

NERC Innovation Internship: Fluvial Geomorphology



THE UNIVERSITY of EDINBURGH
School of Geosciences



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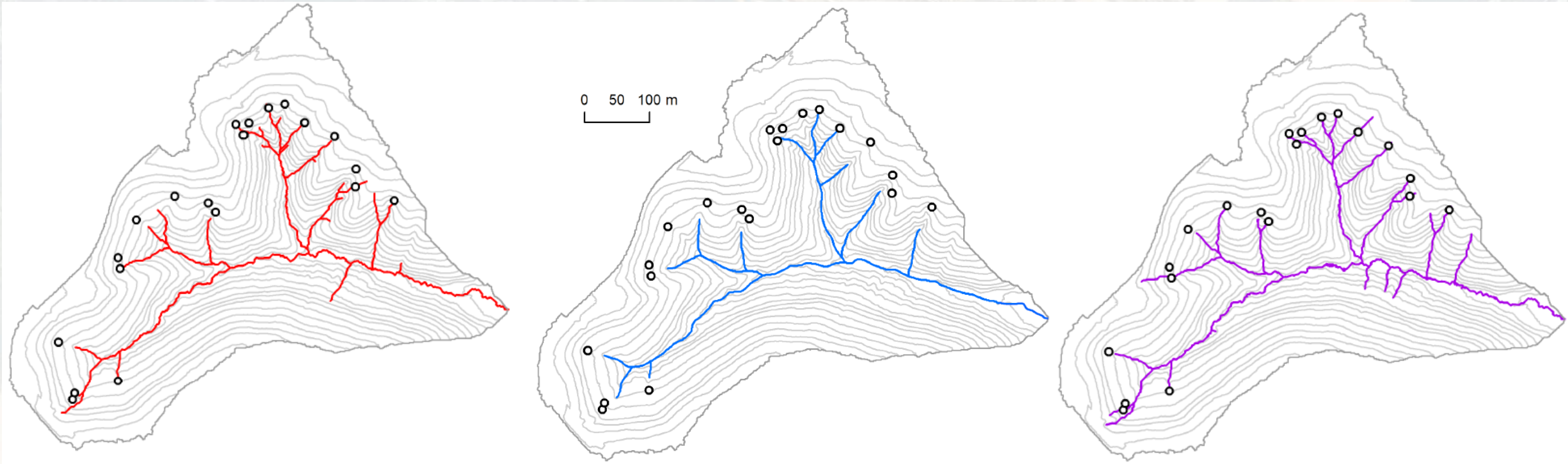


NERC Innovation Internship

“How partner organisations can make use of scientific knowledge, data, models, or other tools to understand and manage their impacts and/or dependencies on the environment”



Channel network extraction

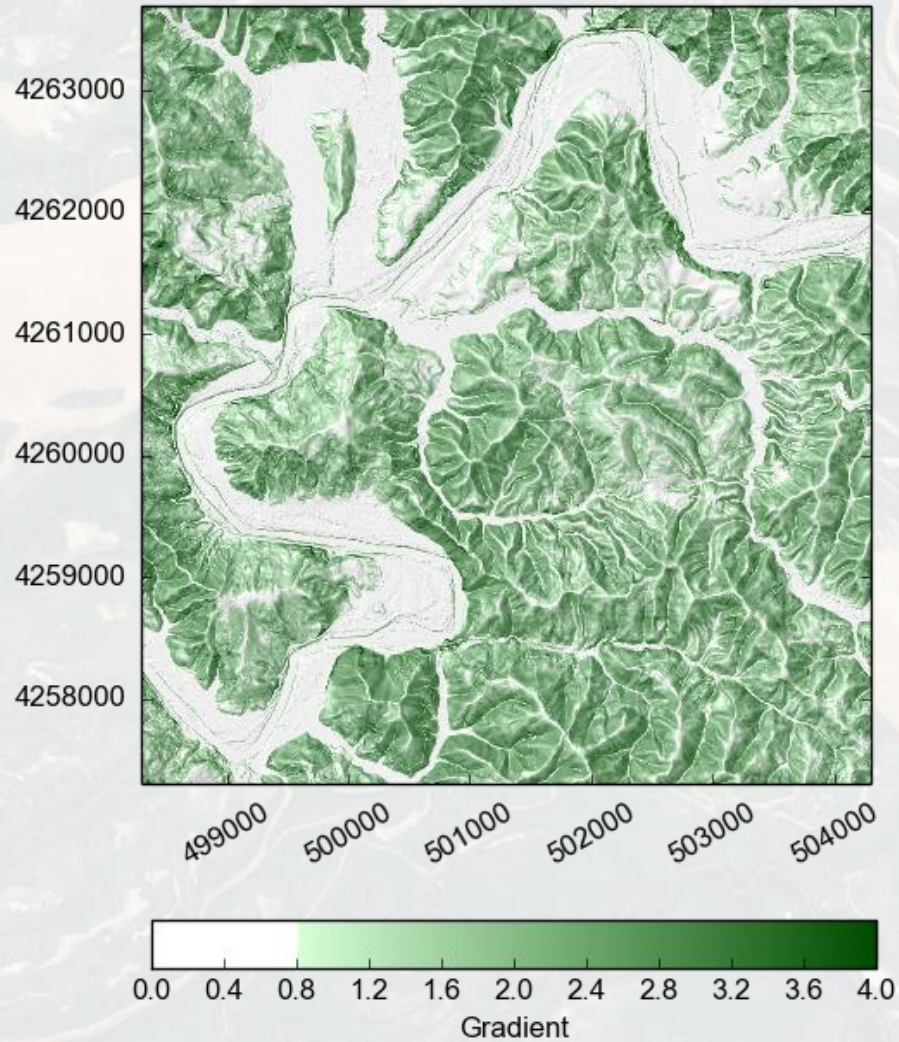


Several different channel extraction methods:

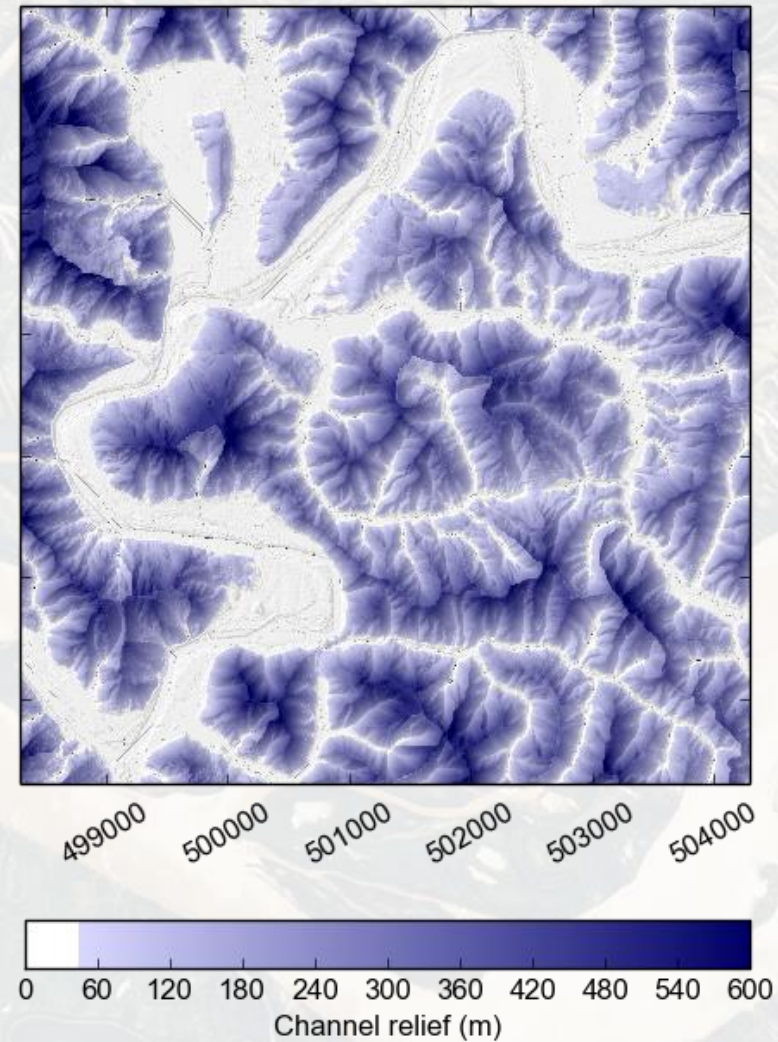
- Area-slope thresholds
- Geometric-based methods (curvature)
- Process-based methods (DrEICH algorithm)

Floodplain and terrace extraction

Gradient

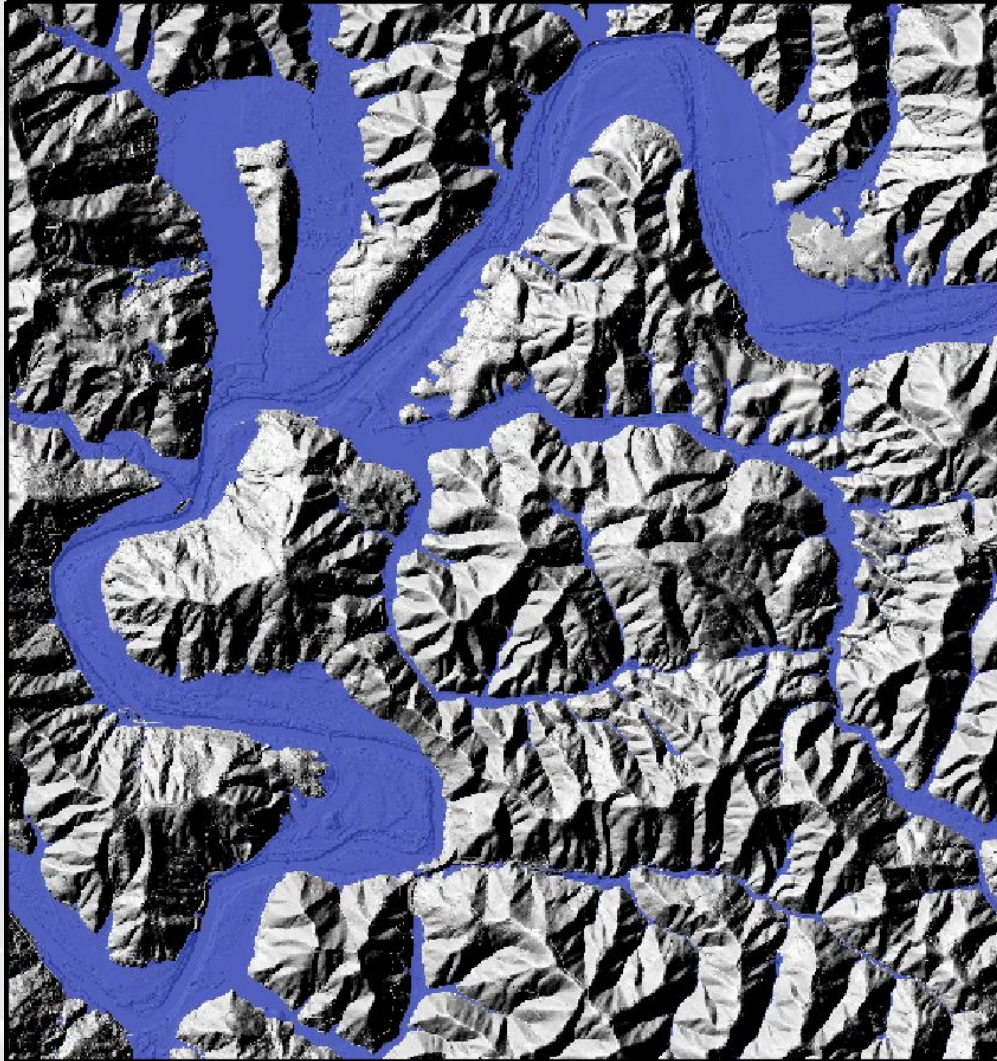


Channel relief

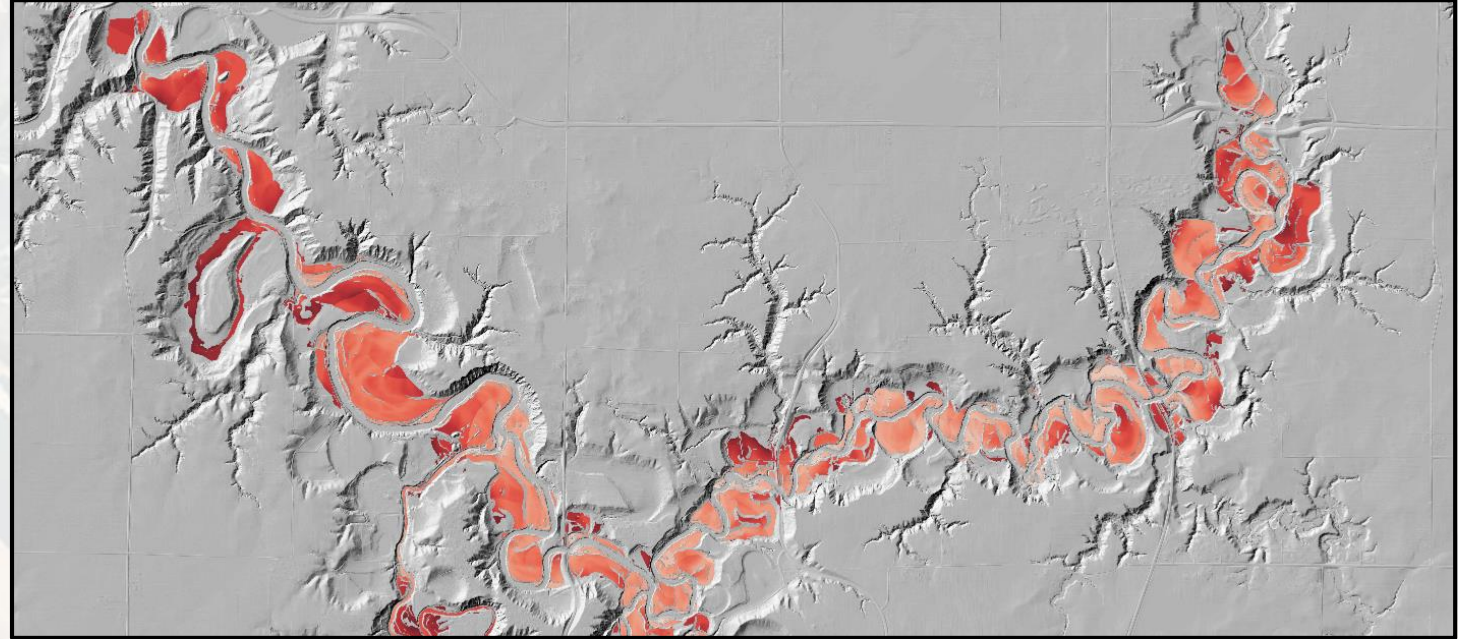


Floodplain and terrace extraction

Russian River, California

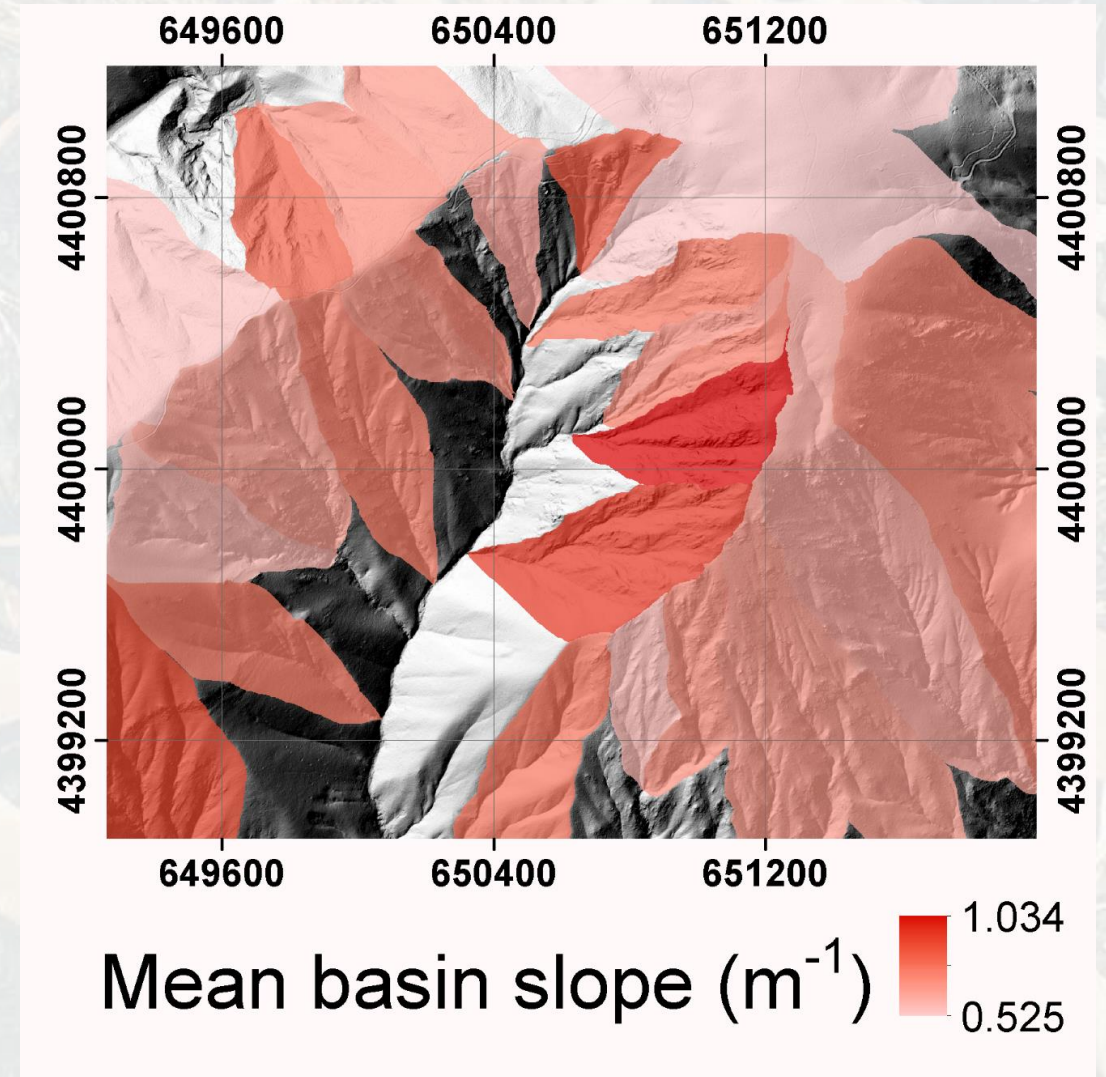
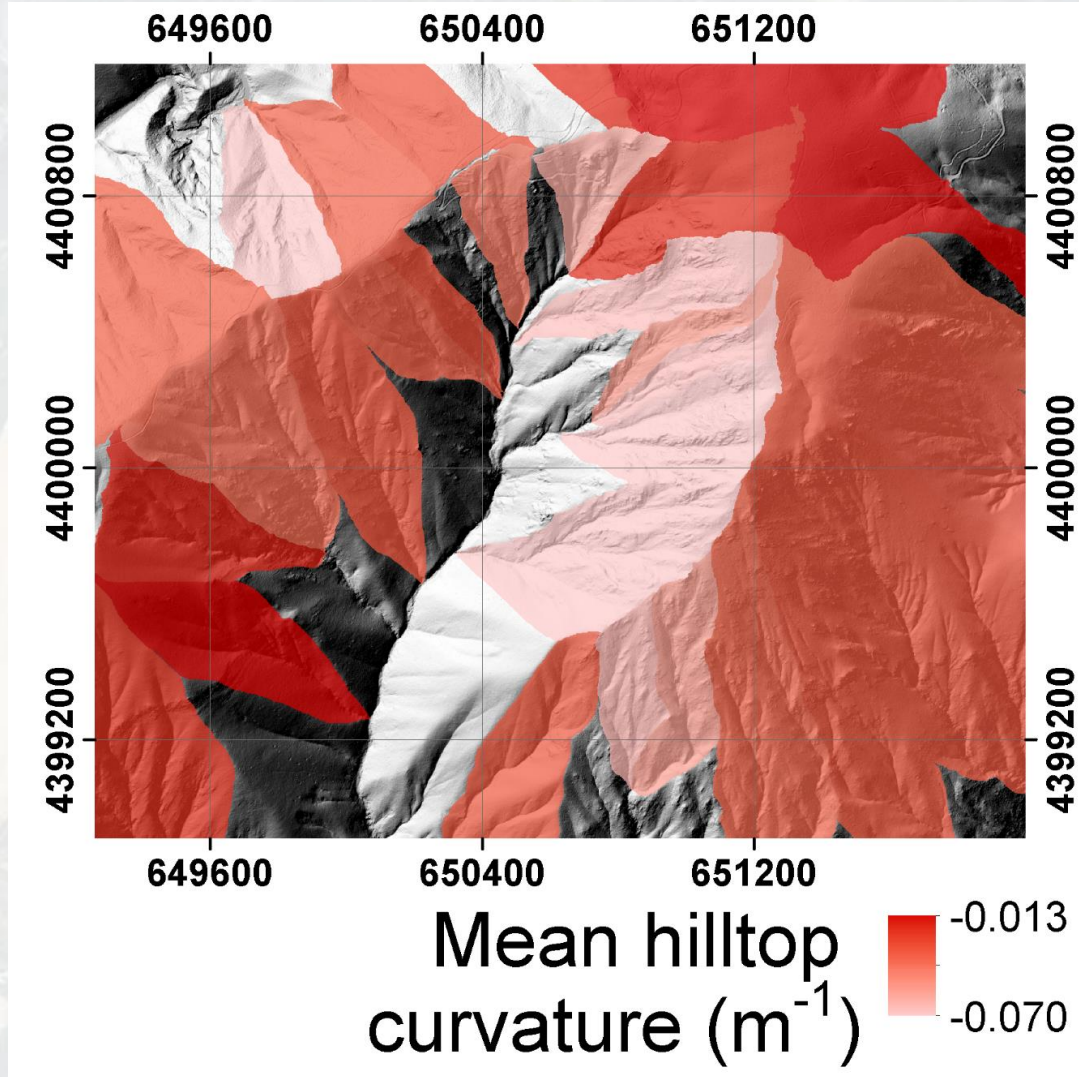


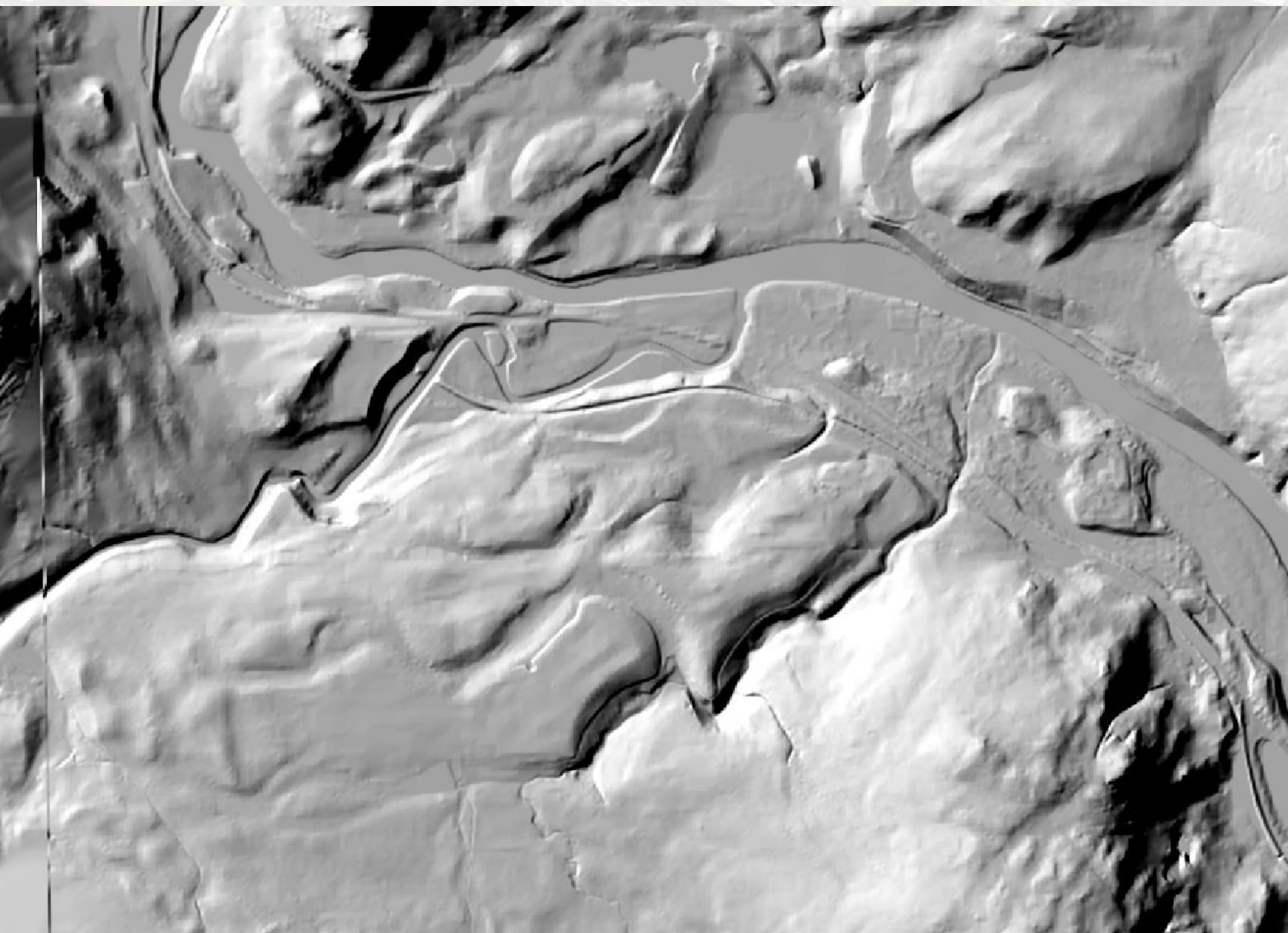
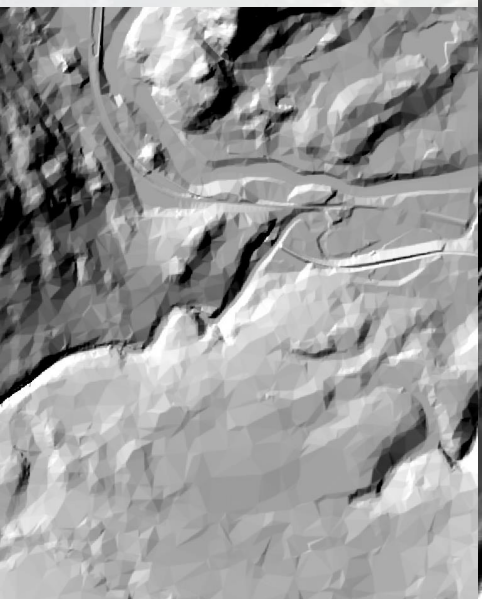
Le Sueur River, Minnesota



- Does not require any independent datasets or field mapping
- Quick to run across large datasets as only requires input of the topographic data

Catchment extraction and analysis



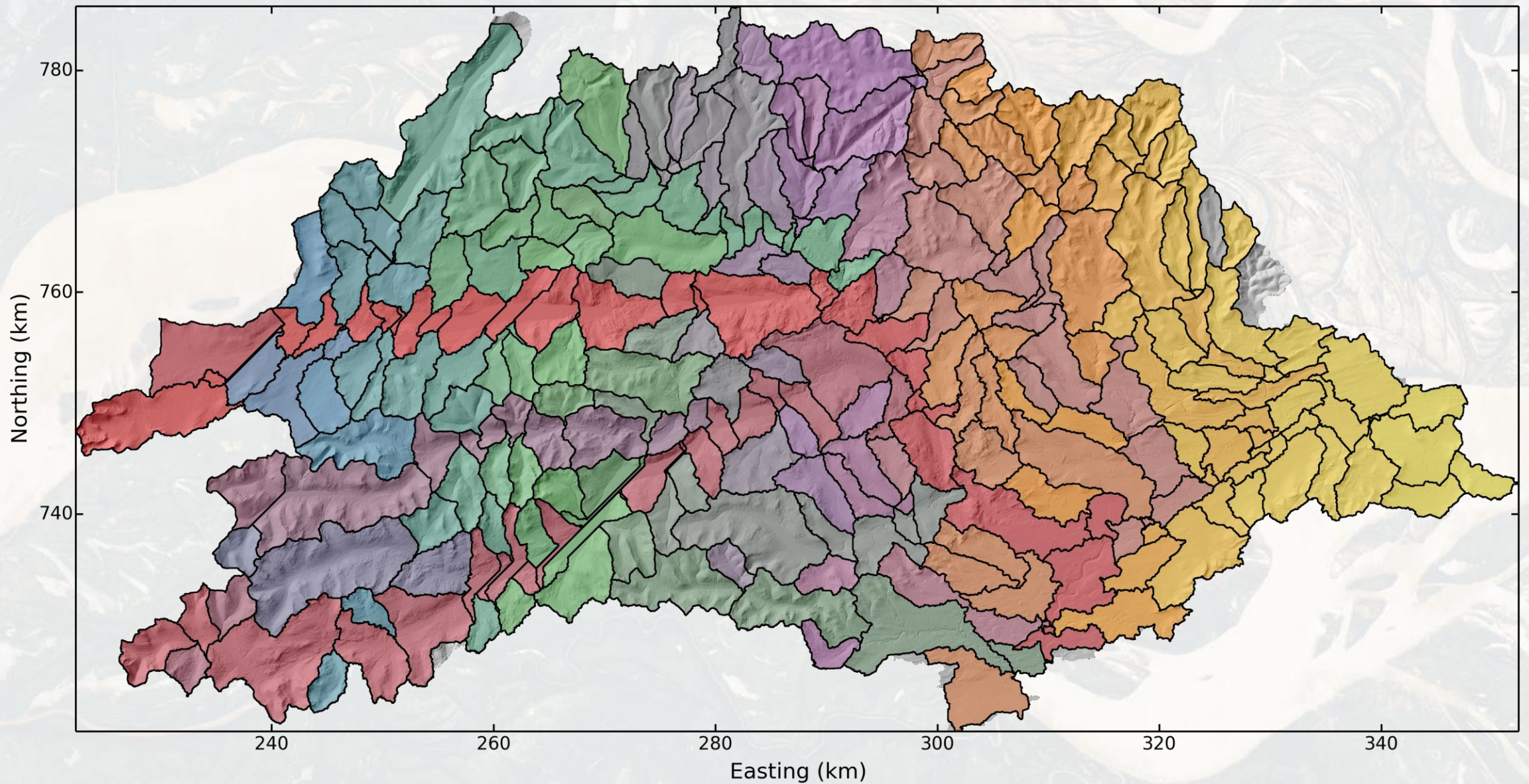


OS Terra
Photogrammetry
Vertical accuracy
RMSE for urban
rural

ng
graphy
50cm

Basin extraction

River Tay catchment



Fluvial typology classification



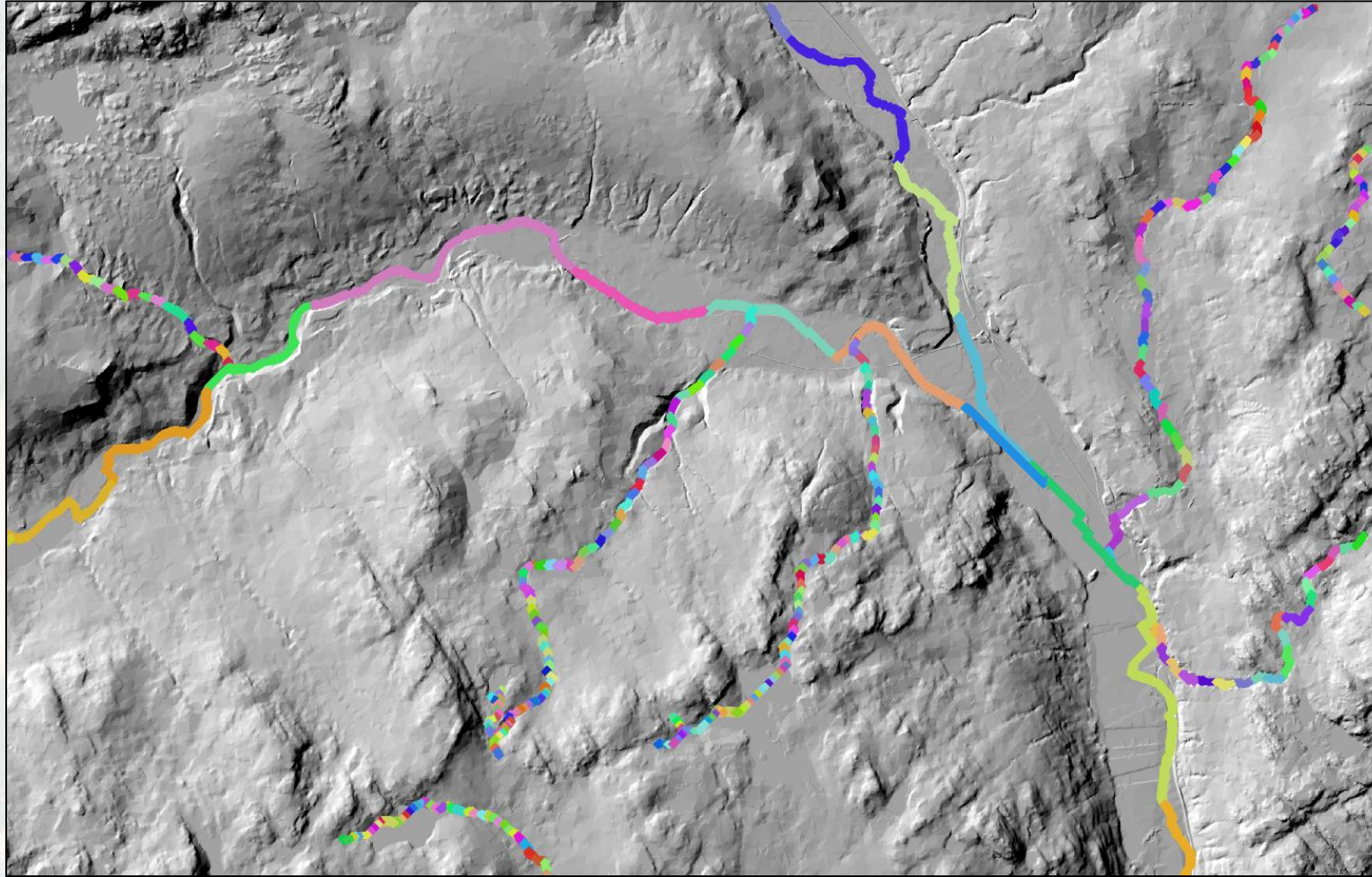
Step-pool channel



Pool-riffle channel

- Scottish implementation of EU Water Framework Directive
- Typology model – classify every river in Scotland based on its slope and discharge.
- Improve original classification and supplement field data (~650 channels out of 2,300)

Fluvial typology classification



- Split each river into a series of reaches based on their drainage area
- Assigned each reach value of local gradient and discharge
- Will be used to classify each reach and compare to field data

Challenges and opportunities

- Dealing with large datasets: topographic analysis on a national level
- Differences between DEM-derived metrics (basins and channel networks) compared to field-mapped data
- Availability of high-resolution topographic data – need for national LiDAR coverage

Thank you, any questions?

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