By necessity, most RYA clubs and associations are near water – be it rivers, estuaries, lakes or the sea. We want you to understand the risk you are at from flooding, how that risk is changing and what you can do to reduce the impact it will have on your organisation. We are seeing an increase in frequency and intensity of extreme weather events, so the risk of flooding from water bodies, drains or surface water run-off is increasing.

The RYA strongly recommends you:

- Assess flood risk using flood maps and knowledge provided by your local flood authority.¹
- Register for flood warnings, where relevant, from your local flood authority.²
- Check your insurance cover.
- Develop a simple flood plan that considers who does what when a flood is predicted.
- Make someone within your club responsible for implementing the plan.
- Review the flood resilience measures the club have put in place on a regular basis.
- Develop flood resilient buildings and storage areas where necessary.
- Review local planning applications to ensure that they will not have an adverse impact on your infrastructure.

The safety of people during a flood event is critical. Every year deaths occur as people are swept away, trapped or overwhelmed by flood water. You must therefore ensure that your plan looks after the safety of your members and the general public. Flooding cannot be stopped, but it is possible to minimise the consequences.

Flooding on the rise

Flooding makes headlines. It also causes untold misery to thousands of people in the United Kingdom every year. Over the last decade, parts of the UK have been hit by a series of floods, with severe damage to property and livelihoods. By the 2080s, winter daily precipitation intensities that are experienced once every two years on average may become up to 20% heavier.² Research published in June 2014³ predicts that, while summers are expected to become drier overall by 2100, intense rainfall indicative of serious flash flooding could become many times more frequent.

Importantly, this does not mean a flood of this size will occur every 50 years; rather it is the statistical probability of such an event occurring in this timeframe – a one in 100 year event can be followed by another of the same size the following week or month. The tidal surges experienced along the east coast of the UK in December 2013 were the worst to hit Britain since January 1953, but there were clearly no guarantees these extreme type of events would not happen again for another six decades – as immediately evidenced by the severe storm-generated damage incurred in January 2014 along significant swathes of coastline in England, Wales, Scotland and Northern Ireland.

¹ Your local flood authority depends on where you live in the UK. In England it is called the Environment Agency, in Wales it is Natural Resources Wales, in Northern Ireland it is the Northern Ireland Environment Agency and in Scotland, the Scottish Environmental Protection Agency.


Types of flooding

Britain has long experienced a cyclic pattern of flood-rich and flood-poor periods\(^4,5\). If a flood-rich period coincides with a climatically-driven increase in frequency of extreme events (climate change), the implications for our river catchments including coastal waters and the people who live, work and play in them could be severe. At the very least, the approach to risk management by Clubs and Associations has to take account of the nature and pattern of the threats from flooding. There are six types of flooding which could affect you, your Club/Association and your equipment and facilities, and the likelihood of each depends on your location and the geography of where you operate:

<table>
<thead>
<tr>
<th>Types of flooding that could affect your club or association(^6)</th>
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</thead>
<tbody>
<tr>
<td><strong>Coastal flooding</strong> occurs when there are high tides and stormy conditions. If low atmospheric pressure coincides with a high tide or series of high tides, a “tidal surge” may occur. This “bulge” of water, often directionally driven by strong winds will cause higher than normal sea levels that may go over the top of defences.</td>
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<tr>
<td><strong>River flooding</strong> happens when a river, stream or canal cannot cope with the water draining into it from the surrounding land, particularly when heavy rain falls on already waterlogged ground.</td>
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<tr>
<td><strong>Surface water flooding</strong> occurs, for example, when rainwater does not drain away through the normal drainage system or soak into the ground, but ultimately flows over the ground instead. Compared to river or coastal flooding, this form of flooding can be hard to predict in terms of intensity and location.</td>
</tr>
<tr>
<td><strong>Sewer flooding</strong> is caused by sewers being blocked by debris or simply overwhelmed by heavy rainfall. The chance of flooding depends on the amount of rainfall and capacity of the local sewerage system. The outcome can be property, land and rivers contaminated with raw sewage in flood water when sewers overflow.</td>
</tr>
<tr>
<td><strong>Reservoir flooding</strong> is possible although the UK safety record is excellent. Reservoirs hold large volumes of water above ground level and it is still possible that a dam could fail, resulting in a large volume of water being released very quickly.</td>
</tr>
<tr>
<td><strong>Groundwater flooding</strong> occurs when water levels in the ground rise above the surface. It is most likely to happen in areas where the ground contains aquifers – permeable rocks that water can soak into or pass through.</td>
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Our dynamic coastline

Our coast is a dynamic environment evolving naturally through the action of wind, weather, waves and tides, driving coastal erosion, accretion and flooding processes. The coastal zone is also an economic and social asset for businesses, housing, tourism and recreational activities. The figures relating to flooding are stark: in England alone it is estimated that 10% of the population currently live in areas potentially at risk from flooding and erosion. According to the Environment Agency

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(EA)\textsuperscript{7} 2.4 million properties and much infrastructure in England is at risk from flooding from rivers and the sea, with about 490,000 properties facing a one in 75 or greater chance of flooding in any one year. While surface water i.e. water that has not entered watercourses is a major issue, drainage or sewer systems, 1,800 km of the 4,500 km of coast in England is at risk from coastal erosion, a risk that is exacerbated by flooding from land and from tidal surges such as were seen in January 1953 and December 2013. While 200 properties are currently vulnerable to coastal erosion in England, this figure is predicted to rise to 2,000 over the next 20 years\textsuperscript{8}.

The recent ending of Government insurance agreements with the Association of British Insurers has increased the risk to almost 200,000 properties country-wide; it is therefore important that Clubs make themselves aware of potential risks in their local areas as, working as part of communities, we can take action to manage these risks and reduce their impact. Whatever the underlying cause of flooding, it is important to recognise that despite the sheer and often overwhelming forces of nature involved, small but effective steps can be taken to help protect against damage; some are outlined at the end of this information document.

‘Making Space for Water’

Repeat flood events prior to 2004 highlighted the need for Government to develop a comprehensive, integrated and forward-thinking strategy for managing future flood and coastal erosion risks in England. The outcome from widespread consultation was the publication in 2005 of the Department for Environment, Food and Rural Affairs (Defra) document ‘Making Space for Water’\textsuperscript{9}, aimed at reducing the threats to people and their property and delivering environmental, social and economic benefits consistent with the Government’s sustainable development principles and involving stakeholders at all levels of risk management. Importantly from an RYA perspective, the document placed emphasis on solutions that work with natural processes, for example wetlands that provide wildlife and recreational resources as well as flooding room and reduction of coastal ‘squeeze’ on habitats like saltmarsh which offer natural coastal protection. There was a tacit recognition that sites of designated environmental importance typically provide other benefits, for example recreational and/or property interests. Operating authorities were mandated to maintain an awareness of these recreational assets in the face of wider threats like flooding and drought, and this is one area where local participation by RYA members remains vital. The outcome has been adoption of a whole-catchment and whole-shoreline approach that is consistent with, and contributes to, the implementation of the EU Water Framework Directive.

The Pitt Review and its ramifications for flood risk management

Following widespread and serious flooding in summer 2007, Sir Michael Pitt carried out an independent review of the way the events were managed. The Pitt Review: Lessons learned from the 2007 floods was published in June 2008\textsuperscript{10} and contained 92 far-reaching recommendations covering prediction and warning of flooding, prevention, emergency management, resilience and recovery. One direct outcome was the enactment of the Flood and Water Management Act 2010 for England; this gives the EA a ‘strategic overview’ of flood and coastal erosion risk management in England.


Environmental Briefing: Introduction to flood risk management for RYA clubs [June 2014]
In Wales, the Welsh Assembly is responsible for developing flood and coastal risk management policy and funds flood and coastal activities undertaken by operating authorities. In Scotland, the key pieces of legislation which determine management of coastal flood risk are: the Flood Risk Management (Scotland) Act 2009, the Marine (Scotland) Act 2010, the Coast Protection Act 1949 and the EU Floods Directive (2007/60/EC). The 2009 Act is in part a response to the EU Floods Directive which requires all EU Member States to have in place flood risk assessments by 2012, flood hazard and risk maps by 2013 and a flood risk management strategy by 2015.

Overall the 2009 Act is aimed at creating a more joined up and coordinated process to manage flood risk at national and local levels including coordination and cooperation between all organisations involved in flood risk management and new approaches aimed at enabling more on-the-ground contribution from stakeholders and the public (including RYA Clubs and individual members). In Northern Ireland, the legislation to enable the EU Floods Directive is called The Water Environment (Floods Directive) Regulations (Northern Ireland) 2009. As with the other UK Acts, the Northern Irish legislation requires the completion of preliminary flood risk assessments by December 2011, flood risk and flood hazard maps for significant risk areas by December 2013 and flood risk management plans by 201511.

Strategies and planning: from national to local levels

The Defra12 diagram below provides an indicative illustration of the relationship between high-level plans, strategies, schemes and other planning initiatives relating to land use, floods and water.

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The EU Directives referred to in the diagram above are the EU Floods Directive and the EU Water Framework Directive (EUWFD). All other aspects of the national to local planning framework, including Shoreline Management Plans, are driven by the EUWFD requirement for water to be managed under a system of River Basin Districts. In terms of who does what in relation to flood risk management and where responsibilities exist, in England and Wales the Local Government Association’s Flood Risk Portal provides online updated information for local authorities at [http://www.local.gov.uk/floodportal](http://www.local.gov.uk/floodportal).

In Northern Ireland, information on flooding is provided by the Department of Agriculture and Rural Development at [http://www.dardni.gov.uk/index/rivers.htm](http://www.dardni.gov.uk/index/rivers.htm) and the Scottish Government at [http://www.scotland.gov.uk/Topics/Environment/Water/Flooding](http://www.scotland.gov.uk/Topics/Environment/Water/Flooding) provides similar advice regarding more sustainable approaches to managing flood risk. As this information base is just as up-to-date and relevant for RYA Clubs and their members, it is recommended they access the relevant websites covering their location and note information provided.

**FCERM: flood and coastal erosion risk management**

To fulfil their obligations under the 2010 Act, the EA and Defra have published a *National flood and coastal erosion risk management strategy for England*[^13] to ensure that those that have a role in FCERM understand each other’s roles and co-ordinate how they manage those risks across river catchments and along coastlines “embracing the full range of practical options and helping local-decision-making”. Of particular relevance for the RYA is the stated aim by the EA and Defra for the FCERM strategy to build capacity, capability and knowledge exchange within all sectors as this by definition includes the recreational sector, including all forms of boating, under power and sail, on inland and tidal waters.

Also of relevance to the RYA and its membership will be the drive towards integrated floodplain development management and allied construction of flood alleviation and coastal protection schemes - again with implications for recreation use of coastal and inshore areas, river mouths and estuaries. Coastal concerns include whole-system pressures including sediment accretion and habitats under threat by coastal ‘squeeze’ (principally sea level rise and hindrance of migratory routes). Under FCERM and encouraged by the recent Flood Acts, the dominant management paradigm has moved from ‘defence’ to ‘integrated risk management’. River channels, beaches and natural features form a crucial component of the FCERM ‘asset base’ and any removal of engineered structures impacting natural protection/erosion control features such as beaches and river channels should take into account non-FCERM usage (e.g. RYA leisure activities etc.).

The emerging paradigm is one of a ‘managed adaptive approach’[^14] where several smaller interventions over time are advocated rather than the ‘precautionary principle’ (which in the past has often resulted in large schemes of inappropriate scale and disproportionate impact). Pertinent to the RYA and its membership are recent examples of managed retreat in areas where erosion and flooding have been persistent issues; for example the £28m “managed realignment” at Medmerry in West Sussex completed in late 2013 has seen the building of 7km of new sea walls up to 2km inland with the development predicted to withstand a one in a thousand year flood.


Inland and fluvial (river) flooding

In 2012 the EA produced a document called *Living on the Edge* setting out the rights, obligations and actions required of landowners where a stream, river, or estuary flows through, or is adjacent to, their land. This is a clearly laid out and accessible document in which much of the advice given on management of fluvial flood risk is also applicable to coastal erosion and flooding. Clubs and marinas on land adjacent to rivers, estuaries and the coast are therefore recommended to access this document and note the guidance and requirements listed.

**Actions you can take to reduce risk and raise resilience**

As a result of successful lobbying and relationship building, the RYA has earned the privilege of being consulted on its views in relation to all applications for work in the coastal and marine environment across the UK. The opportunity to influence the outcome of such decision making is one of the fundamental ways the RYA is able to protect the interests of its members across the country via expert input and the involvement of 15 Regional Planning and Environmental Coordinators (RPECs) in England, Wales and Northern Ireland and 10 Coastwatchers in Scotland. In addition the RYA is invited to provide expert input on national-level planning and environment (including FCERM) Committees. At a more local level, the various national lead agencies (EA, SEPA, DARDNI) all provide advice on flood defences for homes and property including clubhouses and marinas and practical measures which can be used to reduce water ingress and damage.

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## Bottom-up approaches to managing your risk from flooding

RYA clubs and associations working on their own and as part of their local community can make a significant ‘bottom-up’ input in terms of flood mitigation. Where possible, you are encouraged to:

- Make a Flood Plan and nominate Responsible Members for maintaining and updating this.
- Sign up for automated/online flood warnings.
- Take practical steps to prevent water seeping into property and causing damage.
- Be familiar with the online flood maps produced by your local environment agency.
- Be familiar with web-based advice portals covering your locality and check regularly for updates.
- Check whether your insurance covers flood damage, and to what extent.
- Join your local flood or coastal action group.
- Take part if your local community is consulted on local plans or flood alleviation schemes.
- Seek opportunities to become involved in initiatives to protect your local community from flooding or adapt better to coastal change.
- Monitor erosion and accretion in the vicinity of your property.
- Monitor woody debris accumulations as, if mobilised, these can cause significant hazard to facilities and equipment during extreme events.
- Keep drains and culverts in the vicinity of club property free of wood and debris, check the condition of any local flood and coastal erosion defences and maintain any you own.
- Help Government agencies maintain and look after streams and rivers if they own the adjoining land to your property.

### Practical options for FCERM involving local decision-making

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<th>Photo credits: Andy Large and Jonathan Bailey (members of the RYA Planning and Environmental Committee).</th>
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</table>

Know when and where flooding and coastal erosion is likely to happen. Risk management authorities need to improve their understanding of these risks, and in particular, surface and ground water flood risk.

- Make sure that flood and coastal erosion risk plans use the most up-to-date information and raise awareness among affected communities.

Reduce the chance of harm to people and damage to the environment and society by building and maintaining and improving infrastructure and flood management systems, where this is affordable.

Help communities understand risks and take action to manage them or reduce the consequences – for RYA members, this includes making property, facilities and equipment more resilient/better protected and by adapting to coastal change where feasible/affordable.

Avoiding inappropriate development in areas of flood and coastal erosion risk, taking opportunities to work with and enhance communities and services (including recreational usage) while protecting the natural environment.

Improve detection and forecasting and how warnings are issued to maximise action, planning for and co-ordination of a rapid response to flood emergencies and thus promote faster recovery from flooding.