i>Scabiosa incisa</i>	Ground Cover	<i>Scabiosa</i>	<i>incisa</i>		Indig	Med
<i>Senecio tamoides</i>	Vine / Climber	<i>Senecio</i>	<i>tamoides</i>	Canary Creeper	Indig	Med
<i>Solanum muricatum</i>	Herb	<i>Solanum</i>	<i>muricatum</i>	Fruit Salad Plant	Exotic	Med
<i>Spiraea japonica</i>	Shrub & Sub-shrub	<i>Spiraea</i>	<i>japonica</i>	Japanese Spirea	Exotic	High
<i>Tagetes</i> 'Malanseuns' Spp	Annual	<i>Tagetes</i>	'Malanseuns' Spp	Marigold	Exotic	Low
<i>Thymus vulgaris</i>	Herb	<i>Thymus</i>	<i>vulgaris</i>	Common Thyme	Exotic	Med
<i>Vachellia nilotica</i>	Tree	<i>Vachellia</i>	<i>nilotica</i>	Scented Thorn	Indig	Med
<i>Viola cornuta</i> varieties	Annual	<i>Viola</i>	<i>cornuta</i>	Viola-Yellow face	Exotic	High
<i>Watsonia galpinii</i>	Bulb like	<i>Watsonia</i>	<i>galpinii</i>	Watsonias	Indig	Low
<i>Zantedeschia pentlandii</i>	Perennial	<i>Zantedeschia</i>	<i>pentlandii</i>	Yellow arum	Indig	Med
<i>Ziziphus rivularis</i>	Tree	<i>Ziziphus</i>	<i>rivularis</i>	False Buffalo Thorn	Indig	High

Allocation of plant factors for amenity landscape model application

- Consistent with Water Use Classification of Landscape Species (WUCOLS) , except for No water hydrozone
- Applied as part of Amenity Landscape Water Use Model South Africa (ALWUMSA)

Hydrozone	High	High	High	Medium	Medium	Medium
Coefficient	0.9	0.8	0.7	0.6	0.5	0.4

Hydrozone	Low	Low	Low	No water	No water	No water
Coefficient	0.3	0.2	0.1	0.05	0.03	0.01

No water = Very Low

Conclusion

- Aim - amenity landscapes reduce and optimise any water used in the landscape regardless of source.
- Wholesale growers;
 - to grow and sell plants considering specific water requirements and hydrozones.
 - include information into the sales, and advertising
- Nurseries and Garden Centers;
 - should only sell plants with a hydrozone listing
 - use information and display boards to educate customers on correct hydrozone design and placement.
 - train staff in on hydrozones, their importance.
- Educational institutions;
 - should include information in student training material for use in South Africa.

- Media;
 - Should specifically refer to this hydrozone list when referencing hydrozones
- Landscape Architects and Landscapers;
 - should implement hydrozoning on all sites.
 - maintenance post construction to include hydrozones.
- Plant database should be used in combination with Amenity Landscape Water Use Models in South Africa (ALWUMSA).
- The process undertaken was extensive.
- Database should be adopted by Industry for use.

**FINALLY: PLANTS ARE ONLY WATER WISE IF THEY ARE
PLANTED AND MAINTAINED IN THE CORRECT
HYDROZONE**

Thank you

Questions



Medium

Zantedeschia pentlandii



Low

Gazania rigens



Agapanthus africanus

Medium



Aloe dawei

No



Begonia x hybrida

High

