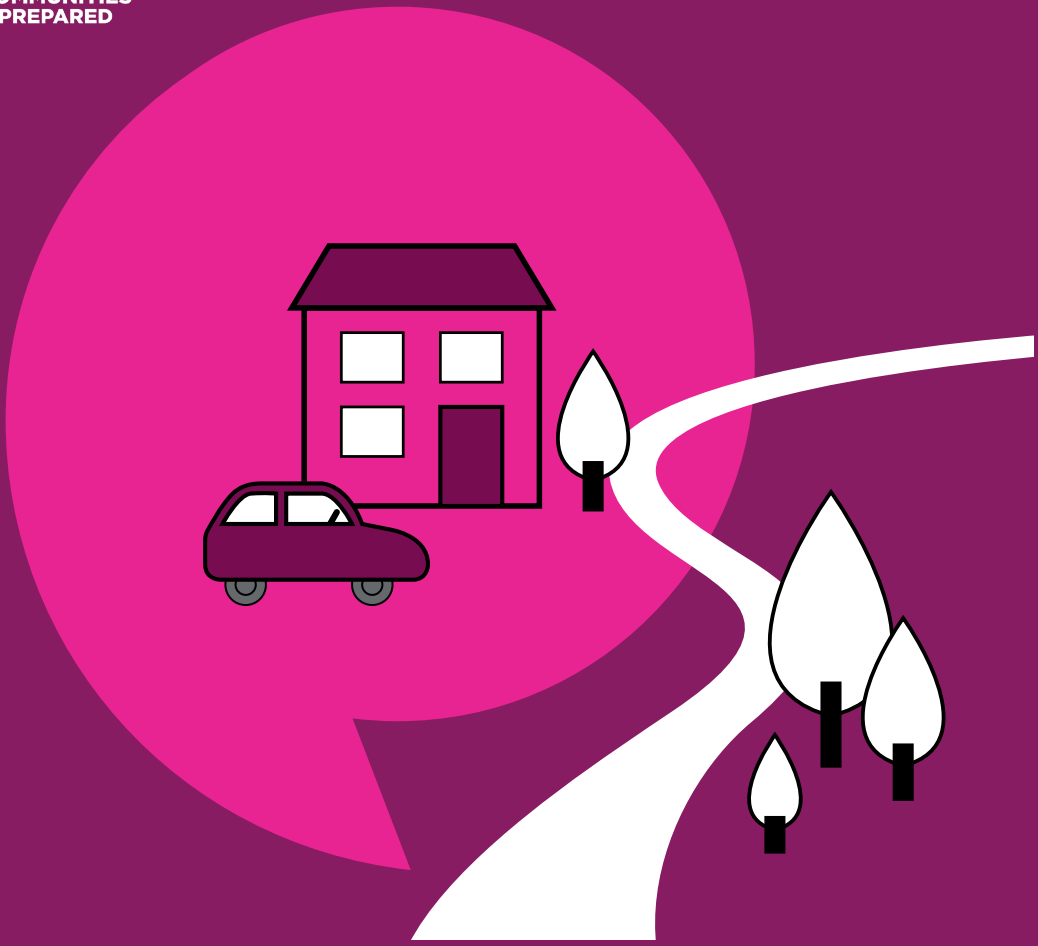
COMMUNITIES PREPARED

Guides for Community Emergency Volunteers



Flood Volunteer Training Part 1

Understanding flooding and your role as a Community Emergency Volunteer

Rev A - November 2019

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Created for Communities Prepared based on material and format produced for Cornwall Community Flood Forum by Charles Richards.

Introduction

The purpose of this guide is to provide an introduction to the processes and terminology associated with flooding.

You may already be familiar with some of the issues covered. However, whether you are a community volunteer or live or work within an area at risk of flooding you may find it useful to understand some of the wider terms and processes.

Flooding is a natural process which shapes our landforms and river valleys.

Flooding is beneficial for:

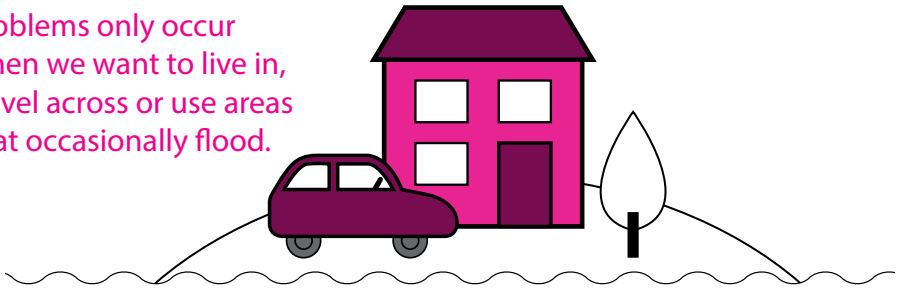
- Maintaining ecosystems, such as wetlands and salt marshes.

Flooding becomes a problem when:

- It occurs in areas we want to live in, travel across or we use areas that flood.

Some of our activities, such as making changes in agricultural or urban land use, modifying stream and river channels or through blocked culverts and sewers can exacerbate flooding and the impact of it.

Problems only occur when we want to live in, travel across or use areas that occasionally flood.



Aims and objectives

By the end of the module you will be able to understand:

- How climate change is affecting flooding
- How the hydrological cycle works
- The most common types of flooding and the factors that can influence flooding
- How flood warnings and flood risk are communicated by the Met Office and Environment Agency
- Who is responsible for managing different sorts of flood risk
- What riparian ownership is
- What roles you could undertake before, during and after a flood

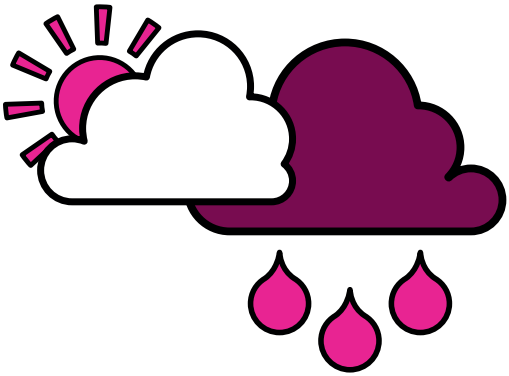
Climate change

Climate change is likely to lead to increasingly uncertain weather patterns. Unusual and extreme weather events are likely to become more commonplace in the future with the rarest events becoming more extreme than those in the past.

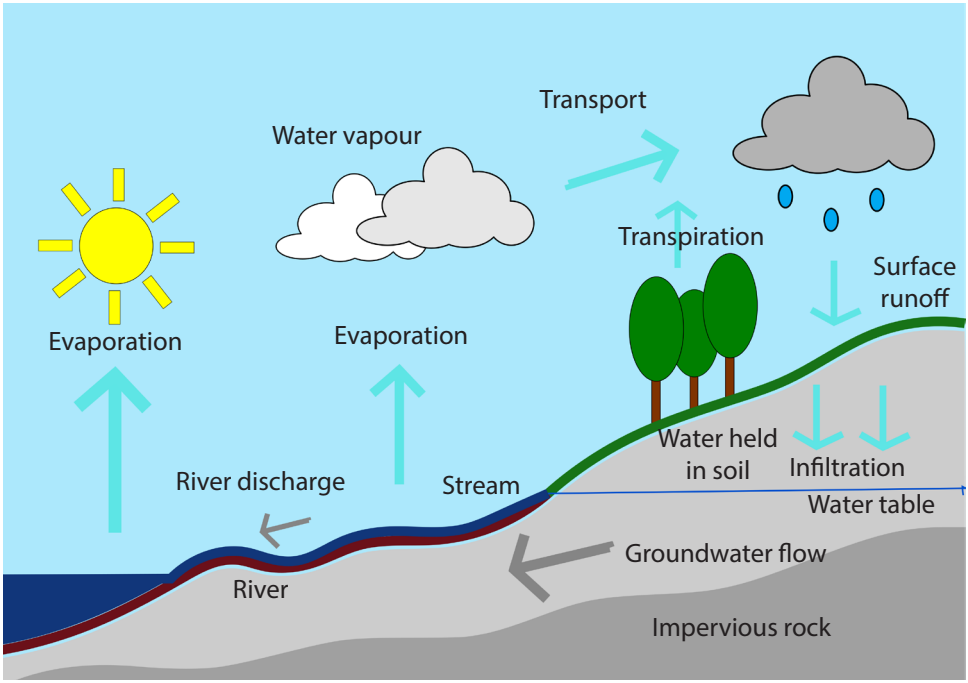
It is impossible to be precise about how much or how quickly the situation may change but both longer wet periods and more intense rainfalls should be expected.

For more information on the causes and effects of climate change visit the UK Government's independent advisory panel's website: *www.theccc.org.uk*.

As a community emergency volunteer you have an important role to play in helping your community adapt to and mitigate the worst effects of climate change.



The hydrological cycle



Flooding other than coastal flooding is linked to the hydrological cycle and how water circulates from the sea to the air and then falls either as rain or snow onto the land.

As climate affects our weather, creating more extreme weather events or changes to seasonal weather patterns, so flooding events, whether fluvial, surface or groundwater, are becoming more intense in reaction to this.

An introduction to river catchments

The journey water takes as it moves from land to sky and back again is known as the water cycle. Depending upon the ground conditions, rainwater will take different routes.

Runoff

Some of the water will flow over the ground surface – this process is called runoff. On rural land this water tends to run into small channels or furrows in fields, then into ditches, streams, rivers, larger rivers and finally into an estuary and the sea. In urban areas the rain may be intercepted by roofs, roads or paved areas. From here it may flow to a surface water sewer that takes it to a stream or river or it may enter a foul sewer and flow to a sewage treatment works. If rainfall is heavy then there may be overflow onto land or into rivers, spilling untreated sewage in the process.

Infiltration

The process whereby rainfall soaks into the ground is called infiltration. From here, some of it will be intercepted by plant roots and transpired back into the atmosphere through their leaves, along with evaporation from puddles – a process known as evapotranspiration.

Baseflow

The remaining water that soaks into the ground will percolate downwards until it reaches the water table. It then recharges the groundwater and flows slowly through the ground to nearby streams and rivers and seeps into these rivers, supplementing their flow – this process is known as baseflow. Baseflow is the reason why rivers flow even when it is not raining.

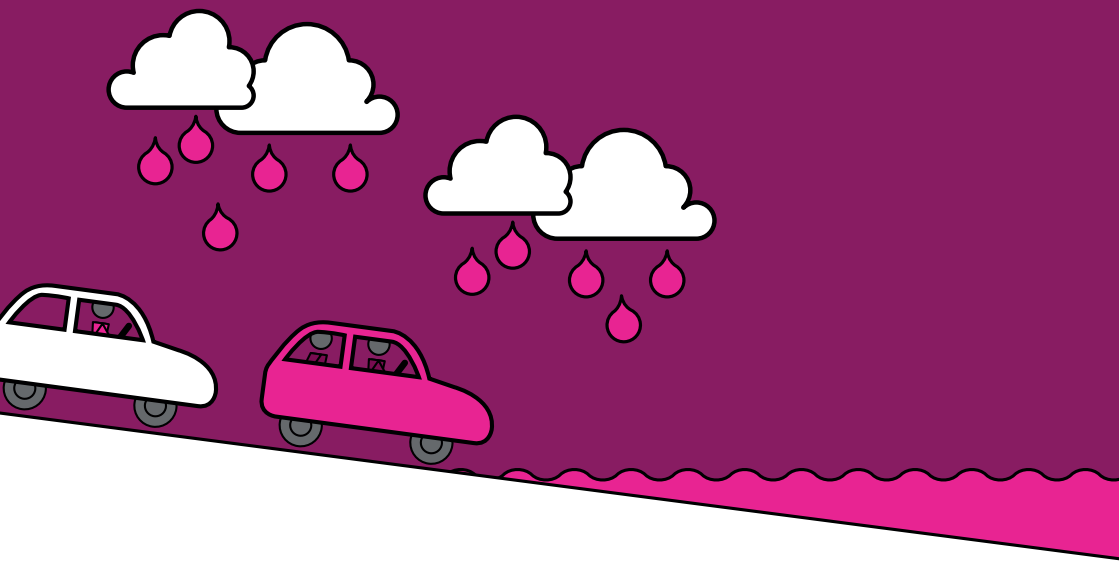
Catchments

The area of land that contributes to the flow in a watercourse is known as its catchment. A catchment boundary is usually a ridge of high land, a watershed, from which the water can flow either way, into one catchment or another. What happens in one catchment will only affect flows within that catchment.

Be alert to ground conditions: baked dry ground can create runoff just as much as saturated ground can. Rivers in large catchments, with contributing tributaries, will react relatively slowly to rainfall events.

Sources of flooding

Floods can happen anywhere at any time. This can be due to burst water mains, blocked or overwhelmed drains, rising groundwater levels or hillside runoff from sudden rain, as well as flooding from rivers and the sea.



The most common sources of flooding are:

Surface water flooding

This is a result of very intense rainfall that accumulates on the ground before it can flow anywhere. It occurs as rainwater travels across the surface of the ground, or roads, on its way to a drainage system.

A short, sharp burst of rainfall can lead to a rapid build up of standing water, often in a matter of minutes. This can flow into properties or create a hazard by collecting in the low points of roads.

Surface water flooding can occur almost anywhere within both rural and urban environments, particularly if drainage systems become blocked.

River flooding

River, or fluvial, flooding occurs when a watercourse cannot cope with the volume of water draining into it from the surrounding land. River banks are then overtopped and the surrounding land flooded.

This often may occur where there are constrictions in the river flow caused by structures such as bridges. Most rivers will naturally overflow onto their flood plain once every year or so unless walls or raised river banks are constructed to contain them.

Reservoir flooding

Some reservoirs hold large volumes of water above ground level, contained by walls, or dams. Although the safety record for reservoirs is excellent, it is still possible that a dam could fail. This would result in a large volume of water being released very quickly.

Coastal and tidal flooding

Flooding from the sea may occur on the coast, or in estuaries and along tidal rivers. The tide has an influence over the likelihood of this type of flooding. Tides follow regular and predictable cycles, which are dominated by the gravitational influence of the sun and the moon. When tides are high, it requires less extreme weather to cause flooding than when tides are low.

Poor weather (strong winds, waves and low pressure) can raise the water level above predicted tide levels. Similarly, good weather (high pressure, with no wind and waves) can lower the water level below predicted tide levels. Wind generated waves can transfer water over the top of defences, causing flooding behind defences. Large waves have more energy to erode beaches and hard flood defences, which increases the risk of flooding.

Sewer flooding

Sewer flooding occurs when sewers are overwhelmed by heavy rainfall or when they become blocked. The likelihood of flooding depends on the capacity of the local sewerage system. Land and property can be flooded with water contaminated with raw sewage as a result. Rivers and beaches often become polluted by sewer overflows.

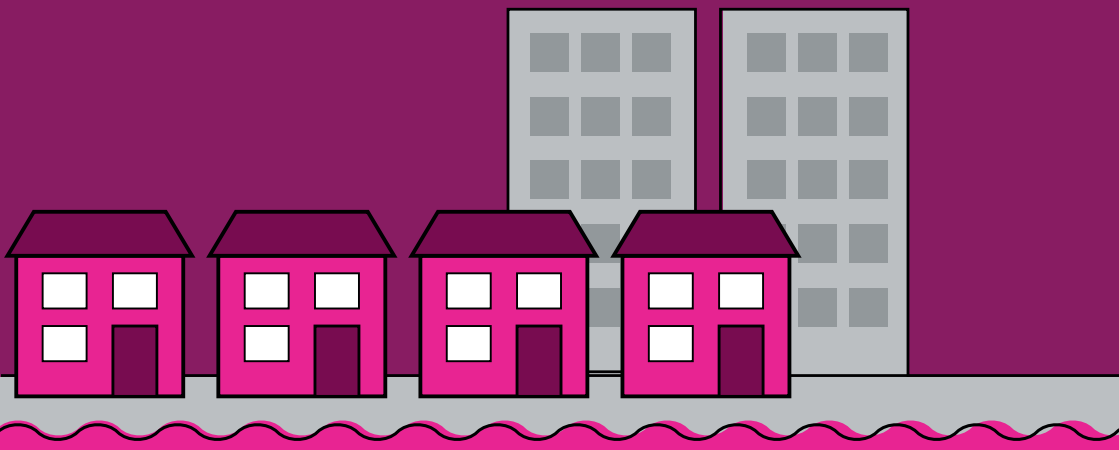
Groundwater flooding

Groundwater flooding occurs when the water table in the ground rises above ground surface levels, breaking out as springs or seeping into cellars. It is most likely to occur in areas underlain by permeable rocks, called aquifers. These can be extensive, regional aquifers, such as chalk or sandstone, or may be more local sand or river gravels in valley bottoms underlain by less permeable rocks.

Factors that can influence flooding

Whilst flooding is a natural process, there are both natural and man-made influences that can affect the likelihood of it happening.

- If the ground is relatively permeable and free-draining then more rain is likely to soak into the ground through infiltration and enter rivers slowly through baseflow.
- If the ground is naturally impermeable then the runoff from a rainstorm event will be greater, resulting in larger and faster peaks in river flows.
- If the ground is already saturated due to prolonged rainfall leading up to a rainstorm event then the water will not be able to infiltrate the ground, leading to a rapid runoff that may overwhelm the streams and rivers, which in turn results in a greater likelihood of river or surface water flooding.



Factors that may inhibit the capacity of a catchment to absorb water into the ground include:

- Waterlogged or saturated ground due to previous wet conditions.
- Dry and hard-baked ground may also lead to increased runoff if rainfall occurs after a particularly dry spell.
- Frozen ground means that snowmelt may result in rapid runoff.
- Paving over of gardens or uncontrolled development involving hard surfaces.
- Alterations to streams and rivers might impact on flood risk, by constricting the flow or channel capacity.

Changes in agricultural practices may also increase the runoff from fields through:

- Removal of peat bogs.
- Drainage of marshy land.
- Changes in crop type.
- Ploughing across the contours on steep slopes.
- Trampling and compaction by animals or farm machinery.
- Use of polyethylene and polytunnels.
- Widening farm gates to allow access for larger machinery.
- Removal of hedgerows to create larger fields.

Blockage of the free flow of water is a major factor that can increase surface water and river flooding:

- Gullies and other inlets to drainage systems may become quickly blocked with leaves, especially in the autumn.
- Debris carried with flood water can become lodged in culverts or under bridges.
- Trash screens, designed to stop debris from clogging channels, need to be kept clear to avoid becoming obstructions themselves.
- Erosion of river banks can lead to slumping of material onto the bed.
- Sediments can clog channels due to the release of materials from upstream.

Note: It is very dangerous to clear gullies or blockages. Always contact the relevant authority. Do not attempt to do this yourself.

Rivers that are close to the sea may suffer from tide locking. When tides are high, downstream conditions restrict the outflow leading to a backing up of water levels along the river length. This effect may extend quite a long way inland, depending upon river gradients. In coastal areas river flooding occurs more often at times that coincide with high tides.

Communicating flood risk and flood risk mapping

The risk of flood is now referred to as:

- High
- Medium
- Low
- Very Low

If you want to find out more information about your flood risk , go to www.gov.uk and search for "flood".

Flood risk is not just the likelihood of flooding, but the possible damage a flood could do as well. When we talk about flood risk we mean:

- The impact or consequences that will result if the flood occurs.

We need to know both the chance of a flood occurring and the severity of any impact (which may change depending on how extreme the flood is). Then we can describe what the risk is for a particular area.

The Environment Agency publishes maps (visit www.gov.uk and search for "flood risk maps") showing flood risk to areas of land from rivers and the sea, reservoirs and surface water.

It is important to remember that the chance of a flood occurring is there at all times – this year, next year and future years.

It is important that you check the Environment Agency flood risk maps to see if your community is in an area at risk of flooding from rivers, the sea, reservoirs, ground and surface water.

Information within this guide has been reproduced with kind permission from the Environment Agency.

The Environment Agency publishes maps (visit www. gov.uk and search for "flood risk maps") showing flood risk to areas of land from rivers, the sea, reservoirs and surface water.

Weather warnings and flood warnings

Weather warnings used by the Met Office

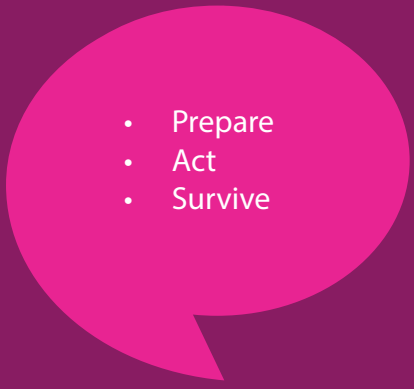
The Met Office provides meteorological data and information to the public.

The Met Office National Severe Weather Warning Service (NSWWS) provides the public with free advice, alerts and warnings for most types of severe weather events. Alerts are issued 2 to 5 days ahead of time, whilst warnings are issued up to 24 hours ahead of time.

Flood warnings issued by the Environment Agency

The Environment Agency provides a warning service for flooding from rivers and the sea. They do not cover other sources of flooding such as ground and surface water.

Flood Warnings Service is the free service provided by the Environment Agency that provides flood warnings by phone, text or email. Visit www.gov.uk and search for "sign up to flood warnings".



Prepare - Flood alerts

Flooding is possible. Be prepared. Flood alerts are issued from two hours and up to two days ahead. Flood alerts relate only to flooding from rivers or from the sea. When a flood alert is issued, it will mean that flooding is possible and for communities to be prepared. The impacts at this stage are normally limited to the flooding of low lying land, roads and can also include spray or wave overtopping on the coast. Flood alerts are issued either based on rainfall or coastal forecasts, or from key levels being met at one of the Environment Agency river level gauges.

Act - Flood warnings

Flooding is expected. Immediate action required. Flood warnings are issued half an hour to one day ahead. Flood warnings also relate only to flooding from rivers or the sea. When a flood warning is issued, it will mean that flooding of property is expected and communities should take immediate action. Typical impacts on the ground include the flooding of homes and businesses, major infrastructure, caravan and campsites, railways and significant waves and spray on the coast.

Survive - Severe flood warnings

Severe flooding. Danger to life. Severe flood warnings are rarely issued, but when they are it indicates that there is a threat to life. These types of warnings are issued after dialogue with professional partners including the emergency services. Impacts on the ground include deep fast flowing water, potential or observed collapsed buildings and communities fully isolated by flood water.

River and sea levels in England is a free service. It can be accessed anytime at www.flood-warning-information.service.gov.uk/river-and-sea-levels. The level displayed will only show the information when the level gauge was last interrogated.

Managing flood risk: who is responsible?

Defra

Defra has overall national responsibility for policy on flood and coastal erosion risk management, and provides funding for flood risk management authorities through grants to the Environment Agency and local authorities.

The Environment Agency

The Environment Agency is responsible for taking a strategic overview of the management of all sources of flooding and coastal erosion. This includes, for example, setting the direction for managing flood risks through strategic plans; providing evidence and advice to inform Government policy and support others; working collaboratively to support the development of risk management skills and capacity; and providing a framework to support local delivery.

The Environment Agency also has operational responsibility for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea, as well as being a coastal erosion risk management authority.

As part of its strategic overview role, the Environment Agency has published a National Flood and Coastal Erosion Risk Management Strategy for England. This strategy provides a lot more information designed to ensure that the roles of all those involved in managing risk are clearly defined and understood.

Lead local flood authorities

In England this means: (a) the unitary authority for the area, or (b) if there is no unitary authority, the county council for the area. They are responsible for developing, maintaining and applying a strategy for local flood risk management in their areas and for maintaining a register of flood risk assets. They also hold lead responsibility for managing the risk of flooding from surface water, groundwater and ordinary watercourses.

District councils & unitary authorities

They have powers to manage flood risk from ordinary watercourses and in coastal areas they also act as coastal erosion risk management authorities.

Internal drainage boards

Internal drainage boards (IDBs) have been established in areas of special drainage known as drainage districts. Their functions include the supervision of land drainage, water level management, flood risk management works and regulation on ordinary watercourses.

Highway authorities

Highway authorities are responsible for providing and managing highway drainage, and roadside ditches, and ensuring that road projects do not increase flood risk.

Water and sewerage companies

Water and sewerage companies are responsible for managing the risks of flooding from water and foul or combined sewer systems providing drainage from buildings and yards.

Main rivers and ordinary watercourses

Main rivers are usually larger streams and rivers, but some of them are smaller watercourses of local significance. An ordinary watercourse is every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows, but which does not form part of a main river.

Private land owners and riparian law

Anyone owning land or property alongside a river or stream or other watercourse including a culvert, in legal terms is likely to be a riparian owner. A riparian owner has certain rights and responsibilities, particularly regarding maintenance, which could affect flood risk. Some of these rights and responsibilities which are particularly relevant to flood risk are summarised below.

As the riparian owner your rights include:

- To presume you own the land up to the centre of the watercourse unless your deeds indicate otherwise.
- The right for water to flow onto or under your land in its natural quantity and quality.
- The right to protect your land from flooding and erosion with permission from the relevant authority.

As the riparian owner your responsibilities include:

- To accept flood flows through your land, even if these are caused by inadequate capacity downstream.
- To pass on flow without obstruction, pollution or diversion.
- For maintaining the bed and banks of the watercourse.

Note: This is not an exhaustive list of rights and responsibilities

For more information...

Visit www.gov.uk and search for "owning a watercourse"

Your role before a flood

Understand flood risk within your local area

The risk of flooding that your community faces changes over time.

- Keep aware of how changes within your local environment may impact on the risk of flooding. You can play an important role by acting as the "eyes and ears" of the local authorities.
- Report any debris in watercourses or culverts to your group coordinator and/or the local flood risk authorities in accordance with procedures in your community emergency plan.
- Check your community's flood risk online at *www.flood-warning-information.service.gov.uk/long-term-flood-risk/map*

Flood Warnings

A flood alert can be an important way to trigger your community emergency plan and start your activities as a community volunteer. By registering in advance you can take steps to be better prepared ahead of an incident.

Go to: *www.gov.uk* and search for **"sign up for flood warnings".**

If you are a group coordinator and need to be registered with the flood warning service but do not live in an area affected by flooding then speak to your local EA flood resilience engagement advisor who can get you signed up to the local flood alert.

Identify properties at risk of flooding

Some properties are at greater risk of flooding than others. Knowing which properties are more likely to flood and possible flow routes of flood water can help you to become better prepared for an emergency.

Some properties, such as industrial units, could contain hazards that might pose a fire, explosive or contamination risk if flooded. To help, take a look at a flood risk map of your local area. Consider which properties have flooded in the past. Also, look for properties in low lying areas or close to watercourses.

Identify vulnerable individuals

Build up an understanding of who lives in your area and especially anyone who may require priority attention during a flood, such as the elderly or less mobile.

Due to the new data protection legislation we would recommend that instead of trying to create your own list of vulnerable people you instead highlight the local Priority Service Register of your local utility company and get vulnerable people to sign up there instead. As an LRF Cat 2 responder they can share this information with the Environment Agency during a flood emergency.

Your strength as a community volunteer is your detailed knowledge of your local area and the people living within it

Support community flood plan training and activities

Do take part in any training for community volunteers. This will provide you with information to help you to carry out your role in a safe and responsible way.

Your community emergency plan forms the basis of your community's response to flood risk (If your community does not have a plan we can help you prepare one).

- Familiarise yourself with the contents of the plan and how to respond during a flood

- Always follow the guidance and advice set out in the plan, as well as any training you have received, to ensure you do not place yourself or others at unnecessary risk

- Highlight to your group coordinator any procedures within your community emergency plan that contradict activities in this handbook

- Test your community emergency plan out on a regular basis to ensure that it works well and to identify any problems within it. This will also help you to be prepared for an emergency

- Attend regular community group meetings to discuss issues relating to flooding in the local community, to help you to keep up to date with recent developments and issues

Help raise flood awareness

Helping to raise flood awareness within the community is an important activity within a community plan. Households and businesses may benefit from useful information such as:

- How to prepare for flooding
- Steps to take to protect property
- Emergency contacts

Assist with the recruitment of community volunteers

As a member of the community you may be ideally placed to identify other people with the enthusiasm, skills and attitude to support the community during an emergency.

Your role during a flood

Personal safety

- Prioritise your own safety at all times, do not place yourself at risk
- Do not attempt to enter or clear watercourses or culverts
- Report any debris in watercourses or culverts to your group coordinator and/or the local flood risk authorities in accordance with your community plan

Community flood plan procedures

A robust community flood plan will set out procedures that ensure a coordinated response from the community in the event of a flood, and also promotes your well-being and that of others.

Relay information to the local community

The emergency services, local authorities or the Environment Agency may call upon you to relay information to the community. This could be to:

- Warn the public of a potential flood and particular areas to avoid
- Provide information to promote health and well-being

This might involve door-to-door visits to engage with individuals.

Follow guidance from the emergency services at all times

The emergency services and the Police in particular take the lead during a flood. Always follow their advice as you may be placing yourself and others at risk of harm if you do not.

If you are told to evacuate from an area, follow the guidance you are given.

Provide the emergency services with local knowledge and information

Local knowledge is your key strength as a community volunteer.

- Relay this information to the coordinator for passing to the emergency services during a flood
- Be mindful the information may relate to individual properties or persons and should be managed responsibly at all times

Collect information about the flood

Information you collect and record during a flood can be important to the Environment Agency and other authorities when analysing the cause and how to reduce risk in the future.

Notes, and especially photographs, on flow routes and water levels can be very useful.

Do not place yourself at risk at any time
Your safety is a priority. Follow the guidance set out in your training and do not carry out activities that may place yourself at unnecessary risk.

Avoid walking through flood water
Flood water poses many different risks and dangers including: trips, slips, contamination, drowning and injury from submerged hazards.

Do not attempt to operate or repair flood defence structures or equipment
The unauthorised use of flood defence equipment could increase the risk of flooding or hide problems that should be addressed by the relevant authority. Similarly, do not use any equipment you have not been trained or authorised to use.

Your role after a flood

Submit information you collected about the flood

Information you collect about the flood event can assist agencies in planning and preparing for future flooding events. It is important that any information submitted is accurate in terms of date, time and location.

Help to relay information to the local community

After a flooding event the wider community often needs help finding out information and where the appropriate places to go and get help are. As volunteers you can be a vital conduit of information between agencies and the community.

Support your community

It can take many months for individuals, households and businesses to recover from flooding. As a member of the community you may be able to provide support to those affected. Refer members of your community to a suitable authority or expert for further guidance and advice.

Summary

	Do	Do not
Before	• Understand flood risk within your local area • Identify properties at risk of flooding • Identify vulnerable individuals • Support community plan training and activities • Help raise flood awareness • Assist with the recruitment of community emergency volunteers	• Attempt to enter or clear watercourses or culverts
During	• Prioritise your own safety at all times • Follow procedures set out in your community emergency plan • Relay information to the local community • Follow guidance from the emergency services at all times • Provide the emergency services with local knowledge and information • Collect information about the flood	• Place yourself at risk at any time • Walk through flood water • Attempt to operate or repair flood defence structures or equipment
After	• Submit information you collected about the flood • Help relay information to the local community • Support your community	

Notes

Notes

The purpose of this guide is to provide an introduction to the processes and terminology associated with flooding and the roles you might expect to fulfill during a flood incident.

If you have direct experience of flooding you may already be familiar with many of the issues covered in this guide.

However, whether you are a community volunteer or live or work within an area at risk of flooding you may find it useful to understand some of the wider terms and processes.

This information pack is intended as a guide only. Whilst the information it contains is believed to be correct, we can take no responsibility for actions taken based on the information contained in this pack.

Other booklets in this series include:

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