What's Happening...

waterRIDE™

WorleyParsons
resources & energy

Recent project work has highlighted the need to create "smart" flood extent polygons. A "smart" flood extent polygon is one that aligns with the intended use of the polygon.

Flood extents may be used for a wide variety of purposes such as development planning boundaries, emergency response zoning, real-time web publishing, model verification, and community education.

In some of the above situations, the "look" of the flood extent may be critical for its effective use, whilst in others, the number of vertices in the polygon may be a critical limitation.

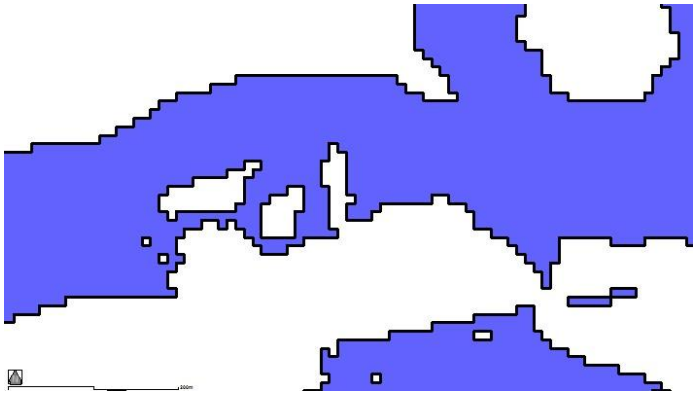
In this issue, we look at some different approaches to generating "smart" flood extents, primarily using gridded datasets.

Flood Extent Mapping: Creating "smart" Flood Extents

waterRIDE™'s dedicated **flood extents tool (FPM Tools menu)** has a range of options for exporting flood extents to match their intended use, but which option is "best"?

In situations where the "accuracy" of the data is to be preserved, then it is often best to export a flood extent matching the "as modelled" results.

In this case, a polygon with blocky edges matching the underlying grid should be simply *exported* directly:



For planning purposes, it is often desirable to *map* model results onto a finer scale terrain framework prior to exporting flood extents (more detail on this approach was discussed in Issues 10, 11, 15 and 17, available here).

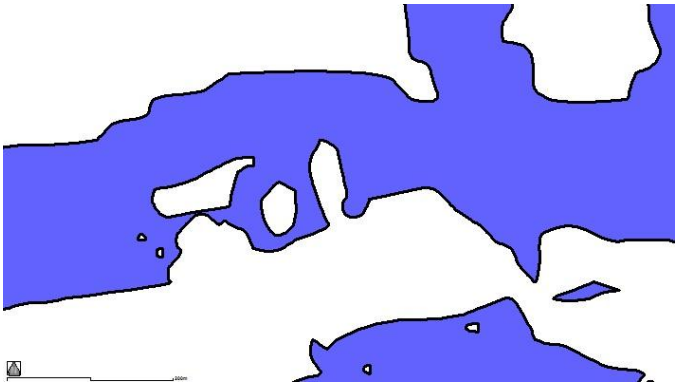
This results in more detailed flood extents, which may be more suitable for finer scale use.

For community education purposes, it may be worthwhile *smoothing* the flood extents during creation.

This provides a more cartographic look to the extents and places less emphasis on the approximations used in the underlying modelling.

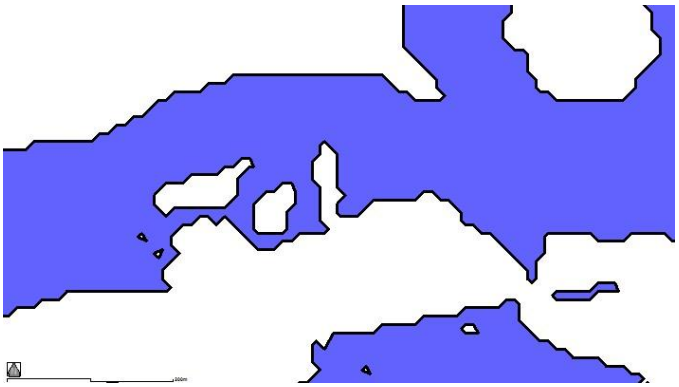
The **smoothing option** fits either a Catmull (standard curvature) or Bezier (lower curvature) cubic spline between every 4th vertex on the flood extent polygon, resulting in a very smooth shape that generally matches the flood extent (although some variations will occur).

However, this comes at the expense of file size as additional vertices must be inserted between every 4th vertex to create the smooth curve:



If flood extents are being published to the web, any limits on the number of vertices in a polygon and ultimate file sizes may be a critical consideration.

For example, as Google maps/earth generally limits the number of vertices in any single object to 100,000, it may be worthwhile *simplifying* the flood extent polyon by removing "redundant" vertices:



The **simplify option** uses a Douglas-Peucker algorithm to identify which vertices to remove from the flood extent polygon based on a deviation of vertices along a localised trendline.

The result is a flood extent that closely matches the base gridded extent, except that corners are generally champhered and has an overall smoother apperance with less vertices.

In some cirumstances, it may be worthwhile combining multiple options, such as *mapping* to a finer scale terrain, removing *puddles/islands*, and *smoothing* the outputs to prepare the most suitable extent.