

Flood Risk Regulations 2009 Preliminary Flood Risk Assessment

Lancashire Area Preliminary Assessment Report May 2011

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Executive Summary

Under the Flood Risk Regulations 2009, Lancashire County, Blackpool and Blackburn with Darwen Borough Councils are each designated as a Lead Local Flood Authority and, as such, are required to undertake a Preliminary Flood Risk Assessment (PFRA).

This involves identifying areas of "significant" local flood risk both from historic flood events and potential future flooding.

Lead Local Flood Authorities have responsibilities for assessing flooding from surface water, groundwater and ordinary watercourses. They do not look at flooding from Main Rivers or the sea, except where there is interaction with these sources of flooding.

The PFRA considers the numbers of people and critical services affected by flooding during a 0.5% Annual Exceedence Probability (1 in 200 chance) rainfall event. This equates to roughly a 1% AEP (1 in 100 chance) flood.

For the purposes of the PFRA, Defra have defined "significant" future flood risk as affecting 30,000 or more people or 150 critical services (e.g. schools, hospitals, nursing homes, power and water services).

In assessing past floods, any flood which affected 20 or more people or one or more critical service was identified.

Following an initial data gathering exercise, around 25 such flood events were identified. This excludes any past floods which have since been resolved and are therefore unlikely to re-occur.

Comparison of the locations of past flooding against the locations of potential future flooding indicates that there are no areas of past flooding that have been missed by the modelling approach used for future flooding.

In terms of the Defra criteria above, there are no significant flood risk areas in Lancashire, Blackpool or Blackburn with Darwen. This means that there are no further actions required in the PFRA process before it is reviewed in six years time.

Any flood which affects people is significant to them. Bearing this in mind, all the data collected during the PFRA will be re-evaluated when formulating the Local Flood Risk Management Strategy for Lancashire.

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1 Introduction

1.1 Scope of the Report

This report has been prepared to comply with the requirements of the Flood Risk Regulations 2009 (the Regulations). This is the legislation under which the EU Floods Directive has been transposed into UK law.

Under the Regulations, County Councils and Unitary Authorities are designated as Lead Local Flood Authorities (LLFA) and must undertake a Preliminary Flood Risk Assessment for flood risk in their area. This culminates in the production of this report, the Preliminary Assessment Report.

Lead Local Flood Authorities have responsibilities for assessing flooding from surface water, groundwater and ordinary watercourses. They do not look at flooding from Main Rivers or the sea, except where there is interaction with these sources of flooding.

The Regulations stipulate that the Preliminary Assessment Report should contain information about past floods and the possible harmful consequences of future floods.

The report must be based on all relevant information which is in the possession of the person preparing the report, the Environment Agency or other authorities and any relevant information which is available to the public. Other authorities which might hold relevant information include:

- a) lead local flood authority
- b) district councils
- c) highway authority
- d) sewer company
- e) reservoir undertaker
- f) navigation authority
- g) harbour authority
- h) Natural England
- i) Historic Building and Monuments Commission for England

1.2 Aims and Objectives

The Aim of this report is to outline the Preliminary Flood Risk Assessment process and the findings arising from it.

The floods to be included are those which had significant harmful consequences for human health, economic activity or the environment (including cultural heritage), or which would have significant harmful consequences for those matters if they were to occur now. The report does not consider past floods of a kind that are not likely to occur now.

Based on this information, any areas which meet the government's criteria for "Significant Flood Risk" will be identified. Where significant flood risk is identified, further work will be required to understand the risks posed to any community affected and the Regulations stipulate what work will be required and the timetable for this.

All the information collected for the PFRA will be used to inform the development of a Local Flood Risk Management Strategy as required under the Flood and Water Management Act 2010, which will consider the impact of flooding from heavy rainfall (including when the sewerage system is overwhelmed), an ordinary watercourse overflowing or its banks being breached, a dam overflowing or being breached, groundwater, or any combination of factors or sources. It will not consider floods caused by a blockage of the sewerage system or floods caused by a burst water main.

Production of the Local Flood Risk Management Strategy is a separate exercise and will be fully reported on at a later date.

1.3 Introduction to the Study Area

The three Lead Local Flood Authorities in Lancashire (Blackburn with Darwen Borough Council, Blackpool Council and Lancashire County Council) have agreed to work in partnership to produce the Preliminary Appraisal Report. In this spirit, references in the report to Lancashire should be understood to refer to the geographical footprint of the area, rather than the Lancashire County Council boundary.

Lancashire is located in the central north west of England and drains west from the Pennines into the Irish Sea. Rivers in Lancashire include the Ribble, Wyre and Lune. Major tributaries of these rivers include the Calder, Darwen, Douglas, Hodder, and Yarrow. The River Irwell rises in Lancashire before flowing south into Greater Manchester.

To the west of the county are the West Lancashire Coastal Plain in the south, and the Fylde coastal plain north of the Ribble Estuary. Further north is Morecambe Bay. Apart from the coastal resorts of Southport (in Sefton), Blackpool and Morecambe, these areas are largely rural with the land devoted to vegetable crops. In the northwest corner of the county, straddling the border with Cumbria, is the Arnside and Silverdale Area of Outstanding Natural Beauty (AONB), characterised by its limestone pavements.

To the east of the county are upland areas leading to the Pennines. North of the Ribble is the Forest of Bowland, another AONB.

The valleys of the River Ribble and its tributary, the River Calder form a large gap in the west side of the Pennines, in which sit most of the larger Lancashire towns. South of the Ribble are the West Pennine Moors and the Forest of Rossendale where former cotton mill towns are in deep valleys. The southern edges of the county (and continuing beyond the modern-day boundaries into Greater Manchester) were coal-mining areas.

Lancashire has a population of 1.45 million and is home to over 35,000 businesses. The county has transformed from its cotton industry roots to its present diverse economy made up of international and local leading-edge industries. However, manufacturing is still the main provider of the area's wealth accounting for a quarter of the 640,000 workforce and 30% of the local revenue. Tourism is also a major contributor to the local economy.

The major settlements in Lancashire are Blackpool, Blackburn, Preston, Burnley, and Lancaster.

2 Lead Local Flood Authority responsibilities

2.1 Governance and partnership arrangements

In addition to working in partnership to produce the Preliminary Appraisal Report, the LLFAs in Lancashire are working with other key partners to ensure that all possible sources of flood risk are considered within the agenda set out by the Flood and Water Management Act 2010. It is intended that these partnerships will continue to produce a coherent set of Local Flood Risk Management Strategies once the PFRA process is complete.

The Pitt Review made it clear that success in reducing the likelihood and impact of future floods will depend on greater coordination and cooperation between local partners. The Government believes that the aims of improved local flood risk management will be best met if new partnership arrangements are established to bring together county, unitary and district authorities, the Environment Agency, water companies, sewerage undertakers and other players. It is expected that these organisations are to work together to decide the best arrangements for delivery on an area by area basis, taking account of their current roles and capacities in order to secure effective and consistent management of local flood risk in their areas.

The new working groups and partnerships as listed in table 2.1 below have been established to promote and facilitate this coordination.

Group	Members	Frequency of Meeting
Strategic Flood Risk Management Group	Lead Local Flood Authorities: Lancashire County Council Blackpool Borough Council Blackburn with Darwen Borough Council Environment Agency United Utilities Single Representative for all 12 LCC Districts	Variable (minimum Quarterly)
Lancashire Flood Risk Management Group	Lead Local Flood Authorities: Lancashire County Council Blackpool Borough Council Blackburn with Darwen Borough Council Environment Agency United Utilities Representatives from each of the 12 District Councils	Variable (minimum Quarterly)
Making Space for Water Group (Meet at District/ Unitary Authority level)	Lead Local Flood Authority & District Council representatives covering: Land Drainage Highway Drainage Planning Authority Civil Contingencies Environment Agency United Utilities British Waterways	Quarterly

Table 2.1 –Flood Risk Management Groups in Lancashire

2.1.1 Strategic Flood Risk Management Group

The purpose of this group is to develop a professional partnership that provides strategic leadership for flood risk management across Lancashire.

Its role is to:

- Identify and agree strategic objectives in relation to the Flood Risk Regulations 2009 and the Flood and Water Management Act 2010
- Set strategic priorities for flood risk management work programmes across Lancashire and its neighbouring authorities.
- Ensure an effective multi-agency approach to flood risk management, which enables the safe and effective sharing of data, information and resources
- Review skills and develop options to build technical capacity, including advice to Elected Members on succession planning and future resource needs
- Act as link to local authority decision making processes and other key groups such as the North West Flood and Coastal Committee, and the Lancashire Resilience Forum

2.1.2 Lancashire Flood Risk Management Group

This group is guided by and reports to the Strategic Flood Risk Management Group and also serves as the professional, multi-agency partnership overseeing the operational delivery of flood risk management across Lancashire.

Its role is to:

- Interpret the requirements of flood risk legislation and guidance, and to develop work programmes based on the latest assessment and understanding of flood risk.
- Lead on the development of data sharing arrangements to enable the safe and effective pooling of information and use this as an evidence base to inform decision making and investment planning
- Identify opportunities to align partner work programmes, so that investment can be maximised to improve collective understanding and management of flood risk.
- Provide a holistic approach to flood risk management, by ensuring that interrelationships between different sources of flooding are understood and used to inform a comprehensive local flood risk management strategy.

The group also prepares reports for the Strategic Flood Risk Management Group which provide:

- assurances that liaison is working and that partners are fulfilling commitments;
- progress towards achieving strategic objectives
- updates on the Group's work programmes and key issues for review and endorsement
- recommendations for action
- requests for support on sticking points, support from other partners, or obtaining resources to invest in improvements.

2.1.3 Making Space for Water Groups

These groups, guided by the Lancashire Flood Risk Management Group, meet in each District and the two Unitary Authorities with the purpose of developing integrated multi-agency partnership working in water management at a district level, in order to:

- provide accurate assessments of the risk, nature and scale of local flooding
- identify and bring forward solutions to reduce the risk of flooding from local sources
- investigate and mitigate the effects of flooding incidents
- For these groups all references to flooding include river, sewage, drainage, groundwater and surface water run-off unless otherwise stated.

Their role is to:

- Seek and create opportunities for more effective integrated water management as directed by the Lancashire Flood Risk Management Group, and in line with the national and local flood risk management strategies prepared by the EA and LLFA's respectively.
- Ensure good communication, knowledge sharing, problem solving and operational working between organisations

- Create a common understanding of roles, responsibilities and limitations of organisations
- Review and respond appropriately to the UK Making Space for Water strategy
- Review and respond appropriately to the EU Water Framework Directive
- Review and respond appropriately to the development and implementation of strategic flood management plans (CFMP's, SMP's and SFRA's)

This group also prepares reports for the Lancashire Flood Risk Management Group or other relevant sources, which provide:

- assurances that liaison is working and that partners are fulfilling commitments;
- updates on the Groups' work programmes and key issues for review and endorsement
- recommendations for action
- requests for support on sticking points, support from other partners, or obtaining resources to invest in improvements.

Figure 2.1 below shows the hierarchy and relationships of the different groups with the strategic lead group at the centre, radiating outwards to the local delivery groups. Lancashire County Council is split into three areas - North, South and East. In this figure, the Making Space for Water Groups are colour coded to show which area they are in:

- North – Black; Fylde, Lancaster and Wyre
- South – Grey; Chorley, Preston, South Ribble and West Lancashire
- East – Pink; Burnley, Hyndburn, Pendle, Ribble Valley and Rossendale
- Unitary Authorities – Blue; Blackburn with Darwen and Blackpool

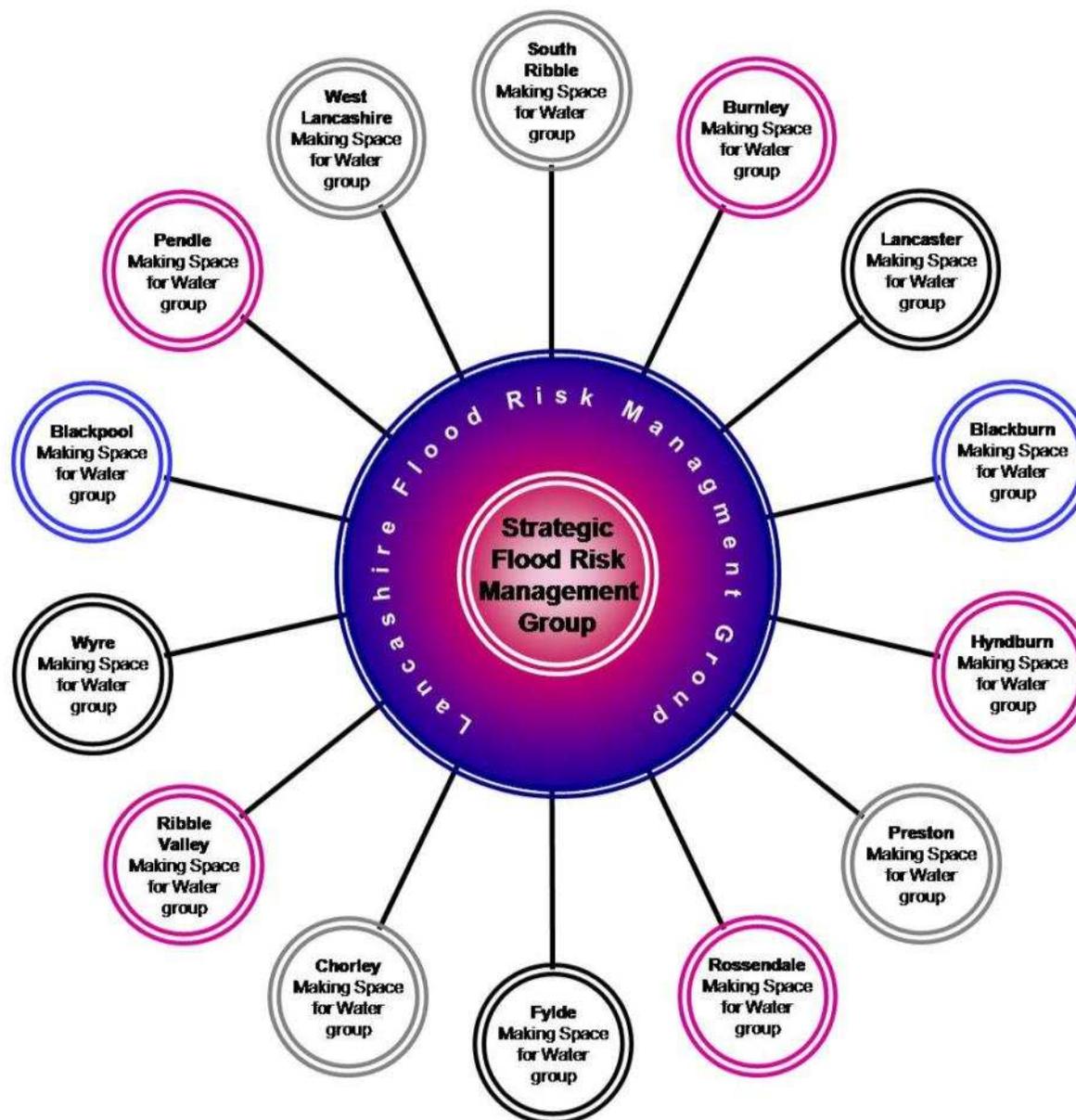


Figure 2.1 – Lancashire Local Flood Risk Groups

2.2 Communication with Partners and the Public

Communication with partners will be achieved through the comprehensive network of working groups and partnerships as described previously. In addition, specific meetings have been held with key partners to discuss their data and to determine the Locally Agreed Surface Water Information.

3 Methodology and data review

3.1 PFRA Process

The flow chart below gives an overview of the PFRA process and the key dates. Due to local government elections in Blackburn with Darwen and Blackpool councils, the Preliminary Assessment Report will not be formally signed-off by these LLFAs until after submission to the Environment Agency. Lancashire County Council does not have any elections at this time and will be able to sign the report off prior to submission.

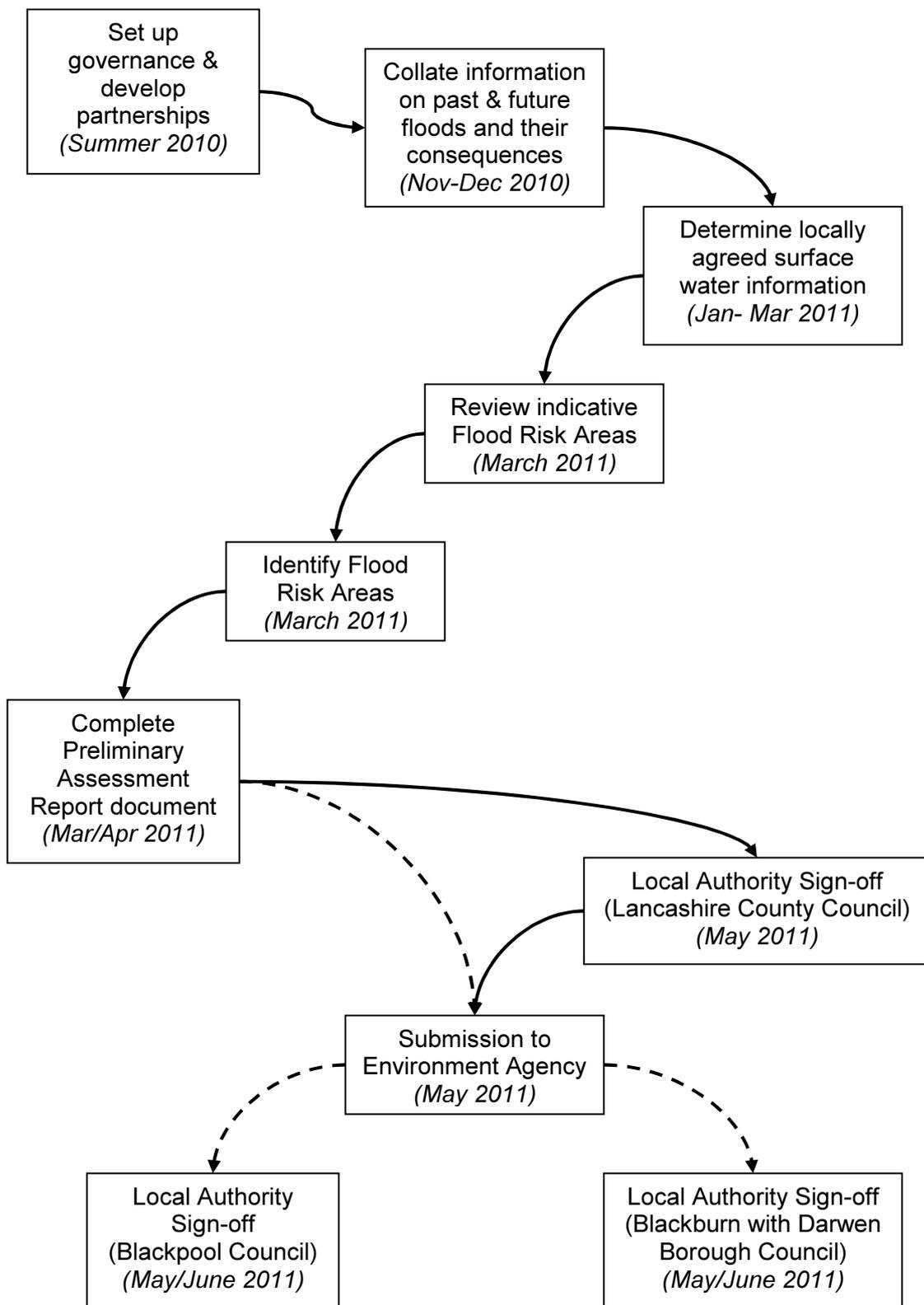


Figure 3.1 – PFRA Process

3.2 Data Collection

Historical flood data was collected from all District Councils within Lancashire as well as Blackpool and Blackburn with Darwen Borough Councils. For the most part, this was data which had previously been gathered together to inform the local authority's Strategic Flood Risk Assessment (SFRA) which forms part of the evidence base for the Local Development Framework Core Strategy undertaken by each Local Planning Authority (LPA). These in turn will shape development and land use in these areas over the next 20 years from its adoption. Progress on the Core Strategy varies across the LPAs within Lancashire. Table 3.1 below summarises this progress.

Local Planning Authority	Core Strategy Progress
Blackburn with Darwen	Adopted – January 2011
Blackpool	Preferred Option Consultation – Summer 2010
Burnley	Issues and Options consultation complete
Chorley Preston South Ribble	Submitted to Planning Inspectorate – March 2011
Fylde	Early community engagement prior to production of Issues and Objectives document later in 2011
Hyndburn	Pre-submission Consultation - December 2010
Lancaster	Adopted – July 2008
Pendle	Issues & Options Consultation – August 2008
Ribble Valley	Publication version: Pre-submission Consultation – expected autumn 2011
Rossendale	Submitted to Planning Inspectorate – December 2010
West Lancashire	Preferred Options Consultation – Summer 2011
Wyre	Issues and Options Consultation – Winter 2010/11

Table 3.1 – Core Strategy Progress by LPA

Some districts were able to provide a "flood diary" or other records of flooding which provide more details of the type of flooding, possible causes/sources and damage sustained. This data predominantly covered flooding from rivers (both Main River and Ordinary Watercourse) and Surface Water (overland flow and ponded water). In some cases, flooding from the underground drainage network (sewers and highway drains) was also included.

Data regarding historical sewer flooding and modelling results showing potential future sewer flooding were received from United Utilities.

British Waterways provided records of historical canal overtopping and breach events.

Environment Agency supplied the Flood Map for Surface Water, Areas Susceptible to Surface Water Flooding, Areas Susceptible to Groundwater Flooding, Historic Flood Map and Flood Map.

The table below summarises the data provided by each partner.

Partner	Data Provided
Blackpool Council	SFRA (Level 1) Central Lancashire & Blackpool Outline Water Cycle Study Additional Flooding info
Blackburn with Darwen Borough Council	SFRA (Level 1) Sources of flood data
Burnley Borough Council	SFRA section on historical flood risk
Chorley Borough Council	Central Lancashire SFRA (Level1) Additional Flooding info
Hyndburn Borough Council	SFRA (Level 1)
Pendle Borough Council	Sandbag records Hotspots for Emergency plan
Preston City Council	Central Lancashire SFRA (Level1) Regular problems 2010
Rossendale Borough Council	SFRA (Level 1) Flood diary 1964 onwards SFRA Appendix A Historical flood events - updated Identified areas of flood risk Asset maintenance documents Collated flood records Known flooded areas - emergency planning PFRA significant historical flooding Flood event record sheets
South Ribble Borough Council	Central Lancashire SFRA (Level1) Locations of highway flooding problems
West Lancashire Borough Council	Summary of flooding hotspots
Wyre Borough Council	SFRA (Level 1) Wyre Flood Forum Action List
Lancashire County Council	Weather Incident Records Highway Flooding Records Preston Surface Water Management Plan
British Waterways	Breach & Overtopping Incidents Asset data
United Utilities	UU Drainage Areas DG5 "At risk register" (Internal & External) Results from hydraulic model runs Metadata for the hydraulic models Extracts from sewerage incident database. Asset data

Table 3.2 – Summary of Data Provided

3.3 Data Availability and Limitations

Data availability varies across the districts, particularly in regard to the quantity and types of data available although all Districts were supportive in supplying what data they held.

There has historically been no consistent method of data collection for flood risk meaning that the actual information recorded about a flood event varies from place to place. EA data collection forms have been given out at the initial meeting of each Making Space for Water Group so a consistent data collection approach has existed since these groups began. Work is ongoing to produce a local form which will ensure that data required in the next round of PFRA will be collected in future.

Generally, flood extent information was not available. Flood events have therefore been mapped as point locations. Whilst this means that large scale flooding may be under-estimated, it does allow the identification of "hotspots" – areas which have suffered repeated flooding from one or more sources. From the descriptions of the flooding, it is unlikely that any of these events were sufficiently widespread for this to be an issue.

Data from British Waterways and United Utilities was readily available on request. This included asset and flood incident data from both as well as model results and drainage area information from United Utilities. In addition, advice and guidance was given on the best use of the data provided.

Environment Agency data was accessible through the Data Share website with advice and guidance provided by the local area Flood Risk Mapping & Data Management team.

3.4 Data Sharing and Future Access

Data collected and collated for the Preliminary Flood Risk Assessment will be held on and accessible via a data sharing website and Lancashire County Council's Map Zone. This data will not be accessible by the general public.

Mapped data will be publicly available where appropriate via Lancashire County Council's online mapping system, MARIO (Mapping and Related Information Online) in due course.

3.5 Quality Assurance

Data collected were reviewed and the quality and accuracy of acquired information and datasets was noted. This included noting where there were data gaps and whether or not the data held sufficient information for use in the PFRA. In some cases, data received included asset records or general land drainage complaints. A log was kept of all data received.

Where data gaps were evident, data was collated to fill those gaps, for example using addresses to locate the incident and identify its grid reference. Not all gaps were able to be filled, for example in some places the incident date is not available. In some cases, the flood source has been estimated

from the description of the incident. Where it is not certain that an incident actually occurred, the data has been omitted from the study. All data received has been retained and will be reviewed and included in the Local Flood Risk Management Strategy where appropriate.

3.6 Data Security, Licensing and Restrictions

The security of data is also a key consideration when it comes to collecting, collating and storing sensitive data. All data collected is stored on local servers which are password protected. Lancashire County Council must adhere to these data security measures to ensure that sensitive data is held in a secure manner.

The following restrictions apply to the different data received as part of the PFRA process.

3.6.1 British Waterways Data

Information provided by British Waterways is licensed for use in the PFRA only and is not to be passed on to third parties unless required by law. If a request is made for disclosure of the information under the Environmental Information Regulations 2004 then the recipient of the request should contact British Waterways for its views on relevant factors to take into consideration in deciding whether or not to release the information.

The information provided by British Waterways for the production of PFRAs may also be used to assist the production of the Local Flood Risk Management Strategies.

3.6.2 United Utilities Data

Information provided by United Utilities is licensed for use in the PFRA only and is not to be passed on to third parties unless required by law. If a request is made for disclosure of the information under the Environmental Information Regulations 2004 then the recipient of the request should contact United Utilities for its views on relevant factors to take into consideration in deciding whether or not to release the information.

The information provided by United Utilities for the production of PFRAs may also be used to assist the production of the Local Flood Risk Management Strategies.

4 Past flood risk

An initial data collection exercise revealed nearly 420 past flood incidents across the area from local authority records. In addition, interrogation of the United Utilities Sewer Incident Record System (SIRS) database uncovered a further 32 incidents of flooding due to the sewer system capacity being exceeded. The majority of these incidents related to flooding of minor roads or single properties.

Examination of this data shows clusters of flood risk in key locations around the area, most notably in Lancaster/Morecambe, Blackpool, Preston and

Bacup/Rawtenstall in Rossendale. It should be noted that whilst flood risk in these areas is known, there are other areas where flooding is known but records do not reflect this local knowledge. In some of these areas this is due to the number and quality of flood records kept. In others, it is that the flooding experienced in the past has been predominantly from Main River and the sea. In these areas, the number of flood records is dramatically reduced when these events are removed.

As part of the PFRA process, the requirement is to report only those past floods which had significant harmful consequences.

4.1 Significant Harmful Consequences

For looking at past flood events, the Environment Agency recommend using flood risk thresholds an order of magnitude less than those used for future flooding. The initial thresholds used for future flooding were:

- More than 200 people affected (i.e. 201 or more)
- More than one critical service affected (i.e. 2 or more)

These were applied to 1km squares before these were aggregated into clusters. The DEFRAWAG guidance of what constituted 'significant' flood risk were applied to these clusters.

Reducing the initial flood risk thresholds by an order of magnitude would mean setting the threshold for past flooding at:

- More than 20 people affected.
- One or more critical service affected

20 people affected equates to roughly eight or more residential properties.

In addition, flooding which happens on a regular basis has also been included because, whilst the impact of each individual flood may be less, the cumulative impact can become significant.

Any past flooding which has since been resolved has been excluded from this list if the likelihood of its re-occurrence is low.

Applying these criteria to the historic flood records collected leaves 25 flood incidents which would be regarded as having had significant harmful consequences.

4.2 Summary Table of Past Floods

The table below provides a summary of those past floods which are considered or known to have had locally significant harmful consequences.

4.3 Summary Map of Past Floods

Flood extent and conveyance route information was not available for any of the flood events for which data was collected. The map below shows the

location of each flood as a point along with the ID number corresponding to the above table.

4.4 Further Details of Past Floods

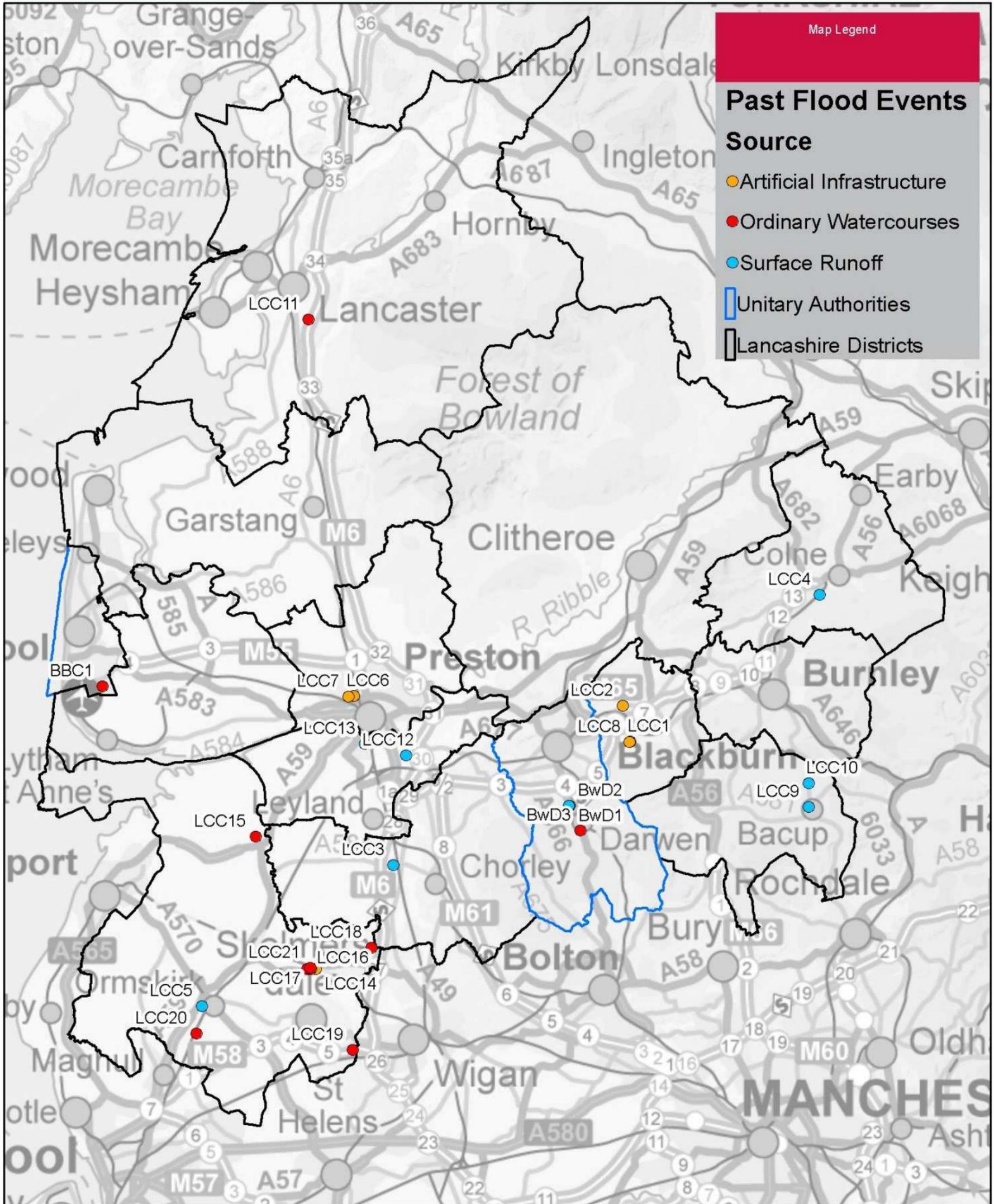
More details of these flood events are recorded (where available) on the spreadsheet in Annex 1. Guidance from the Environment Agency is that the "Significant harmful consequences" columns on the spreadsheet should only be marked "yes" if the consequences were significant at a national scale.

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Lancashire PFRA Past Flood Event Locations

Map created : May 2011

Map scale : 1:361,341



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Figure 4.1 – Summary Map of Past Floods

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Flood Risk Regulations 2009 – Preliminary Flood Risk Assessment
Lancashire Area Preliminary Appraisal Report

ID	Date	Location	Authority	Source	Watercourse
BwD1	13 August 2004	A666, Darwen, Blackburn with Darwen	Blackburn	Surface Runoff	
BwD2	13 August 2004	Blackburn Road, Earcroft, Blackburn with Darwen	Blackburn	Surface Runoff	
BwD3	12 September 2004	Area north of Epworth Street to Junction Street, Darwen	Blackburn	Ordinary Watercourses	Buryfold Brook
BBC1	16 January 2006	St Nicholas C of E Primary School, School Road, Blackpool	Blackpool	Ordinary Watercourses	Un-named
LCC1	2002	Thwaites Road, Oswaldtwistle	Hyndburn	Drainage	
LCC2	2002	Spring Street, Rishton	Hyndburn	Drainage	
LCC3	10 August 2003	Wigan Road, Euxton, Chorley	Chorley	Surface Water	
LCC4	20 August 2004	Gibfield Road, Colne, Pendle	Pendle	Surface Runoff	
LCC5	05 July 2006	St Annes Road, Ormskirk, West Lancashire	West Lancashire	Surface Runoff	
LCC6	October 2009	Seymour Road, Fulwood	Preston	Artificial Infrastructure	
LCC7	December 2009	Savick Brook, Cadley Bridge, Woodplumpton Road	Preston	Artificial Infrastructure	
LCC8	September 2002	Thwaites Road, Oswaldtwistle Rishton, Hyndburn	Hyndburn	Artificial Infrastructure	
LCC9	August 2004	Market Street, Bacup, Rossendale	Rossendale	Surface Runoff	
LCC10	August 2004	Plantation View, Bacup, Rossendale	Rossendale	Surface Runoff	
LCC11		Newlands Road, Lancaster	Lancaster	Ordinary Watercourses	Trib of Burrow Beck
LCC12		School Lane/Chorley Road, Bamber Bridge	South Ribble	Surface Runoff	
LCC13		Penwortham - Marshalls Brow/ Leyland Road	South Ribble	Surface Runoff	
LCC14		Alder Lane, Parbold	West Lancashire	Artificial Infrastructure	
LCC15		Carr Lane / Gorse Lane, Tarleton	West Lancashire	Ordinary Watercourses	Un-named
LCC16		Burnside, Parbold	West Lancashire	Ordinary Watercourses	Dock Brook
LCC17		Mill Leat, Parbold	West Lancashire	Ordinary Watercourses	Dock Brook
LCC18		Mossy Lea Road, Wrightington	West Lancashire	Ordinary Watercourses	Stars Brook
LCC19		Tontine Road, Upholland	West Lancashire	Ordinary Watercourses	Un-named Drain
LCC20		Town Green Lane, Aughton	West Lancashire	Ordinary Watercourses	Un-named
LCC21		Station Road, Parbold	West Lancashire	Ordinary Watercourses	Dock Brook

Table 4.1 – Summary of Locally Significant Historic Floods in Lancashire – split by LLFA

5 Future flood risk

The future flood risk in the study area is predominantly based on the two national datasets, Areas Susceptible to Surface Water Flooding and Flood Map for Surface Water. At a national level, these data were analysed by the Environment Agency to determine number of people at risk in discrete flood areas and these numbers were then issued to LLFAs. In Wyre and Fylde districts, the national modelling and data analysis did not predict flooding to sufficiently large areas to appear in the final data. This does not mean that no flooding is predicted here, only that because the communities affected are smaller, the number of people at risk in any particular area is lower. It should also be noted that the data used for this exercise is for surface water flooding, whilst in these areas there may be greater risk from tidal or Main River flooding.

In Preston, the results of the Preston Surface Water Management Plan were used. Blackpool BC are currently undertaking a Surface Water Management Plan for Blackpool but the results of the modelling for future floods are not currently available. The flood records were also used to help verify the future flood risk data and to help determine which data would be used to form the Locally Agreed Surface Water Information.

Examination of the Environment Agency's Areas Susceptible to Groundwater Flooding data shows that the bulk of the area has low susceptibility to flooding from groundwater. There are only three areas of note which are all shown as being most susceptible to groundwater flooding from superficial deposits:

1. on the Fylde peninsula: an area of predominantly agricultural land between Kirkham, Singleton and St Michael's on Wyre.
2. along the Fylde coast between Warton and Bispham.
3. to the south west of Preston, including Bamber Bridge and Leyland

These areas are shown on the map below, numbered as above.

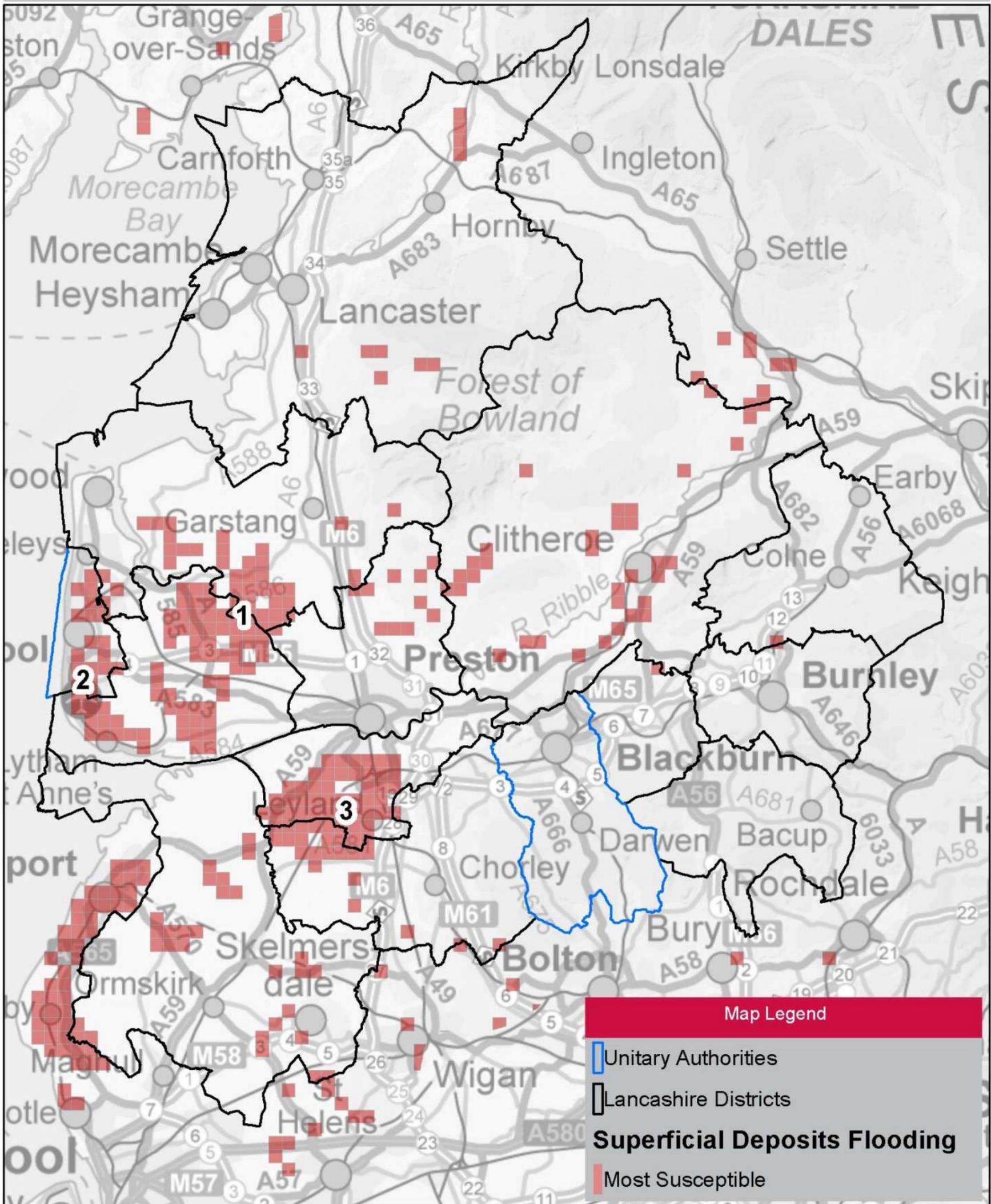
Whilst the risk of flooding from groundwater remains low, the influence of groundwater on surface water flooding in these areas is likely to mean that there is less likelihood of the soil being able to accept much rainfall before becoming saturated. It will also be less suitable to use soakaways in these areas.

Lancashire PFRA

Areas Most Susceptible to Groundwater Flooding

Map created : May 2011

Map scale : 1:361,341



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Figure 5.1 – Areas Susceptible to Groundwater Flooding

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5.1 Summary Table of Future Floods

The table below provides a summary of predicted flooding which is considered to have significant harmful consequences. It also shows the difference in predicted numbers of people at risk depending on which dataset is used. The highlighted cells show which data have been used in the final analysis. In Preston, the results of the Surface Water Management Plan were used as these are from a more detailed study than the national data used elsewhere.

Borough/District	Number of People at Risk		
	Flood Map for Surface Water	Areas Susceptible to Surface Water Flooding	Surface Water Management Plan
Blackburn with Darwen	10,778	4,001	-
Blackpool	2,436	18,311	-
Lancaster	2,541	9,292	-
Ribble Valley	2,567	2,031	-
Burnley	7,795	4,608	-
Pendle		-	
Hyndburn	2,544	1,484	-
Rossendale	7,795	6,997	-
Chorley	1,395	-	-
South Ribble	-	1,647*	-
Preston	2,661	10,219*	3,738
West Lancashire	2,782	3,810	-

Table 5.1 – Summary of predicted flood risk in Lancashire – split by LLFA

*Areas Susceptible to Surface Water Flooding data for Preston includes parts of South Ribble.

5.2 Locally Agreed Surface Water Information

Following a review of the available data, it was agreed that a combination of Flood Map for Surface Water and Areas Susceptible to Surface Water data should be used. In addition, outputs from the Preston Surface Water Management Plan have been used to enhance the data in the relevant locations.

Environment Agency guidance on using Surface Water flood risk information^[1] gives the following advice when deciding which dataset is more representative in any area.

Large increases in property count (Flood Map for Surface Water count a large increase over Areas Susceptible count) are generally more likely to occur:

- *in steep areas like Torbay where the steepness means the water will flow faster and the inclusion of buildings will channel this faster flowing water*

further along more streets (than a model without buildings would) therefore affecting more properties;

- *in areas where the Flood Map for Surface Water Digital Terrain Model shows the topography as being steeper than the Areas Susceptible to Surface Water Flooding DTM did.*

Large decreases in property count (Flood Map for Surface Water count a large decrease below Areas Susceptible count) are generally more likely to occur:

- *in flat areas like Hull where the water will move slower and inclusion of buildings will block where the slow moving / standing water can go so fewer properties are affected;*
- *in flat areas where a longer storm durations are more likely to cause flooding than shorter durations;*
- *in flat areas as flooding is more sensitive to sewer capacity;*
- *in areas where the Flood Map for Surface Water Digital Terrain Model shows the topography as being flatter than the Areas Susceptible to Surface Water Flooding DTM did;*
- *in rural areas because of the larger allowance for infiltration.*

In assessing which dataset to use in any of the 12 Lancashire districts or the two Unitary Authorities, the indicative areas of flood risk have been compared to available historic flooding data and local experience to ascertain which dataset is more appropriate.

The Areas Susceptible to Surface Water Flooding data better represents the flood risk in the more rural districts with flat topography and a history of poor drainage whereas the Flood Map for Surface Water gives a better representation of flooding in the steeper catchments and more urban areas to the east of the study area.

The M6 motorway essentially marks the change point from the steeper upland catchments in the east to the flatter lowland catchments in the west.

In some of the flatter, lower lying areas the drainage capacity is limited. Wyre, Fylde, West Lancashire rely on pumped drainage systems to reduce the amount of water logging in fields, especially due to the tidal influence on local watercourses.

In the upland areas, Lancashire's industrial heritage has left a legacy of mill towns in the bottom of steep valleys. These towns are generally well drained by the urban drainage network and flooding is much more localised due to the steep topography.

The dataset used in each districts is shown in the following table:

Areas Susceptible to Surface Water Flooding	Flood Map for Surface Water	Surface Water Management Plan
Blackpool	Blackburn with Darwen	Preston
Fylde	Burnley	
Lancaster	Chorley	
South Ribble	Hyndburn	
West Lancashire	Pendle	
Wyre	Ribble Valley	
	Rossendale	

Table 5.2 – Datasets used in Locally Agreed Surface Water Information

The summary map below shows the extent of the locally agreed surface water information.

5.3 Detailed Records of Future Floods

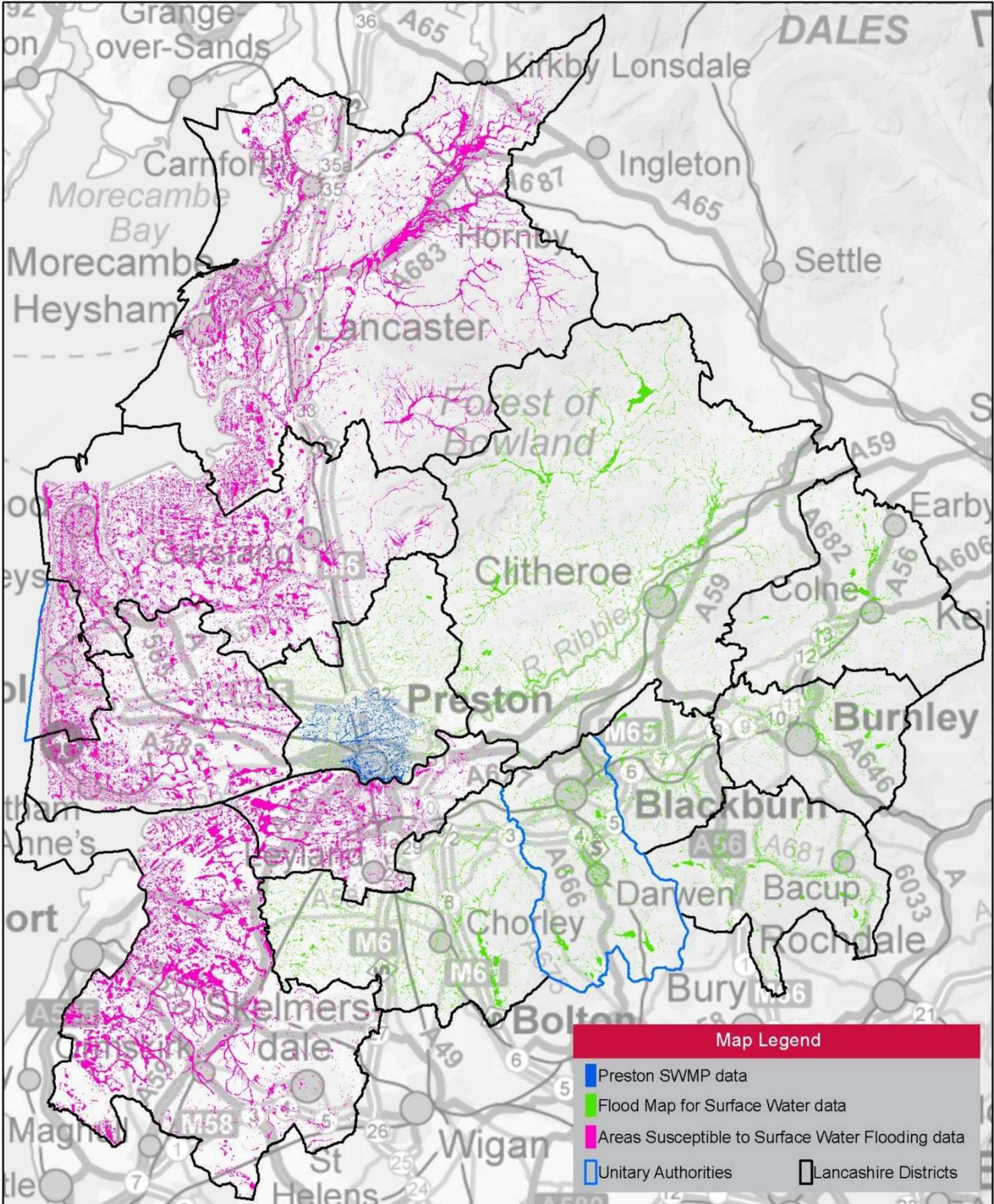
More details of possible future flood events and their consequences are recorded on the spreadsheet in Annex 2

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Lancashire PFRA Locally Agreed Surface Water Information

Map created : May 2011

Map scale : 1:339,347



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Figure 5.2 – Locally Agreed Surface Water Information

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5.4 The impacts of climate change

5.4.1 The Evidence

There is clear scientific evidence that global climate change is happening now. It cannot be ignored.

Over the past century around the UK we have seen sea level rise and more of our winter rain falling in intense wet spells. Seasonal rainfall is highly variable. It seems to have decreased in summer and increased in winter, although winter amounts changed little in the last 50 years. Some of the changes might reflect natural variation, however the broad trends are in line with projections from climate models.

Greenhouse gas (GHG) levels in the atmosphere are likely to cause higher winter rainfall in future. Past GHG emissions mean some climate change is inevitable in the next 20-30 years. Lower emissions could reduce the amount of climate change further into the future, but changes are still projected at least as far ahead as the 2080s.

We have enough confidence in large scale climate models to say that we must plan for change. There is more uncertainty at a local scale but model results can still help us plan to adapt. For example we understand rain storms may become more intense, even if we can't be sure about exactly where or when. By the 2080s, the latest UK climate projections (UKCP09) are that there could be around three times as many days in winter with heavy rainfall (defined as more than 25mm in a day). It is plausible that the amount of rain in extreme storms (with a 20% (1 in 5) annual chance, or rarer) could increase locally by 40%.

5.4.2 Key Projections for North West River Basin District

If emissions follow a medium future scenario, UKCP09 projected changes by the 2050s relative to the recent past are:

4. Winter precipitation increases of around 14% (very likely to be between 4 and 28%)
5. Precipitation on the wettest day in winter up by around 11% (very unlikely to be more than 25%)
6. Relative sea level at Morecambe very likely to be up between 6 and 36cm from 1990 levels (not including extra potential rises from polar ice sheet loss)
7. Peak river flows in a typical catchment likely to increase between 11 and 18%

Increases in rain are projected to be greater near the coast than inland.

5.4.3 Implications for Flood Risk

Climate changes can affect local flood risk in several ways. Impacts will depend on local conditions and vulnerability.

Wetter winters and more of this rain falling in wet spells may increase river flooding especially in steep, rapidly responding catchments. More intense rainfall causes more surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so we need to be prepared for the unexpected.

Drainage systems in the River Basin District have been modified to manage water levels and could help in adapting locally to some impacts of future climate on flooding, but may also need to be managed differently. Rising sea or river levels may also increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses.

Where appropriate, we need local studies to understand climate impacts in detail, including effects from other factors like land use. Sustainable development and drainage will help us adapt to climate change and manage the risk of damaging floods in future.

5.5 Long term developments

It is possible that long term developments might affect the occurrence and significance of flooding. However current planning policy aims to prevent new development from increasing flood risk.

In England, Planning Policy Statement 25 (PPS25) on development and flood risk aims to "ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall."

Adherence to Government policy ensures that new development does not increase local flood risk. However, in exceptional circumstances the Local Planning Authority may accept that flood risk can be increased contrary to Government policy, usually because of the wider benefits of a new or proposed major development. Any exceptions would not be expected to increase risk to levels which are "significant" (in terms of the Government's criteria), but should be recorded here so that they can be reviewed in the future.

6 Identification of Flood Risk Areas

No Flood Risk Areas meeting the thresholds of significance set by the Government for this Preliminary Flood Risk Assessment have been identified in the study area. Based on information supplied by the Environment Agency (see also annex 3), the largest flood risk 'cluster' is Blackpool with approximately 18,300 people estimated to be at risk from surface water flooding during a 0.5% probability (1 in 200 chance) rainfall event. This falls some way below the 'Significant' threshold of 30,000 people at risk.

To ensure that a robust assessment has been applied, the possibility of merging clusters to form larger flood risk areas was examined. As all the clusters represented in the study area are discrete, separate areas this was not feasible. In any event, the numbers of people at risk in each cluster were such that no meaningful flood risk area could be created that would reach the threshold of 30,000.

The records of past floods, whilst showing a handful of previous floods in areas outside the flood risk clusters, did not identify any new areas or provide enough evidence to push an existing flood risk cluster over the 'significant' threshold.

7 Next steps

Because there are no Significant Flood Risk Areas in Lancashire, there are no further requirements for work to be done as part of this PFRA.

The PFRA will be reviewed in line with the requirements of the Flood Risk Regulations in six years time. In particular, data which was optional for this first cycle of PFRAs will be mandatory in future. The outputs from the Blackpool Surface Water Management Plan and any other studies completed will be included.

A local template of data to be collected during a flood investigation is being produced for use by the LLFAs, building on the current Environment Agency form used by Making Space for Water groups. This will ensure that all required data will be available for any new floods.

The data on flood risk collected as part of the Preliminary Flood Risk Assessment will be used to inform the Local Flood Risk Management Strategies required under the Flood & Water Management Act 2010. The outputs from any studies undertaken as part of the local strategy will be available for the next review of the PFRA.

References

- [1] Environment Agency. Using Surface Water Flood Risk Information: Guidance for LRF, RRT, LPA and LLFA. V1 November 2010

Annexes

Annex 1 - Records of past floods and their significant consequences
(Preliminary Assessment Report Spreadsheet)

Annex 2 - Records of future floods and their consequences
(Preliminary Assessment Report Spreadsheet)

Annex 3 - Records of Flood Risk Areas and their rationale
(Preliminary Assessment Report Spreadsheet)

Annex 4 - Review checklist

Annex 1

Records of past floods and their significant consequences

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Flood Risk Regulations 2009 – Preliminary Flood Risk Assessment
Lancashire Area Preliminary Appraisal Report

Annex 2

Records of future floods and their consequences

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Flood Risk Regulations 2009 – Preliminary Flood Risk Assessment
Lancashire Area Preliminary Appraisal Report

Annex 3

Records of Flood Risk Areas and their rationale

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Flood Risk Regulations 2009 – Preliminary Flood Risk Assessment
Lancashire Area Preliminary Appraisal Report

Annex 4

Review checklist

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