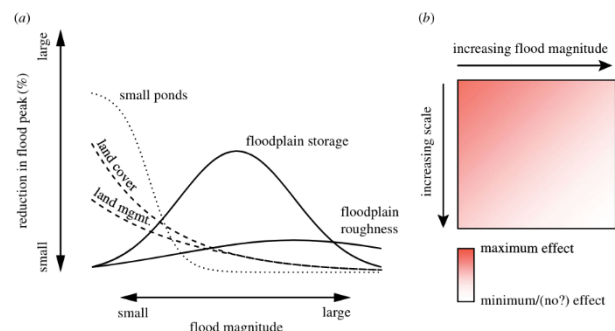


Natural Flood Management – how much can it help nationally?

Floods in the winter of 2019-2020 sparked a lot of discussion on whether our focus in managing risk should shift from traditional defences to embrace natural flood management – using techniques to improve soil properties, slow the flow of water in catchments, leaky dams etc to reduce fluvial flows and hence risk. These are popular with the public as they appear to offer a win-win – improving the environment while reducing risk.

But how effective can they be at managing national flood risk? Some recent research by [Dadson et al.](#) synthesizing evidence from a wide range of sources sounds a note of caution, finding that the impacts of NFM will be mainly limited to more frequent floods in smaller catchments (expressed in their figure, right). How much risk is there from frequent floods in small catchments?



We started to think about this for England by analysing postcode data ([here](#), used as a proxy for property level data) along with the Environment Agency’s Risk of Flooding from Rivers and the Sea dataset ([here](#)) and the UK Centre for Ecology and Hydrology’s integrated hydrological units data ([here](#)). The analysis is limited to fluvial risk, so postcodes below 10m above sea level (according to Ordnance Survey’s [Terrain 50](#) data) are removed to filter out coastal flood risk.

Results are in the tables below. The table on the left shows the number of properties in each flood risk band by catchment size. Most properties are in the medium/low bands, and most are in catchments greater than 100 km² in area. In terms of property counts, the areas that could benefit most from NFM (high probability band, <100 km²) cover only around 4% of the total properties at fluvial risk.

Catchment Size	High >3.3%	Medium 1% - 3.3%	Low 0.1% - 1%
<10 km ²	4,000	21,000	12,000
10-100 km ²	44,000	185,000	107,000
100-1000 km ²	77,000	238,000	238,000
>1000 km ²	34,000	85,000	136,000

Catchment Size	High >3.3%	Medium 1% - 3.3%	Low 0.1% - 1%
<10 km ²	~1%		
10-100 km ²		~25%	
100-1000 km ²			~75%
>1000 km ²			

Counts of properties at risk don’t tell the full story, as properties which flood more frequently will contribute more to damages and disruption. The table on the right estimates the contribution of the properties across the probability bands and catchment sizes to annual average damages. Properties in the high band in catchments of less than 10 km² (the ones where NFM will be most effective) contribute only around 1% of damages; properties in the low band and in catchments of greater than 100 km² (where NFM will be least effective) make up 75% of the risk.

The effectiveness of NFM in England is therefore limited by the way risk is distributed across probability bands and catchment areas.