

Role and Selection of Plants

Outline

- Role of plants and selection of species for:
 - Pollutant removal
 - Hydraulic conductivity
- Other considerations and maintenance

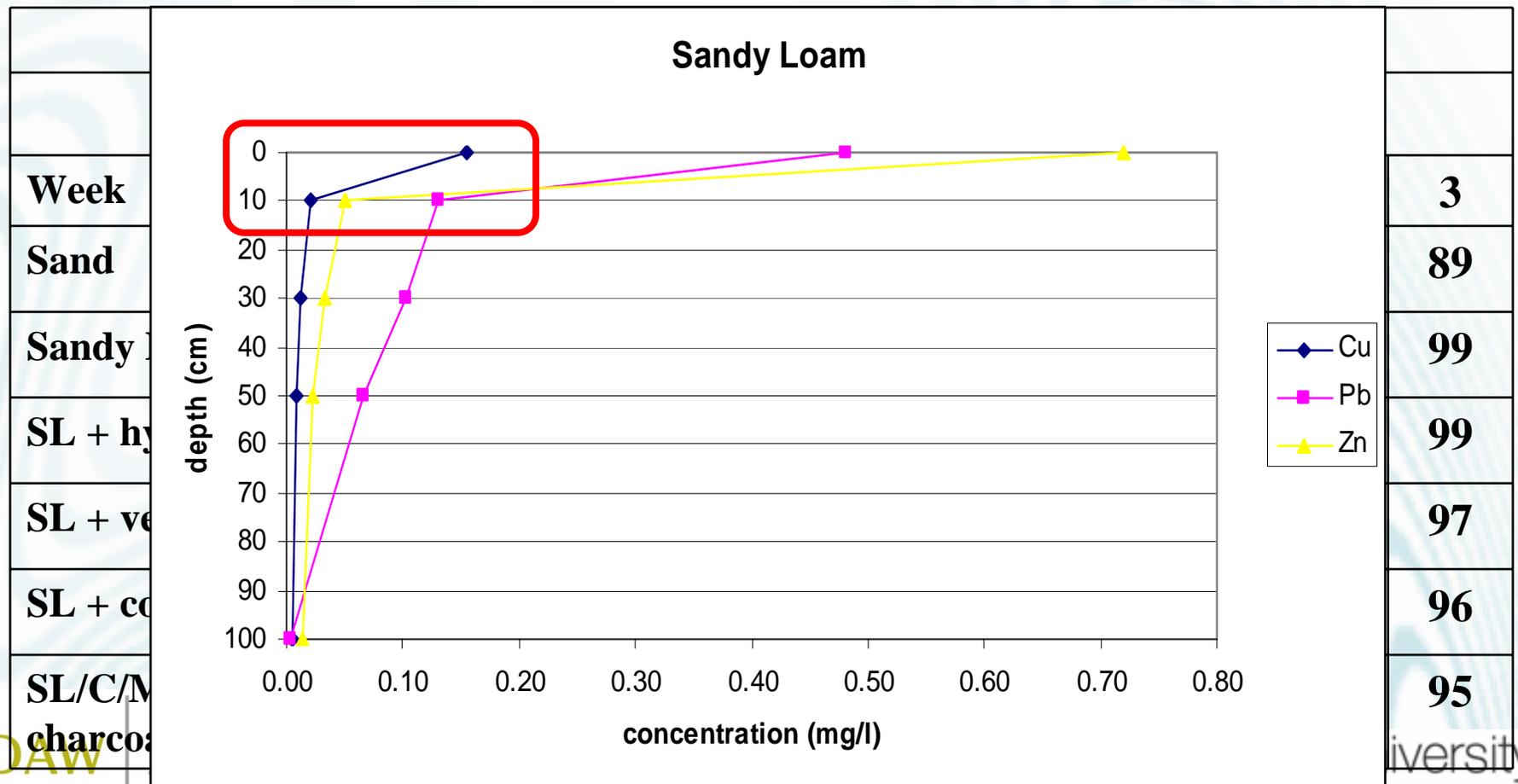


Effect on pollutant removal

- No significant effect for
 - TSS
 - Heavy metals
- Selection of species important for:
 - Nutrients (TP and particularly TN)

Unvegetated Media Tests: *Results*

- Metals: excellent in all cases
- Trapped within first 10 centimetres



Vegetation Trials: *Results*

1. For TSS and most metals:

- Vegetation doesn't matter; removal is by the soil filter

	Stormwater	Effluent	
		Unvegetated	Vegetated
TSS (mg l ⁻¹)	206 ± 32	6 ± 4 (3%)	5 ± 0 (2%)
Al (mg l ⁻¹)	5.45 ± 0.27	0.16 ± 0.04 (3%)	0.17 ± 0.02 (3%)
Cr (µg l ⁻¹)	11 ± 1	1 ± 0 (12%)	1 ± 0 (9%)
Cu (µg l ⁻¹)	237 ± 23	6 ± 2 (3%)	5 ± 0 (2%)
Fe (mg l ⁻¹)	4.66 ± 0.35	3.11 ± 1.46 (67%)	5.01 ± 0.61 (107%)
Mn (µg l ⁻¹)	47 ± 0	371 ± 105 (794%)	599 ± 62 (1283%)
Ni (µg l ⁻¹)	10 ± 1	10 ± 2 (97%)	12 ± 1 (118%)
Pb (µg l ⁻¹)	146 ± 3	<1 (<1%)	<1 (<1%)
Zn (mg l ⁻¹)	1.80 ± 0.04	0.01 ± 0.00 (<1%)	0.02 ± 0.01 (1%)

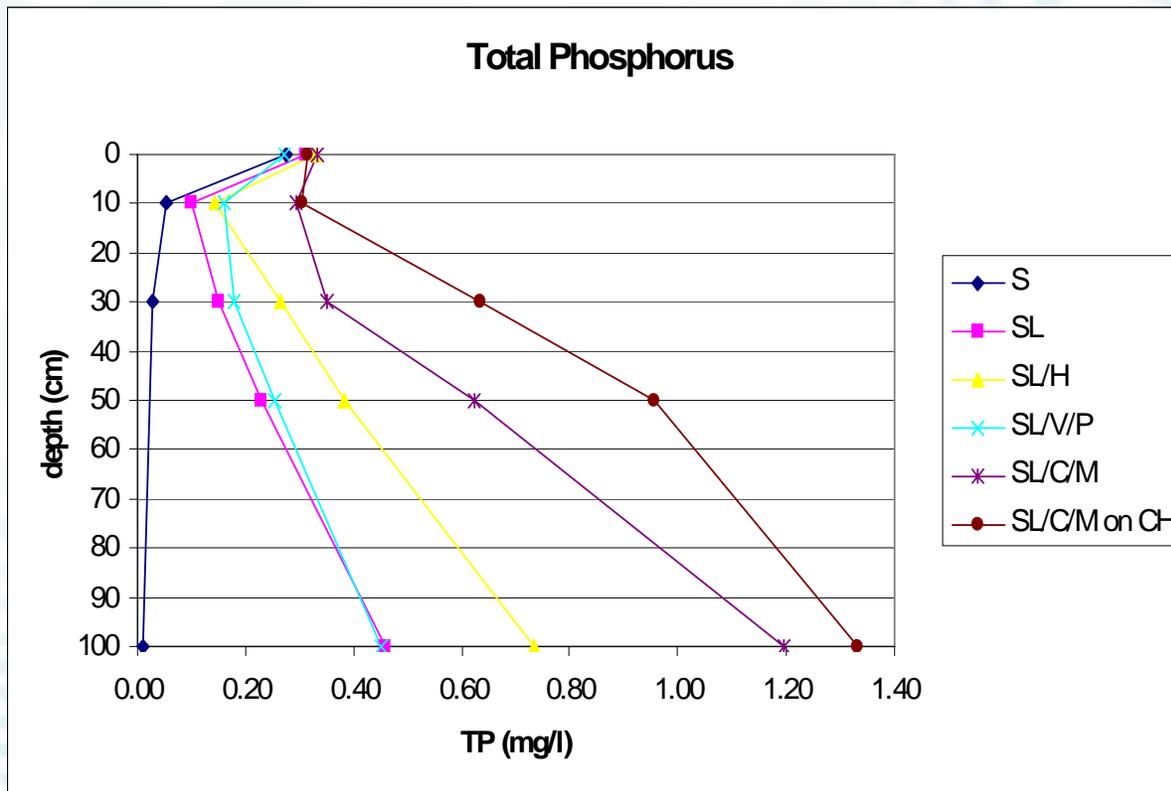
Unvegetated Media Tests: *Results*

- TSS: excellent in all cases
- Trapped at surface; release is from within media

			TSS Removal (%)			
Media		Week	1	2	3	5
S			100 (0)	100 (0)	99 (0)	98 (1)
SL			91 (6)	92 (4)	88 (7)	87 (13)
SL/H			88 (4)	88 (7)	88 (6)	80 (16)
SL/V/P			90 (2)	91 (3)	85 (6)	86 (4)
SL/C/M			84 (9)	91 (4)	86 (6)	83 (11)
SL/C/M on CH			96 (2)	97 (0)	96 (2)	95 (2)

Unvegetated Media Tests: *Results*

- Phosphorus: leaching

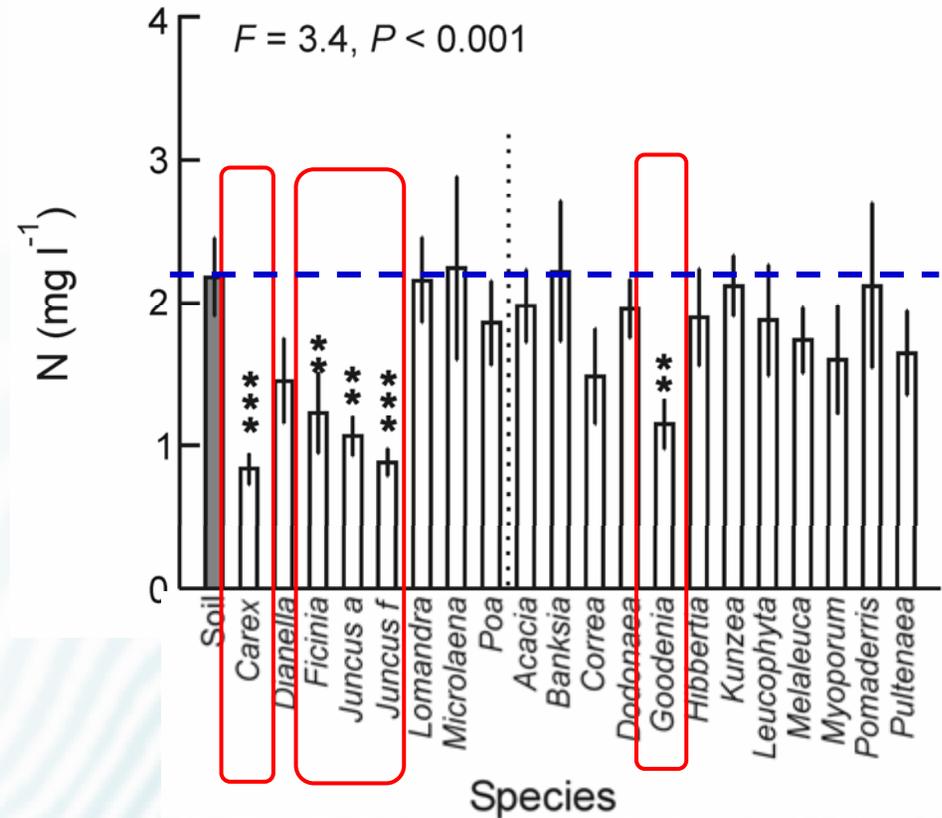


Vegetation Trials: *Results*

2. For nutrients:

- Plants are important, *and*
- There are significant differences between species

Total Nitrogen

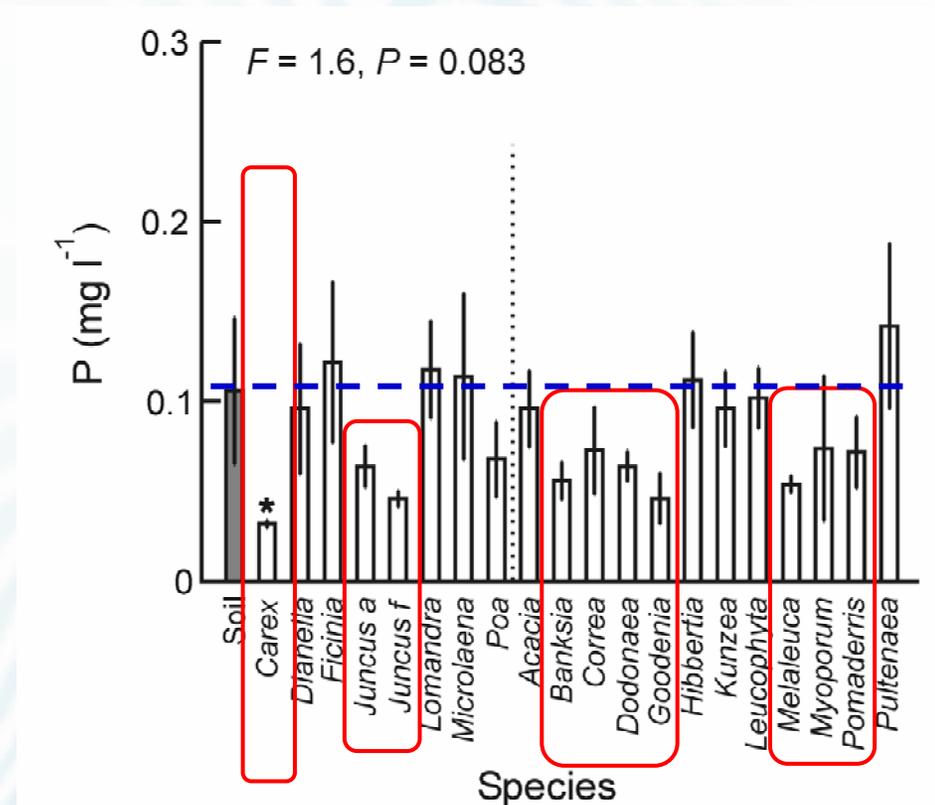


Vegetation Trials: *Results*

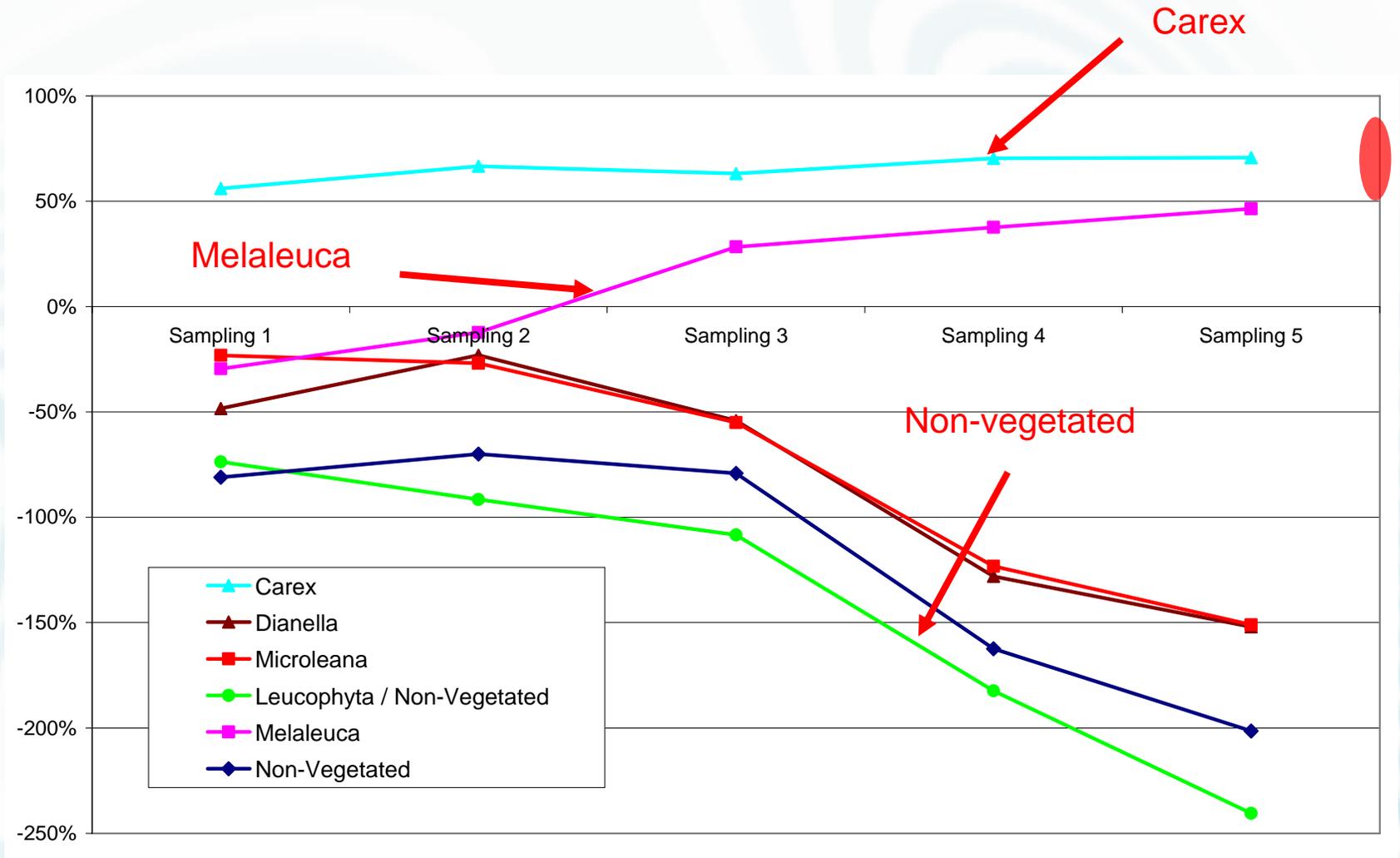
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Total Phosphorus

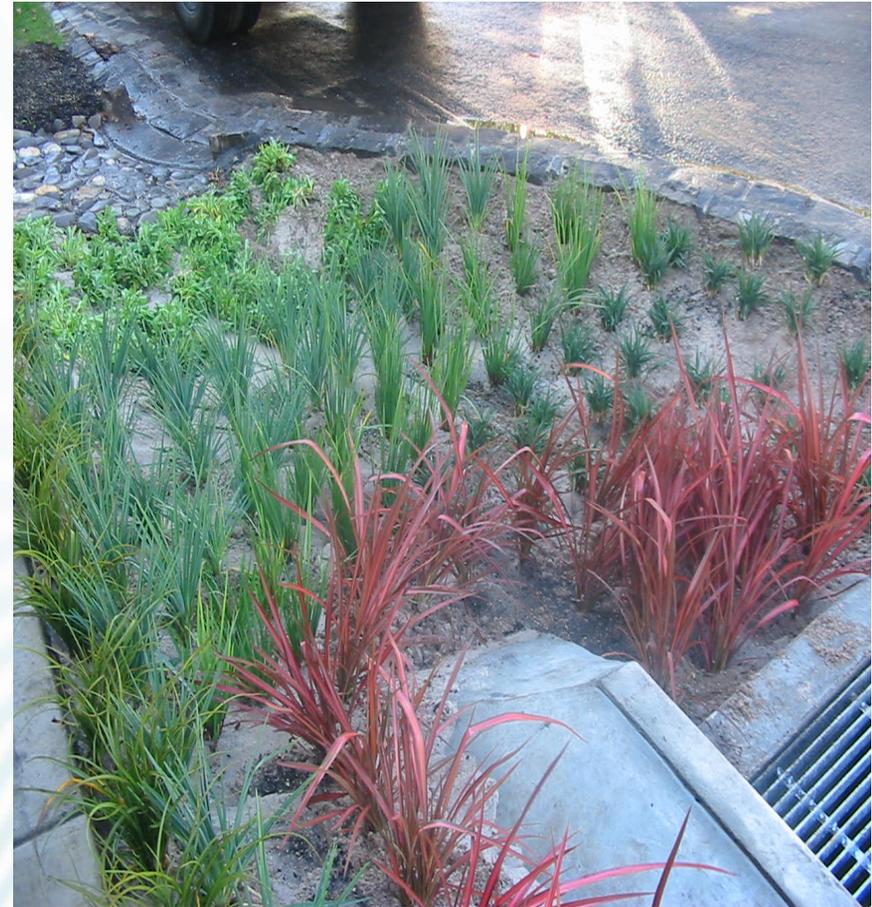


N removal: *effect of species & time*



Selecting plants for N removal

- >50% plants made up of:
 - ***Carex* species**
 - ***Juncus* species**
 - ***Melaleuca* species**
 - ***Goodenia ovata***
- Remainder for aesthetics / biodiversity, etc

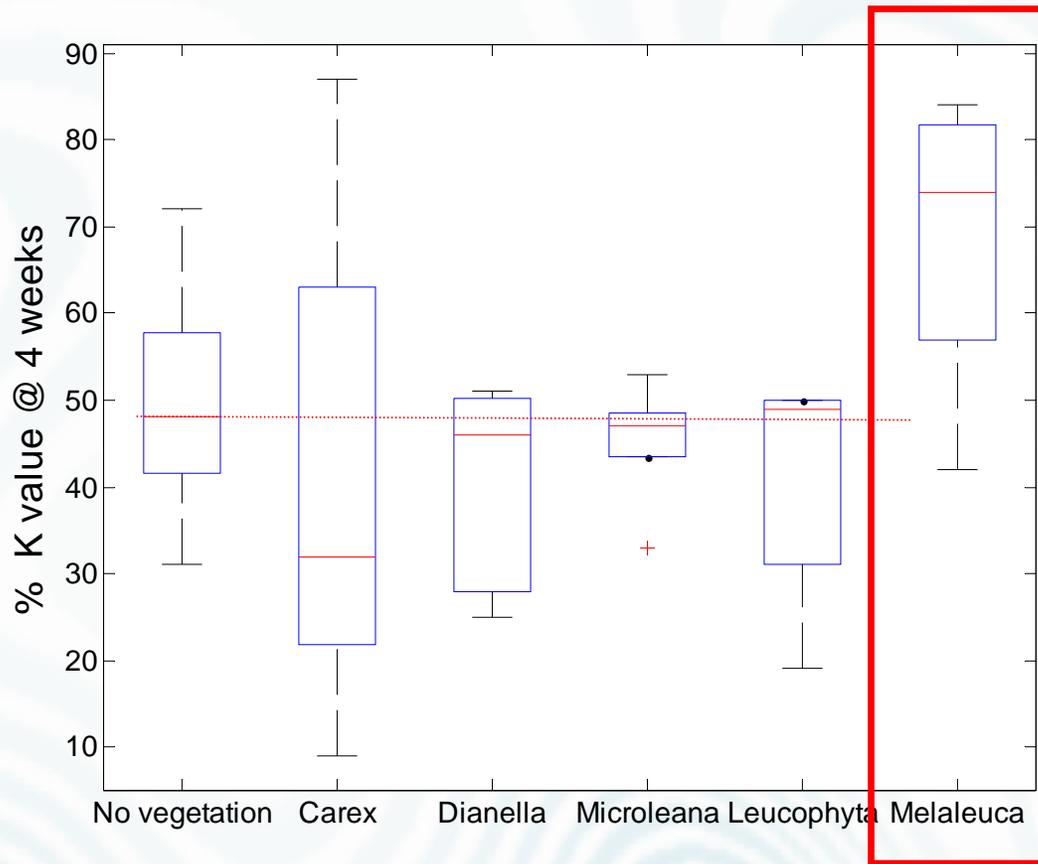


Effect on hydraulic conductivity

- Plants essential to maintenance of hydraulic conductivity
- Differences between plants
- Change over time

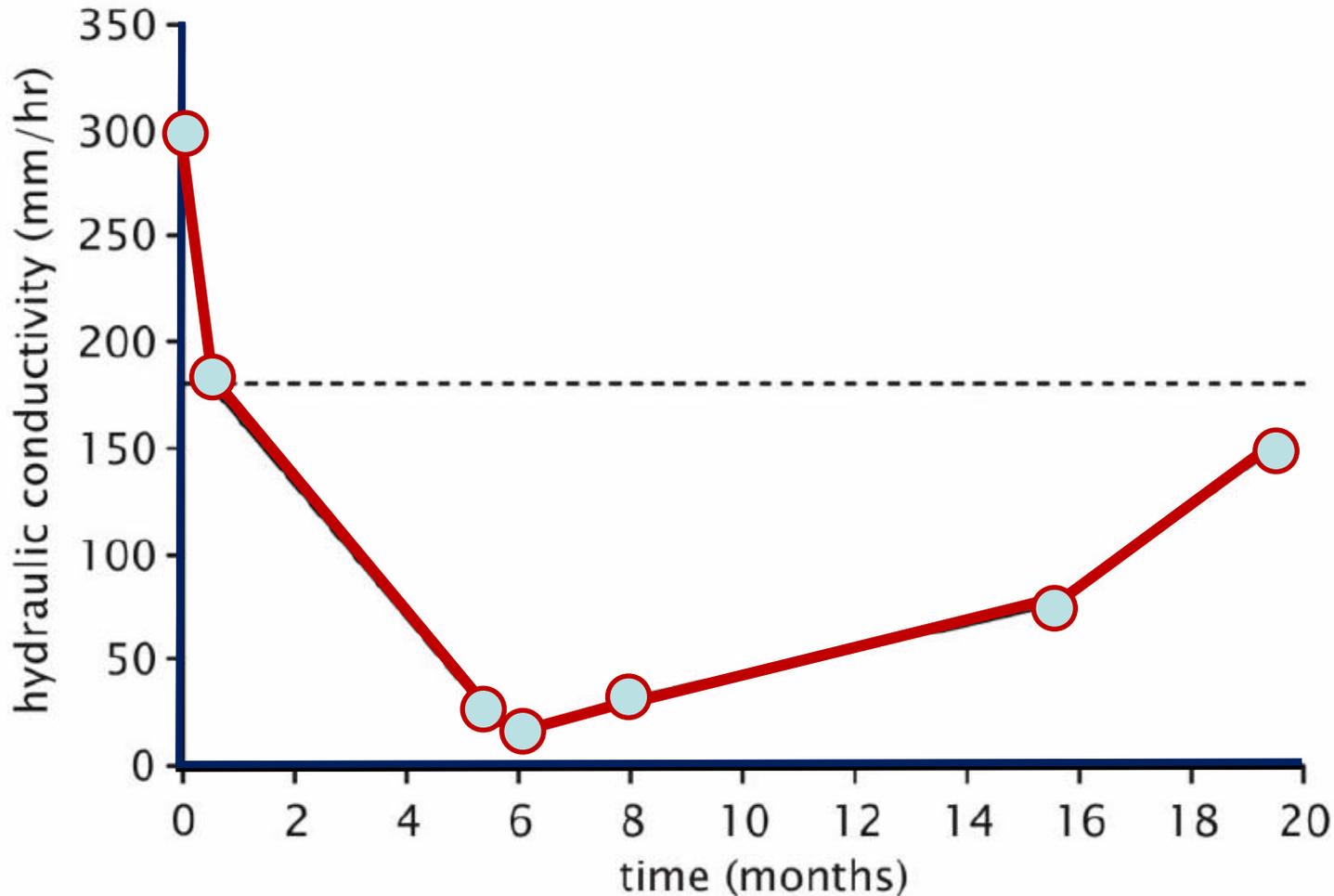


Species with thick roots help...



— limit decrease in K (by creating macropores)

The effect *grows* with time



Other considerations & maintenance

- Selection should also consider
 - Biodiversity (Ecological Vegetation Classes, indigenous plants)
 - Diversity for robustness
 - Aesthetics
 - Suitability for climate / wet-dry regime
- Higher density
 - Less weed invasion
 - Lower maintenance