# Waitītiko - Meola Creek Urban Wetland

**Elizabeth Walker, STEPS** (St Lukes Environmental Protection Society Inc )

May 2011

# Outline

- STEPS Wetland - introduction
- Urban Issues
- Urban Wetlands – Ecological Role
- Roy Clements Treeway (RCT) – location, history
- RCT plantings
- Maintenance
- Biodiversity
- Recommendations

# Wai - Spring fed water

- STEPS, Auckland Council and Watercare have jointly restored the STEPS wetland fed by a spring from the Te Tatua-a-Riukiuta aquifer, in the Roy Clements Treeway
- Originally a neglected, flood-prone area dominated by exotic grasses and weeds
- Now a restored wetland
  - High visual clarity

STEPS Wetland, Waitītiko

# Urban issues

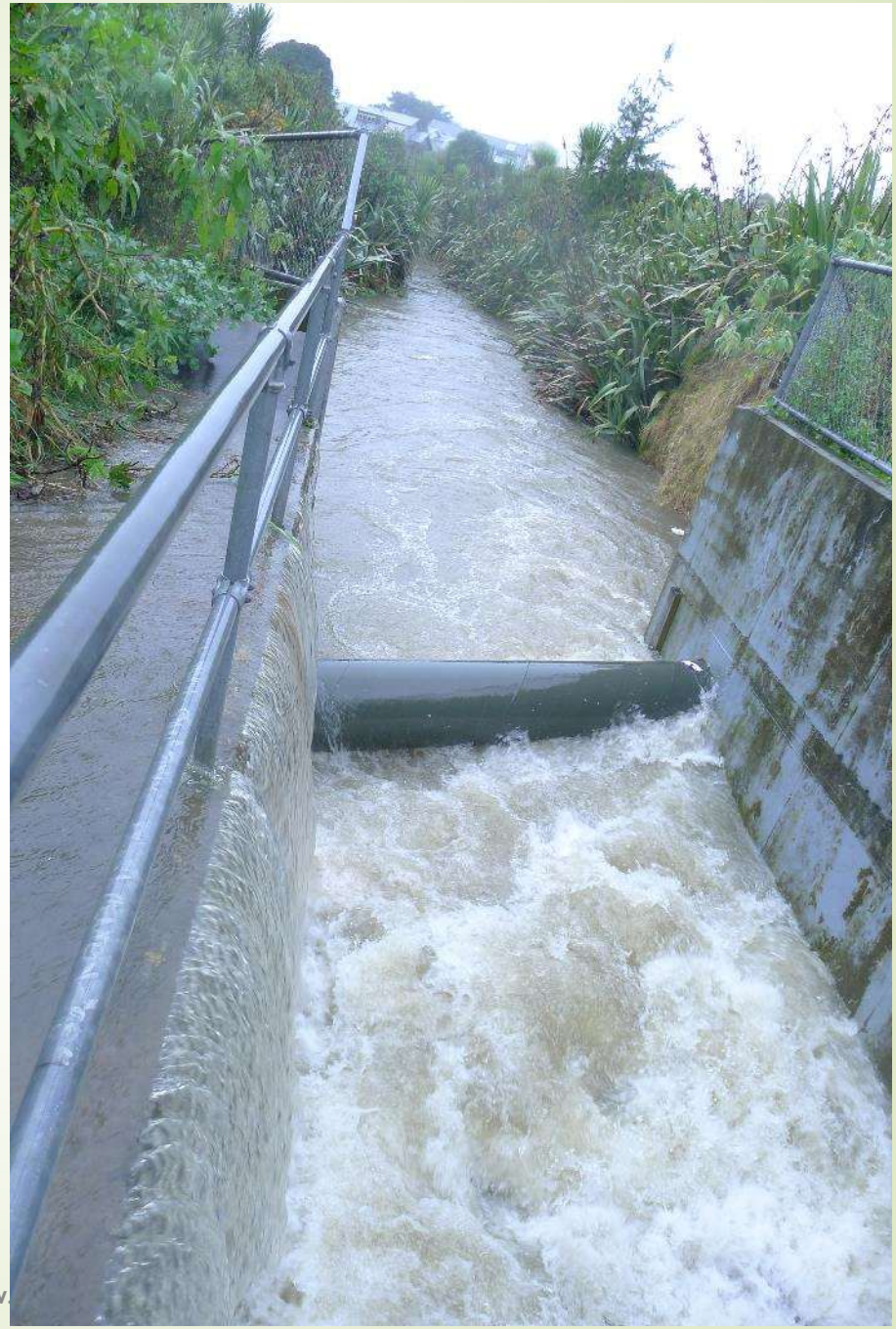
- Urban development brings increased impervious surfaces
- Pollution – Waitītiko creek overflows 80-100 times per year; sewage and heavy metals flood the wetland a few times a year
- Water sensitive design can address and limit impacts
  - "Nature based" soft engineering solutions (e.g. wetlands and rain gardens)
  - Auckland Unitary plan / new developments
- Waitītiko features hard engineering - concrete-lined spillways, piped streams and drainage
- Graffiti removal ongoing
- Important to distinguish functioning natural wetlands from planted stormwater ponds
  - Stormwater ponds often fringed by amenity plantings that provide little in the way of habitat or ecosystem services

# Frequent polluted floodwaters

RC Treeway boardwalk 90cm high P Nicholson 2010

# Haverstock Rd Outfall

- Largest combined sewer overflows in Auckland (NZ?) 300 m south of wetland
- Waste water and stormwater overflows contain sewage, plastic, heavy metals, oil
- New Central Interceptor will reduce frequency
- Auckland Council – no intent to separate stormwater and sewage here



http://www.meolacreek.org.nz/ https://www.

# Waitītiko Meola Creek – urban issues

Non English speaker gathers cress, onion weed and washes in polluted stream

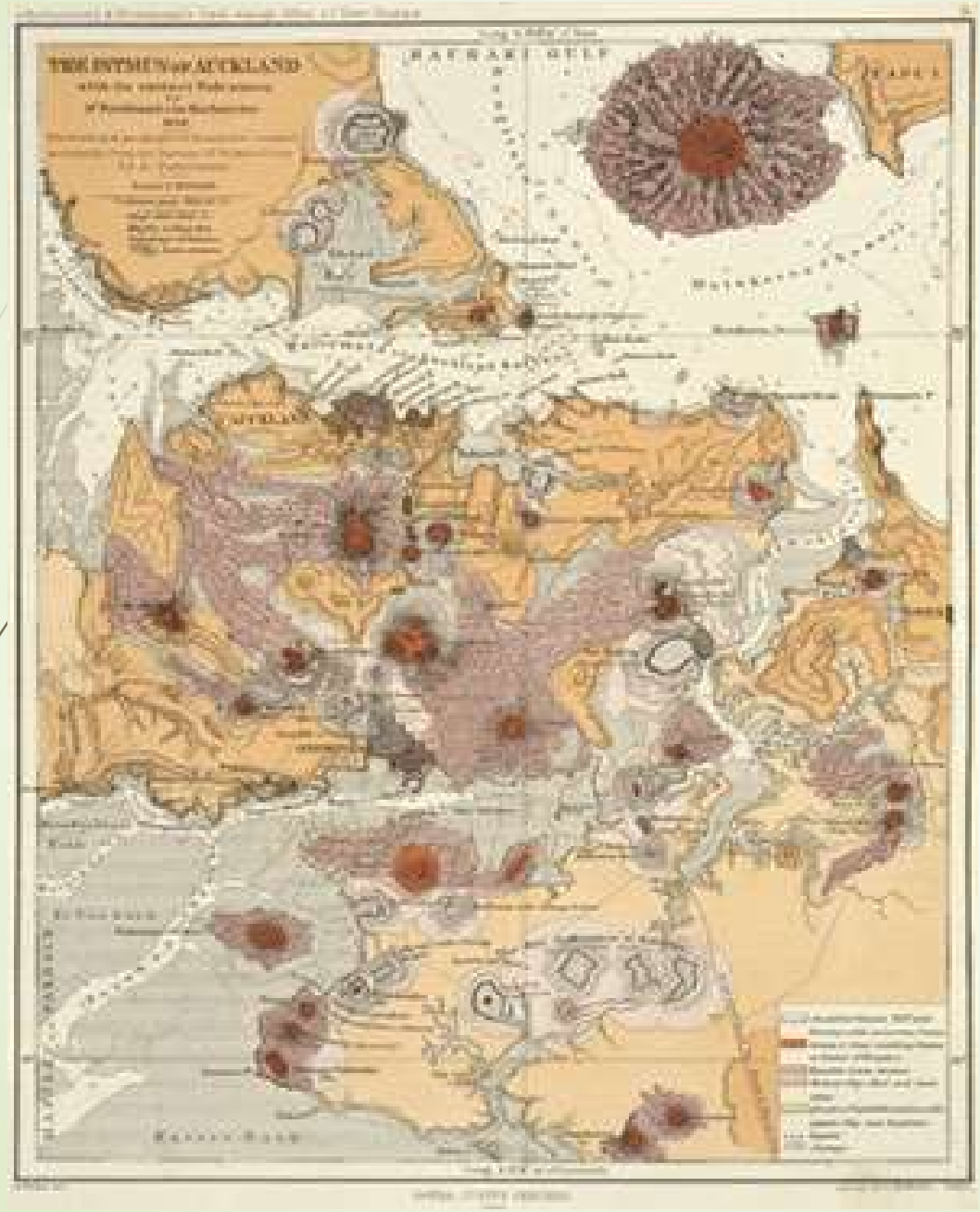

Sign defaced, broken, removed, then graffitied again.

St Lukes retailers rely on Council to return trolleys

# Urban wetlands – Ecological Role

- Urban wetlands bring people and nature into contact
- Education – example of what has been lost and how recovery can be initiated
- Important reservoirs of biodiversity
  - NZ wetlands support a disproportionately higher % of threatened species than terrestrial ecosystems
- Essential ecosystem services
  - Water filtration and purification
  - Attenuation of floodwater and fast-flowing water
  - Wetlands are also very effective at sequestering carbon
  - Provide buffering against effects of storms and floods
- Climate changes include more frequent intense rain events for Auckland

# Auckland's Volcanic Landscape




Hochstetter, 1859

# Roy Clements Treeway

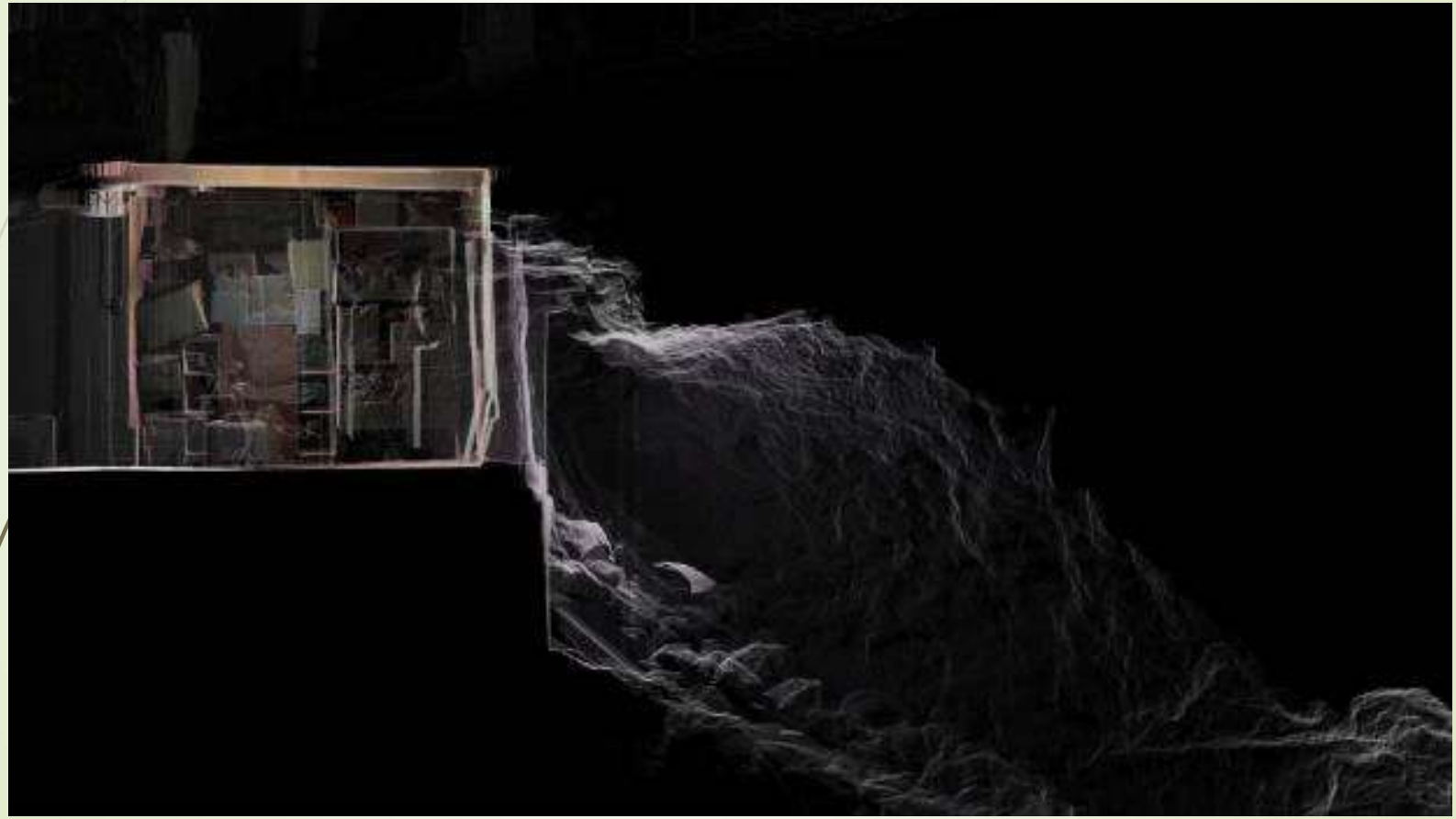
- Location – near Owairaka Mt Albert 'foothills'
- Geology – sits on top of lava flow
- Largest aquifer in Auckland Region
- Wetland combined area 0.5 hectare
- Soils – mixed volcanic and fill

# Cabbage Tree Swamp 1880


Mount Eden -the Cabbage Tree Swamp was on the site of present-day Eden Park. (Backhouse, John Philemon 1845-1908)

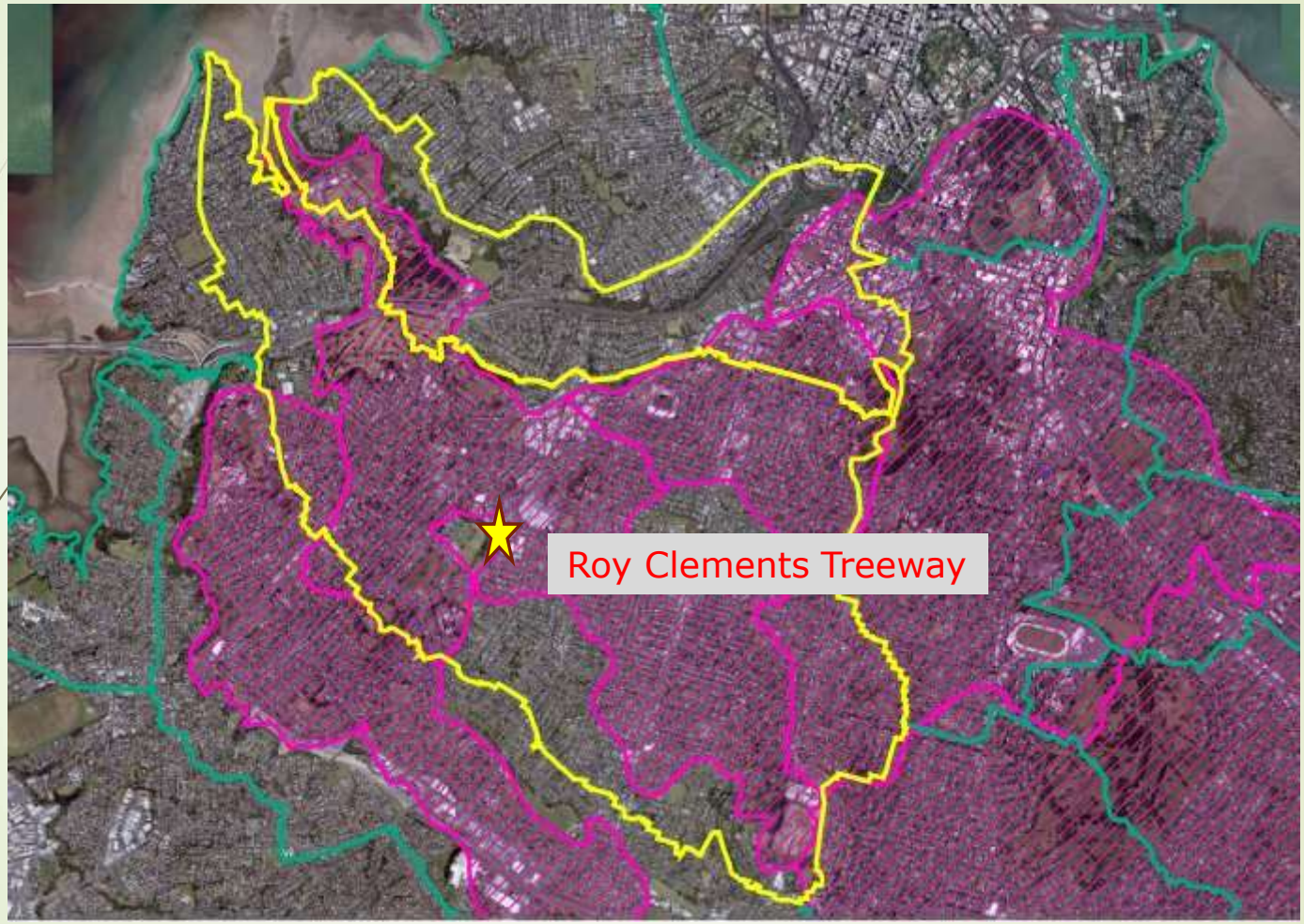
*Cabbage trees growing in a swamp with a settlement in the background and a man on a white horse in the foreground ca 1880. Reference Number: E-052-q-015 (http://mp.natlib.govt.nz/detail/?id=6571)*

# Te Tatua-a-Riukiuta volcanic aquifer links Waitītiko & Waiateao streams



CHIRAG JINDAL/SUPPLIED A cave stretching off a house basement, scanned by Chirag Jindal.

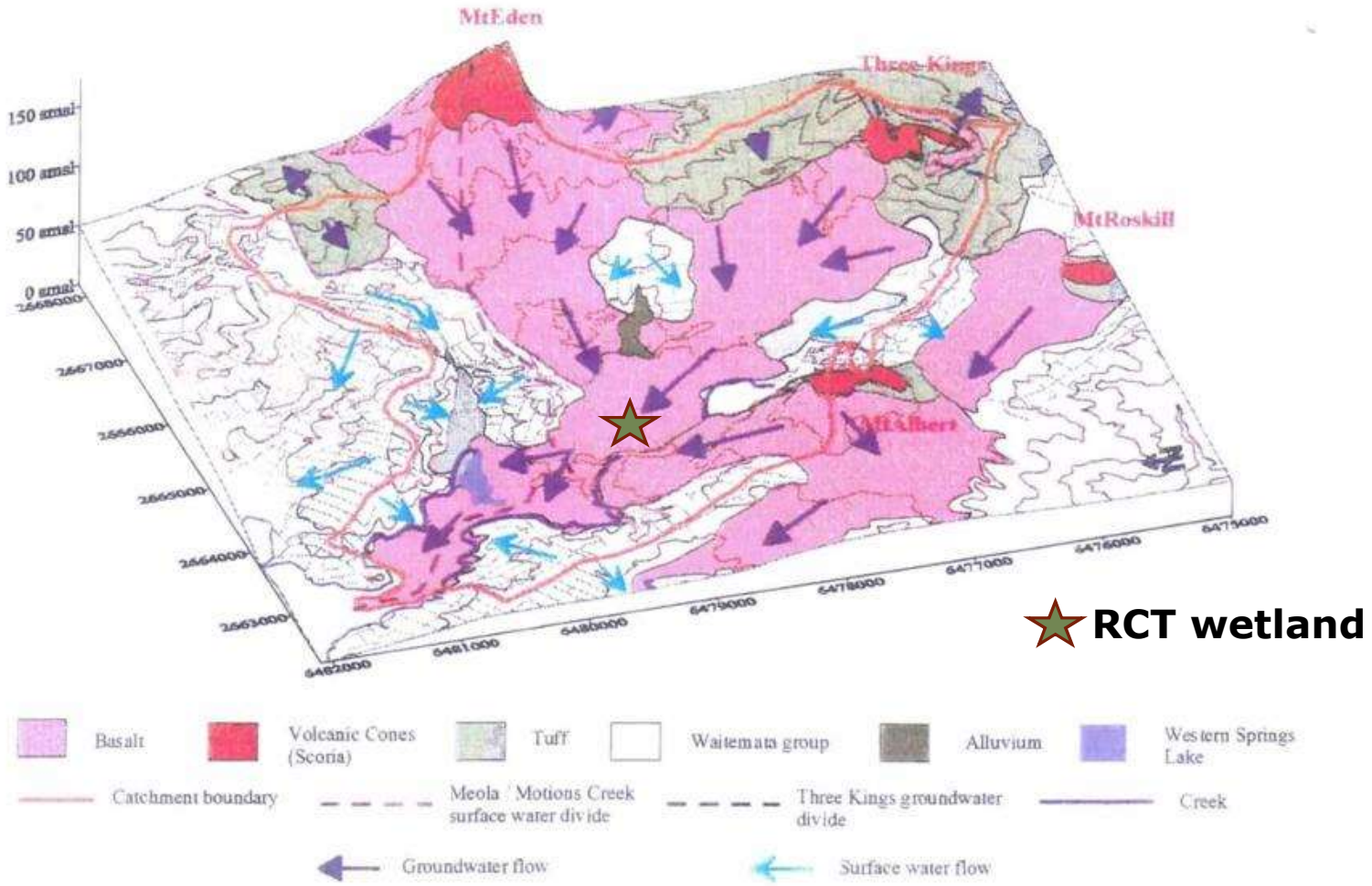
# Te Tatua-a-Riukiuta volcanic aquifer




Aquifer

Stream Catchments

# Western Springs/ Three Kings/ Meola Aquifer




**3d Hydrogeological Model of the Western Springs Aquifer (Viljevac 1998 Figure 2.12).**

References: Clarke, C, **Roy Clements Treeway Boardwalk – Urban stream management**
http://www.nzsses.auckland.ac.nz/Conference/2008/papers/Clarke.pdf p6

Viljevac, Zeljko, 1998: Western Springs Aquifer – Hydrogeological Characteristics and Computer Model. The University of Auckland.

# Roy Clements Treeway – history

- Tangata whenua – Owairaka now under Maunga Authority
- 1980's - Mt Albert Grammar School (MAGS) Teacher Roy Clements planted the treeway with native trees– large community project
  - Kahikatea trees now over 30 years old
- 2008-9 Construction of boardwalk, scruffy dome
  - scruffy dome used to manage water level and channel connected to Meola Creek
- 2009 Wetland – first planting
- Local Government Funding:
  - Originally Auckland City Council (Metrowater and EA Community Board), Watercare, ARC Environmental Initiative
  - Now Auckland Council, Albert Eden Local Board

Refer Caleb Clarke Roy Clements Treeway Boardwalk – Urban stream management (IPENZ Sustainability Society)

# Wetland outlet to stream before 2008

Outlet from wetland prior to installation of scruffy dome,
Roy Clements
16 Aug 2008

# Wetland 2009

- Scruffy dome has 3 levels
- Overflow channel to stream

**Roy Clements**

May 2009
EMW

# Volunteer weeding

Removing willow weed by scruffy dome. Wendy John. April 2012

http://www.meolacreek.org.nz/ https://www.facebook.com/STEPSNZ/ #

# Roy Clements Treeway Plantings - STEPS

- Aimed to maximise species diversity by planting key sedge species together with a range of woody species such as swamp maire and kahikatea – species that are able to tolerate periods of inundation and dry weather
- Provide habitat and food for bird and invertebrate species.
- Site preparation
  - Blanket sprayed grass and weeds a few weeks before initial planting.

# Wetland and Waitītiko Meola Stream, 1985

From inside the Wetland looking background Roy Clements 1985

# Kahikatea c.1985

Entrance to Wetland. Two Kahikatea doing well Roy Clements c 1985

# Creek and Wetland 2004

Track along Creek past Wetland (on right side), Roy Clements Dec 2004

# Wetland and creek in flood 2006


http://www.meolacreek.org.nz/ https://www.facebook.com/STEPSNZ/ #

# New boardwalk by wetland, 2008

Track along Creek past Wetland (on right side), Roy Clements 2008

# New wetland Planting, May 2009

# Wetland 2018

# Key Species planted by STEPS

**Cover species**

- Purei/ Carex virgata
- Carex secta
- Rautahi/Carex lessoniana
- Harakeke/Phormium tenax
- Cabbage tree/Cordyline australis
- Giant umbrella sedge/ Cyperus ustulatus
- Manuka/Leptospermum scoparium

**Enrichment species**

- Swamp maire/ Syzygium

- Pukatea/ Laurelia novaezealandiae
- Swamp astelia/ Astelia grandis
- Putaputaweta/ Carpodetus serratus
- Swamp coprosma/ Coprosma propinqua

# Biodiversity

- Biodiversity – birds, eels, lizards
  - White-faced heron
  - Black shag, scaup
  - Kingfisher, pūkeko
  - Mallard
- Quarterly stream water quality measurements, annually in wetland
- Some tuna travel 7km upstream through 1.8 km of pipes

May 2010

Jan 2013

# Tuna eels at piped tributary

**29 Jan 2007**

http://www.meolacreek.org.nz/ https://www.facebook.com/STEPSNZ/ #

# Waitītiko Meola Creek water measures

| Site | Sample Date | SampleTime | AirTemp | WaterTemp | WaterClarity | pH | DissolvedOxygen | Nitrate | Nitrite | Phosphorous | Phosphate | TotWimp Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Meola Creek, Alberton Ave Culvert in Roy Clements | 13-03-17 | 10:00 AM | 21 | 19 | 83 | 8 | 6 | 3.5 | 0.075 | 0.07 | 0.215 | 49 |
| Meola Creek, Alberton Ave Culvert in Roy Clements | 10-06-17 | 10:00 AM | 15 | 15 | 55 | 8 | 5.5 | 1.5 | 0 | 0.1 | 0.307 | 51 |
| Meola Creek, Alberton Ave Culvert in Roy Clements | 23-11-17 | 4:00 PM | 25 | 22 | 61.5 | 7.5 | 0.1 | 1 | 0 | 0.1 | 0.307 | 42 |
| Meola Creek, Alberton Ave Culvert in Roy Clements | 11-07-18 | 10:00 AM | 12 | 14.5 | 40 | 7.5 | 5.5 | 0 | 0 | 0.05 | 0.154 | 49 |
| Meola Creek, Roy Clements Treeway Wetland | 22-08-17 | 10:15 AM | 12 | 12 | 95 | 7 | 5.5 | 2 | 0 | 0.07 | 0.215 | 72 |
| Meola Creek, Roy Clements Treeway Wetland | 24-07-18 | 11:15 AM | 11 | 16.5 | 100 | 7.5 | 6 | 0.5 | 0.075 | 0.05 | 0.154 | |
| Haverstock Outfall | 10-06-17 | 11:34 AM | 16 | 16 | 90 | 7.5 | 8 | 0 | 0 | 0.035 | 0.107 | 53 |
| Haverstock Outfall | 24-07-18 | 10:20 AM | 11 | 13 | 48 | 7.5 | 7 | 0.5 | 0.075 | 0.05 | 0.154 | |

Excellent | Good | Fair | Of Concern

# Maintenance of STEPS Wetland

- Weeds challenging - urban wetlands near residential areas and gardens
- Arborists /gardeners keep the board walk clear
- Weed maintenance
  - Willows are the main problem
  - Hard to kill and attract wasps
  - Willow weed (Persicaria spp.) - a problem for the first few years after planting
  - Moth plant and woolly nightshade; tradescantia in the adjacent stream and flood plain
- Neighbours – some question large trees (pre-date their houses)
- Council runs a volunteer trapping program in Treeway

# Benefits

- Access to nature benefits people's health
  - (Richard Louv and other writers)
  - Usage – approximately 600 people per day during week
- Recharging the aquifer
- Water filtration
- Carbon sequestration – wetlands are very productive systems
- Resources for people, eg. food harvesting, material for weaving

# Recommendations for urban wetlands

- We need more urban wetlands
- Urban wetlands are a key component of low impact urban design
  - More scope for water sensitive design and soft engineering -
- Creating or restoring wetlands should always be considered in large-scale developments
  - Helps filter sediment and overland flows
  - Improves/creates local biodiversity
- Fish passage is important to consider when creating/restoring urban wetlands, particularly for species such as eels and giant kōkopu
- Consider look out points, interpretation signs and info panels – people are interested!

# Resources and References


- Auckland Unitary Plan 2018
- Indigenous terrestrial and wetland ecosystems of Auckland. Auckland Council. Singers, N.; Osborne, B.; Lovegrove, T.; Jamieson, A.; Boow, J.; Sawyer, J.; Hill, K.; Andrews, J.; Hill, S.; Webb, C. 2017
- Volcanoes of Auckland: The Essential Guide - Bruce W. Hayward, Graeme Murdoch & Gordon Maitland (Auckland University Press)
- New Zealand coldwater springs and their biodiversity (DOC)
- Water quality in New Zealand: Land use and nutrient pollution Parliamentary Commissioner for the Environment: 2013 & 2015
- http://www.aucklanddesignmanual.co.nz/project-type/infrastructure/technical-guidance/wsd Water Sensitive Design Manual
- Understanding the 'wet' in wetlands. Greater Wellington Regional Council 2005

# Thanks to …

- Nick Goldwater – led the 2009 wetland project and reviewed this presentation
- Roy Clements – initiated the project, gave historic photos
- Sel Arbuckle, Wendy John – plants, people, support
- Andrew MacIntosh – photos
- STEPS – we have worked together for 13 years!

Albert-Eden Local Board
Auckland Council