

W7 Sediment Dynamics: Major sources and fate of sediments in streams, wetlands, estuaries and bays to inform management opportunities.

Objective(s)

To improve models of urban, peri-urban and rural sediment budgets and to inform plans and strategies to decrease sediment loads to receiving waters, with a focus on the Westernport catchment.

Why this research is important

Western Port is sensitive environment, containing seagrass beds that are under threat from light attenuation, due to fine sediment inputs from the catchment and coast. A sediment load target was specified to allow sediment to flush from seagrass areas of the bay. Melbourne Water, in partnership with DEECA, is now scoping the need for further planning to achieve that target based on commitments in existing strategies and plans for Westernport.

While sediment loads from rural lands and channel erosion are reasonably well-understood, several uncertainties remain around sediment sources in the catchment, including a knowledge gap on sediment liberated by different stages of urban development. There is also a need to better quantify aspects such as bank erosion and sediment deposition/resuspension. These knowledge gaps need to be addressed in order for Melbourne Water to manage sediment loads to Western Port in accordance with the Environment Protection Act.

Contribution to Melb. Water research priorities

- HWS KRA: Undertake priority research projects identified in the Western Port Environment Science Review and synthesis report
- Informing HWS RPO-17: "Water quality in waterways and bays is improved by reducing inputs of sediment and other pollutants from urban construction and development."

Approach

This research is being delivered as a suspended sediment monitoring program and two PhD projects (jointly enrolled between Lyon university and University of Melbourne).

Suspended sediment fingerprinting study

Will take a new approach (complementing previous work) to pinpoint the contributions of different sediment sources. Sediment fingerprinting determines unique 'fingerprints' for different sediment sources based on their geochemical or isotope composition or other properties.

Variability of sediment sources in peri-urban areas (Phd)

Disentangling the variability of sediment sources from different stages of development within the catchments using turbidity monitoring, allowing for the validation and quantification of the conceptual model.

Sediment transfer in peri-urban areas (PhD)

Exploring the problem of sediment transfer in peri-urban streams and its interaction with riverbed morphology.

Unsealed roads student project (Honours/Masters)

Examine the impacts of road sealing and its influence on sediment loads to streams.

Key outputs

- Final technical report: sediment load monitoring in urbanising areas of the Westernport catchment
- Sediment fingerprinting study report
- Journal article (in collaboration with RMIT): Sediment and pollutant loads from urbanising areas of Melbourne.

Expected benefits

- Refine capability to model sediment loads from urban construction.
- Better understand the relative risk of specific stages of urban construction versus mature urban estates in terms of sediment loads.
- Support the evaluation of management opportunities to reduce sediment loads from urban construction.
- Better understand the relative contributions of specific sources of sediment in urbanising areas
- New understanding of sediment transfer in peri-urban areas.

For more information

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