ANUgreen
Strategies for Sustainability

STUDENT FACT SHEET

February 2010

MEASURING & MONITORING URBAN ECOLOGICAL FUNCTION

PROJECT GOALS

- Test the applicability of the Landscape Function Analysis methodology to the urban context
- Assess the contribution of various landscapes and their impact on the risk of flood at the ANU
- Measure patterns of surface types in relation to infiltration and characterise infiltration of each surface
- Apply a Geographic Information System (GIS) based transect approach to quantify patterns and apply a Landscape Function Analysis (LFA) to characterise infiltration behaviour.

TYPE OF PROJECT

International Alliance of Research Universities Internship conducted at ANU by a student from Oxford University.

INPUTS

- $8,000 international internship
- Existing research and GIS tools from Commonwealth Scientific and Industrial Research Organisation (CSIRO)
- Collaboration with CSIRO Sustainable Ecosystems scientists and the Fenner School of Environment and Society academics

OUTPUTS

- A detailed report published as a National Research Flagship paper on Climate Adaptation – Report Number USP2008/013 (CAF R-555-14)
- GIS transects of landscape features at ANU and surrounds
- Soil surface assessments at 88 sites – covering urban land cover types in the Sullivans Creek Catchment.
- Estimation of land cover underneath tree canopies
- Measurements of infiltration of different vegetation and landscape types
- Analysis of trends over time for the ACT suburb of Turner using historic data
- Presentations of results
- Recommendations for improving landscape function for flood risk mitigation at ANU.

DESCRIPTION

This collaboration between ANU, CSIRO and Oxford University produced a high standard of original research, which has been published and is publicly available.

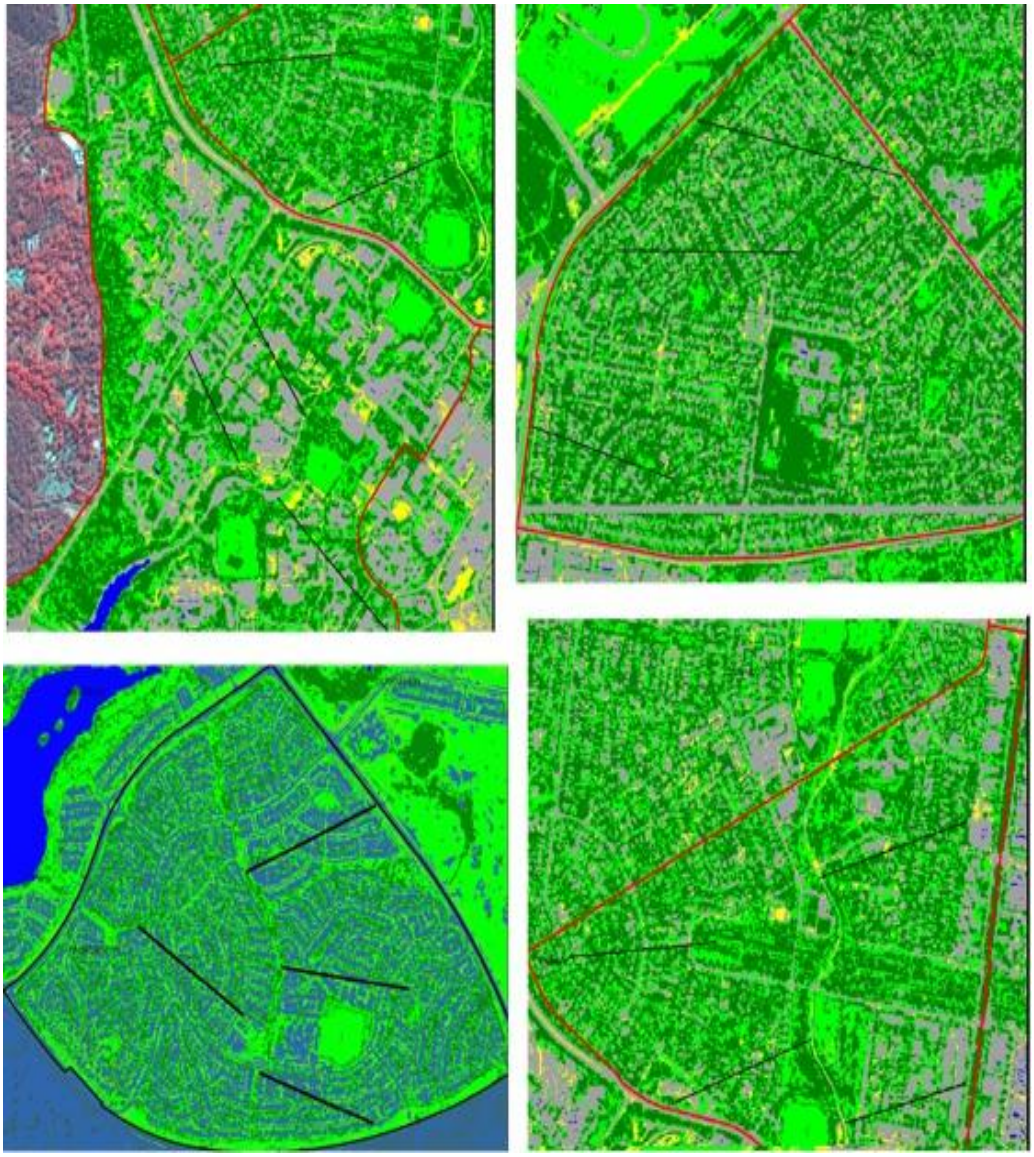
The research examined the relevance of Landscape Function Analysis (a rapid assessment methodology used to assess landscape health) in the urban context as it relates to the infiltration of water and nutrient retention in the landscape. The study assessed water infiltration rates across the ACT suburbs of Acton, Turner, Downer and Palmerston to identify the impact of development patterns and associated flood risk.

OUTCOMES

More than 14km2 of impervious surfaces have been developed in the Sullivans Creek catchment since the ANU was established. This has significantly reduced the capacity for infiltration in the catchment, and increased floodwaters carried by Sullivans Creek to the ANU campus. Effective flood prevention and mitigation on campus requires addressing the impacts of current and possible future developments.

The results showed that the best infiltration is achieved in areas with rough grass, vegetation over 50cm and dense vegetation cover, such as trees, shrubs and tall grasses that act to intercept rainfall. Mown grass, such as is found on ovals and many creek edges on campus has low infiltration and higher levels of runoff and nutrient loss. Buildings and pavement significantly increase runoff and therefore increase peak flows in the stormwater system and contribute to flood risk.

Study results confirm that urban environments display idiosyncratic ecologies making intercity comparisons difficult. While it may be useful for ANU to apply measures of ecosystem function to inform flood risk plans it may be less useful to take such measures to characterise larger urban areas. There were differences in the values of suburban transects in response to housing patterns, implying suburb-level measures may be less useful.



Extracts from ArcMap detailing the transects taken across the land cover classification for) Acton, Downer, Turner and Palmerston (clockwise from top left)

OUTCOMES (CONTINUED)

The report suggests strategies for future plantings that can work to mitigate flood risk while also enhancing the ecological health of the landscape and waterways. Strategies include alternate creek line treatments that include tall reeds and rough un-mown vegetation along the verges and the retention and planting of dense vegetation in greenspace areas. Such landscapes act to intercept and slow the movement of water across the landscape, thus reducing peak flows in the creek system.

PROJECT TEAM

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FOR MORE INFORMATION

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