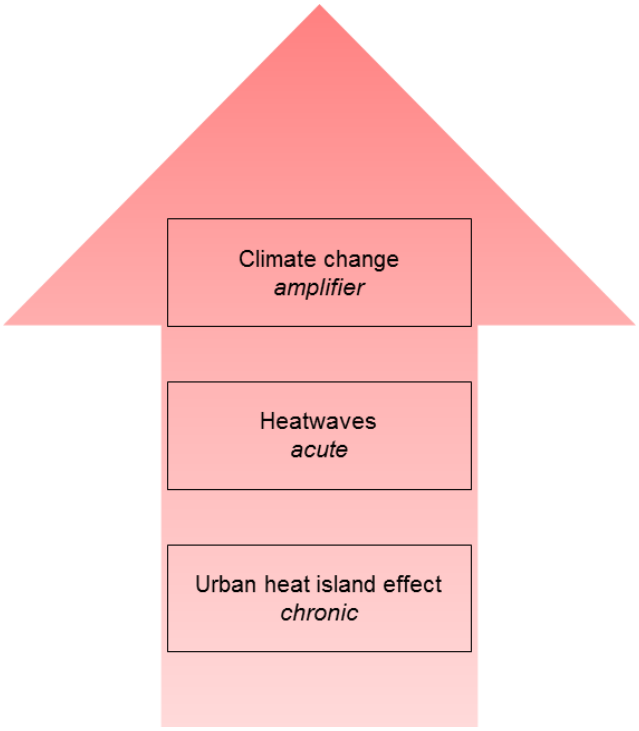
1. Mitigating urban heat with green spaces

As cities grapple with the impacts of heatwaves, exacerbated by the urban heat island effect and progressively amplified by climate change impacts, green spaces can cool urban areas, as well as providing many other functions and benefits to city dwellers' health and wellbeing, and habitat for urban biodiversity.

Urban heat causes and impacts

- **Urban heat island effect:** The impacts of urban heat are increasingly experienced in many Australian cities. Urbanisation processes of vegetation removal and use of dense, dark-coloured building materials result in the 'urban heat island effect' (UHIE) in which cities are significantly hotter than surrounding rural areas, in some cases by up to 10 ^{0}C. The magnitude of the UHIE is related to urban design and layout, materials, weather and climate conditions and the amount of anthropogenic heat (generated by machinery, vehicles and air conditioners).
- There are two distinct aspects to urban heating: *surface* heating and heating of *air* at the urban canopy level. Surface heating, caused by solar radiation being absorbed by unshaded ground surfaces or buildings, is the daytime element of the UHIE. In contrast, air heating, in which the higher temperature surfaces and buildings heat the urban air canopy adds to increased night-time temperatures in urban areas.



- **Heatwaves:** During heatwaves, the UHIE adds to urban temperatures, and contributes to heat impacts suffered by communities, particularly vulnerable elderly, young children and those with chronic illnesses. Heatwaves impact urban biodiversity, reduce economic activity and productivity, potentially damage infrastructure and affect delivery of services.
- **Climate change:** For many cities, climate change impacts, including more frequent and intense extreme weather, are likely to amplify these effects.

- **Mitigating urban heat:** Vegetation, particularly trees and well-watered grass, are one of the most effective mitigators of the UHIE. However, as cities become larger and denser, green spaces within both public and private property are being lost to built areas and paved, impervious surfaces.

Prioritising green space for urban cooling

- Prioritising green spaces for heat mitigation involves considering
    - areas with socio-economic vulnerability
    - areas with heat exposure (areas that currently lack green space and shading)
    - areas of behavioural exposure (higher levels of pedestrian activity, near public facilities and service centres): around community centres, shopping areas, public transport hubs, kindergartens, schools and so on.
- Within these high priority areas, wide streets of east-west orientation, lined by low buildings experience the greatest solar exposure and are therefore the highest priority for street tree planting

- Key opportunities to mitigate urban heat by increasing urban green space and tree planting include:
    - converting underutilised road space, and establishing roadside plantings incorporating water sensitive urban design treatments
    - providing information, guidelines and incentives for increasing vegetation in private open space, including garden areas, green roofs, walls and facades, in new developments and existing residential areas
    - protections for existing trees and urban green spaces
    - providing opportunities for community involvement in the ongoing planning, management and custodianship of urban green spaces

Further information

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