Gullies can be distinguished from **small streams** through machine learning

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Gully vs stream channels: and how to identify them

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INTRO

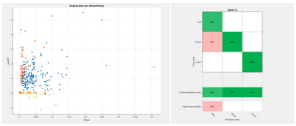
The classification of a drainage line as either a gully or a stream is important for catchment sediment yield modelling, predicting sediment production values at the landscape scale and the prioritisation of rehabilitation projects. Classification in the field can be relatively easy based on the presence or absence of fluvial forms and an assessment of allochthonous or autochthonous sediment sources. Here we present results from a combination of field survey data and desktop based machine-learning methods to remotely classify drainage features into gullies or streams.

METHODS

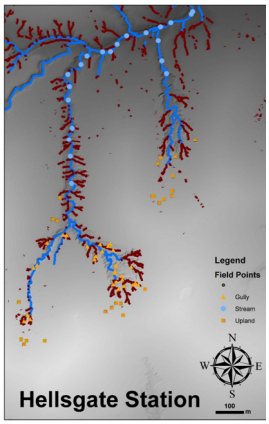
1. Field surveys to classify features as gully or stream;
2. Generated geomorphic metrics from a DEM: slope gradient, area, normalised elevation, residual elevation (surrogate for channel dimensions);
3. Trained model on survey data (validated on 20% of data);
4. Tested at separate site from field survey data.

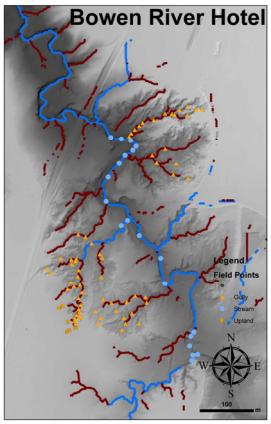
RESULTS

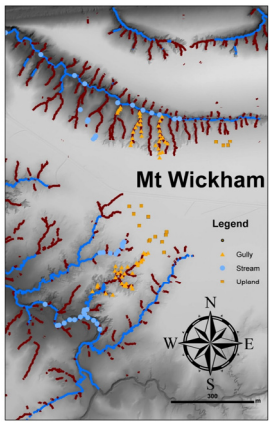
- Used RUSBoosted Tree classification (deals with imbalanced training data sets).
- Residual elevation (21x21 focal window) and drainage slope best separated data
- 88% accuracy on validation data (with held 20% of original survey data).



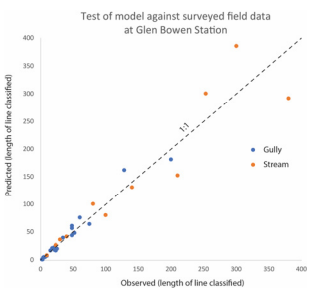
Mapped vs predicted gully and stream networks

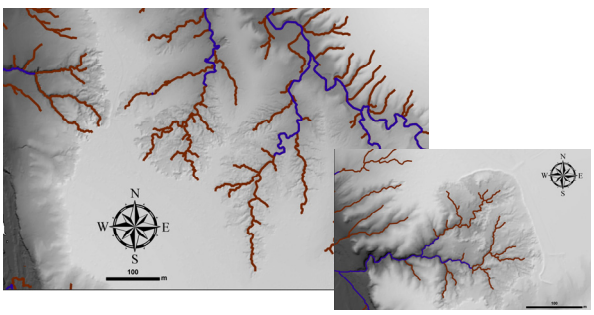






- Tested model on separate survey dataset from Glen Bowen Station: Results show predictions range from 5 to 25% difference from field observations





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