HEREFORD & WORCESTER
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FIRE AND RESCUE SERVICE

Service Definitions of Risk

Water Related Incidents and Flooding

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Contents

Introduction

This analysis of risk for water related incidents and flooding has taken inspiration from the National Fire Chiefs Council's (NFCC) National Risk Methodology for Domestic Dwelling Fires. This methodology has, in a similar vein to that of NFCC's methodology, considered the likelihood and consequence associated with water related incidents and flooding by combining several data sources to provide a risk rating at the Lower Layer Super Output Area (LSOA) level. LSOAs are small clusters of output areas, with each LSOA containing similar numbers of households and resident populations; these geographical areas are designed to aid reporting on small area statistics in England. There are 491 LSOAs across the counties of Herefordshire and Worcestershire and this analysis provides a picture of the risk comparatively across these geographical areas.

This analysis is not a substitute for the insights and guidance afforded to Hereford and Worcester Fire and Rescue Service (HWFRS) by organisations with a statutory duty to manage the risk associated with flooding, including the Environmental Agency (EA) and Local Authorities. This analysis forms part of HWFRS's strategic understanding of risk. It seeks to provide the lens to review that HWFRS is making effective use of its resources and to align its prevention and response strategies in relation to water related incidents and flooding.

This document sets out the methodology employed to reach a risk rating for each LSOA. In the risk model analysis section, the results of the model are discussed and displayed as a shaded map. The final section of this document provides an overview of the Service's water rescue teams, and displays their attendances over the results of the risk modelling.

Methodology

The LSOA Model approach in the NFCC's National Risk Methodology for Domestic Dwelling Fires explained how a risk score could be calculated for each LSOA whereby the associated risk is calculated from factors of likelihood and consequence. In their methodology, they used data inputs including home ownership and deprivation as variables to denote the likelihood and consequence factors associated with dwelling fires.

Currently there is no national methodology for applying an LSOA risk rating to water related incidents and flooding, therefore the Service has adopted a set of variables to denote the likelihood and consequence. Table 1 lists the data inputs compiled in this analysis and summarises the usage of each data source and the weighting it was given to calculate the overall risk score.

Data Input	Data Source	Usage	Variable Weighting
Geographical Context			
LSOA Output Areas	The Office for National Statistics (ONS) Open Geography Portal (2021). Available at: Open Geography Portal (statistics.gov.uk)	This dataset provided the GIS polygon features to map LSOAs in England. The variables will be measured against each LSOA to provide an overall risk score.	
Households	Household Acorn CACI (2023). For reference, see: Household Acorn – CACI	Households were geolocated to LSOA boundaries and spatially joined to identify those within flood risk areas. This dataset also allowed for the standardisation of variables to a rate per 1000 households to further minimise differences between the number of households per LSOA.	
Likelihood Variables			
Incident Data: a) Flooding incidents in buildings during spate weather conditions; b) Water rescue incidents (Property types included road vehicles and outdoor locations).	Incident Recording System (IRS) Reports (1 Apr 2019 – 31 Mar 2024)	Used to calculate a rate of incidents per 1000 households.	0.3

Methodology continued

Data Input	Data Source	Usage	Variable Weighting
Fluvial Risk – 1% or greater chance of flooding each year from Rivers.	Environment Agency (2024): Flood Map for Planning (Rivers and Sea) – Flood Zone 3. Available at: Flood Map for Planning (Rivers and Sea) – Flood Zone 3 – data.gov.uk	Used to calculate a rate of households per 1000 that are within 20-metres of the flood zone 3 area.	0.15
Pluvial Risk – 1% or greater chance of flooding each year from surface water.	Environment Agency (2024): Risk of Flooding from Surface Water Extent. Available at: Risk of Flooding from Surface Water Extent: 3.3 percent annual chance – data.gov.uk	Used to calculate a rate of households per 1000 that are within 20-metres of the surface water extent.	0.05
Consequence Variables			
Incident Data – No. of injured persons recorded at flood/ water rescue incidents.	Incident Recording System (IRS) Reports (1 Apr 2019 – 31 Mar 2024)	Used to calculate a rate of injuries per 1000 households.	0.3
Households deprived in three dimensions	ONS Dataset TS011 (2022): Households by Deprivation Dimension. Available at: Households by deprivation dimensions – Office for National Statistics	Used to calculate a rate of households in three dimensions of deprivation per 1000 households.	0.1
Household composition is a lone person aged 66+	ONS Dataset TS003 (2022): Household Composition. Available at: Household composition – Office for National Statistics (ons.gov.uk)	Used to calculate a rate of lone person households per 1000 households.	0.1

Table 1: Data Sources used for modelling.

Methodology continued

Likelihood Variables

Three variables were utilised as indicative of likelihood; the Service's incident recordings for water related incidents and flooding, the EA's flood map for rivers (fluvial flood risk), and the EA's surface water map (pluvial flood risk). The Service's incident data was the most highly weighted of these likelihood factors on the view that it was the best indicator of these three for likelihood. This higher weighting also aids to counteract that the fluvial risk score does not consider flood risk management schemes and engineering works; where an LSOA scores more highly on fluvial risk score but lower on the number of attendances, this might suggest the presence of flood defences. The weighting aids to make the likelihood score more reflective of the Service's experience of the demand faced without losing sight of areas that have higher fluvial risk in the data.

Incident data: Water Related Incidents and Flooding Recordings

a) Flooding incidents in buildings during spate weather conditions

Data was taken from the IRS, filtering incidents with the following criteria; that the special service incident type is either 'Flooding' or 'Rescue or evacuation from water' and where the property type was for a 'Building'. To be indicative of flooding due to spate conditions, the extract needed to be analysed and trimmed accordingly. In the IRS, the special service incident type of 'Flooding' is the optimal selection for a wide range of flooding incidents irrespective of the cause of the flood, such that a property flooded by an internal leak would be recorded with the same selections as a property affected by widespread fluvial flooding. To improve the relevancy of the incident data pertaining to flooded buildings, the extract was limited to particular time periods where the Service experienced peaks in demand. The notable peaks were corroborated with Met Office recordings of weather events, such as named storms, or from local weather news coverage of flood warnings. Figure 1 displays the peaks in demand identified; and with the exception of the Cold Snap period in December 2022, these peak periods of incidents were isolated to reflect flooding incidents where the cause was more likely to have been due to pluvial or fluvial flooding.

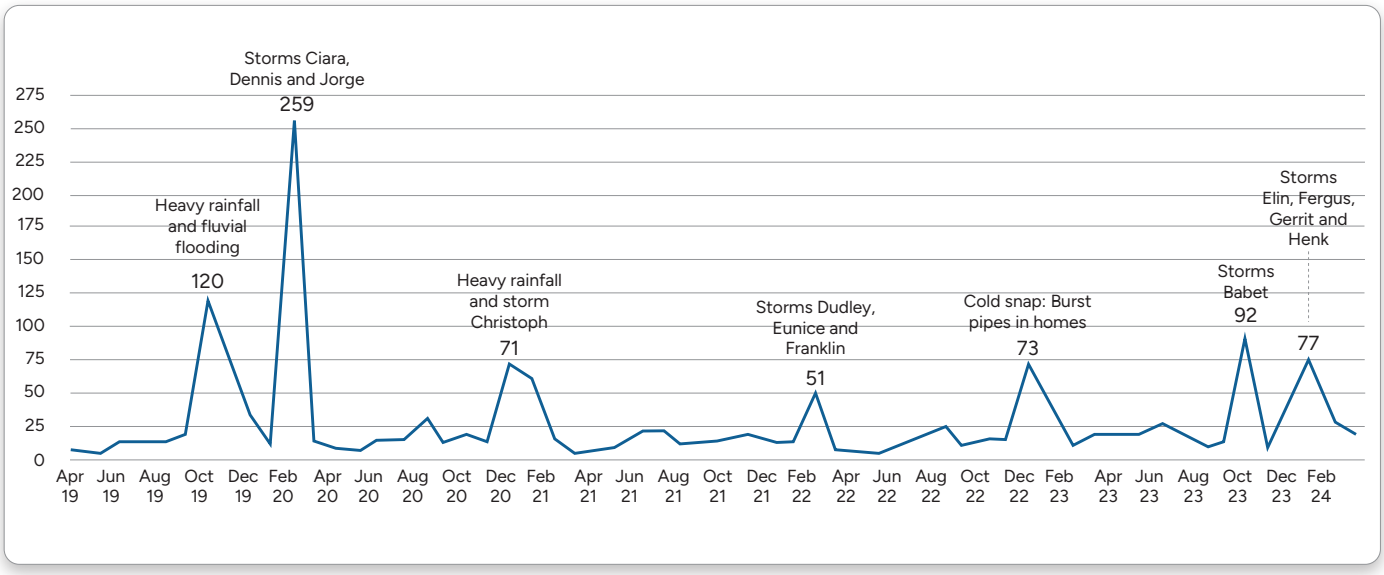

Figure 1: The number of Flooding/Water Rescue Incidents Attended by the Service (April 2019 – March 2023) Source: IRS.

Methodology continued

Data Input	Data Source	Usage
Oct – Dec 2019	Heavy Rainfall / Fluvial Flooding.	Autumn and Winter 2019-20 Flood Events in Worcester, Appendix 1, Worcester County Council. Viewed 31 July 2024.
Feb 2020	Storms Ciara, Dennis and Jorge.	February and March 2020 flood story: River Severn Catchment – Worcestershire, v1.2, Environment Agency, July 2020. Viewed 31 July 2024.
Dec 2020 – Jan 2021	Heavy Rainfall / Storm Christoph.	Picture gallery and updates: How flooding hit Herefordshire, Hereford Times. Viewed 31 July 2024.
Feb 2022	Storms Dudley, Eunice, and Franklin.	UK Floods: Storms Dudley, Eunice and Franklin, JBA Risk Management (UK Floods: Storms Dudley, Eunice and Franklin). Viewed 31 July 2024. Major incidents declared as adverse weather continues, Hereford and Worcester Fire and Rescue Service, 22 February 2022. (Major incidents declared as adverse weather conditions continue). Viewed 31 July 2024. Worcester floods 2022: River Severn flooding hits Worcestershire, Worcester News, 23 February 2022. (Worcester floods 2022: River Severn flooding hits Worcestershire). Viewed 31 July 2024.
Dec 2022	Cold Snap* (Incident recordings excluded as the peak is not thought to be indicative of fluvial/pluvial flood conditions).	December 2022 Weather in Worcester – Graph, Time and date.com (Weather in December 2022 in Worcester, England, United Kingdom). Viewed 31 July 2024. Cold weather alert issued by UKHSA, UK Health Security Agency (Cold weather alert issued by UKHSA). Viewed 31 July 2024.
Oct 2023	Storm Babet.	County Council issues thanks to all involved following recent flooding, Worcestershire County Council, 27 October 2023. (County Council issues thanks to all involved following the recent flooding). Viewed 31 July 2024. Storm Babet: Flooding in Worcestershire, Worcestershire News, 23 October 2023. (Storm Babet: Flooding in Worcestershire). Viewed 31 July 2024.
Dec 2023 – Feb 2024	Storms Elin, Fergus, Gerrit, and Hank.	Autumn / Winter 2023-24 Flood Recovery Cell Update, Environment Agency, 2024. Flooding on Worcester street after heavy rain, BBC News, 02 January 2024. Viewed 31 July 2024.

Table 2: Weather reports coinciding with the peaks shown in the Figure 1 incident data.

Methodology continued

b) Water Rescue incident data

The second set of incident data taken from the IRS included special service incident types where the recording was either 'Flooding' or 'Rescue or evacuation from water' and where the property type recording was either 'Road Vehicle' or 'Outdoor'. Unlike attendances to flooding in buildings, these incident types were not limited to particular peaks in demand as these occurrences were all relevant to environmental conditions or the presence of the watercourse itself.

Flood Maps: Fluvial and Pluvial Risk

The model used two different flood maps from the EA. To represent fluvial risk, the Flood Zone 3 Map for Planning was loaded into ESRI's ArcGIS Pro v.3.3.0. In order to represent pluvial risk, the model used the Risk of Flooding from Surface Water Extent. When scoring the results, the weighting given to pluvial flood risk was lower than the weighting attributed to fluvial flood risk. This is in acknowledgement that the surface water extent map is more challenging to model and forecast, and the EA advise against using the map in isolation for local planning decision making. It was noted in Worcestershire County Council's Section 19 investigation into the unprecedented flooding of Hollywood and Wythall in 2018, that the Surface Water Extent map 'replicates quite accurately … some of the surface water flooding [though it did not] sufficiently represent the full extent of surface water flow.' Overall, the map has been used more cautiously to factor likelihood, to ensure that this variable does not overbear the risk score results.

Consequence Variables

Three variables were utilised as indicative of consequence; the Service's incident recordings for injuries, a deprivation index, and the proportion of households where a person aged 66-years or over lives alone. The Service's injury recording data was the most highly weighted of these consequence factors on the basis that a high prevalence of injuries is the best indicator of these variables to guide for resourcing to risk. Whilst the variables of deprivation and lone households add to the overall result without overstating the total risk, such that LSOAs scoring highly in these factors would not predetermine the overall risk score without the presence of other statistically higher scoring variables.

Incident data: Injuries and Fatalities at Water Related Incident or Flooding

Incident data was extracted from the IRS and compiled where either of these sets of conditions were met; where there was an injury (leading to hospitalisation) or a fatality recording at incident types of 'Flooding' or 'Rescue or evacuation from water'; or alternatively, where the injury (leading to hospitalisation) or fatality was related to either 'drowning' or 'hypothermia' in an 'outdoor' location.

Deprivation

In the NFCC's methodology, deprivation is associated with likelihood as it has been observed that LSOAs with more deprivation typically report a higher number of dwelling fires. The use of deprivation data is intentionally moved across from the domain of likelihood scoring into a factor of

consequence scoring in this methodology. The correlation between the likelihood of flooding incidents and deprivation is not thought to be demonstrably equivocal as the correlation assessed by the NFCC for dwelling fires. In this analysis, deprivation is used as a lens for vulnerability such that those living in more deprived areas may not have the same levels of preparedness or resilience to the impacts of flooding and subsequently there may be a greater need for the Service.

The ONS dataset 'households by deprivation dimensions' was used in this analysis rather than the Indices of Multiple Deprivation (IMD, 2019) used by the NFCC as a more recent data source, and one that is aligned to the more recent 2021 LSOAs boundaries used throughout the analysis.

Lone Households with Persons aged 66+

Where the NFCC methodology used Health and Disability in its consequence variables, this methodology has used the ONS dataset for household compositions to identify the proportion of dwellings in an LSOA where a person aged 66+ lives alone. The charity Age UK note that whilst many older people are able to cope with flooding and spate conditions, there are others who are isolated or in poor health and therefore less able to prepare and recover from the impacts of flooding. The loss of power is noted as a major concern amongst older people at risk of flooding in Age UK's research, with older people expressing concerns about the possibility of tripping and falling in the darkness, or feeling cold and experiencing discomfort which might exacerbate existing health problems.

Risk Scoring Method

For the 491 LSOAs in Hereford and Worcestershire, the indicators of likelihood and consequence were obtained. This was completed using ESRI's ArcGIS Pro v.3.3.0 mapping software and Microsoft Excel. First, the LSOA boundaries from the ONS were added as a layer and CACI's Household Acorn dataset was used to geolocate households in the service area. These two datasets were joined to identify the number of households per LSOA and this provided the means to convert other variables into a rate of households (per thousand households).

Using the IRS data extracts, the incidents dataset and injuries dataset were geolocated and joined to the LSOA layer, providing a count of injuries and incidents for each LSOA and converted to a rate per thousand households. The indicative flood maps from the EA were added to provide fluvial and pluvial flood risk buffer zones. Households were spatially joined to identify those within 20-metres of a flood risk area and counted per LSOA at a rate of per thousand households.

The ONS dataset for deprivation provided the number of households per LSOA that are deprived in three dimensions and this was converted to a rate per thousand households. The ONS household composition dataset provides the % of households per LSOA with a resident living alone aged 66+.

All variables were then converted into standard scores (z-scores).

$$Z = \frac{□ - \mu}{\sigma}$$

□ = The relative value
μ = The mean of the relative values
σ = The standard deviation of the relative values.

Methodology continued

A z-score was chosen to help compare and interpret the variable results. This scoring indicates how far from the mean average one variable result is for an LSOA compared to the results returned for all LSOAs. Figure 4 helps to visualise how the results can come to be distributed. The result for most LSOAs can be expected to fall somewhere near the centre of the distribution, around the mean, and other LSOAs would be found to be significant outliers

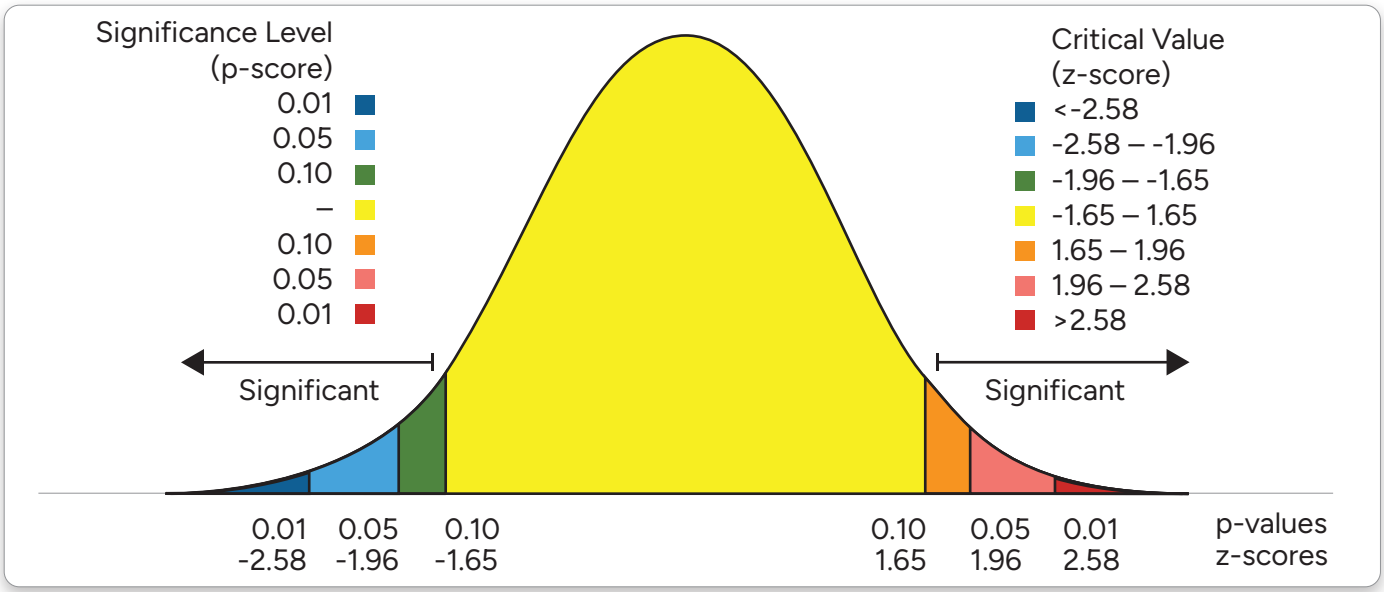

Figure 2: Z-Score bell curve. Image Source: ArcGIS, ESRI.

A total z-score score was obtained by combining the z-scores for all the variables, calculated as:

(Factor^1 × Weighting^1) + (Factor^2 × Weighting^2) + (Factorn x Weighting^n) = Risk Score

Weighting to calculate risk score	0.15	0.05	0.3	0.3	0.1	0.1		
LSOAs	Fluvial Risk	Pluvial Risk	Incidents	Injuries	Deprivation	Lone Households 66+	Total z-Score Result	Risk Rating
LSOA a	4.52	1.48	1.83	3.09	0.89	-0.33	2.27	High
LSOA b	1.35	-1.34	3.62	1.26	-0.46	0.99	1.66	Medium High
LSOA c	1.97	-0.02	1.07	1.42	1.17	0.99	1.26	Medium
LSOA d	-0.50	0.74	-0.31	1.45	0.87	-0.11	0.38	Medium Low
LSOA e	-0.50	-1.92	-0.52	-0.29	-0.73	-2.76	-0.76	Low

Table 3: Example LSOA scoring.

Risk Model Analysis

Model Results

The 491 LSOA were assigned a risk score based on the combined z-score result. Nine LSOAs had a combined z-score of over 1.9 which is indicative of a statistically significant result and these have therefore been categorised as higher risk areas. Table 4 provides the composition of LSOA risk rating results from the scoring and Figure 4 displays the results over a map of the service area.

Category	Z-Score Result (Greater than or equal to)	Number of LSOAs	% of all 491 LSOAs
High	1.9	9	1.8
Medium High	1.5	13	2.6
Medium	0.7	21	4.3
Medium Low	0	100	20.4
Low	-5	348	70.9

Table 4: Risk Score Ratings.

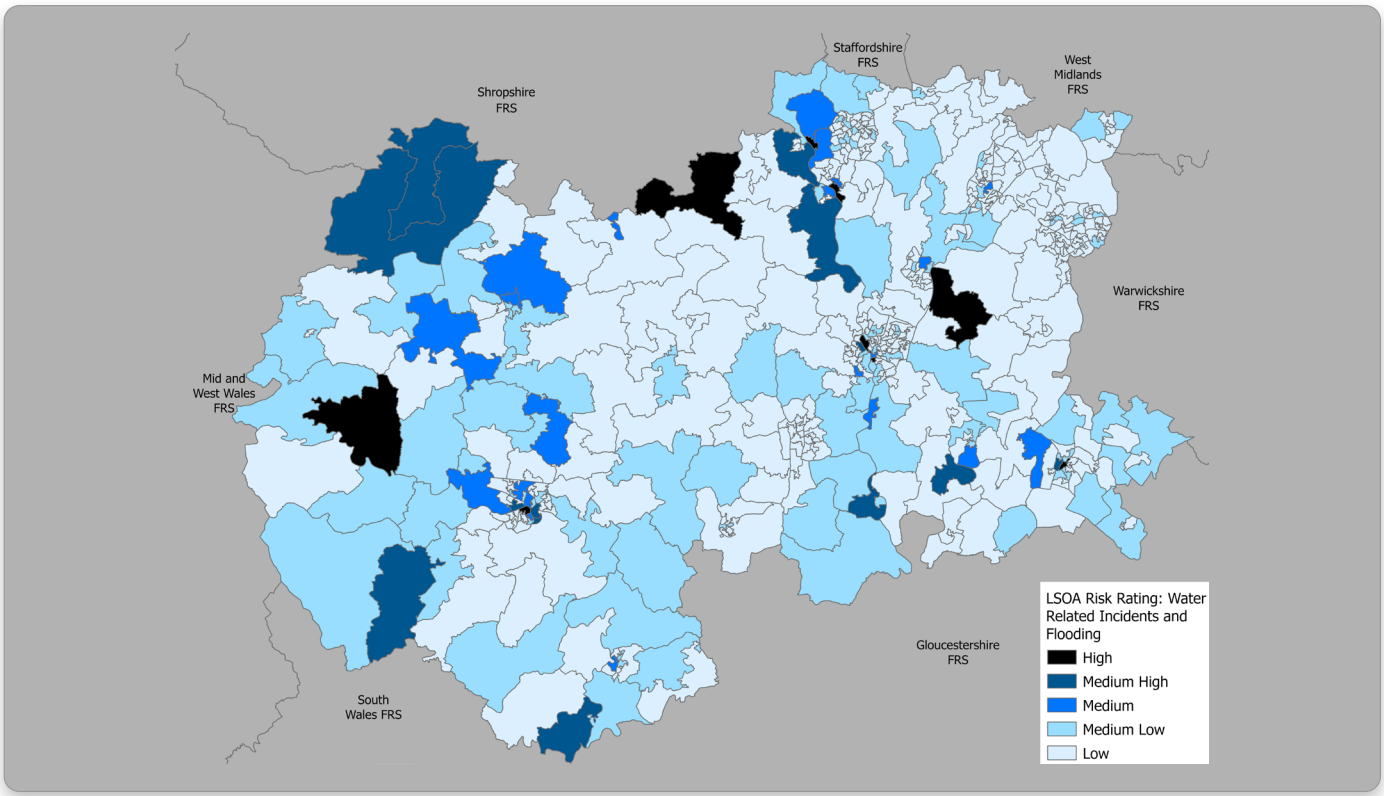

Figure 3: LSOA Risk Rating for Water Related Incidents and Flooding.

Risk Model Analysis continued

Model Results: High Risk Rated Areas

LSOA Locality	Risk Scoring Explanation
Blackmarstone, Hereford.	This area was statistically high across several factors; including fluvial flood risk and deprivation. Water rescue incidents around the Greyfriars Bridge area have been recorded in higher numbers and the Service has attended a larger number of flooded properties.
Eardisley & Letton, Herefordshire.	This area scored highly for fluvial risk and water rescues, particularly involving vehicles in flood water along the A438 near Letton, and on the road out of Letton towards Ailey.
Newnham Bridge, Malvern Hills District.	This area was noteworthy for a significant number of water rescues from a vehicle in water travelling east along the A443 from Newnham towards Lindridge. Persons recorded with injuries at water rescue incidents also scored more highly in this area.
Diglis Area, Worcester.	This area scored highly for fluvial risk and saw a higher number of incidents involving evacuations from flooded homes. Additionally, there were a high number of waster rescues, some involving injuries for persons having entered the River Severn.
Worcester Bridge Area, Worcester.	This area was notable for fluvial risk and a higher proportion of older people living alone. A higher number of flooded properties and water rescues around Worcester Bridge have been recorded.
Himbleton & Shell Ford, Wychavon District.	This area has recorded a higher number of water rescues involving vehicles in flood water, the Shell Ford north of Himbleton is a particular hotspot attended by the Service.
Waterside & Bridge Street, Evesham, Wychavon District.	Fluvial and pluvial flood risk scored more highly in this area and the Service has attended several flooded properties during spate conditions. Water rescues are not uncommon though less frequent than in some other areas identified.
Bewdley, Wyre Forest District.	The Service has attended a higher number of flooded properties in this area, and storm Franklin in February 2022 was a notable period of higher demand after the temporary flood barriers were breached.
Stourport-on-Severn & Lower Heath	This area scored highly for the number of injured persons recorded at water rescue incidents. The rates of deprivation and fluvial risk were also above average.

Table 5: Contributing factors to the results of high risk rated areas.

Risk Model Analysis continued

Model Evaluation

The service is mindful of the limitations inherent in this analysis. The Service's incident recording data has been a significant factor in attributing overall the risk rating. However, it's acknowledged that the presence of the Fire and Rescue Service is not always required and that the impacts of flooding are likely to be more widely experienced than recorded by way of emergency attendances. Secondly, the current version of the incident recording system makes it difficult to determine between the causes of flooding and incident data was extracted by inference of environmental conditions. Moreover, incidents attended during spate conditions may be underreported if several incidents are attended in succession and recorded under a single incident number. The Home Office permit recording incidents in this way having acknowledged that during spate conditions specific incident and actions taken can become indistinguishable, for example where the Service has carried out numerous evacuations along a flooded street. Lastly, risk has been attributed at LSOA level and these geographical areas are not drawn with specific consideration for watercourses. The drawing of an LSOA boundary can create a seemingly arbitrary distinction about the risk on the one side of the watercourse compared to the other. These limitations are acknowledged and the model does not determine the Service's strategy in a vacuum or as a means to invariably allocate its resources.

Analysis of Attendances and Water Rescue Resources

HWFRS's water responder teams have attended an average of 230 incidents per year in the last five financial years. The Service rescued at least one person at 40% of the incidents attended where a rescue is defined as a person who was given physical assistance in getting to safety. The Service has invested significant resources and training into the water response capability of its crews, which in turn reduces risk for the community and its responders at water related incidents. This section provides an overview of the Service's water response capacity, looking at where demand has been highest, and gives an overview of the incidents attended. The final section focuses on incidents at two fords located in the service area where persons have required rescuing from their vehicles having driven into flood water. The fords are a key area that the Service can target prevention activities; by working with partner agencies it hopes to deter drivers from attempting to pass through the ford when the water is high, reducing the likelihood and risk of an incident occurring.

Swift Water Rescue Teams

The Service has three Swift Water Rescue Teams (SRT) based at Hereford, Evesham, and Worcester Fire Stations. These crews are equipped with a 4.6-metre Eurocraft boat and trained for responding to water rescues in faster moving waters. A high proportion of the incidents attended by the SRT will involve water rescues from the service area's rivers and the Crews are trained for swimming in swift moving water if necessary.

The following analysis focuses on the attendance of the first SRT, i.e. the first boat to arrive at an incident. At a water rescue incident, a second SRT would be mobilised to provide further resource to the incident commander. Table 6 examines the number of attendances made by the SRTs and the proportions of attendances made within their own station ground or to a neighbouring station ground areas. The average response times for the SRTs are also shown.

SRT Equipped Stations	Number of Incidents Attended (as 1st SRT/boat in attendance)	Percentage of incidents in home station ground area	Percentage of incidents attended in a neighbouring station ground area	Mean Average Response Time (mm:ss)	Median Average Response Time (mm:ss)
Evesham	156	38%	40%	21:49	15:57
Hereford	221	69%	15%	17:34	11:50
Worcester	347	57%	33%	19:18	17:37

Table 6: SRT Attendances. Source: IRS (1 Apr 2019 – 31 Mar 2024).

Analysis of Attendances and Water Rescue Resources continued

The response times for the SRTs based at Evesham and Hereford have a broader range of response times, which the median average helps to reveal; the travel time required to reach an incident is the most significant factor in the variation of those response times. In comparison to the attendance times of a fire engine, response times for the SRT can be marginally longer and this is related to the time necessary to dress in personal protective equipment (i.e. drysuits, buoyancy aids etc) before the SRT can be mobilised. Another fire engine will generally arrive first and take up position at the last known location of the person thought to have entered the water; the first responding crew can relay information to the SRT, providing an initial incident account to help formulate the incident plan i.e. from where the SRT's boat will enter the water, downstream of the location that the person was last seen.

The SRTs stationed at Hereford and Worcester attend incidents within their own station grounds more than half of the time. This corresponds with the findings of the risk modelling which identified that the bridges and waterways in the county cities of Hereford and Worcester recorded a higher number of water rescues. Evesham's SRT also attended incidents in its station ground area the most, but proportionally it recorded a higher number of its total first attendances in neighbouring station ground areas compared with than the other two SRTs. The Evesham SRT attended incidents in Pershore for 19% of its incidents analysed, to Worcester for 13% and to Upton-upon-Severn for 10%. The Worcester SRT made attendances in the Droitwich Spa station area for 21% of its attendance and to the Wyre Forest area for 12%. Hereford's SRT recorded proportionally fewer incidents outside of its station ground, the Eardisley station area recording the highest number of those attendances (8%).

The location of the Service's SRTs provides an optimal coverage arrangement across the service area and this is reinforced by the findings in the risk modelling. The SRTs are all located within station grounds which scored more highly for water rescue attendances, or flooding risk where hotspots of incidents have been identified.

Water First Responder Teams

The Service currently has 20 Water First Responder (WFR) units, located at 18 of its 25 fire stations. These crews are trained to enter shallow waters and are equipped to respond to flooding and water rescue incidents with equipment including, a water rescue sled, wading poles and throw lines. These crews are based at Bromsgrove, Bromyard, Droitwich Spa, Eardisley, Ewyas Harold, Hereford, Fownhope, Leintwardine, Leominster, Malvern, Pershore, Peterchurch, Redditch, Ross-on-Wye (two WFR crews), Tenbury Wells, Upton-upon-Severn, Whitchurch, Wyre Forest (two WFR crews).

The Service's WFR crews are equipped to respond to a high proportion of the kinds of water related incidents the Service attends and depending on the nature of the incident, a WFR could be mobilised with or without the addition of an SRT. At incidents where both a WFR and an SRT are mobilised, the WFR crew generally arrives first, given that the SRT will usually be required to travel a greater distance. On arrival of the WFR, the Officer in charge may advise whether the SRT's addition capacity would benefit the management of the incident or whether the SRT could be stood down. Over 45% of incidents attended by the Service's WFR crews involve road vehicles that have entered surface water. The WFR crews are equipped to wade out to the vehicle and often persons are rescued with the use of the inflatable rescue sled.

Analysis of Attendances and Water Rescue Resources continued

Table 7 shows the station grounds with the highest number of attendances by a WFR.

Station Ground of Incident	Number of incidents attended by a WFR crew	Number of incidents involving a road vehicle in water.
Wyre Forest	114	13 (11%)
Worcester	45	6 (13%)
Upton-upon-Severn	44	15 (34%)
Pershore	43	25 (58%)
Hereford	42	16 (38%)
Leintwardine	41	37 (90%)
Tenbury Wells	36	25 (69%)
Redditch	32	13 (41%)
Droitwich Spa	29	16 (55%)
Whitchurch	29	14 (48%)

Table 7: Top 10 station grounds by number of WFR attended incidents. Source: IRS (1 Apr 2019 – 31 Mar 2024)

In the station grounds of Leintwardine, Tenbury Wells, Pershore, and Droitwich Spa over half of WFR attendances were to incidents involving a road vehicle in water. Where the service can gather information about recurring incident locations, it can work with partner agencies to bring down the risk and likelihood of incidents occurring.

The current resourcing arrangement provides excellent coverage of water first responders across the service area. The resources of the WFR crews are sufficient to bring many incidents to a close safely without the need for the SRT's attendance. However, where an incident requires the SRT, crews of WFRs can be relied upon by the SRT to begin setting up safety provisions at the incident, locating the victim, or preventing others from entering the water.

Analysis of Attendances and Water Rescue Resources continued

Figure 4 displays the incidents that have been attended by the Service's water rescue crews over the results of the risk model.

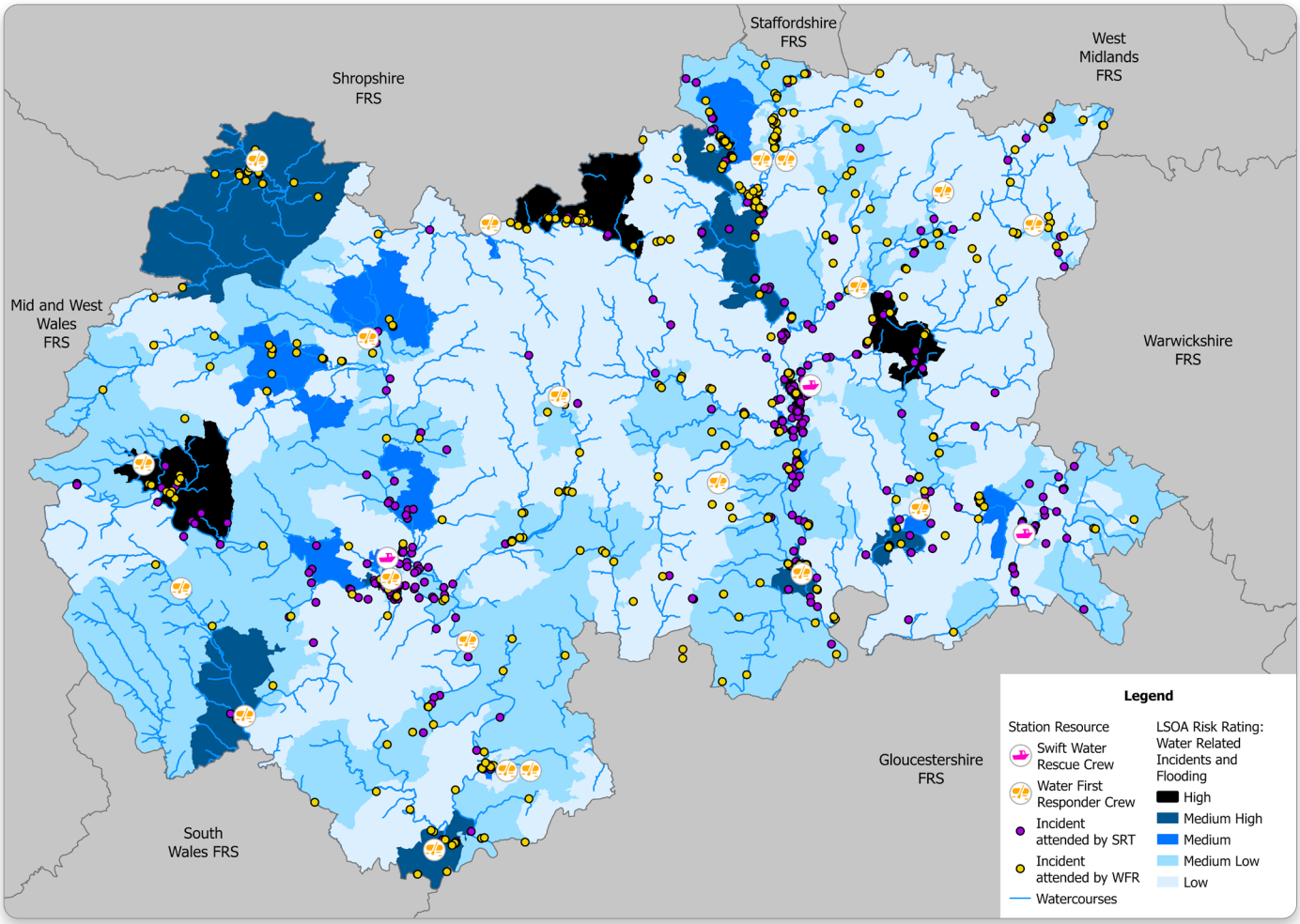

Figure 4: A Map showing Incidents Attended by HWFRS Water Rescue Teams and thee Base Stations of WFR/SRT Resources. Source: IRS (1 Apr 2019 – 31 Mar 2024).

Analysis of Attendances and Water Rescue Resources continued

Water Rescues from Fords

The Service has attended 77 incidents in the last 10 financial years to water rescues at fords in the service area, recording 64 rescues of persons at these incidents. There are several fords across Herefordshire and Worcestershire but analysis of Incident Reporting System (IRS) data finds that 70% of all these attendances occurred at either Shell Ford or Walcot Ford in Worcestershire. These two fords have been attended 54 times in the last 10 financial years.

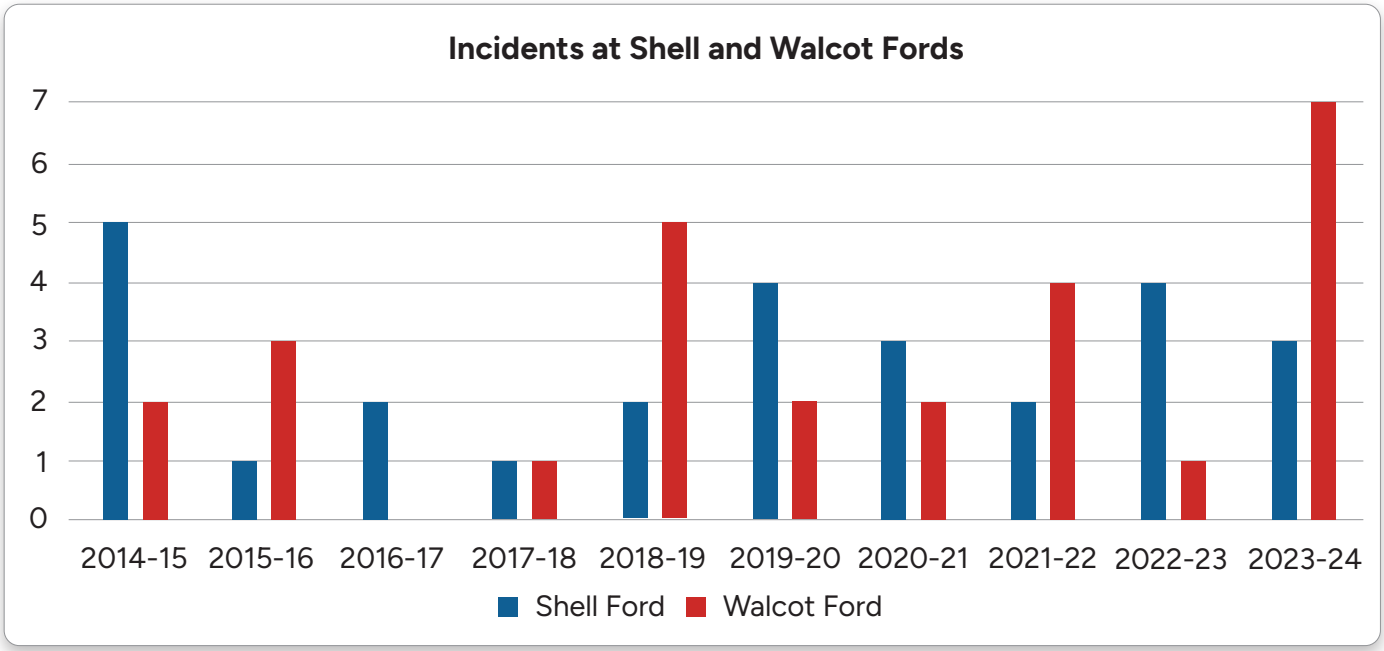

Figure 5: Water Rescues at Shell and Walcot Ford. Source: IRS (1 Apr 2019 – 31 Mar 2024).

Shell Ford is located on Earls Common Road, north of Himbleton where the Shell Brook intersects the road. Walcot Ford is located on Walcot Lane, north of Pershore where the Bow Brook intersects the road. The number of callouts to these fords has been higher in more recent years, at a rate of 6.4 incidents per year in the last five financial years.

Incidents at Shell and Walcot Ford were most common in the autumn and winter months, with those seasons recording 70% of the incidents. The most common two-hour window of emergency calls to these locations came between 10am and noon, with the second most common time being between 8am and 10am.

A total of 52 persons, including both drivers and their passengers, were rescued by the Service's crews. Of those rescued, 25 were rescued with the use of dedicated water rescue equipment such as the inflatable rescue sled. An age was recorded for 24 rescued drivers with one-third of the drivers being aged between 45 and 54-years old. A gender was recorded for 28 rescued drivers, and almost 90% were male.

Thankfully there have not been any serious injuries recorded at these incidents, but the risk is considerable and incident numbers at these locations have grown in recent years. The Service, in partnership with the local authority, is exploring how drivers could be better deterred from putting themselves at risk and entering these ford crossings when they are in flood.

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HWFire

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