

Pathways to water resilient South African cities

*Community of Practice webinar:
Educational material and activities to support BGI transitions*

A/Prof Kirsty Carden

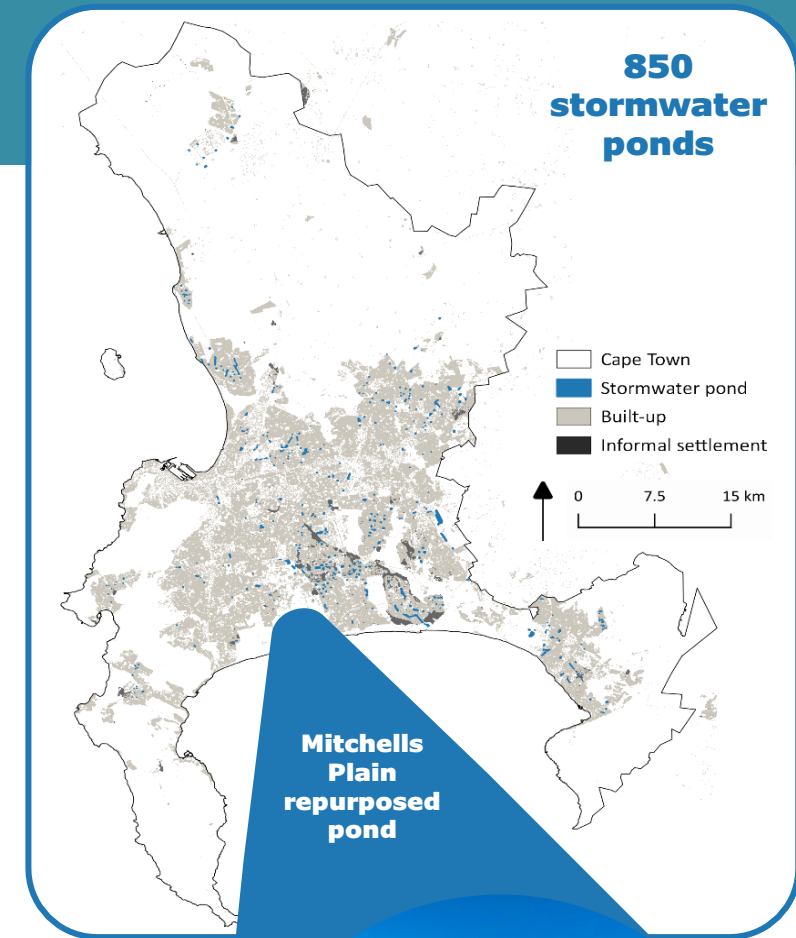
Future Water research institute, University of Cape Town

10 July 2025

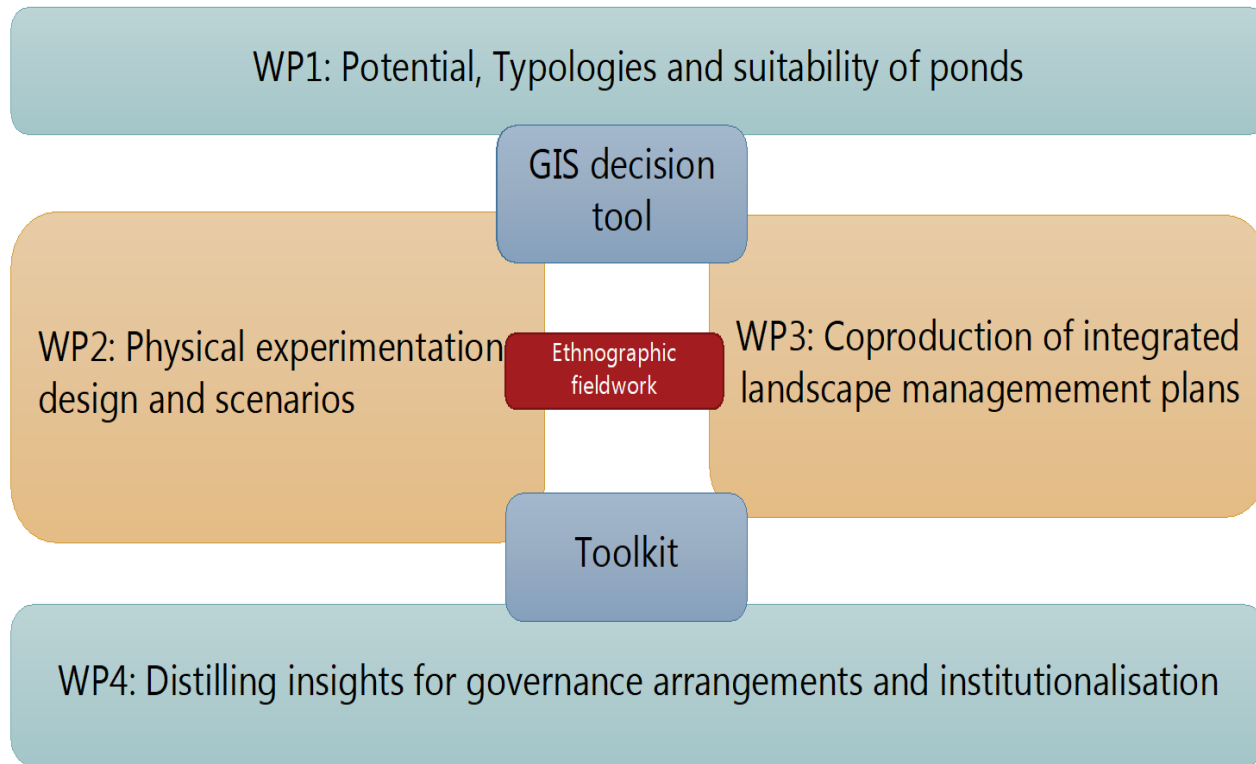
PaWS project - key elements

- Nature-based approaches that link storm runoff and wastewater to water supply
- Water sensitive (urban) design elements and landscape-based solutions
- Integration of built water infrastructure with green infrastructure in a decentralised manner
- Physical and institutional integration pathways (planning, policy)

“to identify opportunities for the physical and institutional integration of hybrid, decentralised Blue-Green Infrastructure into the urban water cycle to accelerate a transition towards water resilience”



“What are the opportunities for repurposing existing stormwater infrastructure as BGI with multiple functions to achieve water resilient South African cities?”



- Co-production around case sites
- Local, civil and city stakeholders
- Platform to foster network building and social learning
- Collaboratively leverage existing policy to achieve stronger BGI in SA cities
- Newsletters, articles, workshops

Presentations

1. Kirsty Carden, Future Water Institute, UCT – *PaWS project education activities*
2. Stacy-Ann Michaels, Zandvlei Nature Reserve, City of Cape Town – *Experiences with environmental education at the City of Cape Town*
3. Sally Sivewright - *Guardians of the Deep education programme*

Discussion

How to create and sustain educational and knowledge-raising material. Why bring children into the discussion

Toolkit theme	Proposed newsletter	Discussion points for seminar	Project presenter	Possible external stakeholder	Date of seminar	Event type
2 Implementing	6. <i>Monitoring water quality in MAR BGI projects</i>	Importance of water quality monitoring and impact of BGI on MAR; physico-chemical tracking. Includes maintenance / management of MAR BGI.	Rachelle Schneuwly, Kirsty Carden, John Okedi	Other DFC-supported project partners? Liz Day? BIOGRIP? <u>CoCT</u> ?	9 April 2025	Webinar
3 Building knowledge	7. <i>Educational material to support BGI transitions (link to mural video)</i>	How to create and sustain educational and knowledge raising material – why bring children in? Mural co-design process.	Kekeletso Ramodibe, Amber Abrams	Sally Sivewright (Guardians of the deep) / Sunbird restoration / <u>CoCT</u>	June/July 2025	Webinar
4 Working together	8. <u>Multifunctional</u> BGI requires multi-layered maintenance and co-production of management plans	Co-design of management plans based on examples from different spaces; workshop processes with civics, city, etc.	Lise Herslund, Amber Abrams, Kirsty Carden	<u>CoCT</u> - Wayne Steyn, Gehardt Muller	May / June 2025	Workshop (in-person)
2 Implementing	9. <u>Institutionalising</u> multifunctional BGI towards a water sensitive city	Input from pond and compendium sites – including policy review from MAR BGI study	Kirsty Carden	External stakeholders	July / August 2025	Webinar
5 Sustaining	10. <i>A Community of Practice around water resilience in Cape Town and other developing cities</i>	Toolkit and Compendium launch, CoP close, catalogue of collaboration across different sectors and disciplines	Kirsty Carden	CONSUS people, Andrew McDonald, GIZ / CFF C40	September/October 2025	In-person (half-day event)

Toolkit theme	Proposed newsletter	Discussion points for seminar	Project presenter	Possible external stakeholder	Date of seminar	Event type
2 Implementing	6. <i>Integrated water quality management for a resilient city</i>	Importance of water quality monitoring and impact of BGI on MAR; physico-chemical tracking. Includes maintenance / management of MAR BGI.	Rachelle Schneuwly, Kirsty Carden	Liz Day – freshwater consulting, <u>CoCT</u> – Scientific Services	9 April 2025	Webinar
3 Building knowledge	7. <i>Educational material to support BGI transitions</i>	How to create and sustain educational and knowledge raising material – why bring children in? Mural co-design process.	Kirsty Carden, Kekeletso Ramodibe	Sally Sivewright (Guardians of the Deep), Stacey-Ann Michaels – <u>CoCT</u> Conservation	10 July 2025	Webinar
4 Working together	9. <i><u>Institutionalising</u> multifunctional BGI towards a water sensitive city</i>	Input from pond and compendium sites – including policy review from MAR BGI study	Kirsty Carden	External stakeholders	September 2025	Webinar
5 Sustaining	9. <i>A Community of Practice around water resilience in Cape Town and other developing cities</i>	Toolkit and Compendium launch, CoP close, catalogue of collaboration across different sectors and disciplines	Kirsty Carden, Lise Herslund	CONSUS team, <u>CoCT</u> SW and other depts, Drakenstein Mun, Stellenbosch Mun, GIZ / CFF C40	November 2025	In-person (half-day event)

Pathways to water resilient South African cities (PaWS) - Project education activities

A/Prof Kirsty Carden

Future Water research institute, University of Cape Town

10 July 2025

Mono-functional stormwater ponds as a WSD opportunity



Pathways to water resilient South African cities (PaWS) project, 2019-2025

- Low-cost retrofitting of stormwater ponds to allow for infiltration and treatment of contaminated runoff
- Stakeholder engagement, co-creation of multifunctional infrastructure with local residents
- Facilitating enabling governance environment for increased water resilience
- Developing pathways for physical and institutional integration of Water Sensitive Design approaches into urban water cycle



Increasing water re-use

Enhancing cultural and heritage associations with water systems

Increasing access to blue-green space

Increasing equity

Reducing the Urban Heat Island effect

Managing water quality

Flood control

Community services connection with water systems

Enhancing biodiversity



Community collaboration in multifunctional POS

9

- **Awareness-raising** and safe-guarding adding support for amenity and biodiversity benefits
- Co-design and management – local stewardship
- Safety / security, preventing land invasions
- Citizen science / monitoring – **education programmes**
- Community anchors - job creation / funding



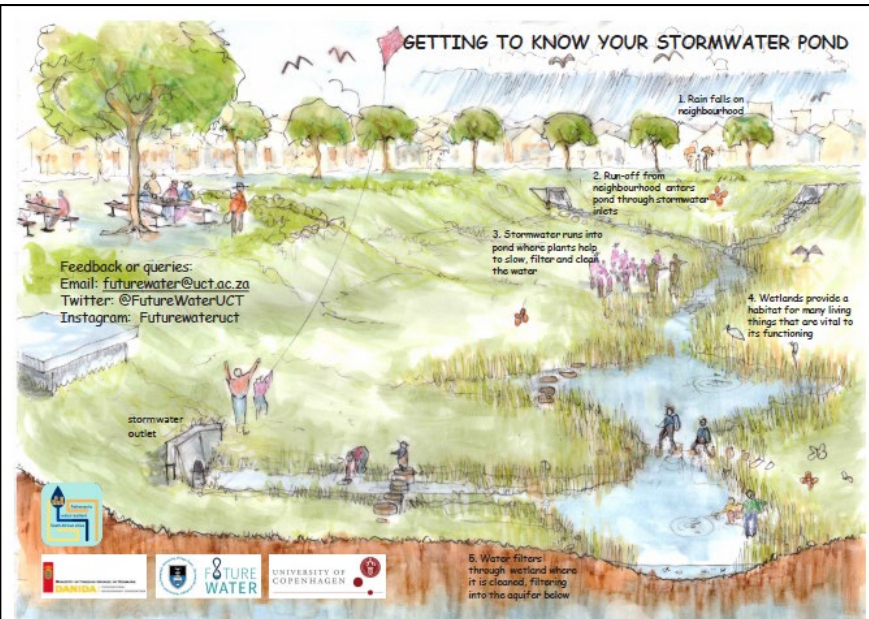
Journey of stormwater

- Source to Sea
- Biodiversity and Nature (plants and animals)
- Ecosystem services
- Cape Flats Aquifer / groundwater
- Connected stormwater systems and pollution impacts
- Eco-friendly paints
- Project QR code



Stormwater pond pamphlet

11



What can you do....

Create a rain garden

Rainwater can be directed from your roof downpipe & channelled into a rain garden. A rain garden is a small basin-like depression you can dig in your garden. Rainwater run-off from your roof or paved surfaces can be channelled into this. Stormwater filters through the rain garden & down into the aquifer below. Rain gardens can be planted with local indigenous plants. An indigenous rain garden absorbs the rainwater from the roof, allowing passive irrigation in the drier months.

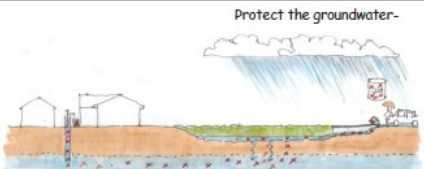


Recharge the groundwater below



Protect the groundwater

Prevent oil, diesel etc. from entering the pond
Oil, diesel, chemicals, etc. are harmful to human life. These toxic substances can enter the groundwater and contaminate it. This has implications for borehole and well-users who access this contaminated ground water. Contaminated water can also kill indigenous plants and wildlife, leading to biodiversity loss and a city less resilient to dealing with flooding, water security, climate change etc. To solve this, engine oils for instance, could be recycled.



Prevent flooding & protect biodiversity

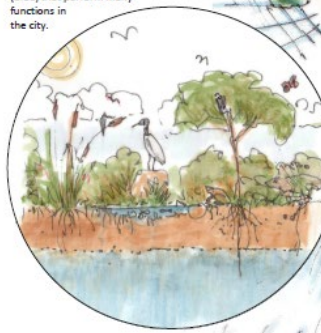
Protect the stormwater system from litter
Litter accumulates and blocks stormwater pipes causing flooding of streets and homes. Littering and dumping also destroys natural habitats and can lead to biodiversity loss. When litter enters a stormwater pond, birds, frogs, toads and insects as well as local plants, some of which occur nowhere else in the world, can be poisoned or choked by it. Litter could instead be recycled or collected by the city.



Blue Green Infrastructure (BGI) includes Stormwater Ponds

What is Blue-Green Infrastructure (BGI)?

Blue-Green Infrastructure or BGI refers to inter-connected natural and designed open planted spaces (green) and water bodies (blue) that perform many functions in the city.

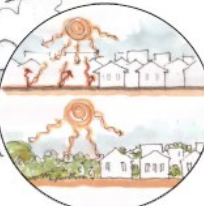


BGI reduces flooding
Blue-green permeable spaces allow stormwater to infiltrate the ground & reduce flooding events



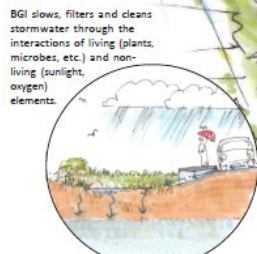
BGI helps reduce the build-up of urban heat

BGI is made up of plants that help to lower urban surface & air temperatures by providing shade & cooling effects.



What does BGI do for us?

BGI cleans storm-water run-off
BGI slows, filters and cleans stormwater through the interactions of living (plants, microbes, etc.) and non-living (sunlight, oxygen) elements.



BGI is vital to our well-being

We rely on BGI for many things in our daily lives. This includes the growing of food, providing clean air, providing for our physical and mental well-being



BGI helps recharge groundwater

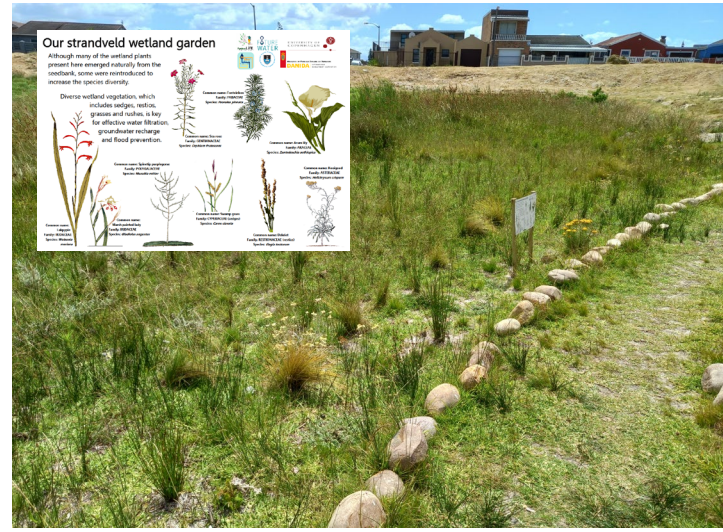
BGI allows water to filter into the ground and down into the aquifer below



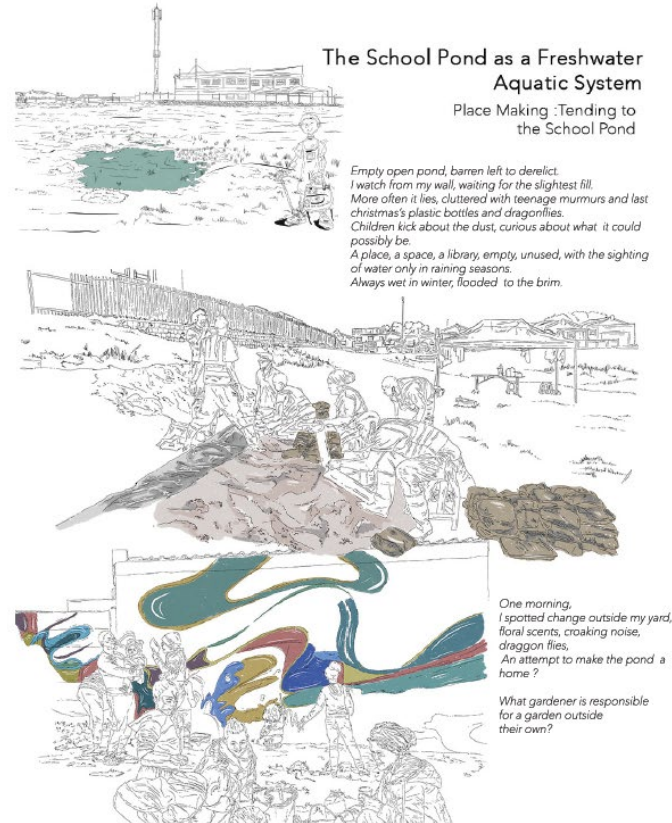
Flyer design and artwork: J Mclachlan, 2023



Curating a biodiverse landscape – information on cues to care







1. Welcome and explanation of stormwater spaces
2. Sensory activity on water and water relations
3. Treasure hunt – what treasures does the space hold?
4. Introducing stewardship
5. Pledge activity
6. Need for monitoring – MiniSASS
7. Guardians booklet, badges and certificates

Guardians of the pond - activities

15



- Nature Connect as funding mechanism / facilitator
- River Wardens
 - Skills development (monitoring / restoration)
 - Community liaison
 - Awareness-raising / education / training
- Friends of Mitchells Plain stormwater spaces
 - Resident-led stewardship
 - Community liaison







Desired waterscapes – let the pond speak

'Guardians of the Pond, between concrete and sky'

In the heart of Mitchells Plain, where concrete often dominates, the Fulham pond breathes life into a hardened neighbourhood. It was openly barren and neglected at first encounter, with its potential hidden beneath years of disregard. As a casualty of apartheid spatial planning, these ponds are shaped by conventional design methods to hold and channel the stormwater present during the wet seasons. However, when the drought period hit Cape Town between 2015 and 2018, the pond sat with a heavy heart as the wind swept through it, waiting for its silent whispers to be heard:

"Oh, how I wish for my potential to be realised and my agency to be mine to own. My inability to speak the common tongue and lack of a personified form, has compromised my relevance many who protect the homes of those who fear my extent."





Questions?



**FUTURE
WATER**

UNIVERSITY OF
COPENHAGEN



MINISTRY OF FOREIGN AFFAIRS OF DENMARK
DANIDA | INTERNATIONAL
DEVELOPMENT COOPERATION