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PS 4.1
Nature Based Solutions

Green infrastructures and associated policies improve urban sustainability: a case study in Melbourne

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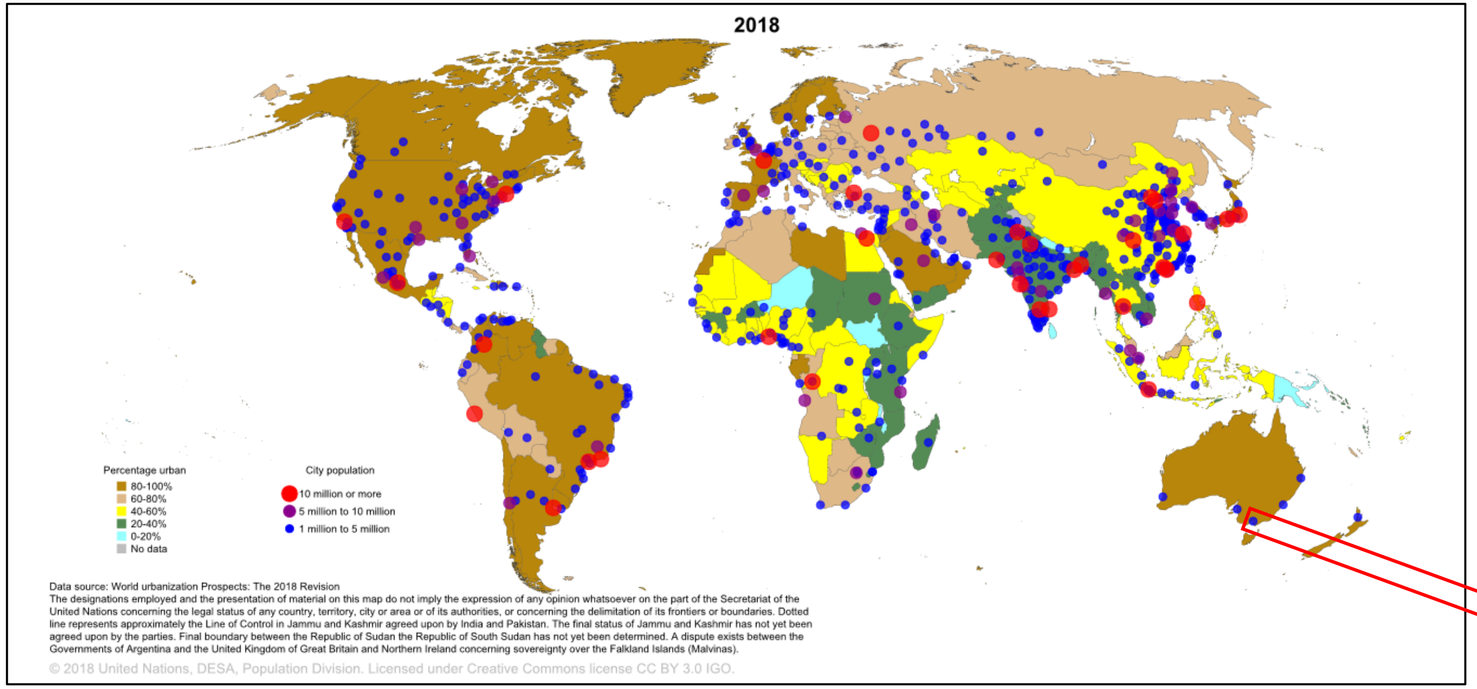
Urbanisation



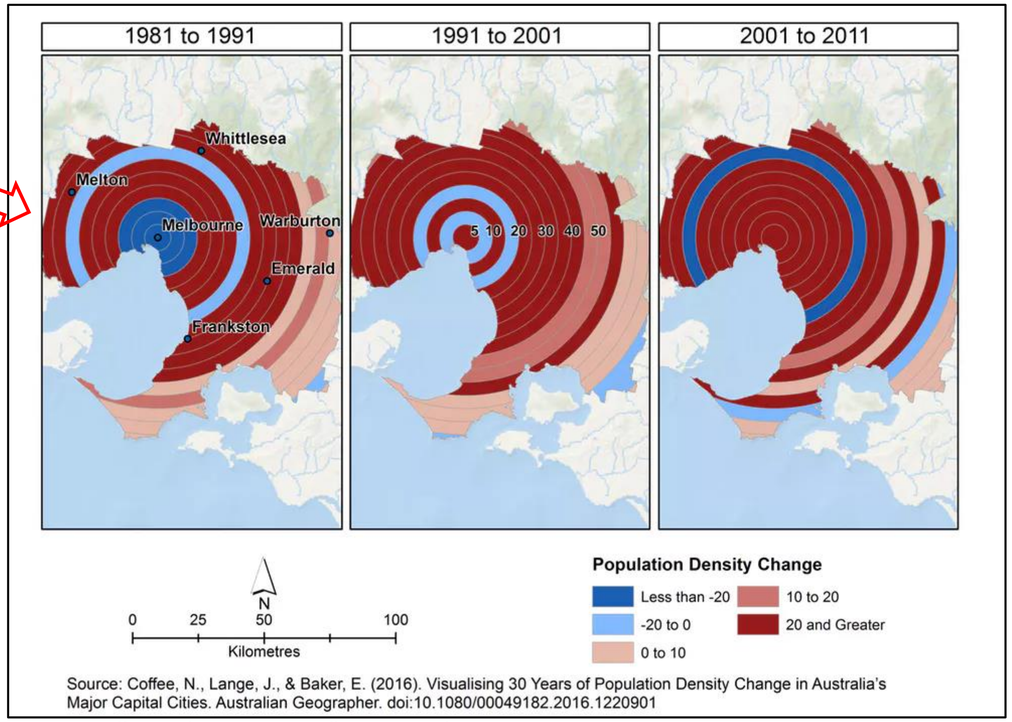
Source: United Nations, 2018

World

- Most countries have urban population accounting for more than 50%.
- A few countries, including Australia, exceed 80%.
- Cities with over 1,000,000 dwellers are increasing, as well as megalopoleis.

Melbourne

- In 30 years, population density in Melbourne increased more than 20% in most areas.
- Urban population is expected to double by 2031.
- Risk of urban green space loss.



Source: Coffee et al, 2016 – Australian Geographer

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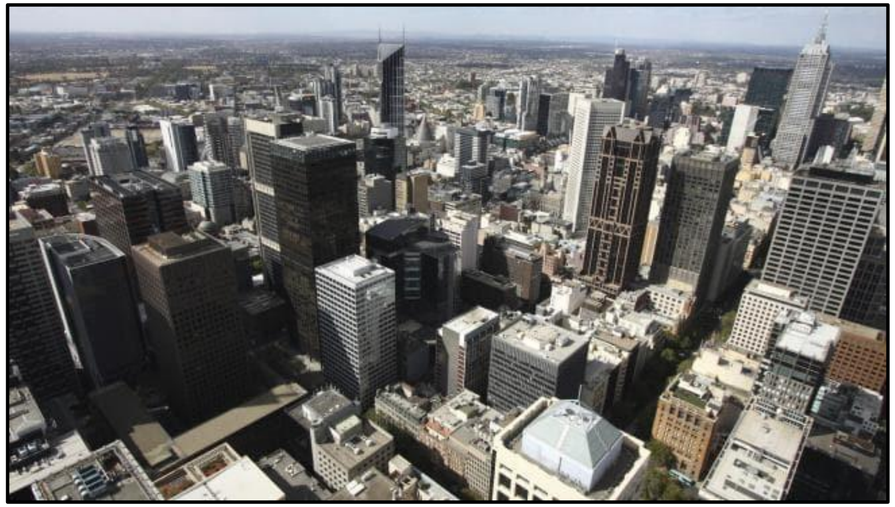
Urban sustainability



Source: Megan Palin @news.com.au

Reduction of urban green spaces:

- exarcebates urban heat island effect;
- makes cities more vulnerable to climate change;
- threatens urban flora and fauna;
- hinders resilience and sustainability of cities.

Urban sustainability is strongly correlated to:

- Energy: buildings account for 40% of the total annual energy consumption:
- Water: water cycle is disrupted by heavy urbanisation and impervious surfaces.
- Nature based solutions can help sustain cities.

Source: http://www.alucraftgroup.com/alucraft/materials/sustainability-statement

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Nature based solutions

Green infrastructure

is the network of natural and designed vegetation elements within our cities and towns, in both public and private domains, and includes traditional and new green elements.

Source: thegirg.org

Water Sensitive Urban Design (WSUD)

is the interdisciplinary cooperation of water management, urban design and landscape planning to bring the urban water cycle closer to a natural cycle

Source: Phil Edwards (Coolth.inc Living Architecture)

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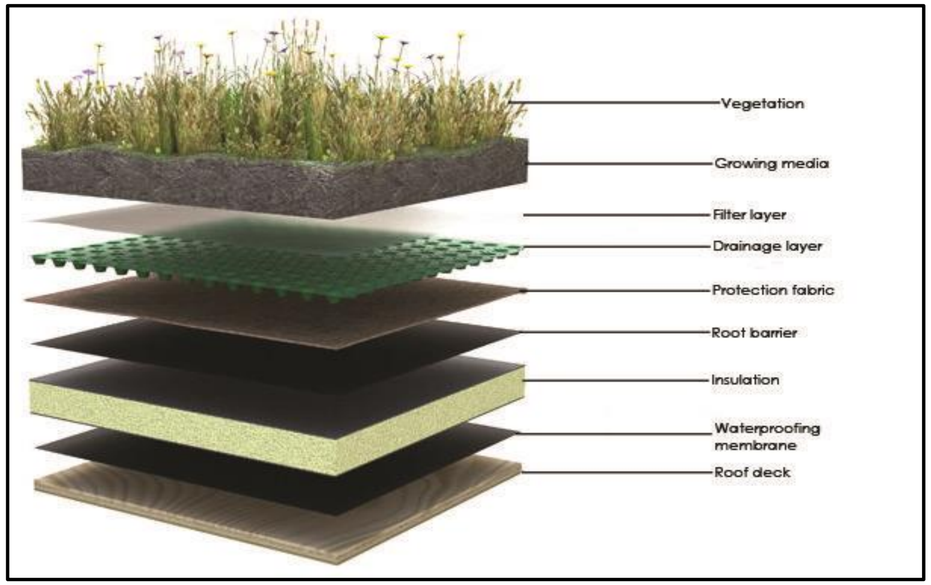
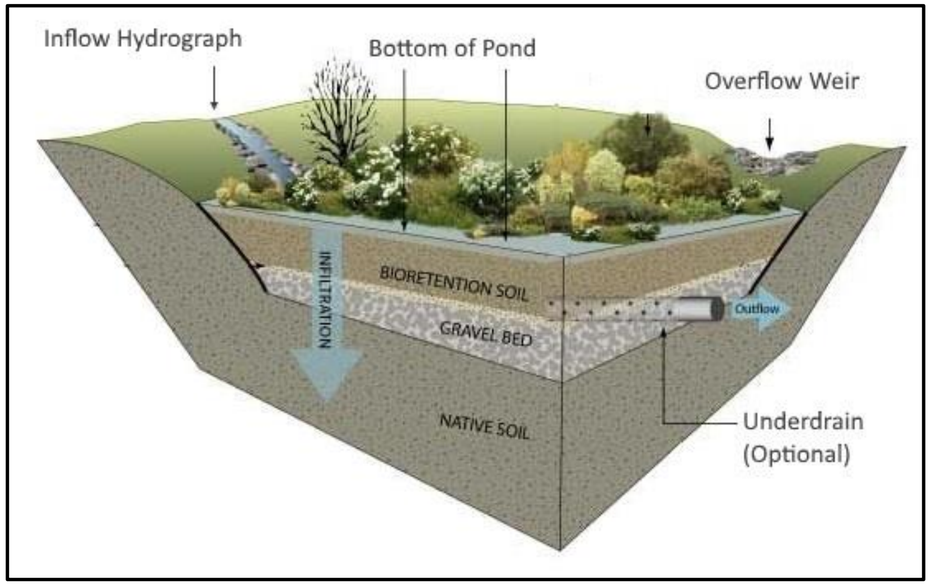
Green roofs & rain gardens



Source: Green Roof Layers / © greenestate.co.uk



Source: https://www.hydrologystudio.com/help/bioretentionbasin.jpg

Green roofs:

- add roof insulation;
- provide evaporative cooling;
- reduce urban stormwater runoff;
- increase urban biodiversity;
- etc.

Rain gardens:

- filtrate stormwater;
- reduce peak runoff;
- able to tolerate drought;
- improve urban aesthetics;
- etc.

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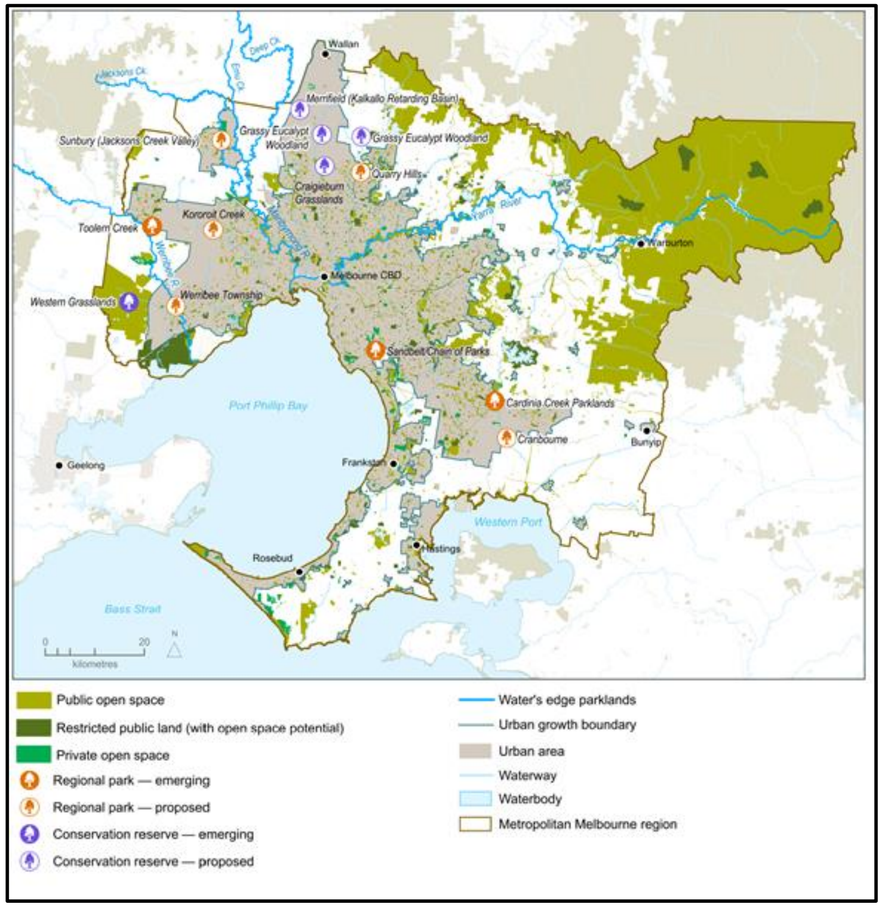
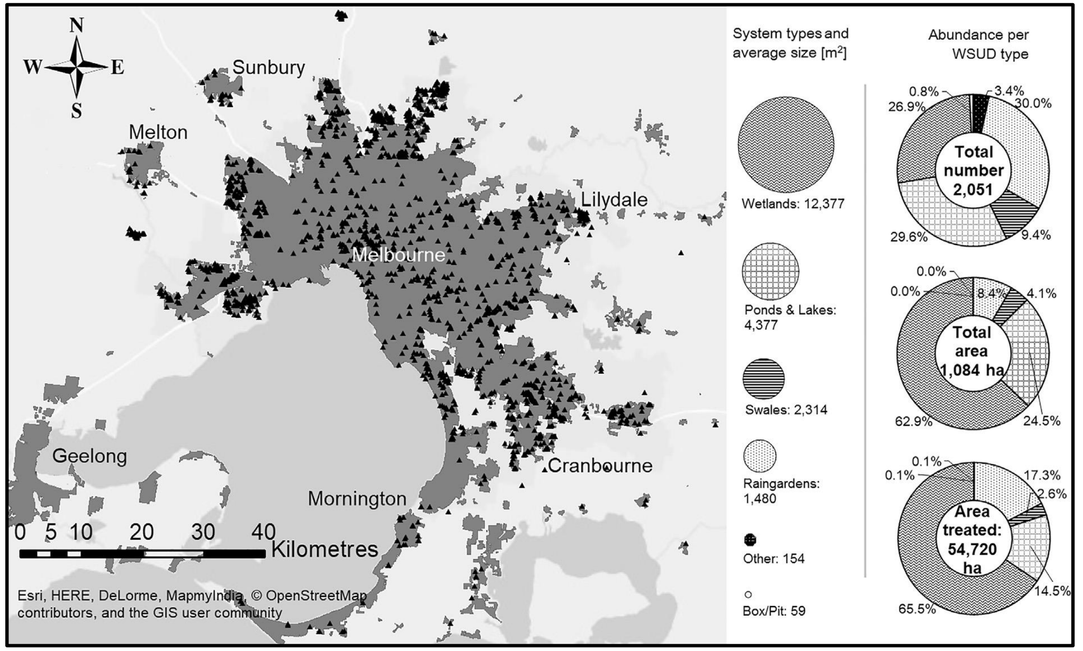
Nature based solutions in Melbourne

Green spaces network



Source: Department of Environment, Land, Water and Planning – Victoria Australia

WSUD installations



Source: Kuller et al, 2018 - Landscape and Urban Planning

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Policy & Science

Policy instruments (Bush and Hes, 2018)

- Information and advocacy (e.g. Canopy Forum);
- Incentives (e.g. greening your laneway);
- Government demonstration and provision (e.g. demonstration green roofs);
- Regulation (e.g. building code and regulations).

Policy regulations might be premature when:

- Not enough data for minimum requirements standards;
- Industry not yet developed to support wide-scale installation & maintenance;
- Uncertainty of costs;
- Lack of political support amongst decision-makers.

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Policy & Science

Policy success factors (Bush and Hes, 2018)

- Strategic – Goals and targets (e.g. 202020 Vision)
- Tactical – Alliances and partnership (e.g. Canopy: government/industry)
- Operational – Technical skills (e.g. green roof maintenance regimes)
- Reflexive – Monitoring and evaluation

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Green Star

Management

Indoor Environment Quality (IEQ)

Energy

Transport

Water

Materials

Land Use and Ecology

Emissions

Innovation

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Conclusions

Science should:

- Research local data;
- Provide quantified evidence of the benefits achievable;
- Enable policy makers to mandate policy recommendations.

Policy should:

- Address local key barriers to uptake;
- Provide information, building awareness and public interest;
- Increase technical capability and expertise;
- Financially support installation & maintenance;
- Promote demonstration sites as test study.

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