Waitītiko - Meola Creek Urban Wetland

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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

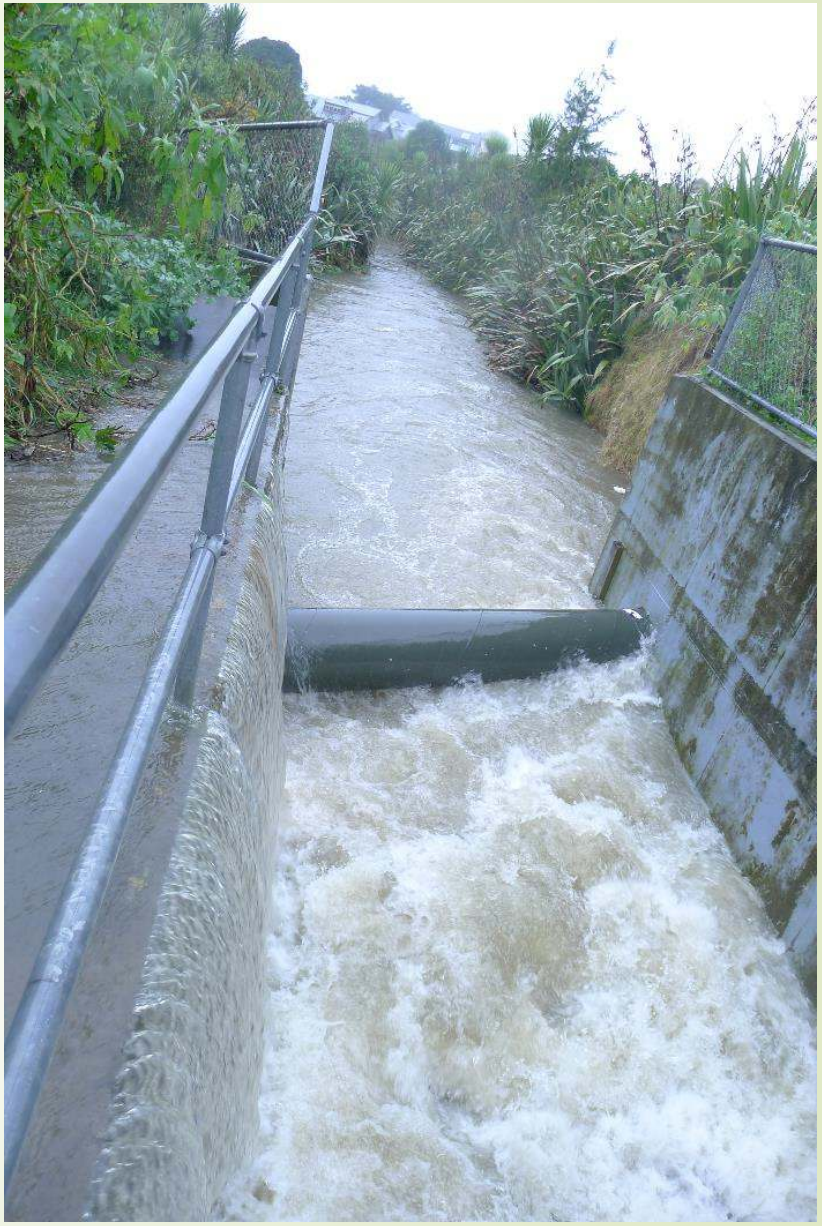
- Urban development brings increased impervious surfaces generating large stormwater volumes
- Pollution – Waitītiko creek overflows 80-100 times per year; sewage and heavy metals flood the wetland a few times a year
- Water sensitive design can address and limit impacts
  - "Nature based" soft engineering 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

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.facebook.com/STEPSNZ/

Waitītiko Meola Creek – urban issues

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

St Lukes retailers rely on Council to return trolleys

Sign defaced, broken, removed, then graffitied again.

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

http:/

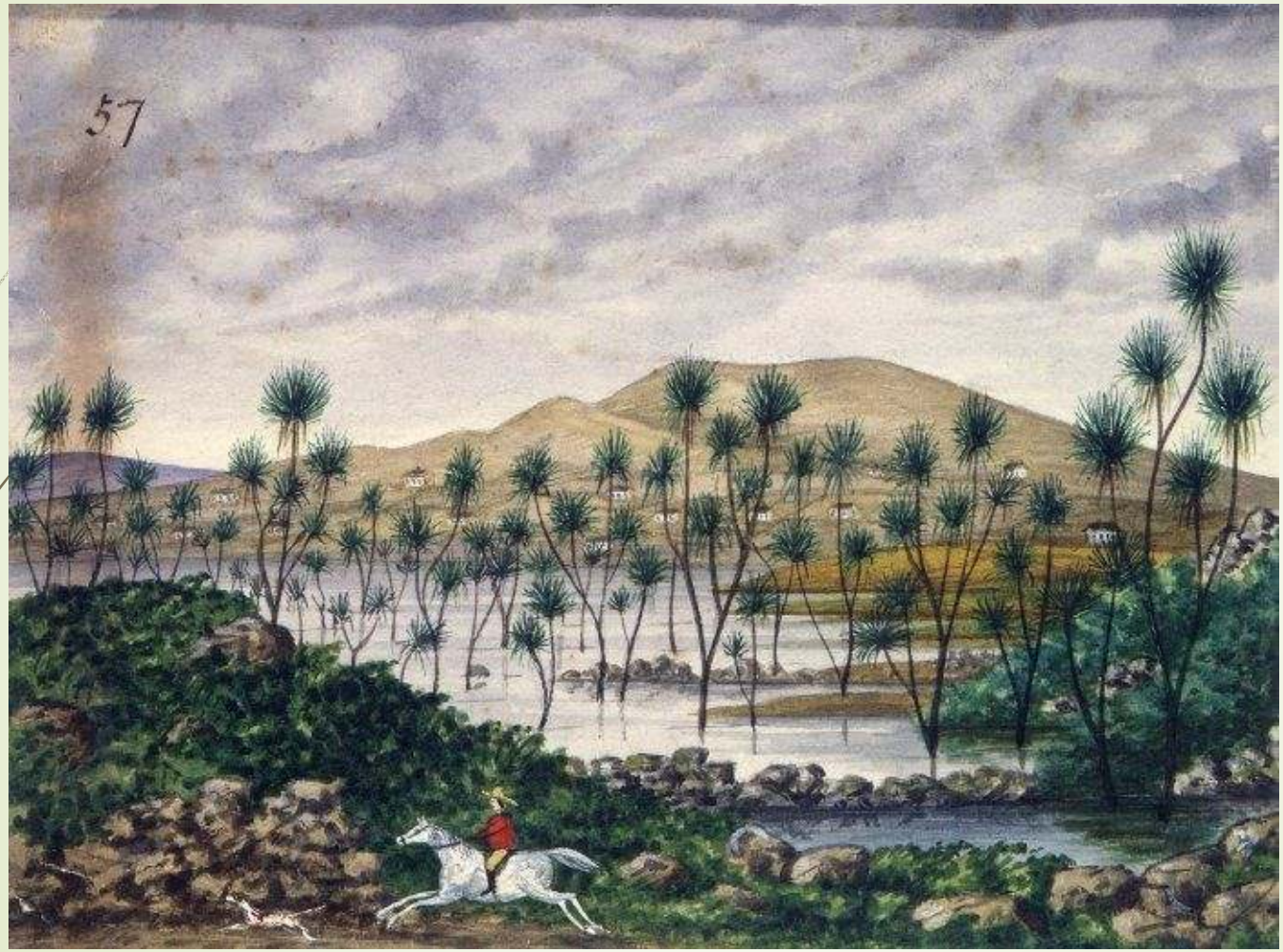
Hochstetter, 1859

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

Andrew McIntosh 2017

Cabbage Tree Swamp 1880

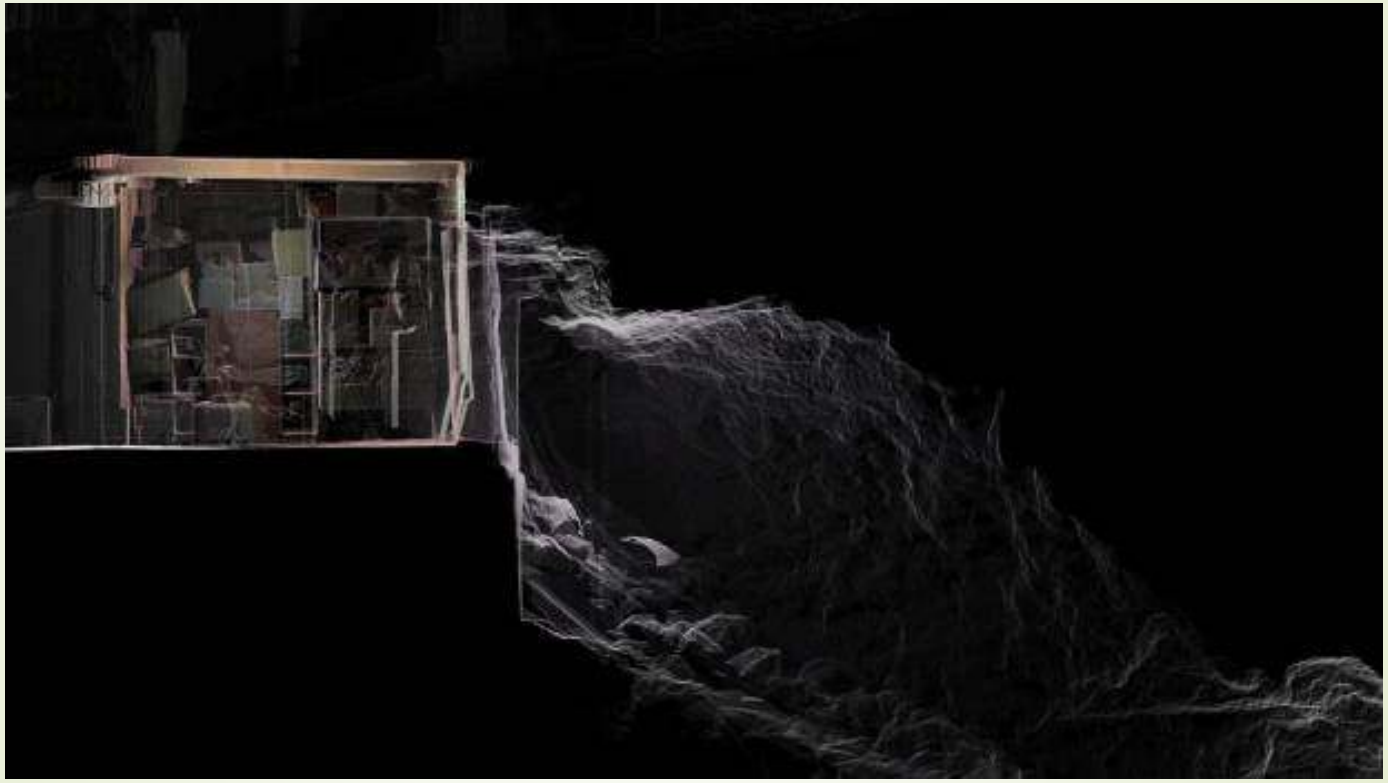


http://www.meolacreek.org.nz/ https://www.facebook.com/STEPSNZ/

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

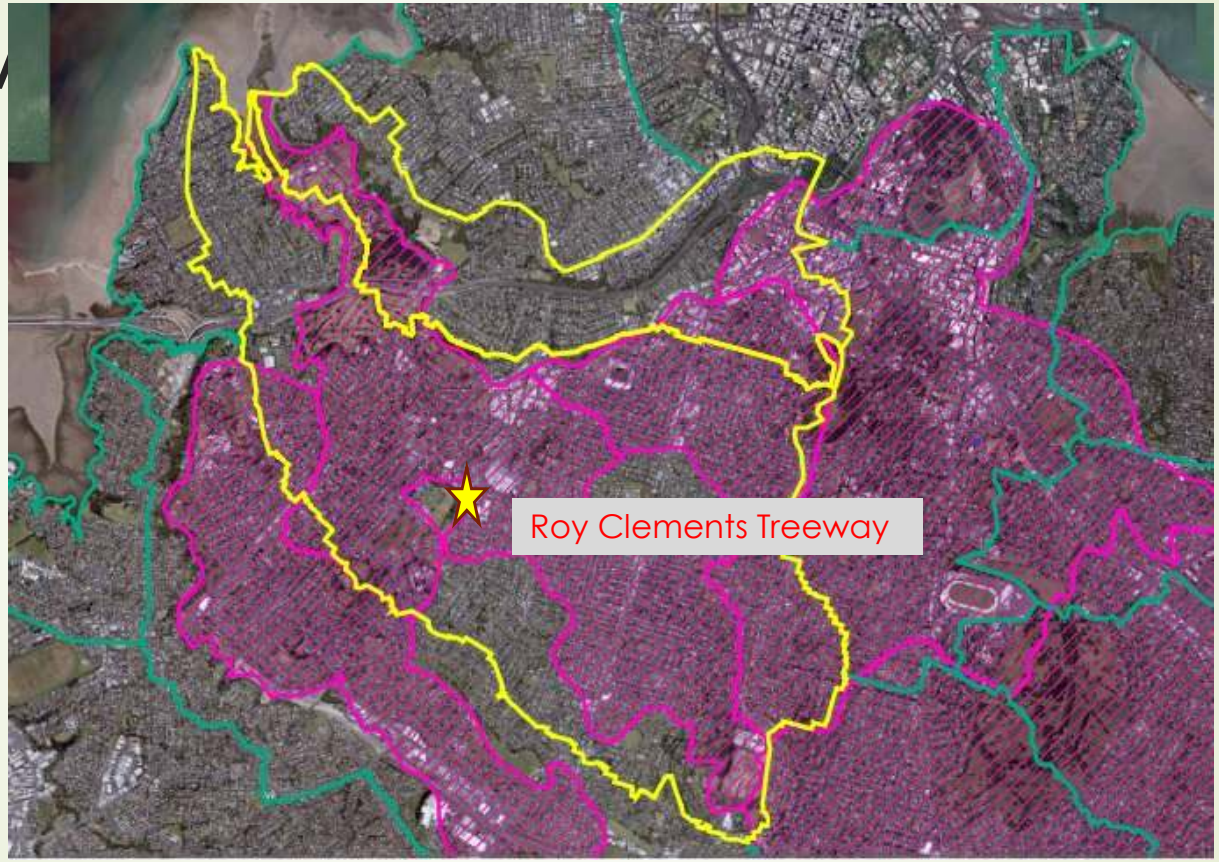
Cabbage trees growing in a swamp with a settlement in the background and a man on a white horse in the foreground ca 1880. Reference Number: E-052-q-015 (http://mp.natlib.govt.nz/detail/?id=6571)

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



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

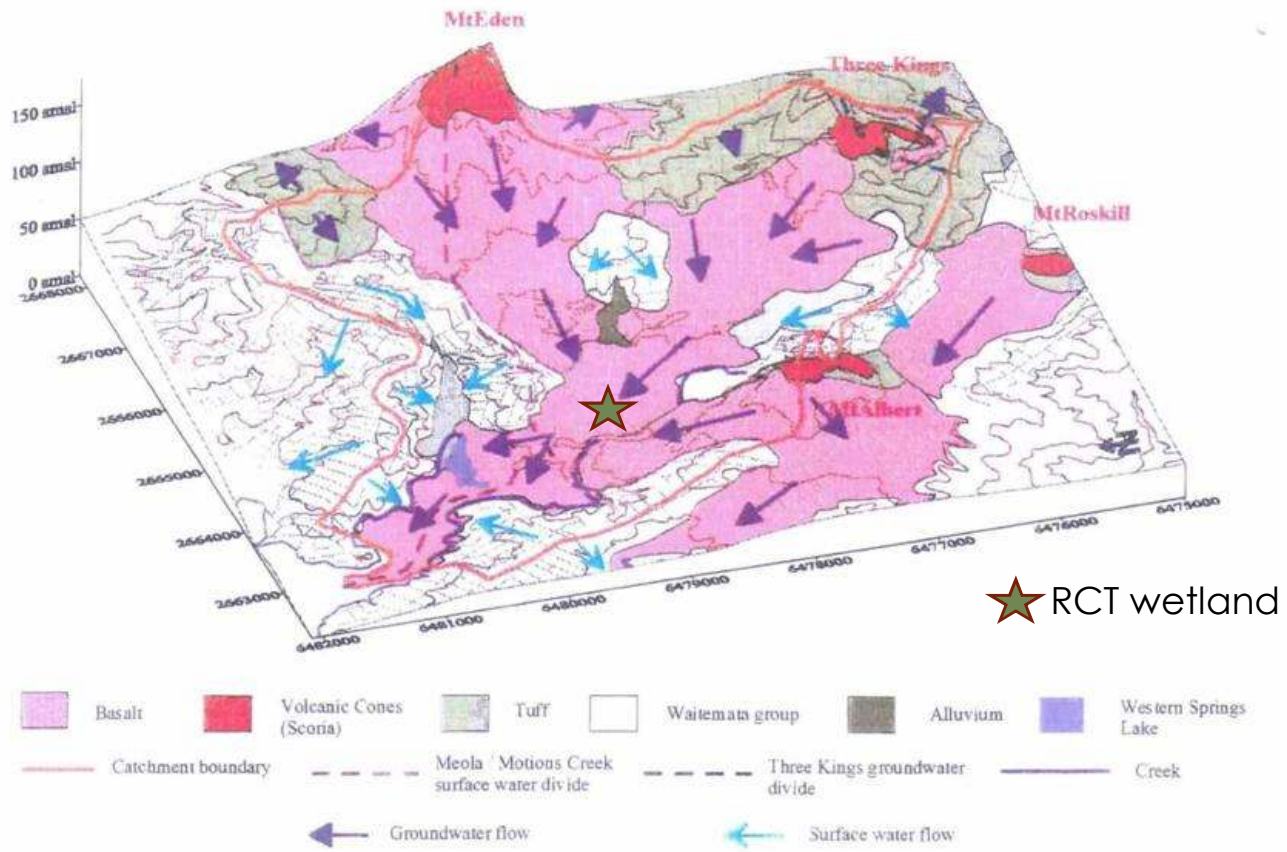
Te Tatua-a-Riukiuta
v



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)

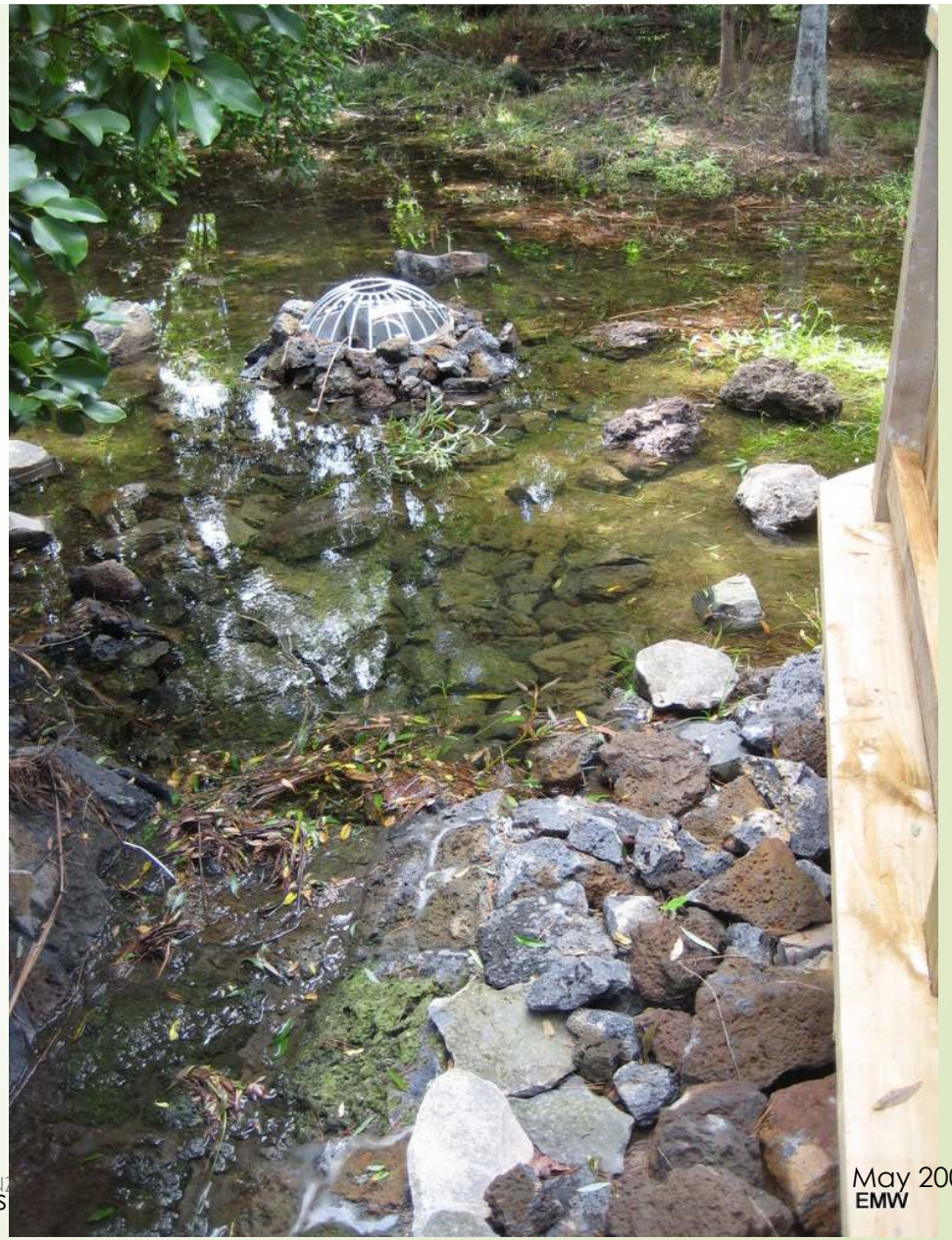
Wetland outlet to stream before 2008

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

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 1980s

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

Two Kahikatea doing well at entrance to Wetland.
Roy Clements
c 1985

Creek and Wetland 2004

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

Creek and Wetland in flood 2006

Floods cover stream banks, path and wetland on right.2006

New Boardwalk by Wetland 2008

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

New Wetland Planting May 2009

Volunteer weeding 2012

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

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

Wetland 2018

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

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

Waitītiko Meola Creek water

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

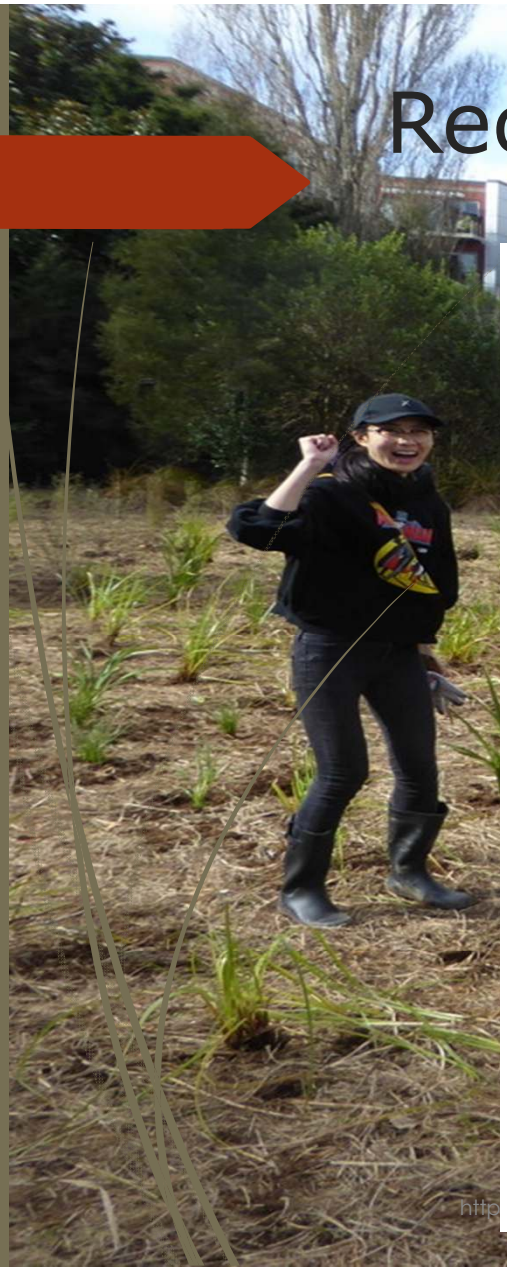
Maintenance of STEPS Wetland

- 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
- 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
- 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 contributed to 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