

## **LitterWatch Victoria: Geelong heatmap layer of predicted litter hotspots**

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### **Summary**

**The predicted litter hotspot layer has been created using locations of infrastructure that might help predict litter distribution. This information is intended to be used to guide land managers and community groups on which areas to monitor and prioritise for action. The heatmap is not designed to substitute real data or provide a comprehensive assessment of litter density in a given area. The heatmaps are at the scale of local government areas and will be expanded as the data is made available. Any questions please email [LitterWatch.Victoria@delwp.vic.gov.au](mailto:LitterWatch.Victoria@delwp.vic.gov.au).**

### **Background**

One of the objectives of the LitterWatch Victoria project was to determine (1) what constitutes a litter hotspot (how is it defined); and (2) identify where these occur based on existing data (mapping of hotspot locations in Port Phillip). Whilst developing the LitterWatch site, it was clear that there were insufficient data from previous monitoring to attempt step 1, and the data that existed were not standardised.

Instead, an alternative approach was trialled using a different logic. Without robust, standardised data on actual litter distribution and abundance, we considered what spatial features of the landscape might represent or reflect the likelihood of litter being present. There are a number of broad factors that might influence this:

- Human behaviour - where people go to eat, recreate or socialise, e.g. takeaway food outlets, kiosks, beaches, parks, public toilets
- Infrastructure features associated with the generation of litter, e.g. roads, playground equipment, picnic tables, rubbish bins
- Transport hubs i.e. train stations, bus shelters
- Proximity to vectors, e.g. drains leading to flowing water

Some of these factors are readily available as public spatial datasets, e.g. infrastructure features like bins, BBQs, playgrounds, while others are either spatially limited (due to custodianship, e.g. Geelong stormwater drains is available but not Melbourne), or not practicable to visualise or meaningful to interpret at the scale of the Port Phillip region e.g. shops, carparks, roads (that is, everything in Melbourne would appear as a litter hotspot).

The first trial of this approach was done with open source data in the Geelong data exchange (<https://www.geelongdataexchange.com.au/pages/home/>) and with a limited set of infrastructure items clearly associated with human recreation that might be expected to behave as a proxy for litter presence. The initial results from this trial aligned well with the hotspots identified by the local community (via Bellarine Catchment Network litter program). The final datasets were used to create a raster image or “heatmap” in desktop GIS (QGIS), which aims to quantitatively represent the density of infrastructure features that might be predicted to reflect litter density.

This was done on the assumption that there is a positive generalised linear relationship between infrastructure and litter, that is, where there are more recreational features of interest, there will be more litter. Clearly this assumption warrants further testing. While there has been research using spatial modelling to predict marine litter distribution (Critchell et al. 2019; Franceschini et al. 2019; Haarr et al. 2019; Ioakeimidis et al. 2016; Mansui et al. 2020), there appears to be very little equivalent research predicting (non-marine) urban litter.

The predicted litter hotspot mapping is intended to be used as a starting point to inform land managers and community groups where litter is predicted to be more prevalent based on public use. This data can also be used to test the locations historically chosen by community groups and other organisations for litter monitoring and to help identify areas which areas to investigate for future litter monitoring. Bellarine Catchment Network will be trialling this approach using the predictive heatmap to guide identification of new monitoring sites for 2020/21.

The heatmap is not designed to substitute real data or provide a comprehensive assessment of litter density in a given area. Rather, it is a useful tool at the municipal scale to identify where further investigation is warranted and an initial understanding of areas where more litter is predicted to occur. In the absence of a comprehensive standardised litter dataset across the whole area this is the best tool available for beginning to compare and prioritise litter hotspots.

#### **Layer name: Infrastructure Density/Predicted Litter Hotspots (Geelong)**

This is a heatmap of areas with the greatest density of the following public infrastructure:

Litter Bins  
Public BBQs  
Public Toilets  
Playgrounds

The scale represents the number of instances of these infrastructure within a 1km search radius.

This heatmap has been clipped to a 1km buffer of the coastline.

#### **References**

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