

W6 Physical Form: Relationship between physical form and ecological health of waterways.

Objective(s)

To unpack geomorphic-ecological linkages to understand how channel morphology influences ecosystem structure and functioning, what aspects of physical form are most important and how they can be quantified or measured.

Why this research is important

Melbourne Water manages waterway health across the region, focusing on supporting a range of key values (including environmental and social). These key values are supported by number of waterway conditions, including physical form. Stream physical form that is reasonably stable (e.g. natural rates of erosion) is likely to support higher levels of key values. However, Melbourne Water, like many waterway management agencies across the world, does not yet have an effective way to quantitatively measure or track physical form condition or to set physical form objectives.

There is a need for better understanding of physical form responses to pressures and management interventions, as well as the integration of improved metrics, objectives and monitoring methods in the next HWS. This will ultimately help support planning and decision making for physical form protection and rehabilitation and help build the case for proactive interventions.

Contribution to Melbourne Water research priorities

- MWRP20 (RV13): Relationship between physical form and ecological health of waterways.

Approach

This project will be delivered via five work programs:

- Predicting channel form disturbance in response to urbanization : PhD project investigating prediction of channel enlargement and simplification due to urbanization (Toomuc Creek).
- Reviewing field-based physical form pilot data: review the pilot dataset and develop recommendations for the next stage of data acquisition.
- Developing metrics and targets for physical form for the Healthy Waterways Strategy: defining key knowledge gaps and plans for integration of new knowledge into the HWS.
- Relating lidar-derived information, field-based physical form data and biological data.

- Quantifying effectiveness of catchment and waterway interventions: through a series of industry workshops.

Key outputs

- Literature review on controls on global variation in channel enlargement due to urbanisation.
- Quantitative studies of stormwater impacts on channel morphology.
- Review of physical form field pilot data and recommendations for rollout of a comprehensive physical form monitoring program to support the HWS
- Recommendations for improved physical form metrics and targets in HWS
- Report on relationships between physical form field and remote-sensing metrics, and between physical form and ecosystem health metrics
- Scope for future subproject on catchment and waterway intervention effectiveness

Expected benefits

- Greater understanding of the influence of urbanization on channel form in a system with complex legacies, greater understanding of timeframes of adjustment to urban impacts
- More extensive physical form dataset with strategic spatial coverage to target key knowledge gaps.
- Better ways to track and report on long-term trends in physical form across the region, clearer guidance on data acquisition needs, clearer definition of 'good' condition in different contexts.
- Greater understanding of which aspects of physical form are most important for key values, and which aspects can be measured using remote sensing data.

Project teams

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