

Spatial prioritisation of catchments suitable for Natural Flood Management

- **Introduction:**

This dataset concerns the spatial prioritisation of catchments suitable for slowing flows and reducing flood risk using Natural Flood Management, land use management change or land use change.

The map has been produced to contribute to the spatial prioritisation of catchments within the pilot Local Nature Recovery and Landscape Recovery land management schemes for NFM interventions, but it is also for assisting in determining priorities within the other grant awarding schemes such as the England Woodland Creation scheme and the England Peatland restoration scheme

The types of interventions relevant to this spatial prioritisation include changes to vegetation cover, farming practices, small scale structures to store water, small scale re-naturalisation of streams and ditches, or other interventions that work with natural processes to slow flows of water.

The prioritisation map aims to identify catchments where these "slow the flow" type NFM measures, or other associated land use or land management changes, will be most effective in reducing flood risk and will maximise the number of properties protected.

- **Methodology: Key Principals**

The method used to produce the maps is based on a number of conclusions from the scientific literature relating to delivering flood risk reduction through land management and land use changes as well as construction of Natural flood management structures. Specifically these types of measures have been demonstrated to be most effective in smaller catchments, for reducing risk to properties at higher risk of smaller magnitude events and in rural settings where conventional flood risk reduction techniques are less effective.

Analysis of data has been undertaken based on the following assumptions:

- Land use and land management change has the largest impact on flood risk in smaller catchments. The main catchment characteristic commonly referred to in the literature as signalling an ability to reduce flood risk using NFM or land management change is catchment size. Smaller catchments increase the probability that we can intervene in sufficient proportion of high flows to reduce risk.
- Land use and land management change has the greatest potential benefit for reducing higher frequency, smaller flood events i.e. Properties at High & Medium risk of surface and fluvial flooding.
- Land use and land management change should be funded where it is likely to deliver the greatest public benefit in terms of flood risk management.

- **Methodology: data analysis**

The following analysis of data was undertaken for all Water Framework Directive water bodies within each Environment Agency Area:

1. The number of residential & non-residential properties at High (1:30) & Medium (1:30 - 1:100) levels of flood risk from fluvial/surface waters were identified in all current Water Framework Directive water bodies (WFD WB). This highlights where the public benefits can be achieved, i.e. where there is people and property at risk of flooding which could be reduced or managed by NFM.
2. The next step was to identify the total catchment area of agricultural and non-agricultural rural land (woodland etc) within every WFD WB and also in the catchments upstream of that WB. This identifies those smaller catchments with a significant area of agricultural land which could be utilised to reduce the risk of flooding. It also excludes urban catchments with large number of properties at risk of surface water flooding.
3. "Coastal Catchments" identified with no upstream areas were excluded i.e. they have been designated to focus on coastal waters and therefore properties are largely at risk of coastal flooding as opposed to fluvial flooding.

Analysis of the above information enabled identification of smaller catchments with significant areas of upstream agricultural/rural land corresponding with areas with the largest numbers of people and property at high & medium risk of flooding. These have then been ranked to prioritise them. The highest ranked being the smallest catchments with the highest density of residential & non-residential properties at High/Med risk of fluvial and surface water flooding. The lowest ranked are large catchments with smaller number of properties at high and medium risk. We excluded properties at low and very low risk and also properties at risk from flooding from the sea from our analysis.

Finally, we removed all water bodies with less than 50% of land identified as "Rural" to exclude water bodies primarily in urban settings. This was done as the prioritisation is primarily aimed at interventions of relevance to rural settings such as the future environmental land management schemes, woodland creation and peatland restoration.

The top third of ranked catchments have been selected for prioritisation within each Environment Agency Area, with the second third of medium priority and the lower third of low priority.

Additional prioritisation catchments:

Where not already identified for prioritisation through the above method the following catchments have been added to the prioritisation maps:

- a. Catchments participating in the Defra Natural Flood Management programme
- b. Catchments identified by Environment Agency Area Flood & Coastal Risk Management teams as a local priority following consultation

- **Limitations & Constraints**

The prioritisation map is designed to be used as a guide alongside local prioritisation decisions which will be able to take into account localised factors or site specific circumstances which are relevant to prioritisation.

There is currently a lack of evidence demonstrating benefits of Natural Flood Management for larger catchments and larger scale flooding events, due mainly to the fact that there are no large catchments with sufficient implementation of these approaches.

Urban areas are excluded from the analysis. Coastal catchments which focus on the coast and have limited “upstream” catchments are excluded.

The spatial prioritisation focuses on identifying catchments where there are properties at High & Medium flood risk as identified by the National Flood Risk Assessment.