Holding Back the Floods

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Introduction

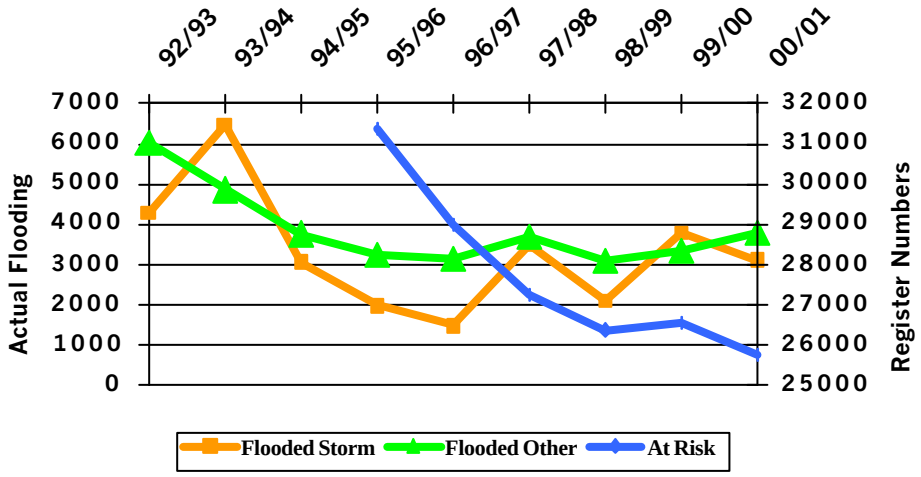
Sewer flooding is set to become "the next leakage" in AMP4. Whilst over 99.8% of properties are not "at risk", sewer flooding is acknowledged as the worst level of service failure. Emphasis has shifted over time from reducing properties "at risk" towards the number of actual flooded properties and incidents that occur each year. The widespread flooding of Autumn 2000, albeit predominantly river related, has focused the attention of customers, the industry, and government. The publication of "Flooding from Sewers – a Way Forward: Consultation" by OFWAT in March 2002 encapsulates this.

There is acceptance that investment levels need to be increased, and that the rate of reduction of at risk properties has to be much greater to significantly decrease the numbers of properties actually flooding each year, which weather variations and climate change conspire to mask. This paper examines this influence and looks at what other methods can be employed to help control actual flooding.

Evolution

AMP1 saw a focus on establishing the "2 in 10" at risk (internal flooding) register and targeting investment towards it. Drainage Area Planning became fundamental to building and verifying flooding data.

A further DG5 at risk register, the "1 in 10", was introduced in AMP2. Whilst the focus for investment continued to concentrate on the "2 in 10" register, there was, increasingly, a blurring of boundaries as both registers combined to provide the industry record of properties at risk. There can be no doubt that investment over the first two AMPs has significantly reduced the percentage of properties at risk twice in ten tears.



The current AMP period has seen a significant shift of emphasis towards actual sewer flooding. The OFWAT "star rankings" were applied to actual flooding of properties, due to

storm and "other causes". AMP3 determinations also referred to actual flooding, often incidents rather than property numbers. There was an implied assumption that achieving targeted reductions in at risk numbers would also meet targets to reduce actual flooding.

The floods of Autumn 2000 brought further attention to sewer flooding. The OFWAT consultation document recognises that companies' performance should be judged ideally on the number of properties flooded or the number of actual incidents of sewer flooding, but that weather variations mean that they can only be used to identify trends.

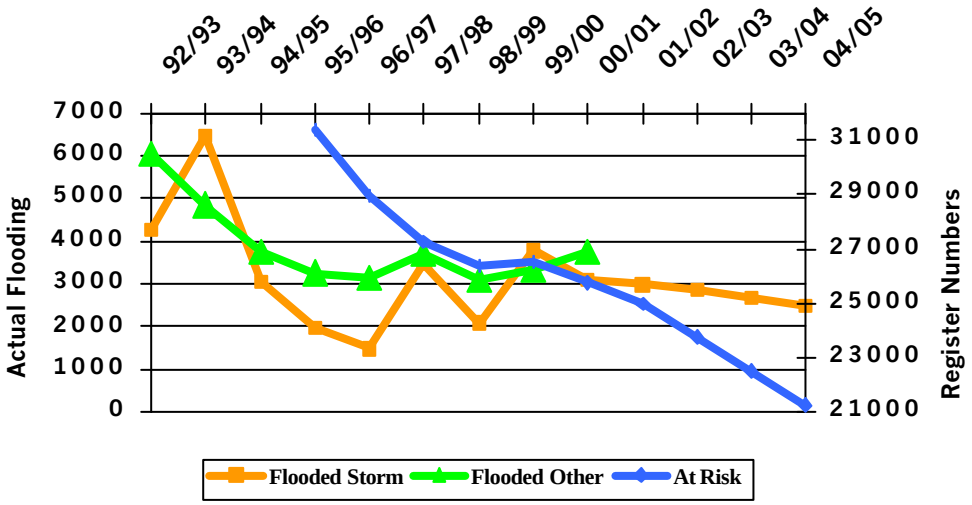
How can actual flooding be influenced?

This paper considers four "ingredients" and, for illustration only, looks at their potential influence on actual property flooding numbers, and the number of actual flooding incidents. The "mix" that each company uses will, of course be different, and there are other factors to consider, eg capital maintenance strategies. Nevertheless, making some assumptions and modelling the consequences provides a helpful "feel" for relative effects and influence.

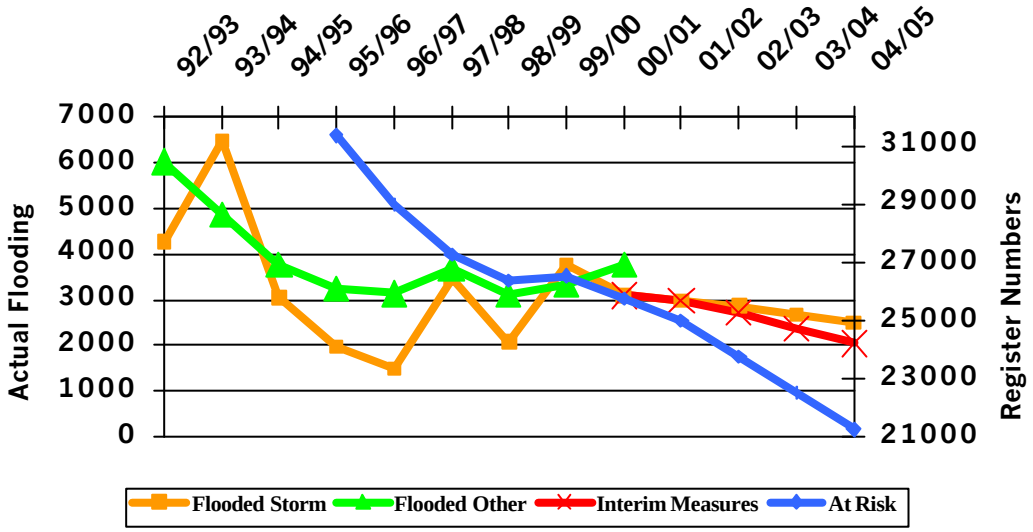
The four ingredients are:

1. Capital investment
2. Interim measures – flooding due to storm
3. Cluster analysis and prevention of repeats – flooding other causes
4. Operational protocols – flooding due to storm

Investment – Examining the number of properties, already on at risk registers, that actually flood in any particular year, provides a useful indication of the effect of investment. Weather variations are significant; in STW for example, the figure lies between 8% and 25% pa. For illustration, let's assume that a figure of 15% and consider what effect may be seen over the remainder of AMP3 as the funded 4,500 net register reduction kicks in. Note that benefits in reduced actual flooding won't generally be felt until the year after the year in which investment is completed.



Interim Measures – companies deploy a range of interim measures. In STW these have been developed over recent years and have proved to be an extremely effective short term measure, as well as providing obvious customer service benefits. As well as more traditional methods such as non-return valves, techniques such as ground reprofiling, air brick protection, and special gates have been employed. Experience shows that few properties are unsuitable, but that some customers refuse to have such measures fitted. As these are applied to the highest risk properties (generally those that are regularly affected at least once every 2 or 3 years), the "return" in terms of preventing actual property flooding, and reducing incidents, are good, although they will tend towards the same as investment improvements over time. They will, of course, also become redundant after investment is complete. DGJR data shows that approximately 1500 properties were protected with such measures in March 01. For illustration, let's assume that interim measures were applied to, say, 20% of what OFWAT estimate the true total at risk register position to be. This would involve doubling current numbers and sustaining around 3,000 interim measures.



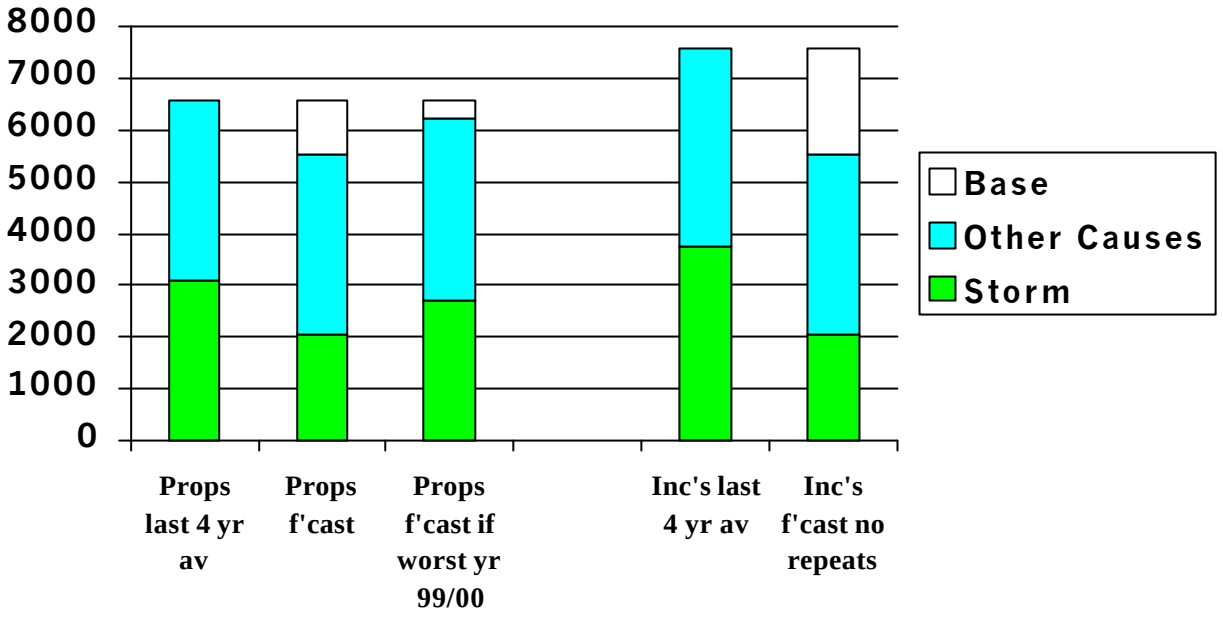
Whilst estimates of the effect on actual flooding numbers can be debated, STW experience is that they can provide an effective additional control mechanism.

Clusters and repeats. Flooding due to other causes (FOC), primarily blockages historically accounts for approximately half the total number of sewer floodings in any particular year. Cluster analysis can be helpful in identifying whether there are any localised networks deficiencies. Such analysis in STW showed very few such locations, confirming that FOC is a relatively random occurrence. DGJR figures show that approximately 10% of locations experience repeat flooding during any year (compare property number floodings with incident numbers), and is therefore a key area to target.

Operational Protocols. Contingency planning and operational protocols are unlikely to have a significant impact on preventing internal flooding incidents. However, combined with short-term weather predictions they can play a part. Trigger levels developed to alert operational teams for storm conditions, used alongside at risk register information, offer potential for a proactive approach where interim measures have not been deployed. Whilst

more work is needed in this area, it is another "ingredient" that can help in the fight against actual flooding, as well as providing customer service improvement.

Summary



Using an average of the past four years data on actual flooded property and incident numbers (bars 1 and 4 respectively) as a base, if all measures were deployed as per the assumptions above, a decrease of up to 1000 properties flooding pa may be seen. However, a "wet year" such as 1999 (third bar), would almost completely mask this. All measures have a greater potential effect on reducing incidents. Bar 5 illustrates the "best case" where there are no repeats within a year.

In conclusion:

1. Variations in weather patterns are likely to mask improvements in actual flooding delivered by the AMP3 investments programme. Climate change effects will exacerbate this
2. Greater deployment of interim measures offers some potential to mitigate this, but heavy rainfall remains the biggest risk
3. Preventing repeat incidents of FOC offers the best way forward where no clustering is present
4. Potential for increased investment levels in AMP4 offer real long term promise.

References:

1. DGJR data – public domain
2. Flooding from Sewers – a Way Forward: Consultation, OFWAT, March 2002