Appendix A Details of the Environment Agency Flood Zone

A.1 Introduction

A more detailed understanding of the Environment Agency Flood Zones and their limitations is important, as these are often used (unless more accurate flood outlines are available) for the production of SFRA flood maps.

A.1.1 Environment Agency Tidal Maps

Mapped tidal Flood Zones 3 and 2 generally comprise land that is lower than the estimated height of the extreme surge tide in the relevant event. Where detailed studies have been undertaken, tidal Flood Zones 3 and 2 have been modified to take into account wave height, the gradient of the land and the relatively short duration of the high tide. In appropriate circumstances, the build up of tidal water trapped behind tidal defences over several high tides is mapped.

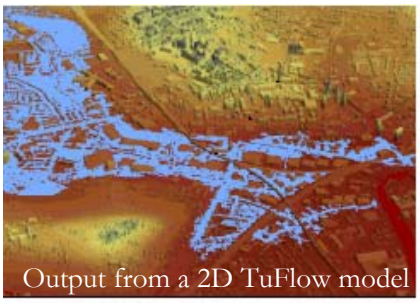
A.1.2 Environment Agency Fluvial Maps

Data for fluvial Flood Zones 3 and 2 is derived from a number of sources. Some observations of flooding by the Environment Agency's predecessors are included, for instance the extent of the severe 1947 floods. Most fluvial flood outlines are derived from the "JFlow" generalised computer modelling, which is a 'coarse' modelling approach (Ref. 31 and 32).

Caution must be exercised in interpreting JFlow derived flood outlines due to the large number of assumptions incorporated into the JFlow model. For instance, at some locations the river centreline incorporated into the model was found to be erroneous with the result that the associated flood plains deviate from the natural valleys.

A.1.3 Updates of the Environment Agency Flood Maps from Modelling

In many places the results of flood mapping studies have superseded the JFlow model. Generally these studies included high quality hydrological research, surveyed river cross sections, and more precise digital modelling such as ISIS, TuFlow and HecRas.



Output from a 2D TuFlow model

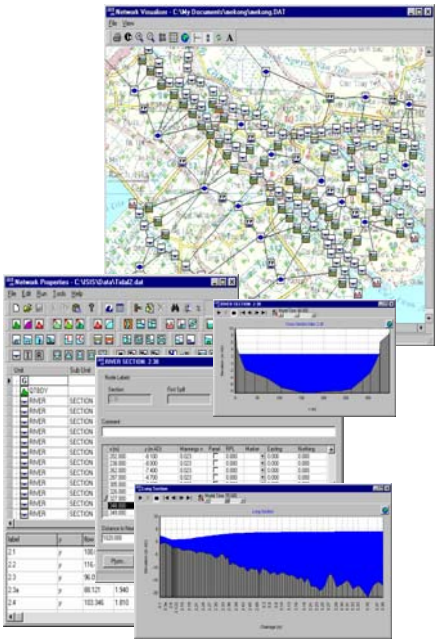
Although fluvial flooding is dependent on the standard of maintenance of watercourses and structures, the degree of maintenance allowed for tends to vary from model to model, with the result that flood maps based on modelling do not offer a consistent approach in this respect. As a consequence, serious blockages occurring during a flood might produce much more flooding than shown on previous modelling for a similar hydrological event.

A.1.4 Updates of the Environment Agency Flood Maps from Recent Events

Records of recent flood events have been used to modify the flood map. In these cases the Environment Agency has determined the return frequency of the observed event and modified the appropriate flood zone accordingly.

When evidence of flooding is based on aerial photographs, there is often uncertainty about a) whether the flooding has emanated from the river or is the result of other land drainage, b) the precise flood return period and c) whether the flooding was the result of blockage or some other maintenance factor. Occasionally therefore, flood zone modifications based on observed flooding are unreliable.

ISIS Software Graphic Interface



A.1.5 Other Forms of Flooding in the Environment Agency Flood Maps

Although PPG 25 and PPS 25 advise that the flood zone maps, which are primarily intended as a planning tool rather than a definitive record, should only show tidal and fluvial flooding, in practice many show other sources of flooding. In Hampshire for instance, much flooding derived from groundwater sources is included, both in dry valleys and isolated ponds. These groundwater flooding outlines are derived from both JFlow and observations.

A.1.6 Non Main River flooding in the Environment Agency Flood Maps

Inland Flood Zone maps show some non main river watercourse flooding as well as main river watercourse flooding. “Main rivers” are principal watercourses defined by Section 93 of the Water Resources Act, 1991 and shown on a formal map held by

the Environment Agency – the Environment Agency flood zones. Larger ordinary watercourses are shown on the background Ordnance Survey mapping.

There is no precise definition of how much non main river watercourse related flooding is included. If no flood plain is shown for a catchment that is less than 3 square kilometres in area, it should be presumed that the area has not been modelled and/or it has not been recorded (as opposed to assuming that flooding has not occurred or would not occur).

A.2 Areas Benefiting from Defences

The current flood maps, although they are based on the "undefended situation", show selected raised formal flood defences, and selected "areas benefiting from defences" (ABDs). This is land where flooding is prevented by defences, although it is assumed that the defences are robust, leak free and maintained, which is not always the case. Improved channels are not normally regarded as defences for the purposes of flood zone mapping.

A.3 Climate Change Effect on Flood Zones

In the absence of better information, the current fluvial Flood Zone 2 can be considered an estimate of the extent of fluvial Flood Zone 3 within 100 years. This principle does not hold for tidal floods, however, as the level difference between a 0.5% and a 0.1% annual probability tide is only about 200 mm, whereas the forecast increase in tide levels over the next 100 years is in excess of 1m.

As noted, current Environment Agency formal flood maps generally do not take into account the effect of climate change on winter rainfall and tide levels, or the effect of changes in the levels of tectonic plates on tide levels.