Living Rivers Program

Partnering for sustainable stormwater management

SUPPORT FUNDING GUIDANCE

Dandenong Ranges Stormwater Research Project

Reducing the environmental impact of stormwater outfalls on high-value waterways

Yarra Ranges Council, Victoria

Yarra Ranges Council

Key Messages

- The Living Rivers program partnership provided Council with the support and guidance necessary to undertake this critical stormwater infrastructure analysis.
- Ongoing funding from Living Rivers has enabled Council to design and implement stormwater infrastructure and broaden the scope of the stormwater research project across the Shire.
- The study found extensive evidence of stormwater impacts on waterways containing threatened species, many in National Parks and reserves.
- 16 out of 72 outfalls in the South-east Dandenong catchment were identified as priority locations for works to mitigate stormwater impacts.
- Community groups can help leverage support for projects and provide valuable local environmental knowledge.

Project Overview

In 2016, Yarra Ranges Council received funding from the Department of Environment, Land Water and Planning (DELWP) and Melbourne Water's Living Rivers Program to investigate the locations and magnitude of stormwater flows from Council drainage outfalls in the Dandenong Ranges. The major focus of the study was to better understand the impact of the Council's 72 stormwater outfalls on waterways and riparian habitat in the South-east Dandenong catchment, in particular the impact on high-value waterways and threatened species. The overall objective of the project was to develop an evidence-based strategic framework for identifying priority sites for stormwater mitigation and to inform the development of an area-specific plan to mitigate the impact of stormwater on sensitive riparian ecosystems. This project demonstrates Yarra Ranges Council's progressive approach to stormwater management, environmental protection and liveability and the capacity building value of the Living Rivers program.

Organisations

Multiple agencies were involved in the project's delivery including Yarra Ranges Council, Melbourne Water, DELWP, Vic Roads, Parks Victoria and local community groups: Friends of Sassafras Creek, Friends of Sherbrook Creek and Southern Dandenongs Land Care.

Research method

Stormwater impacts

Stormwater and drainage infrastructure in the study area was mapped and flows calculated using GIS, catchment mapping, impervious area calculations and hydraulic modelling. Outfalls and gully erosion sites were visited to observe and document impacts. A stormwater impact score, the sum of *stormwater magnitude* and *overland flowpath buffer*, was calculated for each of outfall using multi-criteria analysis. *Stormwater magnitude* was calculated using variables such as increase in *peak flows* and *connected impervious area*. *Overland flowpath gully erosion* was calculated using the length, gradient, modelled flow velocity and observed erosion.

Receiving waterway value

Biodiversity surveys were undertaken for 5 threatened species: the Sherbrooke and Dandenong Amphipods (*Austrogammarus haasei* and *Austrogammarus australis*), the Dandenong Burrowing Crayfish (*Engaeus urostrictus*) and the Slender and Skirted treeferns (*Cyathea cunninghamii* and *Cyathea smithii*). The Dandenong Burrowing Crayfish were surveyed with the assistance of the community in a citizen science project. A number of significant new records and locations were found for each species. Macroinvertebrate diversity and sensitivity measures (SIGNAL score's from Melbourne Water's database) were also collated and mapped across sub-catchments. Using a multi-criteria analysis, receiving **waterway value** scores were calculated based on the threatened species survey and macroinvertebrate distribution data.

Sassafras Creek stormwater outfall

Risk assessment

The impact of stormwater outfalls on waterways was calculated using a risk matrix that plotted **waterway value** against **stormwater impact** for a selection of the outfalls with the highest directly **connected impervious areas** (16 of 72 outfalls in the catchment). The impact of stormwater on the waterway was classified as either high, medium-high or medium risk.

Outcomes

Priority locations for stormwater works

The risk assessment identified seven medium-high to high risk outfall locations for stormwater mitigation. The top three (Sassafras township, 533 Mt Dandenong Tourist Road, Olinda and Kallista roundabout 2) had previously been identified by Council as stormwater hotspots. Yarra Ranges Council are developing concept designs for the top 5 high-risk outfalls identified in the study. This work is also being funded by Living Rivers through the 'WSUD in the Dandenong Ranges' project. A concept design for the *Sassafras Stormwater Detention System* outfall has already been completed and detailed construction designs are in preparation.

Infrastructure outcomes

By confirming the status of high priority outfalls, the South-East catchment project paved the way for additional funding to be secured from Living Rivers to undertake construction of priority infrastructure projects including the *Sassafras Stormwater Detention System* and *WSUD at Olinda-Monbulk Rd, Olinda and Giddens Lane, Mt Dandenong*.

Strategic Framework for Stormwater Planning

This research provided Yarra Ranges Council with the data needed to develop a long-term strategy for mitigating the impact of stormwater runoff on sensitive riparian ecosystems and perform better as the agency responsible for the maintenance and development of stormwater infrastructure in the Council area.

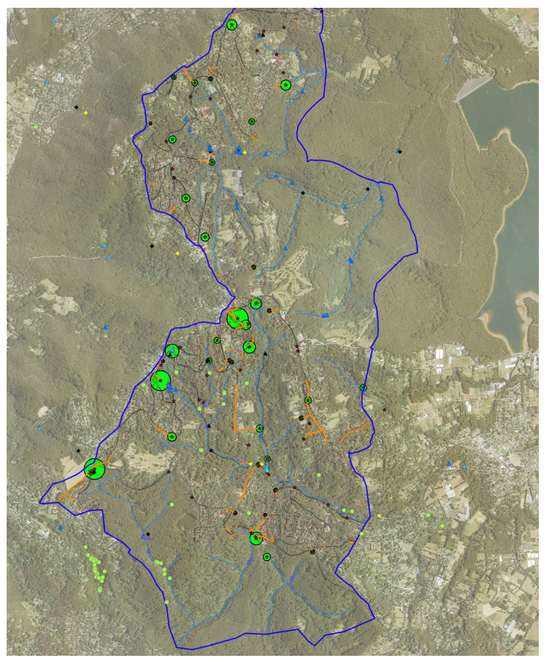
Further applications of the framework

Council aims to reduce the impact of new roads on waterways where possible. The framework developed for this project could be used to map the location and extent of future road sealing projects and identify waterways at risk of being impacted by the increase in impervious area. This research will help prioritise and inform decisions about infrastructure design in new road projects to minimise impacts on waterways and important species. The same approach could be applied to assessment of new subdivisions and drainage upgrades.

Future research

Further funding from the Living Rivers program has been secured to expand the scope of this research to include other priority catchments for Water Sensitive Urban Design in the Shire. This project ('Local area stormwater management plans for priority catchments') will inform the development of a Yarra Ranges Stormwater Mitigation Plan, in partnership with the Infrastructure strategy team's Drainage strategy, which identifies high risk stormwater outfalls across the shire in terms of environmental, local flooding and landslip risk. Further research is also needed to improve Council's holistic understanding of stormwater flows and impact, in particular: the role of informal drainage in stormwater treatment; the role of stormwater assets in conveyance of septic effluent to waterways; and weed spread in the vicinity of stormwater outfalls.

Survey of Dandenong Burrowing Crayfish with Di Crowther of Arthur Rylah Institute (DELWP) and community members.



Location of stormwater outfalls and threatened species in the Dandenong Ranges

Lessons Learnt

- The project significantly improved Council's knowledge of stormwater infrastructure and flows in the Dandenong Ranges and the impact of stormwater on waterways and threatened species.
- Evidence-based prioritisation assessments provide data to support infrastructure planning decisions and project funding applications.
- Council is learning to refine the assessment process as the framework is applied to study areas with different stormwater variables (i.e. flow magnitude and erosion risk) and ecological priorities (i.e. priority species, threats and stressors).

More Information

For more information visit https://www.melbournewater.com.au/livingrivers

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