

Insights into the multi-functionality of stormwater ponds for a water sensitive Cape Town, South Africa

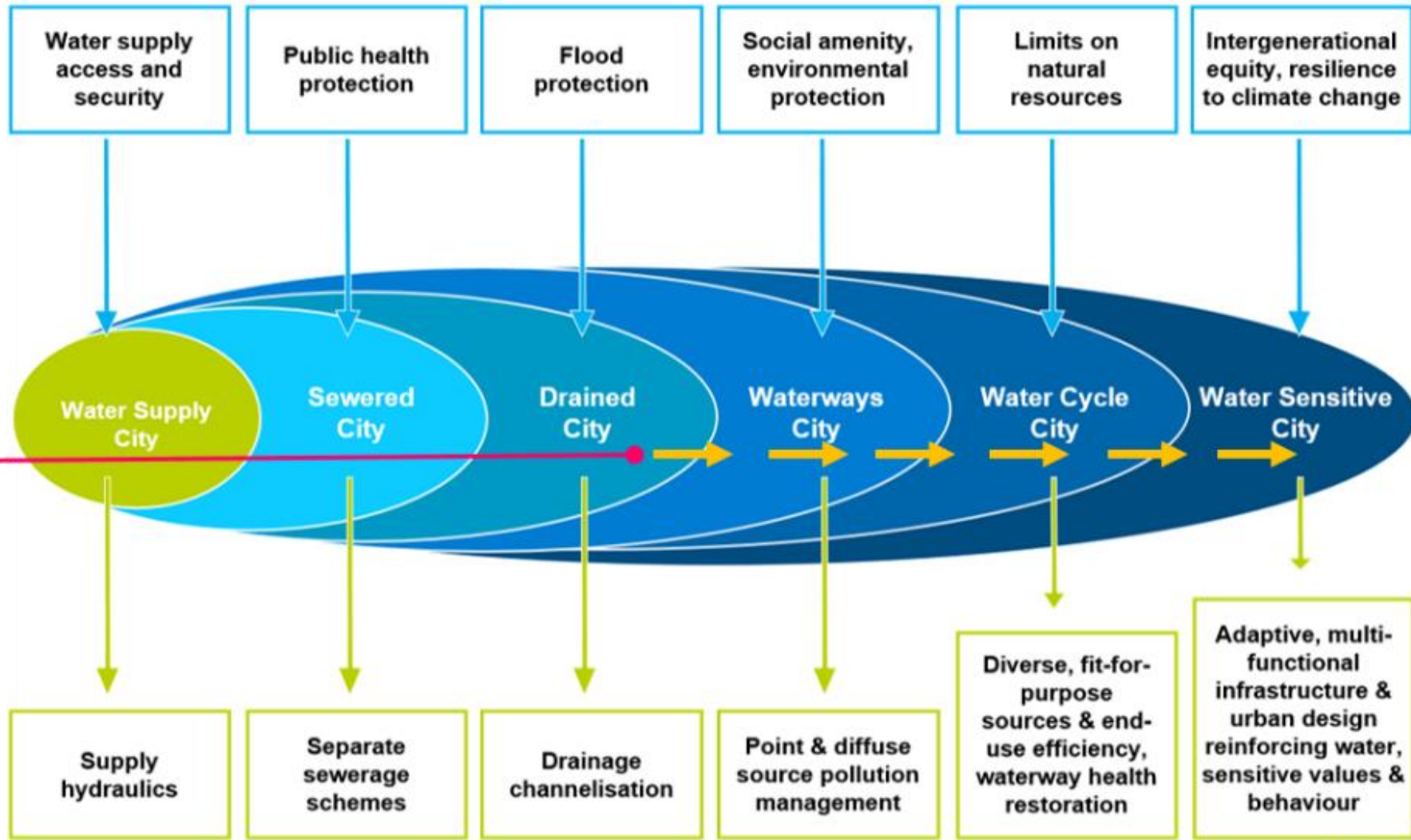
Jessica Fell, Professor Neil Armitage
and Dr John Okedi
ICUD 2021




Cumulative Socio-Political Drivers



— Current state
 → Transition pathway





'Day Zero' crisis + urban water challenges



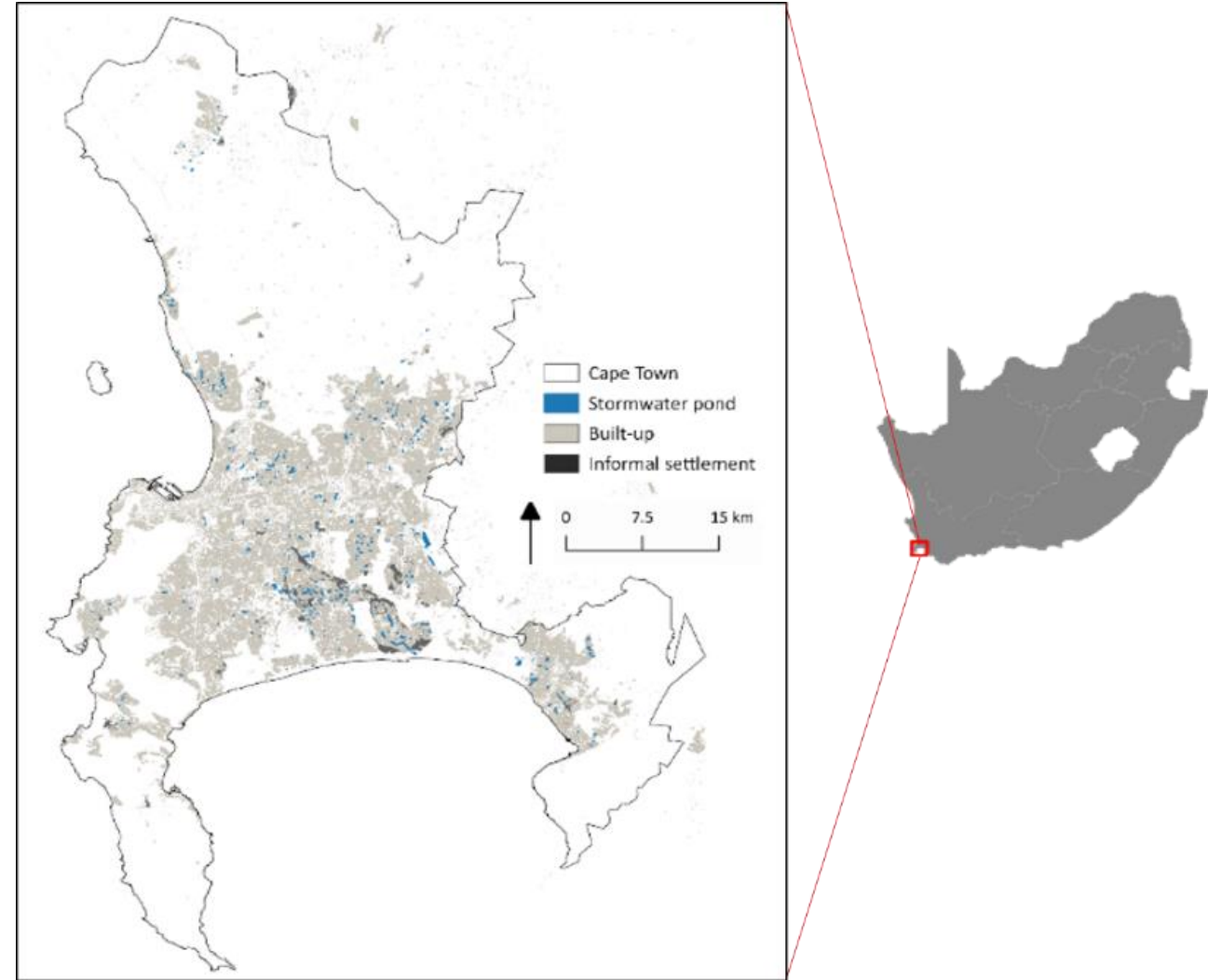
5
A WATER
SENSITIVE
CITY BY
2040

Cape Town's 500+ primarily monofunctional stormwater ponds are under-utilised, with ad-hoc planning and decision-making processes often resulting in the co-incidental occurrence of multi-benefits and the sub-optimal functioning of the system

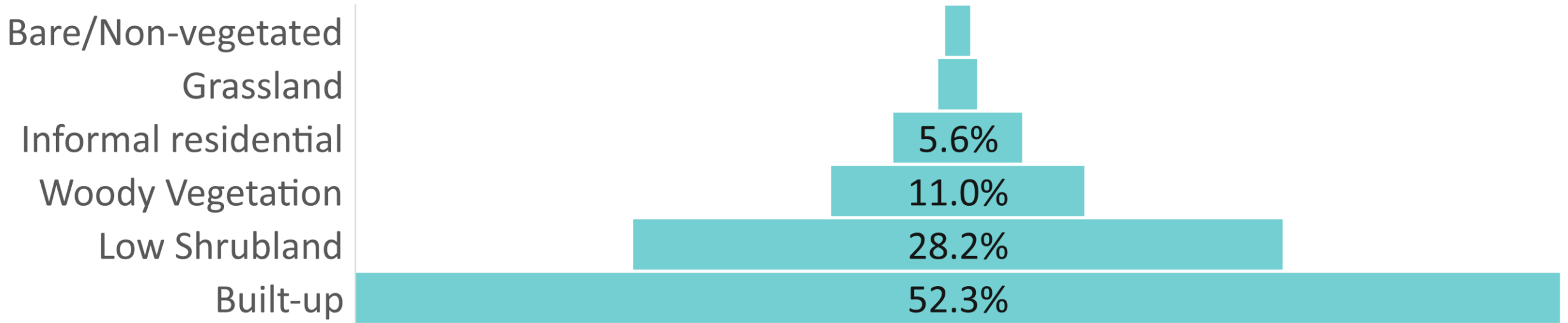


Quantum GIS - spatial relationships between 535 stormwater ponds and five datasets related to WSC multi-functionality :

- (1) Cape Town's Terrestrial Biodiversity Network (City of Cape Town, n.d.),
- (2) Cape Flats Aquifer boundary (City of Cape Town, n.d.),
- (3) South African Mean Annual Precipitation (Bailey & Pitman, 2012)
- (4) South African National Census of 2011 (Statistics South Africa, 2011), and
- (5) South African National Land-Cover 2018 20 meter resolution (Thompson, 2019).



Dataset		Percentage of ponds present	Benefit category
Critical Biodiversity Areas and Ecological Support Areas (100m buffer)		15%	Biodiversity
Cape Flats Aquifer		41.1%	Water re-use
Mean Annual Precipitation class	498-597mm	57.0%	Water re-use, Flood control
	598-697mm	15.2%	
	398-497mm	14.8%	
	298-397mm	5.8%	
	698-797mm	5.4%	
	1098-1197mm	0.8%	
	798-897mm	0.6%	
	898-997mm	0.4%	
	998-1097mm	0.2%	
Population class	0-9999	71.7%	Amenity, Flood control
	10000-19999	13.5%	
	20000-29999	4.4%	
	30000-39999	1.5%	
	40000-49999	3.7%	
	50000-59999	2.6%	
	60000-69999	0.2%	
	70000-79999	2.6%	



Spatial relationships showed:

- potential for the ponds to provide biodiversity functions
- potential for contribute to MAR&R via surface infiltration
- landcover dataset - implications for water quality and insights into the ponds suitable for amenity and unsuitable for MAR&R without water quality improvement.



Further research – Multi-criteria evaluation for WSC transition planning support

Acknowledgements



Supervisors:

Prof Neil Armitage

Dr John Okedi

+ Dr Kirsty Carden



**National
Research
Foundation**

