Flood risk and social deprivation

FCERM Research & Development Programme

Research report

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Executive summary

This is our updated analysis of social deprivation and flood risk. We published our previous analyses in 2006 and 2020. Since then, the data sets used have been updated, including the National assessment of flood risk (NaFRA) and the rerelease of the Indices of Multiple Deprivation (IMD) in 2025.

This analysis uses the most up to date data available in January 2026.

The aim was to assess whether there is an inequality in the distribution of populations living in areas at flood risk in each IMD decile, nationally in England and within subsamples.

The analysis indicates that:

- inequalities in the scale of exposure to flooding remain in England
- inequalities exist for flooding from rivers and the sea, and surface water flooding
- coastal communities experience some of the worst inequality
- inequalities are also found in urban areas
- no inequality in the scale of exposure to flooding was found in rural areas

This report details the data sets used, methodology, results and findings of the analysis.

1 Introduction

This is our updated analysis of the relationship between social deprivation and flood risk. We published our previous analyses in 2006 and 2020. Since then, the data sets used have been updated, including the new National assessment of flood risk (NaFRA2) and the Indices of Multiple Deprivation (IMD) that were rereleased in 2025.

1.1 Background

For 20 years we have examined the relationship between flood risk and social deprivation, using the IMD and flood risk data. We published findings in 2006 and 2022. These showed that inequalities exist, with populations living in areas at risk found to be disproportionately concentrated among more deprived communities (Environment Agency 2006).

In the 2006 report, inequality was defined as an uneven distribution of environmental conditions between social groups for example by social class, ethnicity, gender, age or location. This research uses that definition. We do not assess whether an unequal distribution of flood risk is a problem or not, or what should be done about it. Those are value and policy judgments not in the scope of this research.

The previous analysis of the relationship between inequality and flood risk aimed to improve evidence and understanding of the social distribution of environmental risks, both separately and cumulatively. The research influenced academic and policy understandings of both inequalities in the distribution of flood risk, and differentials in the vulnerabilities and social effects of flooding on different social groups (Environment Agency 2025a).

The need for targeted investment in flood protection for deprived communities is recognised in the new flood and coastal erosion risk management (FCERM) funding policy. The policy states “There [is] an objective to guarantee deprived communities receive at least the same share of investment as their representation in the population, as these communities struggle more to recover from flooding. A minimum of 20% of FCERM investment will go to the most deprived quintile and a minimum of 40% to the 2 lowest quintiles combined, over both the next 3 and 10 years.” (Defra 2025).

1.2 The analysis

This analysis investigated whether there is inequality in the distribution of populations at flood risk in each IMD decile, nationally or within the subsample. It can answer questions such as:

- how many people in England are at risk of flooding from rivers and the sea, and how are they distributed between areas with different levels of deprivation?
- how many people in England are at risk of surface water flooding, and how are they distributed between areas with different levels of deprivation?

- how many people living in a coastal area at risk of flooding from rivers and sea are also deprived?

2 Methodology

2.1 Data sets

We carried out the analysis in January and February 2026 using the most up to date data sets at this time. The data sets were extracted from:

- NaFRA2 - flood risk data products on:
    - risk of flooding from rivers and the sea
    - risk of flooding from surface water
    - risk of flooding from combined sources (bespoke data set)
- National Receptor Database (NRD)
- IMD deprivation deciles 2025
- 2021 Lower Super Output Area (LSOA) boundaries
- Office for National Statistics (ONS) census data on:
    - LSOA population (mid-year 2022 estimates)
    - LSOA households (2021)
- ONS rural urban classification
- Environment Agency coastal definition

2.1.1 New national flood risk assessment

NaFRA has been fully updated for the first time since 2018, giving a single picture of current and future flood risk from rivers, the sea and surface water for England. The new NaFRA, known as NaFRA2, uses the best available data sets from the Environment Agency and Local Authorities and is continually updated as better data becomes available.

The level of risk, or flood risk bands used in NaFRA2 are:

- high risk – this means that each year an area has a chance of flooding of greater than 3.3% (greater than a 1 in 30 annual chance of flooding)
- medium risk – this means that each year an area has a chance of flooding between 1% and 3.3% (1 in 30 to a 1 in 100 annual chance of flooding)
- low risk – this means that each year an area has a chance of flooding of between 0.1% and 1% (1 in 100 to a 1 in 1,000 annual chance of flooding)
- very low risk – this means that each year an area has a chance of flooding of less than 0.1% (less than a 1 in 1,000 annual chance of flooding)

For this analysis we excluded the ‘very low risk’ category so we could make a fair comparison with the earlier analyses. This is because there was no ‘very low risk’ category in the 2006 analysis.

The NaFRA2 shows that 6.3 million properties (homes and businesses) are in areas at risk of flooding from the sea, rivers, surface water or a combination of these sources.

2.1.1.1 Rivers and sea flooding

Overall, the total number of properties assessed by NaFRA2 as being in areas at risk from rivers and sea flooding has decreased by a small amount. However, the number of properties in areas of high risk has increased by 88% since the previous assessment. There are 48% fewer properties in areas at medium risk of flooding, with many now considered as high risk.

There are several reasons for the changes to flood risk. The NaFRA2 uses better data and improved modelling methodologies, resulting in improved assessments of the risk to properties, infrastructure and agricultural land.

2.1.1.2 Surface water flooding

The number of properties assessed by NaFRA2 as in areas at risk of surface water flooding has increased by 43% since the last assessment. Three times more properties are now in areas at high risk of surface water. The large changes in the total number of properties in areas at risk of surface water flooding doesn't reflect a real-world increase in risk. It is almost entirely due to improvements in data, modelling and use of technology (Environment Agency 2025b).

2.1.1.3 NaFRA2 products

The national flood risk data products of NaFRA2 used in the analysis are:

- Risk of Flooding from Rivers and Sea (RoFRS)
- Risk of Flooding from Surface Water (RoFSW)
- Risk of Flooding from Combined Sources

RoFRS is a national flood risk assessment developed by the Environment Agency. It combines modelling with local expertise. The modelling takes flood defences and their condition into account and maps the floodplain into 2m x 2m squares (cells). Each cell is assigned 1 of 4 flood likelihood categories to describe the chance of flooding each year.

RoFSW is a map produced using national scale modelling and enhanced with compatible, locally produced modelling from lead local flood authorities (LLFAs). It shows areas at risk of surface water flooding, using 2m by 2m cells. Each cell is assigned 1 of 3 flood likelihood categories to describe the chance of flooding each year.

Risk of Flooding from Combined Sources is not a formal data set and is not published externally. Combined flooding refers to all residential properties at risk of either surface water flooding or rivers and sea flooding, or a combination of both. Properties that are at risk of both have not been double counted.

For this research, we created a tailored data set using all these 3 of these NaFRA2 data products. All data used in the analysis was extracted in January 2026.

2.1.2 National Receptor Dataset

The National Receptor Dataset (NRD) is a collection of risk receptors used primarily in flood and coastal erosion risk management. A risk receptor is something that is affected by a hazard. For example, homes, businesses or infrastructure, which could be flooded from a river, or a defence breach.

For this analysis we used residential properties in areas at risk of flooding.

2.1.3 Index of Multiple Deprivation (IMD) 2025

Index of Multiple Deprivation (IMD) is the official measure of relative deprivation in England. Our analysis uses the version updated in 2025.

IMD25 ranks all neighbourhoods in England according to their level of multiple deprivation relative to that of other neighbourhoods. Each of the 33,755 LSOAs in England are given a score from 1 to 33,755, where 1 is the most deprived and 33,755 is the least deprived. The deciles divide all the LSOAs into 10 equal-sized groups (such as the same number of LSOAs in each group) with decile 1 representing the most deprived 10% and decile 10 the least deprived 10% of LSOAs nationally.

High ranking LSOAs or neighbourhoods can be referred to as the ‘most deprived’ or as being ‘highly deprived’. However, there is no definitive threshold above which an area is described as ‘deprived’. Deprivation is measured on a relative rather than an absolute scale.

IMD is made up of weighted domains of living conditions that contribute to deprivation. There are 7 domains of deprivation, which combine to create the Index of Multiple Deprivation (IMD25). For each domain, a number of indicators are identified to provide the best possible measure for that domain. The majority of data used for each indicator is from Government administrative sources (such as benefit records from Department of Working Pensions). Census data is used where administrative data isn’t available.

There are 7 weighted domains which combine to create the Index of Multiple Deprivation (IMD25).

1. Income deprivation (22.5%): the proportion of people experiencing deprivation due to low income.

2. Employment deprivation (22.5%): The proportion of working-age people who are involuntarily excluded from the labour market.

3. Education, skills and training deprivation (13.5%): measures the lack of educational attainment and skills in the local population.

4. Health deprivation and disability (13.5%): the risk of premature death and reduced quality of life due to physical or mental health conditions.

5. Crime (9.3%): the risk of personal and material victimisation locally.

6. Barriers to housing and services (9.3%): measures the physical and financial accessibility of housing and local services.

7. Living environment deprivation (9.3%): measures the quality of both indoor and outdoor local environment

IMD25 uses the same conceptual framework and domain structure as earlier versions (2019, 2015, 2010, 2007 and 2004 versions). However, there have been some notable changes to the indicators and methodology used to construct the index.

For example, there are 55 indicators in the 2025 version, an increaa[[aPse from 39 in the 2019 version. Of these, 20 are new indicators, 14 have been significantly modified, while 21 have been updated to more recent timepoints (MHCLG 2025).

Changes to geographies, population and indicators mean it is difficult to compare current and previous indices to determine real changes in the deprivation rankings of small areas. The main aim of the IMD is to provide an accurate picture of the relative distribution of deprivation at a small area level, rather than a direct comparison to previous version of the indices. It is possible to establish that 82% of neighbourhoods in the most deprived decile in IMD25 were also the most deprived decile in IMD2019 (MHCLG 2025).

2.1.4 Census 2021 geographies

IMD25 uses LSOA boundaries updated in 2021. Some changes were made to the previous version of 2011 LSOAs as a result of population and household changes. New 2021 LSOAs were created by merging or splitting 2011 LSOAs to be sure to meet population and household thresholds.

There are 32,844 LSOAs defined in England in the 2011 LSOA dataset and 33,755 defined in the 2021 dataset. The LSOA boundaries 2021 are used in the IMD 2025, and in this analysis.

This means that the LSOA boundaries for this analysis differ from previous versions of the analysis.

2.1.5 Coastal inland classification

For the coastal and inland subsample analysis, all LSOAs at risk of flooding in England were classified as either coastal or inland. Coastal areas were defined using the Environment Agency’s approach where an LSOA is coastal if it is within 100 metres of a coastline or an estuary. All other areas are classified as inland. This coastal classification is not related to the type of flood risk (it does not mean that the source of flooding is the sea).

2.1.6 Rural urban classification

For the rural and urban subsample analysis, we classified all LSOAs at risk of flooding in England as either rural or urban. We used the 2021 rural urban classification that provides a consistent way to classify rural and urban areas by LSOA level. The data set is provided and owned by the Office for National Statistics (ONS) and “the classification defines areas as rural if they fall outside of settlements with more than 10,000 resident population” (ONS 2025). Areas with larger populations are classified as urban.

These definitions have changed since the previous version of the analysis.

2.1.7 Census population estimates

The ONS collects and reports census data. For this analysis, 2 sets of data per LSOA were obtained:

- mid-year population estimates (2022)
- number of households (2021)

We combined the National Receptor Database (which contains Ordnance Survey data on location and type of properties) with flood risk data to calculate the number of residential properties in areas at risk of flooding in different risk bands. We then matched this with census data to estimate the population within each flood risk category.

Mid-year population estimates have some limitations. They are estimates calculated using multiple data sources rather than counts of data. Errors can accumulate over time, so estimates may become less accurate the further they are from the most recent census.

The uncertainty in population estimates was not systematically assessed for this report. The ONS review of small area population estimates median Absolute Relative Bias (ARB) of 2.66% to 3.89% for LSOA population totals (ONS 2023).

2.2 Data analysis

We carried out the analysis using the following steps:

1. We matched the NaFRA2 data sets to both the rural urban classification and the 2 sets of Census population data (mid-year population estimates (2022) and number of households (2021) per LSOA).
2. We multiplied the people per household values by the number of residential properties at risk in each flood risk category (combined flooding, flooding from rivers and the sea, and surface water flooding) - this provided an estimate for the population in at risk areas as well as the number of residential properties.
3. We analysed and visualised separately the 3 categories of flooding (rivers and sea, surface water, and combined) - for each type of flooding we calculated the:
    a. total estimated population by the 4 risk categories: high, medium, low, very low (in the case of surface water, there is no 'very low' risk category)

    b. total estimated population by risk category in areas classified as urban
    c. total estimated population by risk category in areas classified as rural
4. We calculated total estimated population by deprivation decile for coastal areas (by filtering for LSOAs classed as having a coastal flag) and inland (filtering those classed as having no coastal flag) using the Environment Agency's definition (a coastal flag means that the LSOA is within 100 meters of a coastline or estuary).
5. We calculated Concentration indices (CI) scores.

2.2.1 Concentration index explained

Concentration index (CI) provides a summary measure of how exposure is distributed across the deprivation gradient. We use the CI to examine if there is inequality in the population counts across the 10 IMD deprivation deciles.

CI is similar to the Gini Coefficient but builds on it by ranking the extent to which people are at risk according to socioeconomic descriptors. The Gini Coefficient is a standard measurement of income inequality within a population. It measures inequality in a single variable such as income or wealth.

However, the CI measures how an outcome (in this case flood risk) is distributed across socio-economic groups. It is commonly used in the health sector to investigate inequalities in health variables between socio-economic groups (Amroussia and others, 2017).

The CI is defined as:

$$C = \frac{1}{n}\sum_{i=1}^{n}\left[\frac{h_i}{\bar{h}}(2R_i - 1)\right]$$

where h_i is the number of people at a particular level of flood risk exposure and source, $\bar{h}$ is the average number of people at risk across all ranks of social deprivation, and R_i is the fractional (deprivation) rank (areas are ranked in terms of deprivation deciles from 1, most deprived to 10, least deprived).

In the equation, C ranges from (1 − n)/n to (n − 1)/n. The lower value (maximal pro-deprived inequality) indicates that flood risk is concentrated among the most deprived groups. The higher value (maximal pro-least deprived inequality) indicates concentration among the least deprived. In this analysis, the range is approximately −0.9 to 0.9 (Environment Agency 2006).

The CI summarises whether estimated exposure is concentrated towards more deprived or less deprived areas. Negative values indicate concentration among more deprived areas, values close to zero indicate little deprivation-related concentration, and positive values indicate concentration among less deprived areas.

We repeated the methodology used in our previous analyses (2006 and 2020). The CI summarises distribution rather than causation. Therefore, confidence intervals, formal significance testing or exposure-rate analysis are not included.

The CI does not indicate the significance of inequality. That is an ethical or political judgement.

2.2.2 Limitations

The analysis did not investigate patterns of deprivation across England or within subsamples. For example, it did not assess whether there are more deprived communities on the coast than inland. It also did not explore how flood risk is distributed between geographical areas.

The findings are descriptive and indicative rather than causal.

However, the results can still reliably establish where higher numbers of people in deprived locations are more affected by flooding than in less deprived locations within each sample. For more information about the advantages and disadvantages of different ways to measure inequalities from the health sector, see the Public Health Technical Guidance – overview of inequality measurement guidance.

This report does not make a judgement about what an equal distribution of risk would be. It also does not assess whether an unequal distribution of flood risk is a problem or what should be done about it.

The analysis considers and compares estimates of population counts at flood risk and not of the rates of flood risk exposure (for example what proportion of all people in a rural LSOA in decile 10 are at risk of flooding).

Additionally, the analysis does not include any assessment of the effects of flooding on people at different relative levels of deprivation.

3 Results

The analysis is presented in bar charts and CI scores. Of the 15 data sets analysed, 7 are included in this section. All 15 data sets are provided in tables A1 to A15 in appendix A.

The bar charts show the estimated number of people at risk of flooding by deprivation decile and risk band. The x-axis shows the 10 IMD deprivation deciles, from most deprived (1) to least deprived (10). The y-axis shows the estimated number of people at risk in each risk band (high and medium combined, and low).

The pattern of the bars indicate whether there is an inequality or not. The steeper the gradient, the worse the inequality. For example, higher values at the most deprived (left) end of the x-axis decreasing towards the least deprived (right) end indicate greater inequality. This pattern is known as the social gradient.

The approach to exploring distribution and inequality (displaying data in bar charts and calculating CI scores) is an established approached used in previous versions of this analysis in 2006 and 2020. It is also commonly used in the public health sector to show health inequalities in the relationship between health outcomes and socioeconomic status. For example, in the NHS England analysis of congenital anomaly prevalence in areas of different level of deprivation.

The subsamples (coastal, inland, rural and urban LSOAs) show how populations at risk of flooding are distributed between IMD deciles. The deciles are ranked relative to all other LSOAs in England.

This analysis indicates that inequalities continue. People already experiencing social and economic deprivation make up high numbers currently at risk from flooding.

The inequality observed in the data may partly reflect differences in how deprivation is distributed within these subsamples compared to England as a whole. For example, between all coastal communities and the national population.

3.1 Combined flooding

3.1.1 Total population at risk for different levels of deprivation

It is estimated that nearly 11.3 million people live in an area at risk of flooding in England.

Chart 1 shows our results for the estimated number of people living in areas at risk of flooding, by deprivation deciles. The data is also shown in Table A1 in appendix A. The data for the individual subsamples coastal, inland, urban and rural, are in Tables A2, A3, A4 and A5 in appendix A.

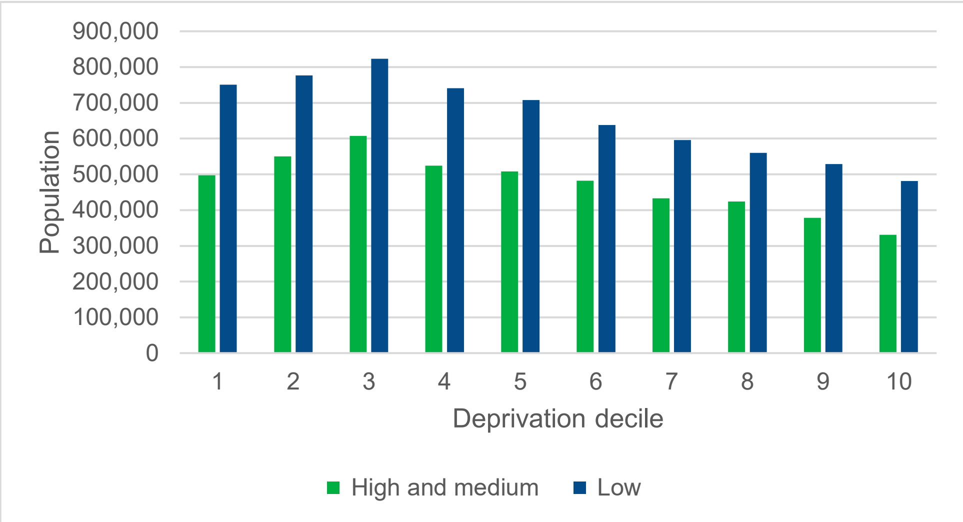

Chart 1: Number of people in areas at high and medium risk, and low risk of combined flooding divided into deprivation deciles

Chart 1 shows that the population at risk of combined flooding generally decreases as deprivation decreases (moving from decile 1 to decile 10). Across all deciles, the population is higher in the low group than in the high and medium group. Population at risk increases slightly from decile 1 to decile 3 where population is highest for both high and medium, and low groups (around 1.4 million in total). It then declines gradually across the deciles to just over 800,000 people in total in decile 10.

Overall, both risk categories follow a similar downward trend from the most deprived to the least deprived deciles.

The CI values are negative for both risk categories (-0.08 for high and medium risk, and -0.09 for low risk), indicating an inequality.

3.2 Flooding from rivers and the sea

This section presents the results for flooding from rivers and the sea, nationally and in the sub-samples (urban, rural, coastal, inland).

3.2.1 Total population

Chart 2 shows the number of people living in areas at risk of flooding from rivers and the sea, by deprivation deciles. The table of data is in appendix A (Table A6)

It is estimated that nearly 3 million people live in an area at risk of flooding from rivers and the sea in England.

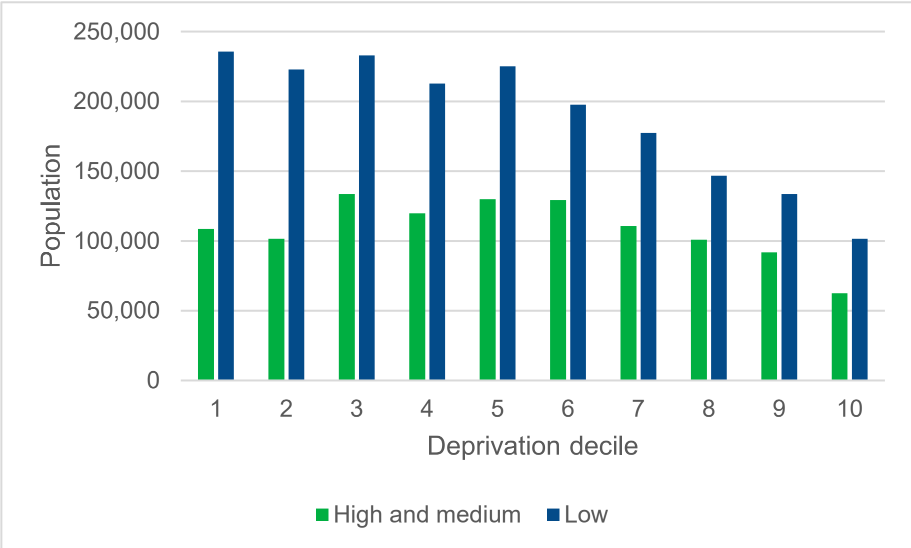

Chart 2: Number of people living in areas at risk from flooding from rivers and the sea by deprivation decile

For both risk groups in Chart 2 the population is highest in the more deprived deciles and generally decreases as deprivation decreases. Across all deciles, the population is higher in the low group than in the high and medium group.

In the low group population is around 235,000 in decile 1. It remains above 210,000 through deciles 2 to 5, then declines steadily to about 100,000 in decile 10.

In the high and medium group, population is about 110,000 in decile 1, peaks at just under 135,000 in decile 3, and then gradually decreases to approximately 60,000 in decile 10.

The CI values are negative for both risk categories (-0.06 for high and medium risk, and -0.13 for low risk), indicating an inequality.

3.2.2 Subsamples: coastal and inland areas.

This section presents the distribution of populations in areas at risk of rivers and sea flooding, in coastal and inland subsamples. The Environment Agency's defines a LSOA as coastal if it is within 100 meters of a coastline or estuary. All other LSOAs are inland.

3.2.2.1 Coastal

The analysis shows that coastal areas experience some of the worst inequality. This is illustrated in Chart 3. The data is shown in TableAB7 in Appendix A.

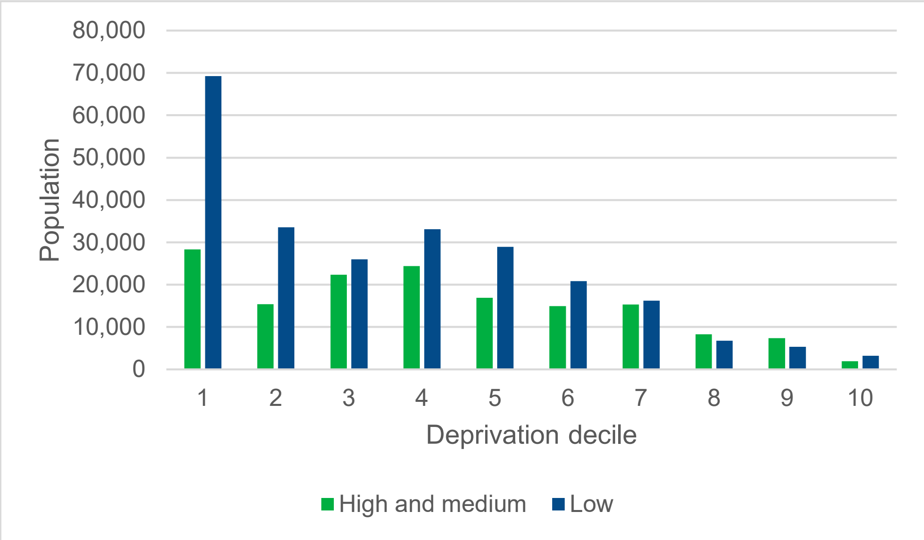

Chart 3: Number of people living in coastal areas at high and medium, and low risk of flooding from rivers and the sea by deprivation decile

The distribution in Chart 3 shows a strongly skewed, downward trend from left to right. Population is highest in the most deprived decile (decile 1), with a clear peak at this point for both risk groups. After decile 1, population generally decreases as deprivation decreases, although there is a small secondary rise around deciles 3 to 4.

The largest populations are in the most deprived areas (decile 1), particularly in the low group (around 69,000), with a smaller but still substantial number in the high and medium group (around 28,000). Population decreases steadily as deprivation decreases across both groups with the lowest numbers in decile 10 (around 3,000 in the low risk areas and 2,000 in the high and medium risk areas). Overall, the data shows that both groups are much more concentrated in more deprived areas, with a sharper concentration in the low risk group.

The CI values are negative for both risk categories (-0.25 for high and medium risk, and -0.39 for low risk), indicating an inequality.

3.2.2.2 Inland

The analysis for inland is shown in Chart 4. The data is shown in Table A8 in Appendix A.

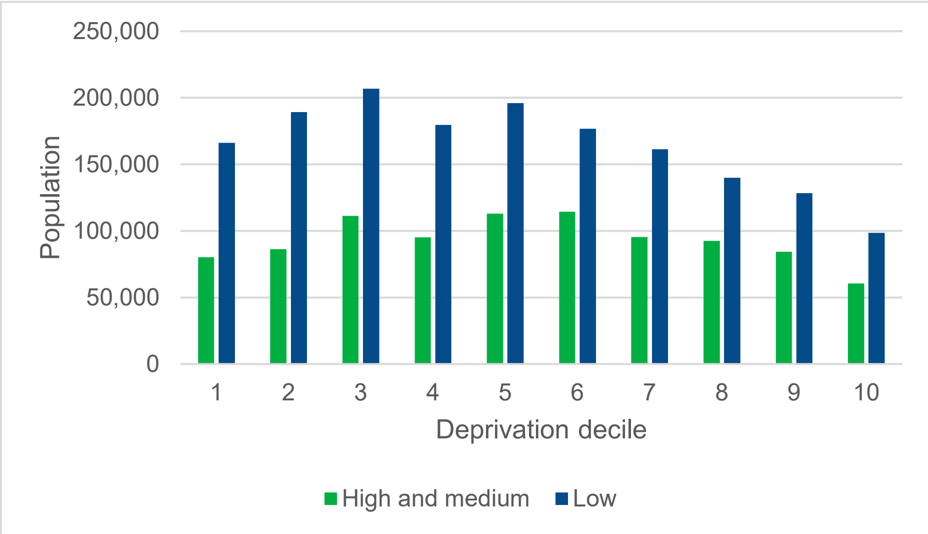

Chart 4: Number of people living in inland areas at high and medium, and low risk of flooding from rivers and the sea by deprivation decile

Chart 4 shows that for both flood risk groups the population is highest in the more deprived half of areas (deciles 1 to 5). It decreases as areas become less deprived. In every decile the low risk group has a consistently larger population than for the high and medium group.

Population in the low risk group peaks at around 205,000 people in decile 3. It remains high across deciles 1 to 5, before declining steadily to around 100,000 people in decile 10. The high and medium group follows a similar pattern, peaking at around 200,000 people in decile 3 and decreasing from deciles 5 onwards to around 60,000 people in decile 10.

The CI values are negative for both risk categories (-0.03 for high and medium risk, and -0.09 for high risk) indicating an inequality.

3.2.3 Subsamples: rural and urban areas

The research looked at the distribution of rural and urban LSOAs at risk of flooding from rivers and the sea.

3.2.3.1 Urban

The vast majority (approximately 2.4 million) of people living in areas at risk of flooding are in urban areas.

The analysis found an inequality in urban areas which is illustrated in Chart 5. The data for this is in Table A9 in appendix A.

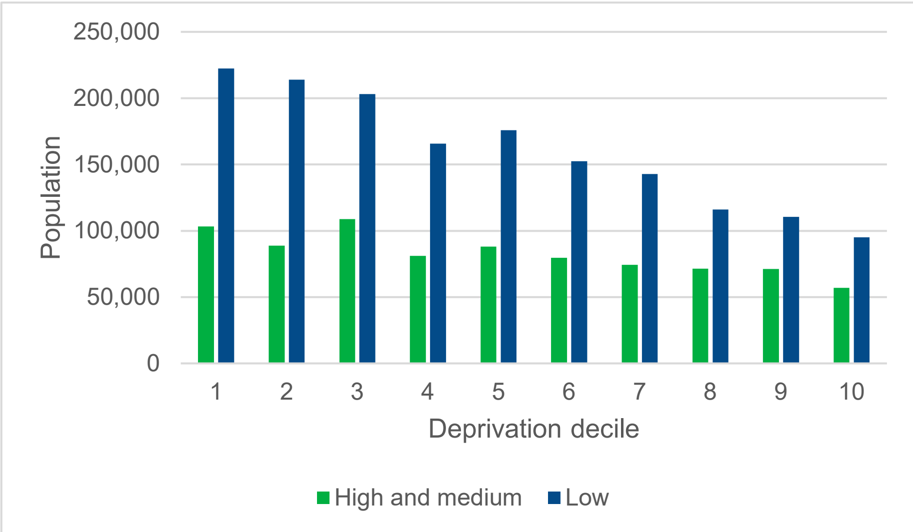

Chart 5: Number of people living in urban areas at high and medium, and low risk of flooding from rivers and the sea by deprivation decile

For both flood risk groups in Chart 5, population is higher in the more deprived areas and decreases as deprivation decreases. Population is highest in the most deprived deciles, peaking at decile 1 for the low group and remaining relatively high through deciles 2 and 3. After this point, population generally declines as deprivation decreases. The high and medium group follow a similar pattern, although it has a smaller peak around decile 3 before declining.

In every decile, the low group has a larger population than the high and medium group.

In the most deprived areas (decile 1), the low group is more than twice as large at 220,000 people compared with about 100,000 people in the high and medium group. Population in the low group declines steadily across the deciles, reaching around 95,000 in decile 10.

The high and medium group shows some variation in the early deciles, peaking at around 110,000 people in decile 3, before decreasing gradually to around 55,000 people in decile 10.

The CI values are negative for both risk categories (-0.09 for high and medium risk, and -0.15 for low risk), indicating an inequality.

3.2.3.2 Rural

Around 550,000 people are estimated to live in rural areas at risk of flooding from rivers and the sea.

The distribution shown in Chart 6 indicates no inequality for rural areas. The data for this chart is shown in Table A10 in appendix A.

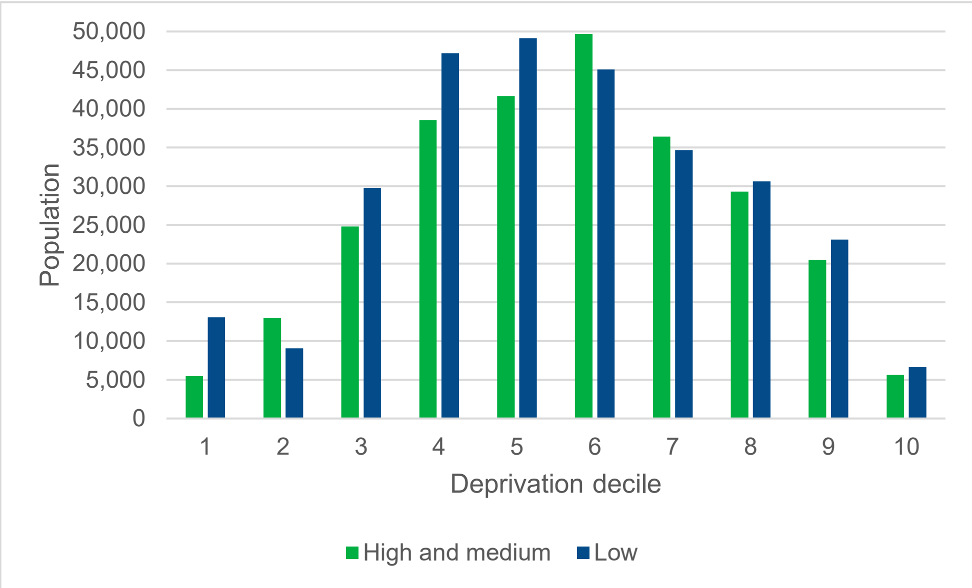

Chart 6: Number of people living in rural areas at high and medium, and low risk of flooding from rivers and the sea by deprivation decile

Chart 6 forms a bell-shaped pattern, with population numbers lowest in the most deprived areas (deciles 1 and 2) and increasing towards the middle deciles for both high and medium, and low risk groups. The highest populations are in deciles 5 and 6, at around 50,000 people in each group.

The CI values are positive (0.03 for high and medium risk, and 0 for low risk), indicating no inequality.

3.3 Surface water flooding

This section shows the results for surface water flooding.

It is estimated that more than 9.3 million people live in an area at risk of surface water flooding in England.

The results for total population are shown in Chart 7 and in Table A11 in appendix A. Our analysis results for the subsamples coastal, inland, urban and rural are show in tables A12, A13, A14 and A15 in appendix A.

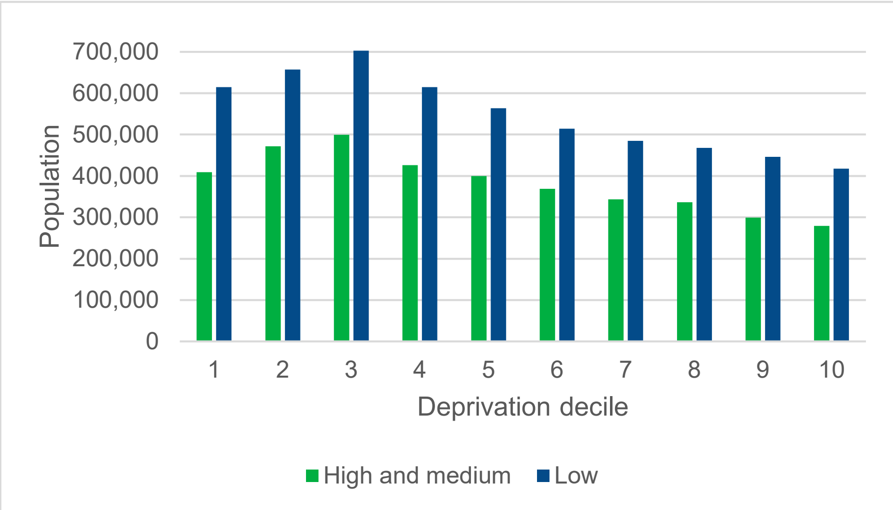

Chart 7: Number of people living in areas at high and medium, and low risk of surface water flooding by deprivation decile

Chart 7 shows that for both risk groups population is highest in the more deprived half of areas and decreases as areas become less deprived.

Population increases from the most deprived areas (deciles 1 to 3), reaching a peak around decile 3 for both groups (500,000 at high and medium risk, and 700,000 at low risk). After this point, population decreases steadily across the remaining deciles towards the least deprived areas (decile 10) (415,000 low and 280,000 high and medium).

The CI values are negative for both risk categories (-0.09 for high and medium risk, and -0.09 for low risk), indicating an inequality.

4 Summary of the CI scores

We used the CI scores to assess whether there is inequality in the number of people living in areas at risk of flooding related to socioeconomic status. This statistical measure summarises the distribution of the whole data set into a single value.

The CI ranges from –0.9 to 0.9. A value of 0 indicates equality. Negative values indicate inequality, with the more deprived disproportionately at flood risk.

The analysis focuses on combined flooding, flooding from rivers and the sea, and surface water flooding. Results are presented in 2 risk categories: high and medium risk combined, and low risk.

The CI values for all types of flooding nationally and in the subsamples (coastal, inland, rural and urban) are shown in Tables 8, 9 and 10.

Table 8: Combined flooding CI values

Population	High and medium risk	Low risk
All population	-0.08	-0.09
Coastal	-0.26	-0.30
Inland	-0.07	-0.08
Urban	-0.11	-0.12
Rural	0.11	0.11

Table 9: Flooding from rivers and the sea CI values

Population	High and medium risk	Low risk
All population	-0.06	-0.13
Coastal	-0.25	-0.39
Inland	-0.03	-0.09
Urban	-0.09	-0.15
Rural	0.03	0.00

Table 10: Surface water flooding CI values

Population	High and medium risk	Low risk
All population	-0.09	-0.09
Coastal	-0.27	-0.26
Inland	-0.08	-0.08
Urban	-0.12	-0.12
Rural	0.16	0.16

The results show an inequality for all types of flooding in the national sample and in the urban subsample.

However, rural areas stand out as not experiencing an inequality (the CI values are positive for all types of flooding).

Coastal areas suffer the highest inequality. For example, for flooding from rivers and sea the CI values -0.25 for high and medium risk, and -0.39 for low risk.

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List of abbreviations

CI - Concentration Index

IMD – Index of Multiple Deprivation

LSOA – Lower super output area

NaFRA - National flood risk assessment

NRD - National Receptor Database

RoFRS - Risk of Flooding from Rivers and Sea

RoFSW - Risk of Flooding from Surface Water

ONS - Office for National Statistics

Glossary

Decile - 10 equal sized groups of small geographical areas that are ranked based on their relative deprivation level.

Lower super output areas (LSOAs) - these are small geographic units used to report statistics. They typically contain between 400 and 1,200 households and have a resident population between 1,000 and 3,000 persons (ONS 2026).

Appendix A

Tables A1 to A15 show the 15 data sets used in this analysis. Seven of these data sets are illustrated in the bar charts in section 3.

Each table has estimates of the total number of people at risk for each risk category (high and medium, and low).

Table A1 – Combined flooding, total population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	497,511	750,971
2	550,058	776,376
3	607,328	823,396
4	524,345	740,496
5	508,108	707,440
6	482,009	637,818
7	433,108	595,540
8	423,884	560,450
9	378,377	528,874
10 - least deprived	330,861	480,875
Total	**4,735,589**	**6,602,236**

Table A2 – Combined flooding, coastal population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	63,592	101,102
2	33,508	51,021
3	42,222	46,517
4	48,019	61,177
5	33,650	53,713
6	30,535	43,938
7	24,899	30,760
8	17,638	20,227
9	17,986	16,605
10 - least deprived	5,178	8,230
Total	**317,227**	**433,289**

Table A3 – Combined flooding, inland population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	433,920	649,868
2	516,550	725,355
3	565,106	776,879
4	476,326	679,319
5	474,458	653,727
6	451,473	593,881
7	408,210	564,780
8	406,246	540,223
9	360,391	512,269
10 - least deprived	325,682	472,644
Total	**4,418,363**	**6,168,946**

Table A4 – Combined flooding, urban population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	486,690	731,242
2	529,100	755,804
3	564,079	768,790
4	451,157	646,112
5	415,704	591,243
6	369,919	511,294
7	331,040	477,606
8	337,053	451,196
9	319,013	450,290
10 - least deprived	311,452	453,493
Total	**4,115,207**	**5,837,069**

Table A5 – Combined flooding, rural population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	10,822	19,729
2	20,957	20,571
3	43,249	54,606
4	73,188	94,384
5	92,404	116,198
6	112,090	126,525
7	102,068	117,934
8	86,830	109,254
9	59,364	78,584
10 - least deprived	19,409	27,382
Total	**620,382**	**765,167**

Table A6 – Rivers and the sea, total population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	108,626	235,536
2	101,692	222,874
3	133,611	232,825
4	119,627	212,840
5	129,806	225,039
6	129,348	197,585
7	110,783	177,527
8	100,804	146,751
9	91,634	133,658
10 - least deprived	62,504	101,678
Total	**1,088,436**	**1,886,311**

Table A7 – Rivers and the sea, coastal population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	28,350	69,282
2	15,361	33,537
3	22,380	25,955
4	24,434	33,078
5	16,884	28,912
6	14,905	20,842
7	15,346	16,254
8	8,316	6,791
9	7,342	5,349
10 - least deprived	1,925	3,194
Total	**155,244**	**243,195**

Table A8 – Rivers and the sea, inland population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	80,276	166,254
2	86,331	189,337
3	111,231	206,870
4	95,192	179,762
5	112,923	196,127
6	114,443	176,743
7	95,437	161,273
8	92,488	139,960
9	84,292	128,309
10 - least deprived	60,578	98,484
Total	**933,192**	**1,643,117**

Table A9 – Rivers and the sea, urban population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	103,176	222,447
2	88,689	213,822
3	108,794	203,029
4	81,049	165,651
5	88,151	175,893
6	79,672	152,477
7	74,372	142,849
8	71,512	116,105
9	71,136	110,533
10 - least deprived	56,865	95,064
Total	**823,415**	**1,597,869**

Table A10 – Rivers and the sea, rural population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	5,450	13,089
2	13,003	9,052
3	24,817	29,796
4	38,577	47,189
5	41,655	49,146
6	49,676	45,109
7	36,412	34,678
8	29,293	30,645
9	20,498	23,125
10 - least deprived	5,638	6,614
Total	**265,021**	**288,442**

Table A11 – Surface water, total population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	409,323	614,908
2	471,573	657,060
3	499,570	702,957
4	425,847	614,494
5	399,804	564,056
6	368,607	514,139
7	343,670	485,100
8	336,570	467,661
9	299,498	446,561
10 - least deprived	279,619	417,882
Total	**3,834,079**	**5,484,819**

Table A12 – Surface water, coastal population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	39,169	56,151
2	20,871	28,545
3	23,514	30,420
4	26,503	37,546
5	19,289	33,034
6	17,430	28,592
7	11,156	19,413
8	10,265	15,956
9	11,675	13,472
10 - least deprived	3,550	5,969
Total	**183,422**	**269,098**

Table A13 – Surface water, inland population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	370,153	558,757
2	450,702	628,515
3	476,056	672,537
4	399,345	576,949
5	380,514	531,022
6	351,177	485,547
7	332,514	465,687
8	326,304	451,706
9	287,823	433,089
10 - least deprived	276,068	411,912
Total	**3,650,657**	**5,215,721**

Table A14 – Surface water, urban population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	403,535	605,059
2	462,737	642,769
3	479,717	672,292
4	387,529	556,875
5	344,176	484,676
6	301,102	418,459
7	273,500	389,304
8	276,133	380,242
9	257,887	384,194
10 - least deprived	265,169	394,815
Total	**3,451,485**	**4,928,686**

Table A15 – Surface water, rural population

Deprivation Decile	High and medium risk	Low risk
1 - most deprived	5,787	9,849
2	8,836	14,291
3	19,852	30,665
4	38,318	57,619
5	55,628	79,380
6	67,505	95,680
7	70,171	95,796
8	60,436	87,419
9	41,611	62,367
10 - least deprived	14,450	23,067
Total	**382,594**	**556,133**

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