

Risk of Flooding from Surface Water - Product Description

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What are the Risk of Flooding from Surface Water products

Overview

Risk of Flooding from Surface Water (RoFSW) are products that show the chance of flooding from surface water to areas of land. It is our main way of communicating flood risk from surface water to the public through our 'Check Your Long Term Flood Risk' service on gov.uk.

Why they are created

RoFSW has been created to support the public and other decision makers in understanding, managing and responding to flood risk.

What they show

The RoFSW products are an assessment of where surface water flooding may occur when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead. It includes information about flooding extents, depths, speed, direction and hazards.

Risk is displayed as one of three likelihood categories:

- High - greater than or equal to 1 in 30 (3.3%) chance of flooding in any year
- Medium – Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance of flooding in any given year
- Low – Less than 1 in 100 (1%) but greater than or equal to 1 in 1000 (0.1%) chance of flooding in any given year

Note that all locations outside of mapped extents should be considered at 'Very Low' risk. 'Very Low' extents in the dataset have been explicitly modelled as below 1 in 1000 chance.

Climate Change

As well as present day risk of flooding from surface water, climate change scenarios have been produced to indicate the predicted impacts of climate change on future flood risk. The climate change allowances are based on the latest UK Climate Projections (UKCP18) from the Met Office, using the Representative Concentration Pathway (RCP) 8.5.

A near-term epoch (2040 – 2060 "2050s" epoch) and central allowances are being used initially, to support short and medium-term decisions informed by the highest flood likelihood projections.

RoFSW products

We update and maintain several RoFSW products:

Risk of Flooding from Surface Water

This is our primary dataset showing the present day flood risk from surface water, represented on a 2m resolution grid.

Depths

This dataset also presents the likelihood of a flood occurring with water at a given depth or higher. There are separate layers for the following depths:

- 0 m (i.e. flooding extent)
- 0.2m
- 0.3m
- 0.6m
- 0.9m
- 1.2m

Risk of Flooding from Surface Water – Speed

This dataset presents the likelihood of a flood occurring with water travelling at a given speed (or higher). There are separate layers for the following speeds:

- 0m/s (i.e. flooding extent)
- 0.25m/s
- 0.5m/s
- 1m/s
- 2m/s

Risk of Flooding from Surface Water – Hazard

Flood hazard ratings are a measure of how dangerous a flood might be. They are calculated using a combination of flood depth and speed – higher depths and speed mean more dangerous flooding and a higher flood hazard rating.

This uses the following equation taken from Defra R&D on risks to people, where:

Hazard rating = depth x (speed + 0.5) + debris factor

Debris factors are also defined in Defra R&D on risks to people. The nationally produced surface water flood mapping uses a debris factor of:

- 0.5 for depths less than or equal to 0.25m
- 1.0 for depths greater than 0.25m (irrespective of the type of land use).

This dataset presents the likelihood of a flood occurring with a given flood hazard rating (or higher). There are separate layers for the following hazard ratings:

- 0 (i.e. flooding extent)
- 0.25
- 0.5
- 0.75
- 1.25
- 2

Risk of Flooding from Surface Water – Flow Direction

This dataset shows the direction in which water will flow when the water is travelling at maximum speed during a flood.

Unlike other datasets, the Flow Direction dataset is represented on a 5m resolution grid.

There are separate layers for each of the following likelihoods of flooding:

- 3.3% (1 in 30) chance in any given year
- 1% (1 in 100) chance in any given year
- 0.1% (1 in 1000) chance in any given year

Risk of Flooding from Surface Water – Climate Change 1

A version of the Risk of Flooding from Surface Water dataset showing flood risk likelihood accounting for climate change, using the scenarios described above, is also available.

Depths

This dataset also presents information on flood depths accounting for climate change, in the same way as in the present-day dataset.

Risk of Flooding from Surface Water – Speed – Climate Change 1

This dataset presents information on flood speeds accounting for climate change, in the same way as in the present-day dataset.

Risk of Flooding from Surface Water – Hazard – Climate Change 1

This dataset presents information on flood hazard ratings accounting for climate change, in the same way as in the present-day dataset.

Risk of Flooding from Surface Water – Model Origin

This dataset shows information about the data used in the RoFSW maps. For each location it shows which flood risk model has been used, whether national scale modelling or a detailed local model, and information about that model.

It applies to both the RoFSW present-day and climate change datasets.

Risk of Flooding from Surface Water - Key Summary information

The RoFSW Key Summary Information provides a summary of the estimated number of people and properties in areas at risk of flooding from surface water. Property counts are also categorised for different property types (residential, non-residential, unclassified).

It includes total numbers / areas at risk, with an additional breakdown by each of the three RoFSW flood risk likelihood categories.

Further explanations about the information presented in the spreadsheets, such as flood likelihood category, property types and how numbers are calculated, are presented in the first tab of each spreadsheet.

Each set of counts is split by different spatial units:

- Country
- ONS Regions
- River Basin District
- RFCC (Regional Flood and Coastal Committee)
- Environment Agency Areas
- LLFA (Lead Local Flood Authority)
- MP constituency

It is provided as a series of spreadsheets which provide the following summary information:

- Number of properties in areas at risk from flooding from surface water
- Number of people in areas at risk from flooding from surface water
- Number of ground floor properties in areas at risk from flooding from surface water

Other related datasets

The surface water for spatial planning datasets hosted on the Flood Map for Planning service are based on the same source data as Risk of Flooding from Surface Water, but present the data in a different way and use a different climate change scenario that is more appropriate for spatial planning purposes.

These datasets are available on the Defra Data Services Platform and further information can be found on these pages:

- [Surface Water Spatial Planning Extents – Present Day](#)
- [Surface Water Spatial Planning Extents – Climate Change](#)
- [Surface Water Spatial Planning Depths – Present Day](#)
- [Surface Water Spatial Planning Depths – Climate Change](#)

How the Risk of Flooding from Surface Water products are managed

How they are created

RoFSW is created by combining best available flood models, including locally produced detailed flood model information from LLFAs, and national flood modelling. These are used to generate the probability of flood risk for each 2m grid square of land, with the aim of using the best available flood risk information in any one location.

Update frequency

In the future we plan to publish the data every three months and update it in locations where new local flood model information is available. Updates on these timescales can be found on [Defra Data Services Platform](#)

Uses and limitations

Who uses RoFSW and why

The Environment Agency

The Environment Agency, as part of its strategic overview role in surface water flooding, use RoFSW to help government understand the scale of surface water flood risk. It is the primary dataset used to communicate this flood risk with the public and our partners.

It provides evidence to support our Long-term Investment Strategies (LTIS) which set out the future costs and benefits of managing flood and coastal risks in a range of different scenarios.

Lead Local Flood Authorities

The RoFSW maps help authorities identify areas vulnerable to flash flooding caused by heavy rainfall to inform local emergency response plans. This data is

also essential for urban planners, emergency services, and infrastructure developers (e.g. in updating SFRAs)

LLFAs use RoFSW to inform investment planning and decisions, including identification of areas suitable for implementing SuDS or surface water storage areas.

The maps can also be used to help create and update surface water plans and local flood risk strategies

The public

RoFSW is produced to give the public consistent information about the likelihood of flooding from surface water. We want to encourage people living and working in areas prone to flooding to find out about the flood risk in their area and take appropriate action.

Our customers and partners

We also make the data available as open data so that customers, partners and infrastructure owners can use it.

Suitability and limitations

RoFSW **does not show other forms of flooding** such as from rivers, the sea, highway drains, sewers or rising groundwater.

Flood estimation is not an exact science, and any flood risk assessment needs to be understood and used in that context.

A confidence category has been assigned, which provides an indicative confidence level for each spatial cell. However, confidence scores are in development and will change, therefore should not be used in any decision making at this stage. This is also not a reflection of how suitable the data is to use on a particular spatial scale.

RoFSW outputs are generally not suitable for property level assessment; instead they estimate flood risk to an area of land. The method used does not provide information relating to when the floodwater may be deep enough to start causing damage or disruption to homes, roads or other infrastructure. Alongside depth information, additional information on properties (including floor levels) would be required to say with any confidence whether flooding of a certain depth would enter into a property and cause damage.

How to access them

Check Your Long Term Flood Risk service

The Environment Agency presents RoFSW products, including climate change and depth outputs, on the Check Your Long Term Flood Risk service via [GOV.UK](https://gov.uk) where anyone can access them by entering a postcode or by viewing the national map.

Data Services Platform (DSP)/ data.gov.uk

The RoFSW products are also available in a variety of formats from the [Defra Data Services Platform](https://defra.gov.uk/data-services-platform) and data.gov.uk

Product Contents and Schemas

The datasets available on the Defra Data Services Platform have the following schemas which describe the geometry and the attributes of the data. When delivered, some file formats may truncate the fieldnames.

As stated in **Suitability and limitations**, the Confidence scores are in development and will change, therefore should not be used in any decision making at this stage.

Risk of Flooding from Surface Water

File Geodatabase Name: RoFSW_vYYYYMM.gdb

Simple Feature Class					Geometry:	Polygon		
1. RoFSW					Contains M Values: ¹	No		
					Contains Z Values: ²	No		
Field name	Description	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Unique object identifier	Object ID						
Shape	Geometry data type	Geometry						
Risk_band	Flood likelihood category assigned to impact cell	Text	No	-	-			12
Confidence	Confidence score assigned to impact cell	Short Integer	No	-	-	5		

Simple Feature Class					Geometry:	Polygon		
2. RoFSW_0_2m_depth 3. RoFSW_0_3m_depth 4. RoFSW_0_6m_depth 5. RoFSW_0_9m_depth 6. RoFSW_1_2m_depth					Contains M Values: ¹	No		
					Contains Z Values: ²	No		
Field name	Description	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Unique object identifier	Object ID						
Shape	Geometry data type	Geometry						
Risk_band	Flood likelihood category assigned to impact cell	Text	No	-	-			12

¹ Measure length (for linear referencing)

² Height value

A layer file is also provided alongside this dataset for use in ESRI applications. This contains the recommended symbology information, reflecting how the data is displayed on Environment Agency systems.

Users of other GIS applications can apply the symbology for each flood likelihood category manually using the RGB information provided in the table below:

	Flood Likelihood Category	RGB	HEX#
	High	61-68-137	3D4489
	Medium	102-153-205	6699CD
	Low	162-207-255	A2CFFF

Risk of Flooding from Surface Water – Speed

File Geodatabase Name: RoFSW_Speed_vYYYYMM.gdb

Simple Feature Class					Geometry:		Polygon	
1. RoFSW_0_0mps_speed 2. RoFSW_0_25mps_speed 3. RoFSW_0_5mps_speed 4. RoFSW_1_0mps_speed 5. RoFSW_2_0mps_speed					Contains M Values: ¹		No	
					Contains Z Values: ²		No	
Field name	Description	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Unique object identifier	Object ID						
Shape	Geometry data type	Geometry						
Risk_band	Flood likelihood category assigned to impact cell	Text	No	-	-			12

¹ Measure length (for linear referencing)

² Height value

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	Flood Likelihood Category	RGB	HEX#
	High	61-68-137	3D4489
	Medium	102-153-205	6699CD
	Low	162-207-255	A2CFFF

Risk of Flooding from Surface Water – Hazard

File Geodatabase Name: RoFSW_Hazard_vYYYYMM.gdb

Simple Feature Class					Geometry:		Polygon	
1. RoFSW_0_0_hazard 2. RoFSW_0_25_hazard 3. RoFSW_0_5_hazard 4. RoFSW_0_75_hazard 5. RoFSW_1_25_hazard 6. RoFSW_2_0_hazard					Contains M Values: ¹		No	
					Contains Z Values: ²		No	
Field name	Description	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Unique object identifier	Object ID						
Shape	Geometry data type	Geometry						
Risk_band	Flood likelihood category assigned to impact cell	Text	No	-	-			12

¹ Measure length (for linear referencing)

² Height value

A layer file is also provided alongside this dataset for use in ESRI applications. This contains the recommended symbology information, reflecting how the data is displayed on Environment Agency systems.

Users of other GIS applications can apply the symbology for each flood likelihood category manually using the RGB information provided in the table below:

	Flood Likelihood Category	RGB	HEX#
	High	61-68-137	3D4489
	Medium	102-153-205	6699CD
	Low	162-207-255	A2CFFF

Risk of Flooding from Surface Water – Flow Direction

File Geodatabase Name: RoFSW_Direction_vYYYYMM.gdb

Simple Feature Class					Geometry:		Point	
1. RoFSW_FDMV_5m_1in30					Contains M Values: ¹		No	
2. RoFSW_FDMV_5m_1in100					Contains Z Values: ²		No	
3. RoFSW_FDMV_5m_1in1000								
Field name	Description	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Unique object identifier	Object ID						
Shape	Geometry data type	Geometry						
Direction		Text	No	-	-			2

¹ Measure length (for linear referencing)

² Height value

A layer file is also provided alongside this dataset for use in ESRI applications. This contains the recommended symbology information, reflecting how the data is displayed on Environment Agency systems.

Users of other GIS applications can apply the symbology manually using black arrow symbols orientated as per the direction given.

Risk of Flooding from Surface Water – Model Origin

File Geodatabase Name: RoFSW_Model_Origin_vYYYYMM.gdb

Simple Feature Class					Geometry:		Polygon	
1. RoFSW_Model_Origin_Layer					Contains M Values: ¹		No	
					Contains Z Values: ²		No	
Field name	Description	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Unique object identifier	Object ID						
Shape	Geometry data type	Geometry						
Model	Name of model used in this location	Text	No	-	-			254
Scale	Indicates whether its national or local scale modelling	Text	No	-	-			8
model_year	Year the model was created	Short Integer	No	-	-			
Flood_source	Source of flooding – should always be Surface Water	Text	No	-	-			16

¹ Measure length (for linear referencing)

² Height value

A layer file is also provided alongside this dataset for use in ESRI applications:

	Scale Category	RGB	HEX#
	Local	128-22-80	801650
	National	244-106-37	F46A25

Risk of Flooding from Surface Water – Key Summary Information

RoFSW_PropertiesAtRisk_vYYYYMM.xlsx

- Number of properties and percentage of properties at risk with breakdown by property type and flood likelihood category.

Reporting Boundaries:

Country, ONS Region, RBD, RFCC, EA PF Area, LLFA, MP Constituency

RoFSW_PeopleAtRisk_vYYYYMM.xlsx

- Number of people and percentage of people (based on residential properties) at risk, with breakdown by flood likelihood category.

Reporting Boundaries:

Country, ONS Region, RBD, RFCC, EA PF Area, LLFA, MP Constituency

Risk of Flooding from Surface Water – Climate Change 1

File Geodatabase Name: RoFSW_Climate_Change_01_vYYYYMM.gdb

Simple Feature Class					Geometry:	Polygon		
1. RoFSW_CC01 2. RoFSW_CC01_0_2m_depth 3. RoFSW_CC01_0_3m_depth 4. RoFSW_CC01_0_6m_depth 5. RoFSW_CC01_0_9m_depth 6. RoFSW_CC01_1_2m_depth					Contains M Values: ¹	No		
					Contains Z Values: ²	No		
Field name	Description	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Unique object identifier	Object ID						
Shape	Geometry data type	Geometry						
Risk_band ³	Flood likelihood category assigned to impact cell	Text	No	-	-			12

¹ Measure length (for linear referencing)

² Height value

³ Risk band is the likelihood of flooding describes as a category (High, Medium, Low, Very Low)

A layer file is also provided alongside this dataset for use in ESRI applications. This contains the recommended symbology information, reflecting how the data is displayed on Environment Agency systems.

Users of other GIS applications can apply the symbology for each flood likelihood category manually using the RGB information provided in the table below:

	Flood Likelihood Category	RGB	HEX#
	High	61-68-137	3D4489
	Medium	102-153-205	6699CD
	Low	162-207-255	A2CFFF

Risk of Flooding from Surface Water – Climate Change 1 Speed

File Geodatabase Name: RoFSW_Climate_Change_01_Speed_vYYYYMM.gdb

Simple Feature Class					Geometry:		Polygon	
1. RoFSW_CC01_0_0mps_speed 2. RoFSW_CC01_0_25mps_speed 3. RoFSW_CC01_0_5mps_speed 4. RoFSW_CC01_1_0mps_speed 5. RoFSW_CC01_2_0mps_speed					Contains M Values: ¹		No	
					Contains Z Values: ²		No	
Field name	Description	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Unique object identifier	Object ID						
Shape	Geometry data type	Geometry						
Risk_band	Flood likelihood category assigned to impact cell	Text	No	-	-			12

¹ Measure length (for linear referencing)

² Height value

A layer file is also provided alongside this dataset for use in ESRI applications. This contains the recommended symbology information, reflecting how the data is displayed on Environment Agency systems.

Users of other GIS applications can apply the symbology for each flood likelihood category manually using the RGB information provided in the table below:

	Flood Likelihood Category	RGB	HEX#
	High	61-68-137	3D4489
	Medium	102-153-205	6699CD
	Low	162-207-255	A2CFFF

Risk of Flooding from Surface Water – Climate Change 1 Hazard

File Geodatabase Name: RoFSW_Climate_Change_01_Hazard_vYYYYMM.gdb

Simple Feature Class					Geometry:		Polygon	
1. RoFSW_CC01_0_0_hazard 2. RoFSW_CC01_0_25_hazard 3. RoFSW_CC01_0_5_hazard 4. RoFSW_CC01_0_75_hazard 5. RoFSW_CC01_1_25_hazard 6. RoFSW_CC01_2_0_hazard					Contains M Values: ¹		No	
					Contains Z Values: ²		No	
Field name	Description	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	Unique object identifier	Object ID						
Shape	Geometry data type	Geometry						
Risk_band	Flood likelihood category assigned to impact cell	Text	No	-	-			12

¹ Measure length (for linear referencing)

² Height value

A layer file is also provided alongside this dataset for use in ESRI applications. This contains the recommended symbology information, reflecting how the data is displayed on Environment Agency systems.

Users of other GIS applications can apply the symbology for each flood likelihood category manually using the RGB information provided in the table below:

	Flood Likelihood Category	RGB	HEX#
	High	61-68-137	3D4489
	Medium	102-153-205	6699CD
	Low	162-207-255	A2CFFF

Licensing

These RoFSW products are available for use under the [Open Government Licence](#).