An Aerial Garden

Faking a tree in an urban setting

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Auckland Botanic Gardens
Where ideas grow

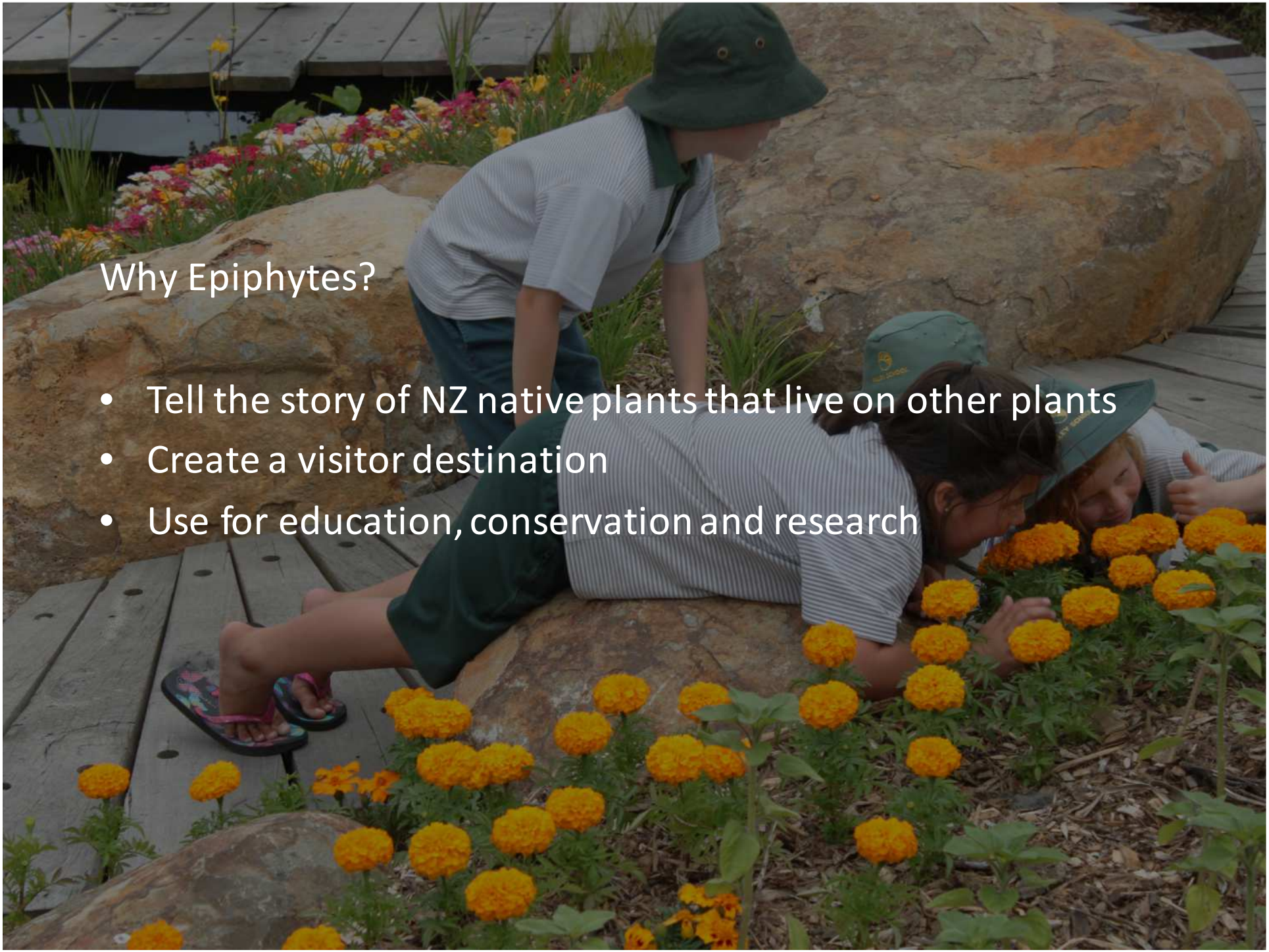
Auckland Council
Te Kaunihera o Tāmaki Makaurau

- Can we reconstruct epiphytic native plant habitats in urban settings?
- The Gardens was asked to provide a description of suitable native NZ plants and environmental conditions needed by epiphytes for the architects of the epiphyte structure planned for the Botanic Gardens.
- I will present this information and comment on the challenges of practically meeting this vision based on what little we know of epiphyte ecology, and discuss the research that will be needed to ensure our community engagement, plant survival and sustainable gardening practice goals are met.

Auckland Council

- Education
- Conservation
- Research
- Visitor destination/recreation
  - All gardens ideally meet all these tests.

Our motto is “where ideas grow” – we aim to inspire and influence our visitors. We want them to be good ecological citizens. We want them to connect with nature through gardening; and understand how nature benefits by using sustainable garden practices. This has relevance for their immediate environment and their health but also “over the garden fence” in the way they impact on and care for our city.


Why Epiphytes?
• Tell the story of NZ native plants that live on other plants
• Create a visitor destination
• Use for education, conservation and research

- Up close to a normally inaccessible world of plants
- Why plants are important, the functional role – carbon uptake, nutrient cycling etc.
- Without plants there is no life - biodiversity ‘life boats’ – habitats up high e.g. for invertebrates

How will we do this?
Build a building that's like a tree
Plant epiphytes, and also vines and mistletoes to elaborate and explain how they are different.

"Can you tell the architect kind of conditions native epiphytes need to grow so they can design a building to grow them on?"

It's complicated

Water (trapping, storage, drought…)

Light

Nutrients

Humidity (elevation, context)

Bark character (chemical, physical)

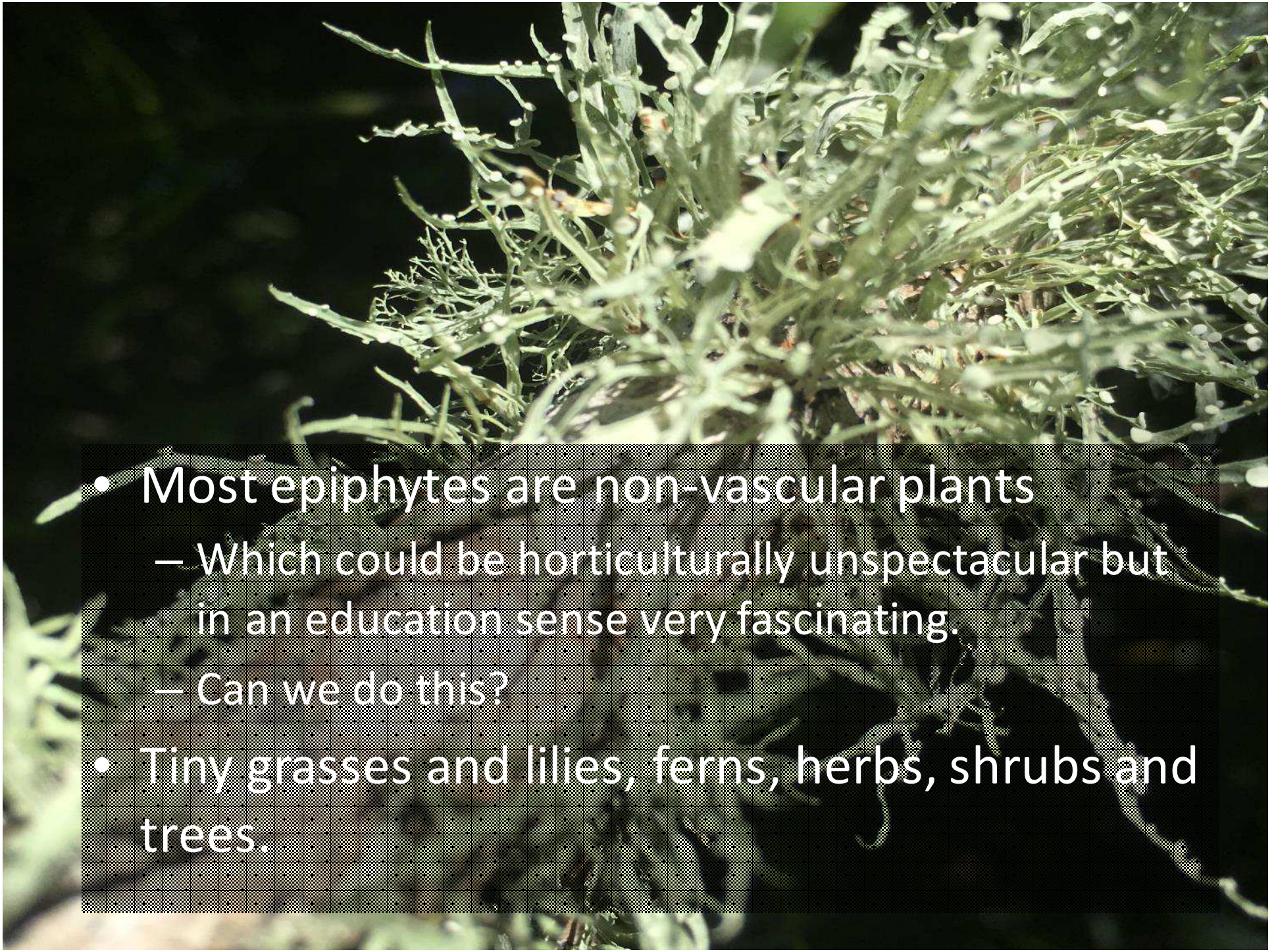
Branch size

Dispersal

Succession (age)

- In a study I helped out with in 1996* 61 non-vascular plants and 94 non-vascular plants were identified on two species (kahikatea and silver beech).
- Surveyed 5m vertical segments of the trees in 4 aspects, then 4 sections (inner by the trunk, middle, outer branches and branch extremes) and 4 different branch types – top/both sides and underneath.
- A tree is full of different habitats or micro-climates. It's not just "up in the tree" some sides/places are wetter or more humid some get morning and not afternoon sun, some get more wind.
- The paper written from this work found 8 different communities in the highly vegetated inner branches of the tree and near the trunk; and 7 additional communities in the less vegetated middle branches to outer extremes.
- That's 15 different main habitats up trees.

* Hofstede, R. G. M., Dickinson, K. J. M. and Mark, A. F. (2001), Distribution, abundance and biomass of epiphyte-lianoid communities in a New Zealand lowland *Nothofagus*-podocarp temperate rain forest: tropical comparisons. Journal of Biogeography, 28: 1033–1049



- Most epiphytes are non-vascular plants
  - Which could be horticulturally unspectacular but in an education sense very fascinating.
  - Can we do this?
- Tiny grasses and lilies, ferns, herbs, shrubs and trees.

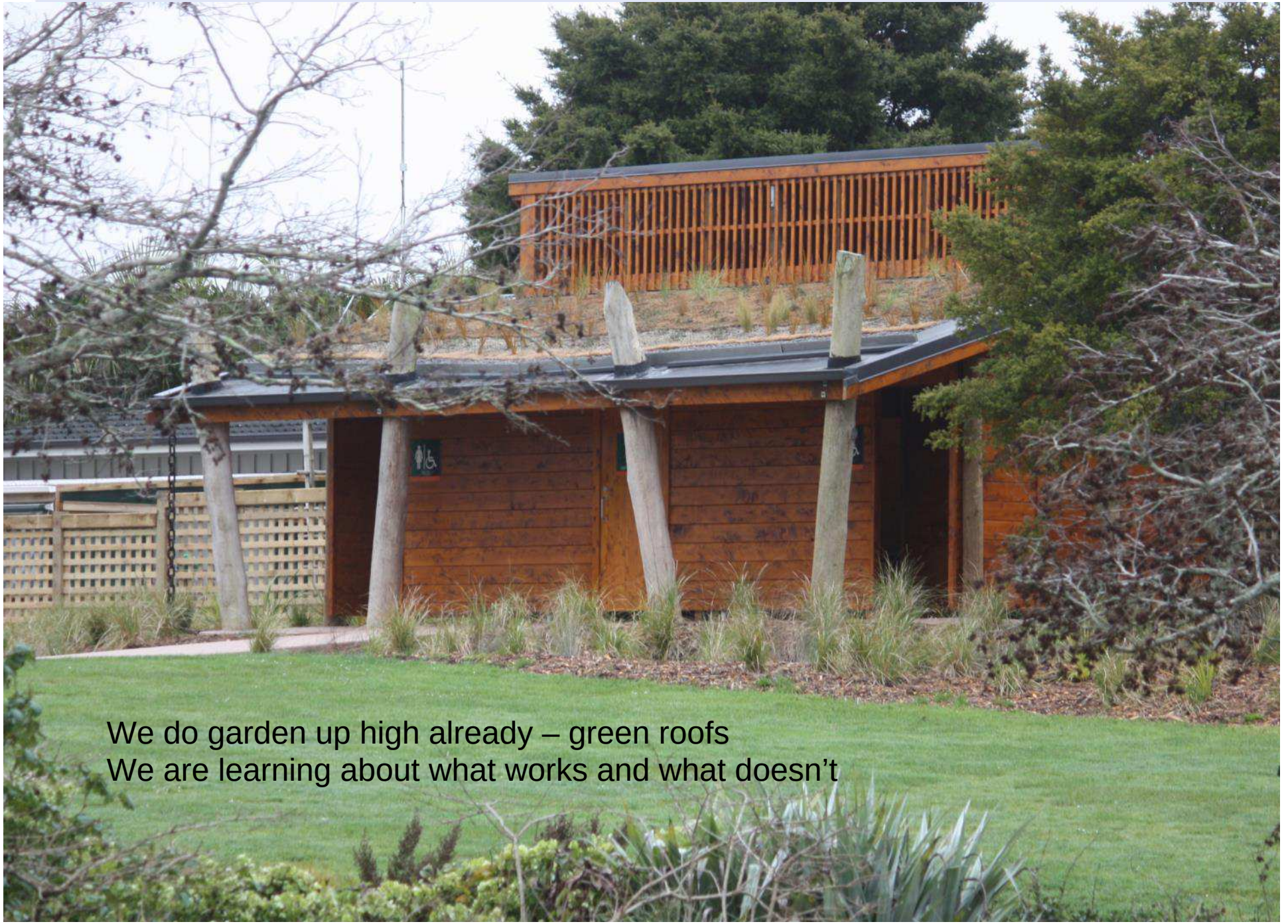
Faking it

- We'll have to mimic microclimates, aerial soil, copy successional patterns, manipulate nutrients…
- Ensure sustainability - we want to conserve water, use natural sources of nutrients, no chemicals
- Ensure it looks amazing (high horticultural standards)

Marie Selby Botanical Gardens

Not the only ones to try this – perhaps we need a field trip to the US!

"the only botanical garden in the world dedicated to the display and study of epiphytes, especially orchids and bromeliads, and their canopy ecosystems, with a focus on botany, horticulture and environmental education"



We do garden up high already – green roofs
We are learning about what works and what doesn't


The Cloud Tree by
Patterson Associates
PATTERSON
ARCHITECTS
EPIPHYTUM
AUCKLAND BOTANIC GARDENS

The Cloud Tree by Patterson Associates

http://m.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11214543

http://aaa.org.nz/wp-content/uploads/2014/12/AAA-Visionary-Architecture-Awards-2014-Work-In-Progress-Highly-Commended-Sajeev-Ruthra-Andrew-Mitchell-from-Patterson-Associates-The-Cloud-Tree.pdf

http://pattersons.com/