

Thesis
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**An Analysis of Landscape Diversity on the Floodplain of a
Scottish Wandering Gravel-bed River.**

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The contents of this thesis are original
and all of the work was undertaken
by the author. The results presented herein
are not taken from any other thesis
written by the author.

Signed.....*Helena Parsons*.....

Abstract

This thesis examines landscape diversity within alluvial valley floors using the case study of a Scottish wandering gravel-bed river. The thesis aims are two-fold; firstly to investigate the spatial and temporal patterns of valley floor landscape diversity within semi-natural environments, and secondly to develop a methodology for quantifying alluvial valley floor landscape diversity in space and time. The diversity analysis involves quantifying the spatial patterns of geo-, pedo- and biodiversity (flora) within floodplain zones which have been exposed to approximately 100 years of recovery since flood embankment abandonment along the most active reaches of the river. In addition historical records including aerial photographs, maps and narrative accounts were used to assess the temporal patterns of the diversity of landscape patches and how they have changed through time using a series of landscape indices. The analysis thus accounts for the role of river channel change in producing a complex mosaic of land cover types within alluvial valley floors.

The spatial analysis revealed that landscape diversity tends to be greater in the perpendicular orientation to the main channel, i.e. along an aquatic-to-terrestrial environmental gradient. The temporal analysis results revealed that the landscape over the last 50 years has changed from being dominated by few relatively large isodiametric patches to a landscape dominated by small irregular shaped patches. Thus although landscape patch richness has increased along with an increase in land cover types through time, the landscape patches have also become more fragmented.

The major outcomes of the research are the deriving of quantitative results of the spatial and temporal patterns of floodplain landscape diversity, an evaluation of the role of channel dynamics in creating the diverse mosaic of land cover types, the identification of the environmental controls and supporting floodplain habitats of a number of rare species and a proposed methodology for assessing landscape diversity to be validated on other river systems.

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