

Newsletter

Pathways to water resilient South African cities (PaWS) project



STORMWATER PONDS: 'STEPPING STONES' TO URBAN BIODIVERSITY?

Julia L McLachlan

Biodiversity as a key to Resilience

Cape Town is looking to improve its long-term sustainability in the face of growing climate change concerns. To do this, the city is developing its capacity for resilience – the ability to adapt, accommodate change and function adequately in response to disturbance.

Biodiversity is key to urban resilience: biological diversity, of species and traits, enhances the buffering capability of ecosystems to respond to disturbances or systemic shifts. The International Union for the Conservation of Nature or IUCN, links biodiversity to numerous benefits. These include improved air quality, enhanced mental well-being, the regulation of climate, ecological resilience, pollination support as well as recreational and economic benefits.

This issue

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'Stepping Stones'
to Urban Biodiversity?

About the project

The 'Pathways to water resilient South African cities (PaWS)' project is a collaboration between UCT's Future Water Institute, and the University of Copenhagen, funded by Danida MFA. Drawing on physical experiments and governance and social processes, it explores the potential for existing flood attenuation infrastructure to be adapted towards water resilient cities (read more [here](#)).

Contact: Kirsty.carden@uct.ac.za



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Ahern (2012) citing Lister helps us to visualise urban biodiversity as ‘a *library of knowledge*’, equating it to the books in a library: in this library there are those books that are read and known whilst others remain hidden and, like treasure, are yet to be discovered.

Blue-Green Infrastructure– an interconnected network that includes both natural and designed open green spaces with permanent or temporarily inundated water bodies (O'Donnell, et al., 2021) - offers an approach for physically incorporating biodiversity in the urban landscape and through this, creating the opportunity to re-imagine these pond landscapes as ‘living libraries’. *How could this be implemented though?*

Cape Town’s urban landscape

Various academic publications refer to the lack of biodiversity and persisting environmental injustice in Cape Town (Anderson et al., 2020) as well as an ongoing ‘Green Apartheid’ (Venter et al., 2020).

Whilst these papers highlight numerous deep-seated problems, there are small but significant opportunities to address these through strategic interventions, *but it requires us to re-imagine these landscapes.*

Re-imagining Stormwater ponds as ‘living libraries’

There are around 850 stormwater ponds across Cape Town that form a vital part of a single-purpose stormwater management system. These ponds have been zoned as Public Open Space 2 – with primary uses for public open space and environmental conservation. Many of these ponds only serve a flood attenuation function though, with biannual mowing and litter clearing.

Work done by the PaWS research team suggests that simple, strategic interventions at a stormwater pond study site in Fulham Rd, Mitchells Plain, can contribute to curating these ponds into biodiverse ‘living libraries’.



Above: April 2019, Stormwater Pond Study Site at Fulham Rd, Mitchells Plain



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With the assistance of local residents, a neighbouring school (The Leadership College Hyde Park), and the NPO wildlife charity, FynbosLIFE, the team has observed the transformation of a stormwater pond over several years, from a single-purpose stormwater pond into a more biologically diverse landscape.

Observations of increasing biodiversity from the study site, 2020-2024

Sept 2020
Covid 19 pandemic
lockdown.

Mowed landscape with
patches of water visible.



Sept 2021
Spring Planting Day with
students from The Leadership
College Hyde Park.

Narrative: *The Living Wetland*.



Jan-Dec 2022
Central *Living Wetland*
protected from city mowing by
some local residents.
Perimeter areas mowed
and maintained by CoCT.

Diverse plants found growing
within *The Living Wetland*.



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Observations of increasing biodiversity from the study site, 2020-2024

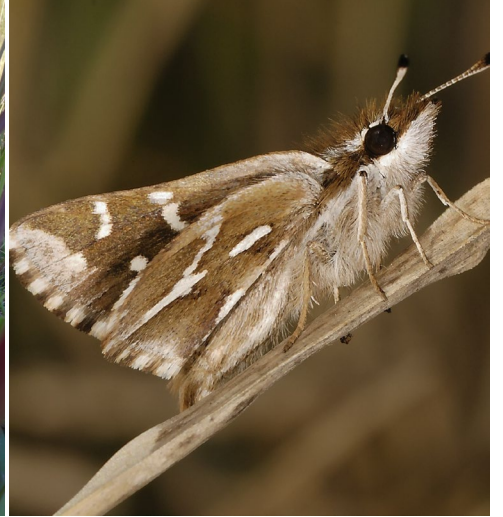
July 2023

Curating a biodiverse landscape with FynbosLIFE along *The Living Wetland*.

Building on biodiversity with locally indigenous planting and signage to demonstrate medicinal, edible and ecological roles of plants in urban landscape.



Left: Critically endangered plant, *Psoralea glauca* identified on site in *The Living Wetland* area.



Centre: Patches of *Imperata cylindrica* (sword grass) growing on site. These are critical host plants in the life cycle of the highly threatened Barber's Cape Flats Ranger Butterfly (*Right*) with the caterpillar laying its eggs in the spear-like grass. Mowing of this grass destroys their eggs.



The planting strategy kept the valuable seed bank layer intact by planting within the existing vegetation. This also means that existing vegetation roots continue to bind the soil especially on the slope down to the wetland.



Curating the biodiverse landscape

Designing the 'library shelves' for urban biodiversity

From our observations, the presentation of biodiversity in the urban landscape is a key consideration.

In 'Messy Ecosystems, Orderly Frames', Nassauer (1995) refers to 'cues to care' and the need to demonstrate a human intention to care for the landscape if we are to improve ecological quality. Recent studies in the US examined stormwater management approaches using green stormwater infrastructure. Findings indicated preferences for neat planting rather than land devoid of any life or messy (Suppakittpaisarn et al., 2019).

The findings at the stormwater pond study site mirror those found in US papers. After maintenance and mowing, local residents have commented on the pond looking attractive, neat and tidy.

To balance biological diversity with neat, attractive landscape, work at the pond has adopted 'cues to care' strategies.

- The indigenous garden, developed with the valuable input of FynbosLIFE, has included for instance, rock-lined paths, clearly defining planted areas accompanied by explanatory signage;
- Strategic mowing is beneficial in providing 'cues to care' for the pond, though recent findings suggest that more frequent interventions are required to adequately curate these biodiverse landscapes.



Above: Thick kikuyu at the pond before (top) and after. Strategic mowing is beneficial in providing 'cues to care' however the grass soon grows back. More frequent and strategic mowing interventions may be required that speak to the different needs of each pond.



Above: 'Cues to Care' with stone-lined paths defining planted areas. Worn paths indicate current use.

Stormwater ponds: Stepping Stones to enhanced Biodiversity

Individually, stormwater ponds could be re-imagined as 'living libraries' but to function more effectively, these ponds need to be considered collectively, as *stepping stones* in the urban landscape to improve the city's biodiversity strategy targets.



Above: Imagining stormwater ponds as biodiverse stepping stones for wildlife in the urban landscape

In Summary:

Observations from the past few years at the Fulham Road Stormwater Pond suggest some potential context-dependent strategies for enhancing and curating biodiversity, that could be adapted and replicated in similar ponds:

- Avoid mowing in pond zones that receive stormwater to allow local indigenous plants to grow;
- Recognise the value of planting locally indigenous plants responsibly sourced and cultivated;
- When introducing planting, maintain maintaining existing vegetation layers;
- Demarcate planted areas or those needing to be protected by surrounding them with rocks, log rolls or similar, to provide 'cues to care'.

In the urban landscape, it is important to meet both social and conservation needs by curating and stewarding the pond landscape possibly through:

- Having planting days with local residents;
- Teaming up with local schools to provide outdoor learning opportunities;
- Regular mowing and weeding of selected areas to ensure a neat appearance, potentially by a team of local residents;
- Controlling Kikuyu growth either by removal or where this is not possible, by regular mowing.

Until the next edition.....

Helpful resources

- Ahern, J. (2012). Urban landscape sustainability and resilience: the promise and challenges of integrating ecology with urban planning and design. *Landscape Ecology*, 28(6), 1203-1212. doi:10.1007/s10980-012-9799-z
- Anderson, P., Charles-Dominique, T., Ernstson, H., Andersson, E., Goodness, J., & Elmqvist, T. (2020). Post-apartheid ecologies in the City of Cape Town: An examination of plant functional traits in relation to urban gradients. *Landscape and Urban Planning*, 193. doi:10.1016/j.landurbplan.2019.103662
- Nassauer, J. I. (1995). Messy Ecosystems, Orderly Frames. *Landscape journal*, 14(2), 161-170. doi:10.3368/lj.14.2.161
- Suppakittpaisarn, P., Larsen, L., & Sullivan, W. C. (2019). Preferences for green infrastructure and green stormwater infrastructure in urban landscapes: Differences between designers and laypeople. *Urban Forestry & Urban Greening*, 43. doi:10.1016/j.ufug.2019.126378
- Venter, Z. S., Shackleton, C. M., Van Staden, F., Selomane, O., & Masterson, V. A. (2020). Green Apartheid: Urban green infrastructure remains unequally distributed across income and race geographies in South Africa. *Landscape and Urban Planning*, 203. doi:10.1016/j.landurbplan.2020.103889



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