Devon County Council

Flood Resilience Community Pathfinder Project

Final Report
April 2015

Quality management

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Foreword

Improving our ability to cope with extreme weather and long-term climatic changes is one of the challenges that Devon is facing today. Throughout Devon there is a risk of flooding from rivers overflowing their banks, heavy rainfall increasing runoff and overwhelming the drainage systems and high tides and storms battering our coastline.

As a Lead Local Flood Authority we recognise that we cannot eliminate these risks so we must try to manage them as best we can. This means we all need to be prepared. Developing community level flood plans, knowing where to find information and how to get the right advice will enable local communities and individuals to develop the solutions that are best for them.

Many of the actions piloted by the Pathfinder project have brought tangible benefits to local communities and built confidence in dealing with future floods. Through working together with the support of local agencies and authorities, communities have been empowered to take action for themselves.

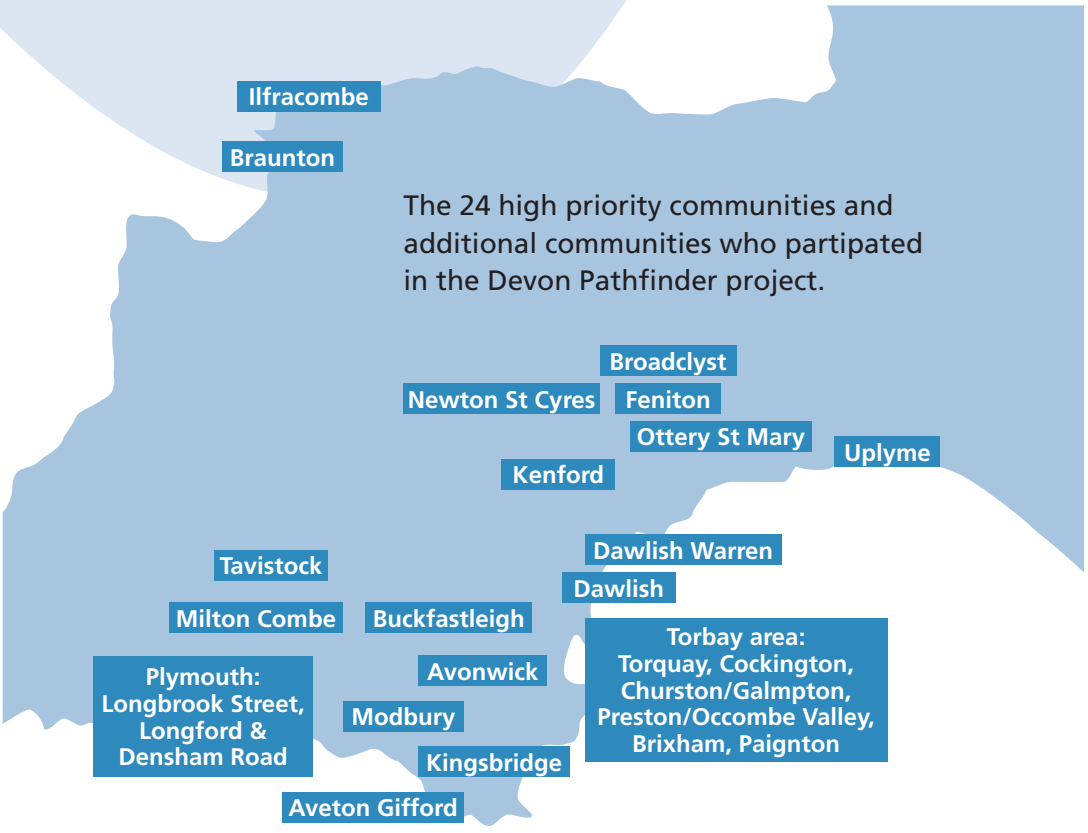
We have witnessed incredible community spirit as people worked together to make their neighbourhoods more resilient to flooding. This report shares our experience and also showcases the work of some very proactive Devon communities.

Cllr Stuart Hughes

Introduction

The Community Flood Resilience Pathfinder project for Devon, which serves the three Lead Local Flood Authorities (LLFAs) of Devon County, Torbay and Plymouth City...

focused on rapid response catchments and 2012 flood recovery communities where minimal or no advance warning was available for flooding. A priority list of 24 high risk communities was established in partnership with the three LLFAs and the Environment Agency (EA). The ultimate aim of the project was to reduce flood losses by helping communities focus more on mitigating risks; preparing for and responding to floods and recovering quicker rather than simply dealing with the consequences after a flood occurs. The project provided those communities with the knowledge, skills, equipment and training to help them help themselves before, during and after the flood.



The 24 high priority communities and additional communities who partipated in the Devon Pathfinder project.

Project objectives

The main objectives of the project were to:

1. **Raise public awareness of flooding.**
2. **Increase level of flood preparedness by reviewing/ establishing Community Flood Plans or Community Emergency Plans (CEP) in 24 communities.**
3. **Improve telemetry systems to provide more accurate warning information.**
4. **Increase flood resilience in communities by ensuring that each community is fully equipped with the tools and basic defences.**
5. **Build local capacity by establishing and training volunteer 'Flood Warden' groups in each of the 24 communities.**

Project highlights

The Devon Pathfinder project offered a range of support which all contributed towards building local flood resilience and increased confidence in dealing with the next potential flood. Some of the aspects of this project were of particular success and interest. Here are the highlights:

A priority list of 24 high risk communities was established by the project partners. Most of the original 24 communities participated in the Pathfinder project and embraced the principle of flood community resilience by working on strengthening their capacity to prepare, respond, cope and bounce back before, during and after flood events. The participating communities were: Avonwick, Aveton Gifford, Braunton, Buckfastleigh, Dawlish & Dawlish Warren, Ilfracombe, Kennford, Kingsbridge, Modbury, Milton Combe, Newton St Cyres, Ottery St Mary, Uplyme, Brixham, Paignton, Galmpton, Longbrook Street, Colebrook and Denham Close in Plymouth. Additional communities were also able to join the project along the way to benefit from the proactive nature of the project and these were Ashburton, Broadclyst, Feniton, Topsham, Shebbear and Yealmpton.

The use of Community Emergency Plan facilitators (externally procured or internally resourced) to assist the production of suitable Community Emergency Plans or Community Flood Plans was critical in providing the communities with suitable experienced professional expertise and advice. The facilitators supported newly formed or existing flood groups in preparing plans that are fit-for-purpose. The strength of the local plans lies in the fact that they are not written by the facilitator but by the local group. This in turn led the group to feel more empowered and confident in activating the plan. This was particularly visible during the desktop exercises organised to test the various Community Emergency Plans. The support of the Environment Agency Flood Resilience Team was a very important part of the process too, providing expert information on local flood risk or on how to access and interpret local flood warnings. On many occasions the Environment Agency was seen as the “experts”.

Whilst the Environment Agency uses a number of high tech telemetered flood warning systems on main rivers, the EA Flood Warning Service is not available on ordinary watercourses or small catchments. In order to bridge this gap, localised, community owned flood warning systems were installed on ordinary watercourses providing more detailed flood data at smaller catchment level. The installation of local river level and rain gauges, with community driven trigger values, are designed to improve local flood predictions and inform the local flood groups of

when to activate their plans. This is considered a really practical way of helping communities prepare for and effectively manage flooding. Various approaches were tested and useful lessons learned are now available. See Case Studies.

A very successful "Flood Warden" pilot training session developed by the Cornwall Community Flood Forum was rolled out across Devon and offered to the Pathfinder communities. The training was organised by Devon County Council and delivered by the Environment Agency and Devon and Somerset Fire and Rescue Service with the support of Charles Richards, a flood group coordinator from Par St Blazey in Cornwall who led the development of the training. The training was extremely well received by the local community. One of the flood group coordinators explained: "this is another piece of the jigsaw puzzle in building local flood resilience". The presence of various agencies and a representative from a community affected by floods is the ideal combination for delivering a successful training event. The groups and flood wardens valued the expert advice from the Environment Agency and Devon & Somerset Fire and Rescue Service but they equally valued the independent and practical input from a flood group representative. The fact that Charles Richards gave his time to talk to other communities validated the local flood groups' and flood wardens' existence and removed the perception that this process was being imposed by the various flood agencies.

One of the other important highlights of the project is the effective and true multi-agency partnership working that took place throughout the Pathfinder project, which strengthened as the project progressed. This was only possible thanks to the commitment of the various project partners who contributed resources and time to the project delivery and not just in attending partnership meetings. For example the Environment Agency Flood Resilience staff were fully engaged and proactive with most of the 24 communities by either attending and supporting flood group meetings or sending information as and when required. Their support to the Pathfinder project manager and officers was instrumental in delivering a successful project. They acted as a conduit and relayed queries and questions to other Environment Agency departments on technical issues such as understanding local flood levels and alarm triggers, understanding results of feasibility studies or informing communities of the progress of local flood improvement schemes. Equally it was noticed that the role of local authorities' engineers added real value to the delivery of the project thanks to their technical skills, expertise and local knowledge. They usually have a local presence and an existing relationship with local residents. They can provide practical solutions to minor/quick win flood improvement works too. The involvement of the Water Company (South West Water) or other departments at Devon County Council, Plymouth City Council, Torbay Council and district councils also had a positive impact in engaging the local communities. When the Highways Department, the Bridge Maintenance team, the Flood Risk Management team or the Emergency Planners attended flood group meetings or public meetings, questions could be directly answered and myths dispelled. Cross county partnership was also strengthened with the delivery of the Flood Warden training where Cornwall Council, the Cornwall Community Flood Forum, Devon & Somerset Fire and Rescue Service and Devon County Council worked together to deliver a very successful pilot.

Last but not least, thanks to the motivation, tenacity, positive can-do attitude of the flood groups and their members, communities are now better equipped to deal with future flood events.

DEFRA and the Pathfinder Scheme

Defra is working across a range of technical areas including planning, land management, flood defences and sustainable water management, to improve flood resilience in England.

Community resilience – the response of people at risk of flooding – is an important aspect of this system. Quite often, simple actions by individual householders and communities can significantly reduce local vulnerability and the level of any resulting damages from flood events. The Flood Resilience Community Pathfinder scheme is a demonstration pilot, whose outputs and outcomes will help us understand better the contribution that actions by individuals and communities can make to better manage their flood risk.

The scheme operated between 2013 and 2015 and we expect that the overall investment in this scheme to be around £5.2m of which, Defra will have provided £4m. The first output from the scheme was published in February 2014 – a study reviewing the best research evidence about communities and resilience [The report http://goo.gl/jf0N9G]. Its findings underscored the complexity the relationship between awareness and action but noted that interventions based on engagement, dialogue and learning seem to provide promise, in terms of improving resilience to flood risk at the community level. This will form part of the base line for the overall evaluation of the scheme.

Authorities in: Blackburn, Buckinghamshire, Calderdale, Cornwall, Devon, Liverpool, Northamptonshire, Rochdale, Slough, Southampton, Swindon, Warwickshire and West Sussex, all implemented practical projects with local communities. Many are partnerships, with the authority working with a range of national and local organizations to deliver the aims of their project.

The local audience for each project varies considerably across the country and they deployed a range of approaches to engage local people. We hope that the results help authorities work with other local communities in their area and that by sharing their learning and experiences from their projects, they can inspire neighbouring authorities to engage their communities in similar ways.

Achievements, impacts and lessons learnt

Raising public awareness of flooding and community engagement

Achievements and outcomes

Some of the main activities of the project were to undertake initial community engagement, improve public awareness and engage with existing flood groups or support the creation of new ones.This was a vital element of the project. It included an assessment of the existing level of flood awareness of each community before developing a specific plan to deal with the risks and implement necessary actions as soon as a flooding risk is identified. In some cases, denial, within communities about the risks and the degree to which properties may be affected was also apparent. The speed at which flooding occurs is also often underestimated, particularly in rapid response catchments. Confusion can occur where a community is affected by both coastal and fluvial flooding, again particularly an issue in rapid response catchments. Flood visualisation was originally part of the work package of activities designed to raise awareness of flood risks. Early in the project it appeared unpractical to actually visualise flooding in large communities and there was also some unease and very little or no appetite from the communities point of view to deploy such a dramatic tool in smaller communities. With many communities keen to engage with the project from the outset it was deemed unnecessary to produce such images that would in essence be used to encourage their involvement and uptake of the proposed assistance.

> "I feel that since the flood group has been formed the overall awareness has grown. So I am much more confident about dealing with future floods."
> **Aveton Gifford Flood Group**

Activities to raise public awareness of flooding and engage on the associated issues were carried out in several ways. Introductions through local resilience forums and council meetings took place with town and parish councils, ward councillors, community partnerships and or exiting flood groups at the beginning of the project. Most engagement started with organising multi agency flood events or flood fairs. Most communities agreed and supported these events. In total 4 flood fairs were organised by Emergency Planning officers at a local district authority level. These events were supported by the Pathfinder partners. Community based events were also organised by the local communities themselves, again with the support of the Pathfinder partners, in Uplyme, Kingsbridge, Ilfracombe, Braunton,

Brixham and Paignton. Supporting existing local flood groups or helping to create new ones was identified as the main vehicle for effectively raising awareness of flood risk at a local level. Seven communities already had flood groups at the time of engagement and the project supported the creation of fourteen additional groups.

The project helped create or directly supported 21 active flood groups in: Aveton Gifford, Avonwick, Braunton, Broadclyst, Buckfastleigh, Dawlish & Dawlish Warren, Ilfracombe, Kennford, Kingsbridge, Milton Combe, Modbury, Newton St. Cyres, Ottery St. Mary, Uplyme, Brixham, Galmpton, Paignton, Colebrook, Longbrook Street and Denham Close in Plymouth.

Existing and new groups were given help with disseminating information about local flood risk, flood warning systems or with recruiting volunteers. The group chose to carry out such activities in various ways using social media, existing or new local websites or parish and town newsletters. There are now several flood group webpages or Facebook groups. Some groups also issued press releases. Some of the articles found on webpages were also circulated via local newsletters. See Appendix for examples of articles and links to community webpages. Household surveys were sent at the beginning and the end of the Pathfinder project to eight communities at risk of flooding. The survey did not show an increase in the percentage of individuals who have taken actions (signed up to a flood warning service or bought flood protection products) during the life of the project. Perhaps people/home owners are still expecting others, such as the council, to deliver flood improvements or provide resilience measures to reduce the risk and impact of flooding. Also perhaps people don't take action because flood risk can feel too overwhelming and impossible to manage at an individual level. Maybe more compelling evidence is required to convince residents that simple steps can help them reduce their flood risk.

A lack of awareness and acknowledgement of flood risks remains. Although the level of awareness amongst flood groups is high, awareness raising activities aimed at communities at risk are still required. Changes of attitude take place over a long period of time. There is a long term need to raise awareness about future flooding patterns. There is also a long term need for all the relevant agencies, government departments and local authorities as well as their elected representatives to send residents in areas at risk of flooding consistent messages about the importance of making their home flood resilient. Further work is required to help individuals understand the benefits of taking action, e.g. understanding the cost of damages avoided in a flood and how quickly they may recover after a flood. It would also be interesting to know if there's any evidence that insurance premiums would reduce as a result of individuals flood proofing their property.

"I am becoming more knowledgeable about the causes and how I can help myself and am also now part of the Flood group."
Buckfastleigh Lower Town Flood Group member

Lessons learnt

Early engagement required

After initial contact with communities by the project officers or project facilitators, there were varying levels of support or engagement received. Some communities at first felt the process was being imposed on them while others embraced the process immediately. In hindsight community participation would be better sought

before the start of the project or built into the time frame of the project. It was noted that communities who were not part of the original list of 24 communities and expressed an interest in being part of the project engaged and progressed very quickly.

The larger the community, the harder to engage

It was noticed that communities within larger towns or boroughs are much harder to engage with. In most situations it was difficult to locate the actual community or get the feel of a community similar to that in small locations. This may be explained by the fact that the number of properties usually flooded represents a small proportion of the total number of properties in the area. It is then much harder to convince them of the importance of flood resilience with town councils or wards. This is usually exacerbated if the community has not experienced flooding in recent years. When flooding has been experienced, larger town councils, community wards or community partnerships struggle to allocate resource to this process. This is explained by a local councillor in the following terms: local councils are already financially stretched and are expected to run various local services. This places another important burden on paid staff such as town clerks but also on local councillors. The Pathfinder project worked around this challenge not only thanks to the willingness of local individuals and councillors but also thanks to the support of existing and established community groups.

Time to engage communities, factors delaying or progressing engagement

Local feud and tension between different parts of a community can also be a threat to the effective delivery of local community flood resilience. This was experienced in the Devon Pathfinder project were different representative groups from a same community were not prepared or able to work together. This made the Pathfinder project officers work much harder either by trying to get the various factions to work together or failing to do so to work with each individual faction in order to build some level of community flood resilience.

This leads to an important learning point that community engagement takes time. A community engagement project of this kind is more effective and would have more impact if it were delivered over 3 years. Community engagement projects rely on individual's goodwill and time which is not always there when the project needs it the most or is not constantly or consistently available. Additionally the sustainability of the groups depends very much on the individuals driving the process and unless the group engaged is large enough with representation from the Parish and Town Council and even better with members from local established groups such as the Women's Institute, the Rotary, the Round Table or the Lyons Club for example, there is a risk that the group may disappear in the future. In rural Devon, the above groups are very active and relatively easy to engage with as they are already working on resilience issues. The Pathfinder project re-asserts the fact that fitting community engagement work in a strict project delivery timeframe is difficult. Additionally, on many occasions the Pathfinder project was competing with other demands on communities and parish and town councils such as the closure of the local library or swimming pool.

Another factor that may also affect the progress of the project is hijacking. The project may be hijacked by other flooding issues and the attention is taken away from the original project objectives. This was experienced in one Devon Community in particular where the Pathfinder could not be pursued because the desire for physical improvements outweighed the desire for self-help measures and there was a general feeling that the authorities should be providing flood defences at whatever cost without the need for the community to get involved.

Inclusive, open and equal-footed engagement

Some groups expressed the frustration that local knowledge was usually overlooked by the flood agencies and local authorities. Bringing together expert local authority and agency staff and flood groups with local flood knowledge helped establish a working relationship based on trust and enabled the exploration of wider flood risk issues. Trust was even more noticeable and communities were on board more quickly when the project was able to offer or deliver some tangible quick wins or flood solutions during the first phase of the project. This was particularly noticeable when Property Level Protection was installed in Colebrook and Longbrook Street or when the grant for flood resilience equipment was launched and offered to the communities. Kingsbridge Flood group actually summarised this point by explaining that "a community would be foolish not to take the support and the money available". A learning point from this is the importance of explaining up front that building local flood community resilience is only one element of the overall flood risk management process. There was fear amongst some communities that they would not be supported on reducing local flood risks if they participated in the Pathfinder project and worked on community flood resilience. Interestingly but not surprisingly the majority of people who joined the flood group had either been flooded or had a professional skill or local knowledge to bring to the group. Most of them were also involved in other community groups and societies with some being part of the Parish and Town Council but not exclusively.

"Learning more about flooding , future risks and how the agencies are involved are important. Meeting and talking to other agencies was very useful and essential in forming a plan."
Buckfastleigh Lower Town Flood Group

The need to clarify and explain the roles of the various Flood Risk Management Authorities and other flood related responsibilities

All along the project, it was clear that there was a high level of confusion with regards to the responsibilities of various organisations with regards to flood risk management. The project partners paid particular attention to clarify the various roles and responsibilities to the local flood groups. Most of Devon operates in a three-tier system of local government with services provided by Devon County Council, the local District Council and over 400 Town and Parish Councils. Plymouth and Torbay councils have unitary councils which provide all local government services in their areas. As a result there are three Lead Local Flood Authorities in Devon (Devon County Council, Plymouth Council and Torbay Council), the Environment Agency and other flood risk management authorities such as district councils and South West Water. Another area of flood risk Management that required clarification was riparian ownership.

Some unexpected outcomes

Valued Peer to Peer activities

Peer to Peer exchange and support was extremely valued and an unexpected outcome of the project. Although not part of the initial Pathfinder project in Devon, peer to peer activities came about towards the end of the project when Kingsbridge flood group, which positively engaged in the flood resilience process, agreed to meet and talk to a "late to engage" community on the benefits of participating in the project and building community flood resilience. This was extremely well received by the "late to engage" community and within one month of Kingsbridge attending the meeting, the community had completed their first draft of their Community Emergency Plan. This was in effect the start of a local community support network. The project partners identified this as an important element of future community engagement strategies. This was echoed by the involvement of a flood group representative in the delivery of the Flood Warden training. See the Project Highlights section about the Flood Warden Training.

Improved communication

Another unexpected outcome is the increased ability for communities, via flood groups, to be heard and to know who to talk to. At first many communities expressed their frustration on how complex flood risk management responsibilities and governance are locally. However, groups noticed that by regularly engaging with local authorities and agencies staff, two way communications had improved and relationships strengthened with the local community.

Integrated flood risk management at a local level

The community engagement process and the work on flood resilience have also focussed on the long term and wider flood management issues. For example Braunton and Ilfracombe benefited from Surface Water Management Plans being developed with the participation of the local flood group. In Longbrook Street, by building community flood resilience, they have now exhausted all the quick win solutions and can now, with the local authorities, focus on longer term flood solutions. Additionally the local Pathfinder project officers or manager are able to use their contacts and knowledge to help flood groups get in touch with the appropriate department or organisation to explore flood risk management solutions. For example, Aveton Gifford was able to engage with Bridge Maintenance at Devon County Council and with the local district engineers to establish riparian ownership along a culvert and investigate the need for clearing it. One of the flood group members commented that the Pathfinder project "has opened the doors to having some of the larger flood issues being dealt with in the village which had for many years and until recently been put on the back burner. These improvements will make a huge difference in our area". Similarly, Avonwick was able to engage with South West Water and be updated on various flood improvement works. Another example was how various community concerns regarding flood risks in Newton St Cyres were tackled by bringing together all the agencies around the table to discuss possible solutions.

Increasing the level of flood preparedness by reviewing/ establishing Community Emergency Plans

Achievements and outcomes

Recent flood events highlighted deficiencies in existing community level plans where too great a reliance on a few individuals who happened to be away when flooding occurred or on the emergency services whose resources are stretched in the event of county-wide flooding. This highlighted the need for back-up plans and wider buy-in for both existing community level plans and new ones being developed.

Very early on it became apparent that some communities would benefit from a wider Community Emergency Plan rather than just a flood plan. In some cases, getting support in writing a community emergency plan convinced the more reluctant communities to participate in the Pathfinder project and engage on community flood resilience issues. Community Emergency Plan Facilitators from Contingency Planning Solutions (www.contingencyplanningsolutions.co.uk), a local emergency response consultancy, were appointed to support flood groups in reviewing existing community plans (flood or emergency plans) or develop new ones. Most communities welcomed the support and expert advice in writing these wider plans.

There are now 15 additional communities with tested Community Emergency Plans as a result of the Pathfinder project.

The speed of response is critical in many of the communities and testing CEPs is vital in order to identify gaps and assess their robustness. If adequately tested and reviewed, CEPs are going to lead to greater flood resilience and a reduced financial impact on the community. Testing the plan addressed many of the deficiencies identified in existing plans and ensured that they remained relevant alongside changes in the makeup of the community, e.g. those with greatest vulnerability. Testing the plans also helped community volunteers to become more familiar with their emergency arrangements and has given them confidence in what works well too.

In developing Community Emergency Plans, community-specific priorities emerged and informed the subsequent activities that the flood group needed to undertake. Most of these activities were supported by the CEP facilitator via the Pathfinder project.

At the time of the 2013-14 storms no pathfinder communities had tested or activated their Community Emergency Plan with the exception of Kingsbridge. Kingsbridge activated their emergency arrangements for flooding during the 2013/14 winter storms. A questionnaire sent to the members of the various Pathfinder flood groups at the end of the project showed that, as a result of the project, all the groups felt confident to very confident in dealing with a flood.

"The original Emergency Plan was based on theory as, at the time, we had not experienced a flood in the village. The assistance we received in constructing the existing plan, particularly the flood element, was invaluable." **Braunton Flood group**

As a result of the Pathfinder Project up to 4,200 properties and almost 10,000 people across Devon are more prepared for flooding. Communities are now better able to manage flooding themselves, reducing the impact to property and risk to life.

A questionnaire sent to Parish and Town Council clerks at the beginning and at the end of the project strikingly shows the increased level of preparedness at a community level. 100% of the clerks who returned the survey say that their parish or town has a specific flood action plan compared to 20% at the beginning of the project. 75% of the surveyed clerks now have a record of vulnerable people or properties (compared with 10% at the beginning) and 63 % of Parish and Town Councils now have a flood warden scheme compared to 20% originally.

Lessons learnt

The importance of public meetings

Early community meetings of any type (i.e. public or parish/town council) generate a forum for venting frustrations, recriminations and debrief of previous flood events. This is an inevitable but also important step which usually leads to constructive engagement. When not planned at the beginning of engaging a new community, this can lead to delays in constructively working towards flood resilience as the community believe that their voice has not been heard. Future community engagement processes need to allow time and space for the community to air their grievances (if applicable) in order to subsequently focus on flood or emergency planning in a productive manner.

Not one-size-fits-all approach

Although a Community Emergency Plan (CEP) template was designed during the pilot project through combining the Environment Agency Community Flood Plan and the Local Authority Community Emergency Plan, it soon became apparent that a one-size-fits-all template is not suitable for all communities. However, the basic concept of the combined plan should be identified as best practice. Each plan needs to be treated on its own merit and tailored to each community in whichever size and format is most suitable. The template could perhaps better be referred to as a 'guidance template' in the future.

Each community needs to have a named contact to work with the plan facilitators as early on as possible to make the writing of the plan efficient. Without a named and available contact from the outset it takes time to identify a motivated volunteer. This proves critical in giving the group some momentum and confidence. When the writing and testing of the plan was dragging on, the group was then struggling to assess their needs in terms of a flood warning system, resilience equipment or the recruitment of volunteers such as flood wardens.

The final 'exercise' or desktop exercise designed to test and identify gaps in the CEP was offered to all communities who had written a plan. This exercise needs to be tailored to each community need. What suited one community such as full police/ fire/local authority involvement did not suit others and whilst the content of the exercise scenario can be reasonably generic it also needs to be relevant to the local risks.

The flexible role of the facilitator

The CEP facilitator was originally envisaged as being just that – facilitating the work of the community. However, at times, the facilitator has had to get more fully involved in arranging meetings, volunteers and on rare occasions writing initial draft plans in consultation with comments offered by the community. This should be accepted as a method to motivate a community and engage and should not be seen as 'taking over'. This hand holding role was crucial in building confidence in the group and without it, flood plans would have probably taken much longer to write and launch. And in some instance they would probably have never been finalised. Perseverance and drive need to be the attributes of facilitators.

Multi-agency work is crucial in building local community trust and resilience and it needs facilitating. It needs embedding in job descriptions of flood risk management officers and facilitators. Change of culture and training may be required in places to achieve multi-agency support.

Community Emergency Plan desktop exercise in Braunton.

Improving flood warning systems to provide more accurate information

Achievements and outcomes

Receiving a warning about the onset of flooding is one way communities and individuals can make preparations to stay safe and minimise damage. For each Pathfinder community a review of their local catchment to determine flood risk factors was the first task before identifying the most appropriate data systems to support localised advance warning of potential flood events. The ability of individuals and communities to access information easily has been highlighted as a major factor in both raising awareness and responding rapidly at times of elevated flood risk. Whilst some of the data is available on the Environment Agency website, it focusses on Main Rivers. Existing Environment Agency systems are, generally, located in Main River locations and provide warning of major fluvial flood events which build gradually. These systems do not provide the specific detail required in many smaller, but high risk, communities and in particular for rapid response catchments that are the focus of this Pathfinder Project. The installation of telemetered gauges and rainfall-based warning services was identified as one possible answer to provide vital early warning in rapid response and vulnerable catchment. Data available at a suitably early stage and in a format that enables them to respond rapidly to emerging flood risk was therefore provided to local communities.

All the Pathfinder flood group members were encouraged to register to the Environment Agency Flood Warning Service where it is available in their local area. The flood groups also made local residents aware of the service and encouraged them to register. The installation of local telemetered gauges and rainfall-based warning services was identified as one possible answer to provide vital early warning in rapid response and vulnerable catchments. A specialist contractor Hydro-Logic Services (www.hydro-logic.co.uk/field-hydrometry/field-hydrometry-services/rainfall-and-climate) was appointed by the project partners. Several rain gauges and river level gauges were installed accompanied by a dedicated flood risk web-based access.

26 Pathfinder communities now receive flood warnings relevant to risk (either from a local flood warning system or from the Environment Agency Flood warning service).

They are: Avonwick, Aveton Gifford, Broadclyst, Braunton, Buckfastleigh, Dawlish, Dawlish Warren, Feniton, Ilfracombe, Kennford, Kingsbridge, Modbury, Milton Combe, Newton St Cyres, Ottery St Mary, Topsham, Uplyme, Brixham, Torquay, Cockington, Churston/Galmpton, Preston/Occombe Valley, Paignton, Longbrook Street, Colebrook and Denham Close in Plymouth. In Torbay and Plymouth, the newly installed rain and river level gauges can be used by the local authorities to provide flood warning, review significant rainfall events and estimate trigger levels for other communities or areas that may not be covered by local flood plans. For example, Colebrook rain gauge is used for Longbrook Street.

At the time of writing this report, 31 local flood warning systems had been installed and the associated local flood groups were trained on how to use the data. As part of the training Torbay Council have produced a Website User Guide.

This was probably the most time consuming and resource intensive element of the pathfinder project. Most of the flood warning systems were installed between the summer 2014 and Spring 2015. At the time of writing this report and with the exception of Feniton and Kingsbridge, no communities had received alarms or activated their community emergency plan. In July 2015, the newly installed community owned river gauge in Kingsbridge sent an alert to warn of river level rising. This was used as a trigger to check the river bank. The river bank was cleared resulting in water flowing back to normal levels.

Specific flood warnings can now be delivered to at risk communities in advance of flood events. Devon Pathfinder communities have improved understanding of and warning of flood events and have triggers for implementing their community emergency plans.

"As flood warden co-ordinators, we receive text alerts when the alarm is triggered by heavy rain. We can then respond by helping vulnerable residents at risk of flooding, by checking that all the drain covers are clear of litter and by placing sandbags strategically around drains to divert the flow to other drains which are more able to cope. Once the alarm sounds, we know that we have to move quickly and we do!" **Feniton Flood Group**

Lessons learnt

Devon County Council took a different approach from Plymouth City Council and Torbay Council in managing, installing and providing the information from the flood warning systems. The difference of approaches and associated leanings are explained in the Case Studies section. Overcoming the challenges for taking up the ownership and future maintenance of such flood warning systems was the main obstacle. This was dealt with in different ways by the Devon Pathfinder partners. The various lessons from providing adequate early warning information such as flood warning systems to local communities can be found in the Case Studies section.

Increasing flood resilience in communities by ensuring that each community is fully equipped with the tools and basic defence

Achievements and outcomes

After reviewing the needs in each community, a package of local tools and measures were implemented. Recent experience has shown that small deficiencies in a range of infrastructure can make a significant difference both to the risk of flooding itself but particularly the speed at which both individual householders and communities as a whole can respond. This is especially important in rapid response catchments.

Baseline work identified a wide range of small infrastructure measures that could make a real difference. These range from the provision of sandbag stores and other flood equipment, small improvements to drainage infrastructure (e.g. bolted man-hole covers or installation of a secondary debris grill) and carefully targeted property-level protection in particularly vulnerable locations. Where appropriate, these have been complemented by signage at strategic locations. Suitable guidance was provided to the communities regarding the usage and deployment of signs. Such measures were identified and prioritised through the Community Emergency Planning process and this will likely ensure their effectiveness. The community has taken ownership and responsibility for monitoring and maintaining their operation.

As part of the project, a grant was awarded to each flood group for flood resilience equipment. This could include tools, stores, sand bags, Personal Protective Equipment (PPE) etc. At the time of writing the project plan in 2012, it was envisaged that most communities would be interested in sandbags and stores. It transpired that several communities considered other flood protection measures such as "aquasacks" or transportable flood barriers. It is interesting to note that in the space of two years the flood resilience market has evolved greatly. A wider variety of products are now available and experience shows that sand bags have their limitations. Each community is different and therefore has different needs. It was important that the groups set out their own shopping list with the support of the project facilitators.

In total 24 communities have accessed flood resilience equipment grants thanks to the Pathfinder Project.

"Works and equipment have made a huge difference in both feeling we are better prepared and able to cope should we flood again."
Kingsbridge Flood Group

21 of the communities involved have directly benefited from the Pathfinder grant purchasing flood resilience equipment and creating local community resilience stores. In addition, other communities such as Broadclyst, Topsham and Buckfastleigh Station Road Flood group were able to access a resilience grant from the Devon Community Foundation. Signage as well as PPE were also the most purchased items. Two communities also utilised their grant for creating dedicated local flood resilience websites.

In some circumstances additional grants were awarded for specific signage such as for Kingsbridge, Sheepwash and Broadclyst to limit the number of cars which in the past were found stranded on flooded roads. This is a typical problem that many communities face and a number one problem for emergency services as it stretches resources on the ground with fire and rescue services rescuing individuals from cars. It can also potentially lead to injuries or is a risk to life.

Over 30 properties benefited from individual property protection work.

27 properties in total were assessed for Individual Property Protection (IPP). These were carried out in Colebrook, Longbrook Street, Milton Combe and Tavistock. As a result IPP measures were installed to reduce the risk of flooding. Additionally to IPP surveys, new ways of delivering quick wins were piloted and tested in Milton Combe, Colebrook and Buckfastleigh in the view of reducing the risk of flooding for a group of properties instead of individual properties. In Longbrook Street in Plymouth, Floodstop barriers and portable inflating barriers in Milton Combe were purchased, the latter protecting up to 6 properties at one location. In Buckfastleigh, work was carried out to support some of the properties most affected by flooding in 2012 on Market Street and Station Road in Buckfastleigh. The quick wins included the raising of a pavement to allow surface water to flow directly in a nearby drain, relief holes in the wall of a bridge and the installation of flood gates and other property level protection measures to 15 properties. This was complemented by some minor works (blocking holes) on riparian walls. In this instance the minor works were carried out in partnership with the Environment Agency and Devon County Council and are designed to complement a future and wider community scheme. The minor works were the result of discussions between the local flood group, the residents and the flood risk authorities. The residents have been made aware that the quick wins are intended to help with and build some level of resilience for their property but are not designed to fully reduce flood risks. Although residents have been shown, in an induction session, how to use and deploy the specific measures, it was not possible to evaluate the successful deployment of such tools and measures during an actual flood event at the time of writing the report.

Devon Pathfinder communities are better equipped with the tools and basic defence measures they need. Devon Pathfinder Communities are better able to reduce the impact of flooding through implementation of local tools and measures.

Lessons Learnt

It was noted that the offer of tangible support in the form of equipment and/or a grant helps to engage with a local community and a flood group and bring about trust. This was noticed by all the partners while delivering the Pathfinder project. Originally the groups were awarded £2500 for purchasing Flood Resilience equipment. It quickly transpired that this budget needed to be increased and additional funding was made available to all groups in order to meet the groups' specific needs. Most groups chose to provide

some Personal Protective Equipment such as high-viz jackets, waterproof trousers, torches etc. which are costly and can eat up a sizeable proportion of the grant especially if the flood group is large.

Flood groups were encouraged to research and identify what equipment they needed. Most groups were originally very keen in purchasing sand and sandbags when this was not provided by their local authority. The facilitators emphasised the need to decide first what the sand and sand bags would be used for and if there was an expectation that this would be used as property level protection. This point was revisited during the Flood Warden training (see following section) under the "Sandbag" module where it was explained that a large quantity of sand and sandbags are required to protect a single front door of a property for example and that it is not quick to deploy. This reinforced the message that the group has a role to play in encouraging individual owners to protect their own properties and that the sandbags should perhaps only be used for emergencies or as a last resort for properties that have never flooded in the past.

Kingsbridge Flood Resilience Store.

Building local capacity by establishing and training volunteer 'Flood Warden' groups

Achievements and outcomes

Local Community Emergency Plans will only be fully effective if those implementing them on the ground have sufficient training and the community have an awareness of their existence. As noted earlier, the speed of response is critical in many of the communities. Rather than each community working in isolation, a county wide Flood Warden pilot training was offered to the pathfinder community to allow sharing of experience and best practice on managing Community Emergency Plans and volunteers. Consistently trained and prepared volunteers who are clear about their responsibilities and how to respond in an emergency situation are more likely to promote and deliver effective community resilience.

Communities are better prepared to cope during and after an emergency when everyone works together. The Flood Warden Training is aimed at community volunteers. The purpose of the Flood Warden Training is designed to help individuals act safely while providing the best level of support to their community during an emergency, such as flooding. The training was developed and is the property of Cornwall Community Flood Forum. Cornwall Community Flood Forum agreed for the Devon Pathfinder project to pilot the training with Devon communities. The training contained 6 modules covering:

an introduction to flood risk issues, the role of emergency services, the use of sandbags, the role of a flood group, health and safety risks awareness and Personal Protective Equipment.

The training has been developed to work alongside a community plan. To get the most out of the training, it was decided that the training would be provided to communities who had or were in the latter stages of developing, a community flood or emergency plan. Several community groups found the training useful as a mechanism to endorse a new or review an existing Community Emergency Plan. For example one of the Modbury Flood Group coordinators commented that their future action was to update their new Community Emergency Plan to reflect the learning from the training and explain the plan to their wardens.

Six training sessions were organised across Devon (in Modbury, Kingsbridge, Braunton, Buckfastleigh, Topsham and Feniton) where 2 or 3 communities would be represented each time. The following communities sent representatives to the Flood Warden training: Dawlish & Dawlish Warren, Modbury, Yealmpton, Braunton, Ilfracombe, Avonwick, Aveton Gifford, Kingsbridge, Ashburton, Buckfastleigh, Brixham, Paignton, Feniton, Topsham, Broadclyst, Newton St Cyres, Ottery St Mary and Uplyme.

18 communities trained local flood wardens. 120 wardens were trained. Flood wardens have a better understanding of flood risks. They feel they are able to implement their local community emergency plan and champion flood issues within their community.

"The Flood Warden training is the last piece of the jigsaw puzzle."
Modbury Flood Group

The returned Flood Warden Training feedback questionnaires show that:

- Overall communities are planning to take action following the flood warden training, with 96% saying that they would take action.

The communities felt that in equal measures, the most useful learning points from attending the flood warden training were:

- the role the community can play in reducing the impact of flooding,
- getting a better understanding of flood risk;
- learning about how to use sandbags effectively and their limitations;
- hearing from people responsible for flood management;
- learning about the risks of flood water and how to stay safe during a flood.

Lessons learnt

Providing training proved to be another positive incentive for communities to engage or finalise their Community Emergency Plans.

The right mix of trainers

The lessons learned are mainly on how to promote, present and deliver the training. The strong selling points were: the training was developed by flooded communities who experienced flooding in the past and delivered by the Environment Agency, Devon & Somerset Fire and Rescue Service and community representatives who brought trust and also confidence in the training as the trainers have specialist knowledge, experience and expertise. This is the ideal combination of deliverers. This makes the training very resource intensive and requires a high degree of planning and funding.

Attending the training not too early, not too late in the process

Managing expectation and also encouraging communities to attend the training at the right stage are important too. It was noted that individuals who were probably not given a detailed enough explanation of the aim and content of the training and the level at which it was pitched, expressed disappointment on the lack of locally focussed advice on how to activate their plan for example. The training aims were to help individuals act safely while providing the best level of support to their community during flooding. It was also designed to complement their work so far that they had achieved through the development of their Community Emergency Plan. The training was not available until the end of 2014 and the beginning of 2015. This was later than planned and unfortunately some flood groups had already finalised their plan. In hindsight the training should have taken place in the autumn of 2014 when most community groups were still finalising their plan. It was also noted that flood groups who had just started forming and had not written a draft Community Emergency Plan were slightly out of their depth in places during the training.

Some unexpected outcomes

The fact that more than one community was participating in the training sessions had some unexpected effects. It was noticed that participants were keen to share their experience and learnings during and after the training with some groups offering to circulate their Community Emergency Plans or their list of resilience equipment. By realising that they were not the only ones working on flood resilience, it validated their effort as a community. Additionally the involvement of a long standing flood group representative (Charles Richards from Par, St Blazey) in the delivery of the Flood Warden Training also helped validate their personal endeavour. It was interesting to note that, in many cases, attending the Flood Warden Training was the first opportunity for members of a same group to meet each other. Perhaps a training session has a strong rallying effect compared to regular flood group meetings.

The training also brought local communities together. Communities still at the early stages of writing their plan and organising their flood group have expressed the need for additional networking opportunities to learn from others. It has raised the question of finding a forum that would allow Devon communities to network in the near future. Suggestions and ideas on the subject are in the Project Legacy section.

Flood Warden Training in Braunton in January 2015. 'The Role of the Emergency Services' module delivered by Matt Herdman from the Devon & Somerset Fire & Rescue Service.

Case study

Devon communities at risk of flooding benefit from local flood warning systems

Background

With pre-planning, community involvement and innovative methods of disseminating messages to communities at risk, the most effective response to flooding can often be taken by local people themselves if they are forewarned.

The DEFRA funded Devon Pathfinder project piloted the installation of community-based flood early-warning systems to detect and respond to flood emergencies that are prepared and managed by the communities. The wireless ICT-enabled system helps manage flood or flash flood risk by providing early warnings to communities at risk of flooding.

Technology and installation

For each Pathfinder community a review of their local catchment to determine flood risk factors was the first task before identifying the most appropriate data systems to support localised advance warning of potential flood events.

The ability of individuals and communities to access information easily has been highlighted as a major factor in both raising awareness and responding rapidly at times of elevated flood risk.

The local communities involved in the project were all encouraged to register to the Environment Agency Flood Warning Service where it is available in their local area. Existing Environment Agency systems are, generally, located in Main River locations and provide warning of major fluvial flood events which build gradually. These systems do not provide the specific detail required in many smaller, but high risk, communities and in particular for rapid response catchments that are the focus of this Pathfinder Project.

The installation of local telemetered river level gauges and rainfall-based warning services was identified as one possible answer to provide vital early warning in rapid response and vulnerable catchment. Data available at a suitably early stage and

in a format that enables them to respond rapidly to emerging flood risk was therefore provided to local communities.

This ICT solution consisted of two units – a GPRS (General Packet Radio Service - a method of enhancing 2G phones to enable them to send and receive data more rapidly) telemetry enabled logging device and a suitable sensor. In the case of a river level gauge, the telemetry unit is installed on the riverbank above the maximum flood level. A pressure sensor to detect the water level is linked to the logger and a reading is taken at routine intervals. When the water reaches a critical level, a signal is wirelessly transmitted to an IT server via a GPRS signal. The flood warning is then disseminated via text messages and emails to concerned vulnerable communities at risk of flooding. Critical flood levels are set with the help of the local community and can be refined as more data becomes available.

In the case of rain gauge, the monitoring system is installed at the top of a river catchment. A simple tipping bucket gauge is used to register the rainfall with each 0.2 mm given a time stamp. When the frequency and quantity of rainfall reaches a certain level a predefined intensity threshold is passed, the same technology as per river level gauges is used to warn the local community of the risk of flooding.

The flood warning systems are accompanied by a dedicated flood risk web-site which can be accessed by the local community. The community can access real time information about their local flood risk whenever they want.

The installation of the local flood warning system was commissioned by the local authorities: Devon county Council, Plymouth City Council and Torbay Council and was contracted to the flood warning specialist Hydro-Logic Services. The siting of the gauge required the technical input from the Environment Agency based on their knowledge of the catchment. Data from the rain or river gauge is available to view on line, and recipients of the warning messages can be managed online as well as the content of the messages. The website also contains an historic record of rainfall, and information on when trigger levels are exceeded. Trigger levels were set in accordance to advice from the Environment Agency and with reference to previous flood events and local knowledge. Records are available to view from 1 day to 1 year, at intervals from 15 minute values to daily rates.

The communities that benefited from the installation of a local flood warning system are Aveton Gifford, Braunton, Broadclyst, Buckfastleigh, Dawlish, Dawlish Warren, East Budleigh, Feniton, Ilfracombe, Kingsbridge, Modbury, Milton Combe, Newton St Cyres, Ottery St Mary, Shebbear, Brixham, Torquay, Cockington, Churston/Galmpton, Preston/Occombe Valley, Paignton, Longbrook, Colebrook in Plymouth. Two flood warning systems were coupled with electronic signs where roads flood regularly in the hope of limiting the numbers of vehicles being stranded in flood water or creating more flood damage to nearby property by driving through flood water. In total 26 communities across Devon benefited from local flood warning installations and 31 gauges were installed (rain and/or river).

Procurement

The Pathfinder partners went through a joint procurement process saving time and money to the three local authorities.

Managing the local flood warning systems: The different approaches

Devon County Council took a different approach from Plymouth City Council and Torbay in managing, installing and providing the information from the flood warning systems. Although it was a time and resource intensive element of the pathfinder project, the Devon Pathfinder communities have improved understanding of and warning of flood events and have trigger for activating their local flood plans.

River gauge near Aveton Gifford.

Torbay Council

Torbay Council has opted to install, maintain and provide public access on a website of 15 rain and river gauges covering the communities of Torquay town centre, Cockington Village, Occombe Valley in Paignton, Paignton town centre, Churston and Brixham. Torbay Council will act on the flood alert and pass the information to the communities at risk. In addition Torbay Council have produced a guide for residents on how to understand the information contained on the web site.

In order to assist with flood management partners Torbay Council have provided log in details to the Environment Agency, South West Water and Torbay Council's Emergency Planning department. The information provided from the rain gauges although specifically located within the rapid response catchments can be used to provide rainfall information to the remaining areas of Torbay. This is especially useful in fulfilling Torbay Council's duties under the Flood and Water Management Act 2010 for investigating flooding incidents.

Due to the importance of the rain and river gauges for Torbay Council, they have taken the decision to retain ownership of the gauges and will fund the maintenance costs rather than pass them on to the individual communities.

Plymouth City Council

Plymouth City Council has installed one flood warning system in Colebrook and will maintain it in the foreseeable future. Since the rain gauge has been installed, it has provided rainfall data for an additional community at Longbrook Street in Plympton. This community has also flooded from surface water run-off, and a Flood Group was set up by the residents in the same manner as that of Colebrook. The rain gauge issues an SMS to the Flood Group

leader if a set trigger level is exceeded. This trigger level can be set differently to the trigger level for Colebrook. The rain gauge data is available to the Environment Agency and Plymouth City Council Emergency Planning. The gauge provides information about rainfall for the Plympton area, but also can provide some useful information for the rest of the city, especially quantifying the intensity of heavy overnight rainfall.

Devon County Council

Although pathfinder paid for the purchase, installation and 3 years maintenance of the rain and river gauges, the ownership was handed over to each individual community. This obviously slowed the process down as in most cases the parish council or town council needed the flood warning system ownership approved by the members. As each location is dealt with individually, it engenders high level of ownership from members of the community in question as they are encouraged to help identifying a suitable site based on local knowledge but also help identifying and liaising with land owner in order to get permission to install the equipment.

This approach takes time as separate meetings are needed to site and set up each gauge and seek formal approval from the local parish or town councils. When land owners are not known by the local community a land search is required which can also be a lengthy process. In most cases the main barrier for the take up of a local flood warning systems was in fact maintenance costs.

Maintenance costs vary from £200 to £700 per year. Some parish councils do not have much budget to spare. One way of overcoming this issue in the short term was for the Pathfinder Project to cover the cost of maintenance for the first three years. This allows communities to assess the benefit of maintaining such equipment and find ways of funding future maintenance costs. Training was provided to the local communities on how to access the river and/or rain gauge information on line but also on how to set or change the alarm threshold if required.

Training with Ottery St Mary Flood Group on how to manage the local flood warning system.

Case study

PATHFINDER PROJECT

Community Flood Resilience in Kingsbridge

The most effective response to flooding can often be taken by local communities themselves if they are aware, prepared, trained and can respond.

The DEFRA funded Devon Pathfinder project worked with 24 communities of different sizes in Devon helping them to build local flood resilience. Kingsbridge is one of them.

Background

Kingsbridge is a small estuary town on the South Devon Coast. The town has a population of 5,887. Several small watercourses rise north of the town on higher grounds and flow south to converge in the town before discharging into the estuary. Kingsbridge is particularly prone to flooding when fluvial flows try to discharge during a high tide event. Fluvial flooding is also associated with the small watercourses flowing in and out of manmade culverts and channels.

Kingsbridge Fire Station is within the flood risk area. The town is located in the popular Salcombe Estuary and as such the population may rise significantly during holiday periods. Visitors may be unfamiliar with the local area or flood risk, and may not speak English. There are also several pubs, restaurants and shops within the flood risk area, where large groups of people may congregate, especially in the summer holiday season. Kingsbridge also has a higher percentage of people over the age of 65 living in the town than the average across England and Wales.

Approximately 460 properties are at risk of flooding (low to high risk) and 388 properties lie within areas at risk of surface water flooding as shown on the Environment Agency's current Flood Maps. The Environment Agency has classified Kingsbridge as being located in a Rapid Response Catchment; consequently they consider that a special flood risk (risk to life) exists in Kingsbridge due to:

- Convergence of small steep sided valleys and rivers that respond rapidly to rainfall
- High tourist populations in the summer when there may be visitors without knowledge of flood risk
- No appropriate flood warning service

The Environment Agency's Rapid Response Catchment modelling has calculated that:

- The Time to Peak (time between rainfall starts and water entering the local rivers) at Kingsbridge is less than 1 hour.

Kingsbridge has a long history of flooding including regular tidal flooding of the quay and surrounding buildings with the earliest event recorded dating back to 1963. In December 2012, heavy rainfall caused widespread flooding, 28 properties flooded. In the winter 2014, 13 properties flooded. There are several culverted sections of watercourse, which contributed to recent flooding due to blockages. Sewage flooding was also experienced on many occasions.

The Environment Agency and the Local Authority have powers for flood risk management and maintenance of the watercourses in Kingsbridge. In 1984, South Hams District Council constructed a scheme that alleviated the flooding on one of the watercourses. There are no other formal flood defences in Kingsbridge.

Early Engagement and Multi Agency Support

According to Keith Wingate, chairman of the Kingsbridge Flood Resilience Committee and Martin Johnson (Town Council Clerk), regular tidal flooding had almost become part of Kingsbridge's life with for example pub regulars reported by the local news in 2009 to enjoy a pint in the middle of flood water. The realisation that business as usual was no longer an option occurred at the time of the 2012 severe floods due to heavy rainfall and high tide.

Following the event, Devon County Council organised a flood recovery surgery as part of their Lead Local Flood Authority duty to investigate. The Environment Agency Community Engagement Officers with Kingsbridge Town Council, South Hams District Council and South West Water facilitated the surgery together, and this partnership formed the foundation for future team work as part of the Pathfinder project. The surgery provided the opportunity for homeowners and businesses to share their story ask questions and find information to support their recovery. It was also an opportunity for the partners to fully understand Kingsbridge's flood risk (e.g. which roads flood first, which drains are susceptible to block, which manhole covers raise during floods) and identify vulnerable people in the community such as residential care homes and rest centres. This background information would become very useful when creating Kingsbridge Community Emergency Plan.

Town Council led Flood Resilience Committee

Following the 2012 events, Kingsbridge Town Council recognised the importance of flood resilience as part of local flood risk management and set up a Flood Resilience Committee, so that it became a standing item for the town council's meetings and remains an ongoing priority. The committee is made up of local councillors, the Town Clerk and the Town Mayor. The Flood Risk Management Authorities as well as the Police and Fire & Rescue regularly attended these meetings. The benefits of this approach included:

- Transparency for parishioners, because minutes from Flood Resilience Committee meetings are published on the town council's website.

- Accountability, because Kingsbridge Town Council could flag flood risk management issues to the various flood risk management authorities for investigation/consideration and track progress. In the group's words, this helped them to, "pull all of the flood risk management strands together," which is particularly beneficial when lots of different organisations have a role to play with respect to flood risk management and flood resilience. Kingsbridge Town Council feel that the Flood Resilience Committee has given them leverage to successfully lobby for flood risk management solutions for the town.
- Participation in the DEFRA funded Pathfinder Project led by Devon County Council. In July 2013, the Flood Resilience Committee immediately saw the advantages of being part of the project as it offered funding and specialist assistance. The project helped with carrying out local flood awareness raising activities, installing and receiving local flood warnings, flood warden training, facilitating the writing of a Community Emergency Plan and purchasing flood resilience kit and equipment.

18:15 – 4x4 at town square,
"slow flood" and "road closed" signs.

Community Emergency Plan and Awareness Raising

As part of the Pathfinder project an emergency planning specialist was appointed by Devon County Council to support the writing of a local emergency plan. A template was provided and the facilitator guided the committee through the process. The Environment Agency's Community Engagement Officer provided advice regarding flood warnings, local flood forecasting and how these triggers could be incorporated into the Community Emergency Plan. The committee was also advised on what actions could be taken before, during and after a flood to help the community stay safe and minimise damage. The local Police and Fire and Rescue teams took part in the development of their plan. This has strengthened the relationship and both parties know they can call on and support one another to deal with local flood incidents. For example, the committee use their local knowledge to advise the police which roads to close during flooding. Fire and Rescue position their 4x4 to help divert traffic around flooding and discourage pedestrians and vehicles to travel through floodwater.

The Flood Risk Management Authorities assisted the Flood Resilience Committee in exercising their plan. The group was given a number of mock scenarios covering flood events which they were told to respond to using the plan. The exercise was held to identify what works in the plan and whether any aspects could be improved so that the town is prepared and can cope during a flood event.

Kingsbridge Flood Resilience Committee activated their plan to respond to flooding during the Winter 2014 storms and as a result reduced the volume of traffic driving through floodwater, helping to keep drivers safe and limiting property flooding from

bow waves from vehicles. A review of the plan was carried out and improvements were made as a result of the flood event.

The writing of the plan and regular discussions with Risk Management Authorities helped Kingsbridge Flood Resilience Committee understand the importance and benefits of recording local flood history and reporting flooded properties to Risk Management Authorities as evidence of the need for remedial action. As a result of writing the plan, Kingsbridge Town Council developed their own coastal flood forecasting techniques, based on previous tidal flooding experience.

This process also helped the Flood Resilience Committee understand the roles and responsibilities of all organisations that can help with managing flood risk, e.g. Environment Agency, local authority flood risk management/engineering teams, local authority emergency planners, Devon and Somerset Fire and Rescue Service and local Police teams.

Kingsbridge's local flooding knowledge has been shared with the Risk Management Authorities and is helping to inform a catchment study for possible engineering solutions for flood risk management.

During and after the writing of the emergency plan, the Kingsbridge Town Clerk developed with the help of Devon County Council and the Environment Agency messages in the form of posters and local press releases to raise awareness about local flood risks. A flood awareness event also took place at Kingsbridge Library in November 2014 led by the Environment Agency and their national campaign "Floods destroy, be prepared".

Flood Resilience Equipment, localised flood warning and volunteers training

The Pathfinder project also funded the provision of flood resilience equipment. The equipment list was drawn up as a consequence of writing the emergency plan. The equipment consists of Personal Protective Equipment such as high visibility jackets, but also road signs, walkie-talkie radios, sand bag, sand hoppers, as well as the installation of electronic signs on The Quay.

Devon County Council, the Environment Agency and Kingsbridge Town Council worked together to install local flood warning systems in the community, to help the Flood Resilience Committee decide when to activate their emergency plan for flooding. Devon County Council appointed Hydro-Logic Services to install a rain gauge and river level gauge within the town. The Environment Agency provided expert advice on where to site the gauges. The Pathfinder project paid for the installation and first three years' maintenance costs for the gauges. Hydro-Logic Services trained the committee members on how to access the data from the gauges online and how to receive flood warning alarms. Kingsbridge Town Council owns the gauges and has agreed to fund the ongoing maintenance in the future.

To build confidence and equip volunteers with the knowledge and skills to safely activate the emergency plan, the Pathfinder project also offered a Flood Warden training. The training, organised by Devon County Council, was delivered to Kingsbridge flood volunteers by the Environment Agency staff, Devon and Somerset Fire and Rescue Service and Charles Richards a community member from Cornwall Community Flood Forum who led the development of the training.

Cornwall Community Flood Forum (CCFF), via Cornwall Council's Pathfinder Project, agreed the use of the training materials. The training is designed to help flood volunteers understand flood risk, how it's managed, how to stay safe during flood incidents and how to work alongside emergency responders.

Peer to peer support

Through the life of the Pathfinder project it became apparent that peer to peer support had a positive effect on the communities involved. Indeed, Kingsbridge Flood Resilience Committee had the opportunity to observe the nearby community of Yealmpton when they tested their own plan which opened the doors for networking, mutual support and the adoption of good practice. It also validated the decision for Kingsbridge to work on building community flood resilience locally. Kingsbridge Town Council was in turn able to offer such support to Brixham Town Council with Cllr. Keith Wingate sharing his experience of developing Kingsbridge's Community Emergency Plan and its key features. This was a decisive intervention in engaging Brixham in the Pathfinder project.

It's important to stress that Kingsbridge Town Council's and the Flood Resilience Committee's motivation, tenacity, professionalism, positive can-do attitude, and strong links with their community, throughout the whole project, are core components of their success.

Kingsbridge Flood Resilience Committee is very clear that although they and the Community Emergency Plan will help organise any relief effort in the future, the work is not finished as on going awareness raising is required for people to become more self reliant and prepared. It is essential for people who live in the flooding areas to have their own measures in place to protect themselves, their belongings and their properties.

Kingsbridge Flood Resilience Store.

Case study

PATHFINDER PROJECT CASE STUDY

Community Flood Resilience in Colebrook, Plympton

The most effective response to flooding can often be taken by local communities themselves if they are aware, prepared, able to act and trained.

The DEFRA funded Devon Pathfinder project worked with 24 communities of different sizes in Devon helping them to build local flood resilience. Colebrook in Plympton is one of them.

Background

Colebrook is a small residential community in Plympton, part of the east side of the Plymouth conurbation consisting of approximately 150 properties. The area lies within the Environment Agency's (EA) indicative Flood Zone 3, with flood risk from two watercourses: the Boringdon Stream and the Tory Brook. Located at the foot of a steep sided catchment, the village community is also at risk of flooding from surface water run-off and surcharged combined sewers.

During November and December 2012, 30 properties were flooded from accumulated surface water, groundwater and surcharged combined sewers, with 8 of these having flooded twice within one month.

A holistic support provided

Following a number of Public meetings that followed the flooding, the residents were advised of the benefits of forming a Community Flood Group, with the support of Plymouth City Council (PCC), the Environment Agency and the Community Pathfinder Programme.

Once established, the flood group with nominated Co-ordinators, held and continues to hold regular meetings, attended and supported by the local MP, ward Councillors and EA and PCC representatives.

In order to reduce the long term risk of flooding to the Colebrook community, Plymouth City Council, the Environment Agency and South West Water Services Ltd, liaised to develop a flood alleviation scheme to remove surface water from the combined sewerage system.

The Community pathfinder funding supports the Flood Group through the following:

- Establishment and Implementation of a Community Flood Plan
- Individual property protection to 14 properties
- The provision of sandbags, a store and installation training
- Personal Protective wear for Flood Co-ordinators
- Flood warning and emergency road signs
- Flood Warden training

Local Flood Warning

Another aspect highlighted as being of benefit to the Flood Group and community was the use of a rain gauge to provide advance warning of the heavy, intense rainfall likely to cause surface water flooding in the rapid response catchment.

Existing flood warning was generated by adjacent watercourse levels. It was proposed by PCC to install a rain gauge within the Colebrook catchment to assist with flood warning. Hydro Logic were approached and supplied a rain gauge with telemetry that records rainfall and sends out SMS and email messages when pre-determined trigger levels are exceeded. The unit uses the mobile phone network to issue alerts, and also uploads the rainfall data to a website. The unit is battery powered and self-contained, making remote siting possible. Following the company's and EA recommendations, a site for the rain gauge was located in the grounds of the nearby Boringdon Hall Hotel, located near the top of the catchment. An agreement with the Hotel was reached, with the Hotel permitting the installation in an unused area of land in the Hotel grounds.

Data from the rain gauge is available to view on line, and recipients of the warning messages can be managed online as well as the content of the messages. The website also contains an historic record of rainfall, and when trigger levels are exceeded. Trigger levels were set in accordance to advice from the Environment Agency and with reference to previous flood events.

Since the rain gauge has been installed, it has provided rainfall data for an additional community at Longbrook Street Street in Plympton. This community has also flooded from surface water run-off, and a Flood Group was set up by the residents in the same manner as that of Colebrook. The rain gauge issues an SMS to the Flood Group leader if a set trigger level is exceeded. This trigger level can be set differently to the trigger level for Colebrook.

The rain gauge data has been made available to the Environment Agency, PCC Emergency Planning as well as the Flood Risk Management team. The gauge provides information about rainfall for the Plympton area, but also can provide some useful information for the rest of the city, especially quantifying the intensity of heavy overnight rainfall.

Hydro-Logic rain gauge.

Economic benefits

It was anticipated that around 4,200 properties in 24 communities would benefit from the Pathfinder project which would equate to around 10,000 individuals assuming an average of 2.4 individuals per dwelling.

The precise number of dwellings benefitting from the project both directly or indirectly is difficult to calculate as neighbouring communities are also likely to benefit from some of the resilience measures, such as helpful signage. The project activities offered individual properties the potential to reduce the financial cost of damage from flooding. Whilst the actual risk of flooding would only reduce where specific physical measures are introduced (either at community level or individual property level), in all cases the severity of impact would be reduced, particularly minimising the damage to contents and vehicles.

In Plymouth, some locations suffered frequent 'low level' flooding. While flood levels were not especially deep, they were frequent, up to four or five times a year, and in some cases, twice within a month. Damages for each event may not be as high (although collectively the cost could be significant) but they are frequent and possibly would have been met direct from the householder rather than an insurance company claim.

Perhaps we also need to stress the economic benefits associated with quick flood recovery. For example, if businesses are prepared for flooding they are more likely to be able to open their doors for business more quickly after a flood. For example, in Lostwithiel, a barber shop was able to open its doors 24 hours after a flood event, as a result of property protection being installed. As well as avoiding damages, they also avoided a reduction in their turnover. "By taking action to prepare in advance for flooding, most businesses can save between 20 and 90 per cent on the cost of lost stock and movable equipment, as well as some of the trouble and stress that goes with such an event." (Source: EA leaflet, Would Your Business Stay Afloat?)

It is hoped that the Pathfinder projects outcomes will be discussed with the insurance industry alongside the potential savings noted above with a view to the development of a pilot insurance cost reduction based on the level of community resilience and basic protection scheme. This could include some form of accreditation of Community Action Plans for insurance purposes which could be used in a similar way to the Neighbourhood Watch scheme in reducing the risk of burglary.

How to...
recommendations

Activity	**Drawing up a Community Emergency Plan or Flood Plan**
Audience	Direct audience: Parish and Town Councils, neighbourhood wards, community partnerships and flood groups themselves. Indirect audience: Residents.
Who can deliver	Emergency Planning officers, local authority engineers, Flood Risk officers, Environment Agency staff, consultant or voluntary organisations with specialist skills in emergency preparedness, or another community that has experience in drawing up a community emergency plan.
What	Facilitating the writing of a Community Emergency Plan or Flood Plan with members of the flood group.
Method	If possible, regular face to face meeting with the Flood Group members in charge of writing the Community Emergency Plan or Flood Action Plan. Agree milestones at the beginning of the facilitation work and ensure that actions or steps are agreed at the end of each meeting for the next meeting. Offer templates and guidance on the content of the plan. Quality check the plan and organise a 'desktop' exercise to identify gaps and weaknesses. Usually a flooding scenario is proposed and the group is asked to explain what they would do according to their plan. Invite observers to attend the desktop exercise such as the Fire and Rescue Service, the Police, the Environment Agency and Emergency Planning officers. Finalise the plan and communicate the plan to residents. Inform local authorities.

Resources	**Facilitator's qualities and skills.** Driven, enthusiastic and supportive individual with strong facilitating skills. The facilitator needs to proactively involve other partner organisations from Risk Management Authorities and emergency responders, to support the community, but also to help them understand what the different organisations are able to offer during a flood. The need of the user must be the focus and no one template fits all should be imposed. Flexibility in the approach is imperative. Every community is different. Each flood group and flood coordinator' skills vary and the facilitator needs to be flexible and adaptable, being prepared to work evenings. Sharing examples of other completed CEPs with audience adds value, and assist networking and the sharing of lessons learned between communities. **Facilitator's role.** The plan should not be written by the facilitator but by the flood group. Guidance and feedback should be the main activities that the facilitator is providing to support the writing of the plan. **Time.** Depending on the flood group coordinator and the flood group, the writing of the plan can be lengthy. This is sometimes due to a lack of time. Facilitator's time input will need to be short but regular over a long period of time. This is particularly true if the group needs regular encouragement to progress the plan or in finalising it. **Peer to peer support.** Other communities who have successfully written their plan can be mentoring new communities. **Training.** The facilitator may need to be trained in writing CEPs or Flood Action Plans or in facilitating skills if not already acquired. **Local agencies and authorities.** Will be able to advise and maybe check that the plan is adequate.
Outcome	A Community Emergency Plan or Flood Action Plan that is quality checked or tested, endorsed and publicised and regularly reviewed. The flood group is confident to act in the event of flooding.

Risk Table

Potential risks	Likelihood	Impact	Mitigation
Inadequate facilitators skills	Likely	Poor quality or non-finalised CEP. Unconfident group.	Training
Difficulty in finding a local volunteer / representative	Likely	Challenge in progressing the plan. Difficult to engage with others. Lack of local knowledge. Incomplete process.	Perseverance. Use Fire and Recue and local Police knowledge. Approach other well established groups.

Activity	Purchasing Resilience Equipment
Audience	Direct audience. Parish and Town Councils, neighbourhood wards, community partnerships, flood groups and residents.
Who can deliver	Parish and Town Councils, neighbourhood wards, community partnerships and flood groups.
What	Purchasing and storing flood resilience equipment such as sandbag stores, signs, high viz jackets and other Personal Protective Equipment (PPE).
Method	Identifying a list of appropriate resilience equipment. Purchasing the equipment. Adequately storing the equipment so that it can be deployed quickly and easily in the event of flooding.
Resources	Advice – Signposting from local agencies and authorities, or from established flood groups. Financial. Councillors community grant, Award For All and other Lottery grants, Community Foundation grant, other local resilience grant funding such as sustainable development funds, charitable trusts etc. Donation, sponsoring or fund raising.
Outcome	The community has the adequate equipment to deal with flooding events.

Risk Table

Potential risks	Likelihood	Impact	Mitigation
No grants available	Unlikely	No resilience equipment is purchased. Groups less equipped and confident in tackling flooding events. Flood volunteers putting themselves at risk.	Donation, fund raising.
Funding source unknown	Likely	Delayed the purchase of resilience equipment. Group may face a flood event without equipment.	Information on funding and grants provided to Flood groups. Local authorities providing links to local funding opportunities.
Equipment not stored or deployed appropriately	Likely	Properties flooded.	Training.

Activity	**Flood Group/Warden Training such as the Cornwall Community Flood Forum Training package**
Audience	Direct audience: Community volunteers and/or members of Parish and Town Councils, neighbourhood wards, community partnerships and flood group members themselves. Indirect audience: Residents.
Who can deliver	Multi Agency delivery. Staff form the Environment Agency, the Fire and Rescue Service, the Police, the Local Authorities (emergency planners, flood risk officers) and experienced flood group members.
What	Delivering training.
Method	Over a full day or two evenings. A longer training would deter volunteers to attend. Be clear on the aim of the training not to raise expectation. Allow for interaction and questions.
Resources	Training Material. Handouts. Experienced trainers. Venue.
Outcome	Flood group safely and confidently activating Community Emergency Plan or Flood Plan in the event of flooding.

Risk Table

Potential risks	Likelihood	Impact	Mitigation
Training is not freely available	Possible	Training cannot be delivered. Reduce confidence and awareness level of group.	Find community grant to pay for accessing or using the training.
Multi agency don't have the resource to support the delivery of the training	Likely	Lower quality training or no training.	Identify mentors or experienced community members that can support the delivery of the training instead (ex fire service, police, EA staff, experienced flood group members).
Training is only available online	Likely	No questions answered or opportunity to share good practice or experience. Missed opportunities for added-value learning.	Find community grant to pay a trainer. Organise feedback sessions between volunteers.
Non-engagement by the communities	Possible	Untrained volunteers. Inoperable Community Emergency Plan.	Encouragement, provision of advice and support.

Project legacy

The flood group members who responded to the questionnaire overall found the assistance received from the pathfinder project valuable to very valuable.

The most useful thing(s) the pathfinder helped the groups with were: accessing funding for localised telemetered flood warning systems, liaising with the various agencies in charge of flood risk in order to find short term or long term solutions to flood problems, helping recruit volunteers and flood wardens, writing a Community Emergency Plan or Flood plan and generally finding out information.

When asked what could be improved in terms of the overall Pathfinder support, there were various comments, The trend of response was focussing on continuing information exchange and networking with other communities, and continued support from all the agencies with a single point of entry/portal.

Flood Group Starter Pack

The project tested various ways of engaging with communities on building local flood resilience by offering a menu of help and support and testing various methods of support. The project officers encouraged communities to access the support in a specific order, however some communities opted for an "à la carte menu" or picked a different order due to volunteer's time constraints. The Devon Pathfinder project came to the conclusion that the most effective way of building community flood resilience can be summarised in simple steps. The project has decided to create a starter pack for non-Pathfinder communities who wish to embark on such a process. The starter pack has been developed in partnership by Devon County Council, Plymouth City Council, Torbay Council and the Environment Agency. The pack will be available electronically. It is planned to be launched in the middle of the year 2015 via local resilience forums. A link to the pack will be available on the Risk Management Authorities websites.

Devon Community Resilience Forum

Local Authorities, The Environments Agency, emergency responders as well as community representatives are developing a Devon Community Resilience Forum with an internet presence and possibly six-monthly events. Start up funding has been allocated and further funding opportunities are being considered and sought to sustain the forum in the long term. The forum will

be community led. The Pathfinder project has agreed to support the creation of the website. Indeed the Pathfinder flood groups have expressed the need to have one point of entry for flood resilience issues and information. The flood risk management roles and responsibilities in Devon are very complex due to two tiered local authority set up and the existence of two unitary authorities. The website will be able to explain who is responsible for what area of flood risk management for example as well as providing practical information and guidance including the Flood Group Starter Pack. Although the forum is community led, it would be supported by the various Risk Management Authorities and emergency responders, which in turn will strengthen local partnership working.

Embedded flood community resilience facilitation within flood risk management roles and sustained partnership working

It is clear that building community flood resilience, including raising awareness about flood risks and strengthening partnership working is an increasing part of the flood risk management process. This is in line with the existing Local Flood Risk Management Strategy for Devon.

Each partner has decided to carry on or integrate the role of community flood resilience facilitator in existing flood risk management roles. At the Environment Agency in spite of budget restrictions, 1.5 full time equivalent post will remain delivering community resilience support in Devon. The support will be in the form of events that multiple communities can attend at the same time, alongside meetings and the provision of guidance and information such as the starter pack.

Torbay Council and Plymouth Council have decided to integrate the community flood resilience facilitation role in their existing flood engineer post and support new communities who are in need of guidance. This will also include supporting existing flood groups, new groups and provide guidance around securing funding for future works.

At Devon County Council, it is envisaged that the role of facilitation, to support communities as and when required, will be jointly delivered between the existing Flood Risk officers' roles and the emergency planning officers, depending on level of input and expertise required.

In all cases it is envisaged that the Starter Pack and the future Devon Community Resilience Forum will be assisting existing staff in their continued or new role and allow partnership working and multi-agency support to be sustained.

Appendix

Examples of community awareness raising activities

Aveton Gifford flood page
www.aveton-gifford.co.uk/local-info/flooding-in-ag

Buckfastleigh Lower Town flood Facebook group
www.facebook.com/groups/494186404017169/?pnref=lhc

Newton St Cyres flood risk page and newsletter articles
www.middevon.gov.uk/newtonstcyres/index.aspx?articleid=10484

Uplyme flood page
uplymeparishcouncil.org/flood-news-and-reports

Ottery St Mary's flood page with articles
www.otterystmary-tc.gov.uk/Ottery-St-Mary-Town-Council/Default-24397.aspx

Ilfracombe December 2014 North Devon Journal article
www.northdevonjournal.co.uk/Battle-flooding-Ilfracombe-needs-volunteers/story-25759474-detail/story.html

Ilfracombe Flood & Resilience Network
www.ilfracombefloodresilience.co.uk

Braunton North Devon Journal article January 2014
www.plymouthherald.co.uk/Emergency-services-new-Braunton-flood-plan-test/story-20522920-detail/story.html

Braunton Community Flood Guide
www.brauntoncommunitynews.co.uk/braunton-flood-guide.html