

Civil society contributions to local level flood resilience: Before, during and after the 2015 Boxing Day floods in the Upper Calder Valley

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There is an increasing emphasis on the local level as well as growing expectations regarding civil society actors in flood-risk management in the UK. However, not enough is known about the potential contributions of civil society to flood resilience at the local level. This paper addresses this knowledge gap by conceptualising flood resilience at the local level across three phases inherent to flood disasters: pre-flood, during the flood and post-flood. These phases act as the foundation for this paper's exploration of the contributions of civil society to local-level flood resilience. Data were collected before, during and after the 2015 Boxing Day floods through interviews (in 2015 and 2017) and from secondary data sources. The paper identifies the importance of time and place when analysing civil society contributions to local level flood resilience. These contributions were dynamic over time with a strong initial response that diminished over time due to apathy, “active forgetting” and lack of further exposure. Exposure and a sense of community strongly influenced civil society contributions to flood resilience in the Upper Calder Valley. Issues of representation and varying place-based capacities were also identified as relevant for flood resilience-based policies. These results have larger implications for our understanding of the contributions of civil society actors to flood resilience and suggest that while they can deliver better local context-specific approaches, there needs to be caution over the long-term sustainability and longevity of their contributions.

KEYWORDS

civil society, England, flood groups, flooding, resilience

1 | INTRODUCTION

Flooding is becoming an increasingly urgent societal issue that will worsen in the future. Recently, European countries have experienced damaging flood events, the causes of which can be broadly grouped into issues relating to: a lack of “conscientious planning” (Restemeyer et al., 2015, p. 45), urbanisation (Hegger et al., 2016) and outdated infrastructures (Scott, 2013). These causes are expected to be exacerbated by climate change-induced impacts such as increases in the duration, frequency and intensity of high precipitation events, and sea-level rise (Hegger et al., 2016; Restemeyer et al., 2015).

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It is not only the intensity and frequency of flooding that is changing, but also the flood-risk management (FRM) approaches applied in practice. In the last few decades, there have been two important shifts in FRM approaches. The first shift that FRM is experiencing relates to the changing roles and responsibilities of both public and private actors. There has been a change in the actors involved with a shift from “government” to “governance” and a greater role for non-state actors (Mees et al., 2016; Meijerink & Dicke, 2008). In England, there has been a shift towards spreading FRM responsibilities across a broader range of actors in addition to the state (Johnson & Priest, 2008; Nye et al., 2011) and a greater relevance of the local level in FRM since the 1990s (Begg et al., 2015; Coates, 2015; Twigger-Ross et al., 2014). As part of this shift, there has been an increased focus on empowering and increasing the role of local non-state actors, such as citizens and communities, especially at the local level (Begg et al., 2015; Forrest et al., 2017; Johnson & Priest, 2008; Nye et al., 2011). The combination of increasing flood events, non-state-actor involvement in FRM and emphasis on the local level has led to a growing relevance of civil society in FRM.

The second shift is the growing prominence of the “resilience” approach in FRM theory and practice (Restemeyer et al., 2015). In many European countries, over the last few decades, the policy discourse on FRM has been moving from a focus on flood-defence systems based on flood-risk “certainty” towards a more holistic flood-resilience approach, acknowledging that floods cannot always be prevented, but their impacts can be reduced (Meijerink & Dicke, 2008; Nye et al., 2011; Schelfaut et al., 2011; Scott, 2013). The concept of flood resilience also accommodates the growing uncertainty associated with flood risks due to climate change and relates land use with anticipated damages, which is especially attractive to planners (Restemeyer et al., 2015; Woltjer & Al, 2007). This focus change from prevention to anticipation gives more importance to social and spatial measures, which shifts the emphasis to also include interventions before and after a flood event. A strong emphasis emerges on the element of “time” in preparing places for flooding as well as dealing with the actual flood event and its consequences. Hence, in order to understand civil society contributions to local level flood resilience, this paper considers “time” as a central factor and therefore discusses the civil society contributions by examining three disaster phases: pre-flood, during the flood and post-flood.

Although the two shifts outlined above show a growing role for citizens and a transition towards flood resilience, there has been limited research conducted into the contribution of civil society to flood resilience. In order to understand the contributions of civil society to local flood resilience, the paper will investigate a specific case: the 2015 Boxing Day floods in the Upper Calder Valley, England. This area has experienced multiple flood events in recent years and has evidence of civil society involvement in FRM. In order to explore civil society contributions to flood resilience before, during and after flooding, the paper draws on interviews conducted before (in May 2015) and after (in January 2017) the 2015 Boxing Day floods, supplemented by secondary data sources from during and in the immediate aftermath of the flood.

The paper will first discuss civil society and flood resilience and develop a conceptual framework. Data will then be presented and analysed in order to identify and explore the contributions of civil society to flood resilience in the Upper Calder Valley. Finally, the theoretical, policy and practice implications for local flood resilience, based on the findings, will be discussed.

2 | CONCEPTUAL FRAMEWORK: CIVIL SOCIETY AND FLOOD RESILIENCE

2.1 | Civil society's role in FRM

Civil society can be conceptualised as consisting of actors and groups that are non-state, formally or informally constituted, and can be part of the voluntary sector (McIlwaine, 2009). Civil society can also be understood in terms of processes, with Aldrich (2012) associating it with social capital and social networks. Furthermore, Aldrich and Crook define civil society in terms of “networks of trust and reciprocity among citizens” (2008, p. 379) at different scales: these networks can allow issues to be aired in the public arena and can support a strong civil society in pressing for authorities to take action (Jalali, 2002). Conversely, a weak civil society, which is fragmented, hard to mobilise and contains weaker social bonds, may put up less resistance in the face of controversial state decisions (Aldrich & Crook, 2008).

Based on the above, when exploring civil society contributions to flood resilience, this paper understands civil society at the local level as: consisting of social networks of non-state actors, individuals as well as formal/informal groups, acting voluntarily, that are (directly or indirectly) involved in FRM.

There is evidence of civil society playing different roles in local FRM, e.g., contributing knowledge, skills and political/economic resources and capacities (Coates, 2015; Forrest et al., 2017), and encouraging knowledge exchange between authorities and citizens (Cheshire, 2015; McEwen & Jones, 2012). Civil society can also challenge expert flood-risk knowledge, as done by local flood groups (Forrest et al., 2017; Smith et al., 2017) and communities (McEwen & Jones, 2012) in

England. Civil society involvement can also ensure that local, context-specific post-flood needs are met (Rumbach et al., 2016).

2.2 | Flood resilience

The “resilience” concept originated in the engineering and environmental sciences before being adopted by a range of different disciplines, including disaster management and planning (Trell et al., 2017). This paper refers specifically to “flood resilience,” which can be framed from engineering, ecological or evolutionary perspectives in theoretical discussions (Hegger et al., 2016; Liao, 2012; Twigger-Ross et al., 2014; White & O'Hare, 2014). The engineering perspective is more functionalist, focusing on resistance and a post-flood return to equilibrium (Liao, 2012; Matthews et al., 2014). This engineering perspective is commonly used, although not always explicitly described as such, tending to be measured at single points in time and to be quantified in terms of the ability or speed of the system to recover/return to its pre-flood state (Davoudi, 2012; Matthews et al., 2014). This perspective of recovery/return to the pre-flood state can be identified in definitions that refer to post-flood maintenance of the same structures and processes (e.g., in Haase, 2013), which may lead to the reproduction of pre-flood vulnerabilities (Twigger-Ross et al., 2014).

Conversely, ecological and evolutionary perspectives are more dynamic, focusing on adaptability and transformability of a system, emphasising notions such as flood-ability and reorganisation (Liao, 2012; Matthews et al., 2014). Adaptation describes incremental changes that occur within the existing system and draws on characteristics such as flexibility and resourcefulness (Davoudi et al., 2013). Transformation instead describes larger changes “fundamentally altering the nature of the system,” which can include a reorganising and restructuring of the existing system (Walker et al., 2004, p. 2) and creating “a new way of making a living” (Folke et al., 2010; Walker & Salt, 2012, p. 20). Transformation may be seen as relatively long-term changes with characteristics including a need for innovation (Davoudi et al., 2013). It includes “shifts in perception and meaning, social network configurations, patterns of interactions among actors including leadership and political and power relations, and associated organizational and institutional arrangements” (Folke et al., 2010, p. 5). These non-engineering perspectives reject the idea of only a single equilibrium state being available, and of “returning to normal,” and can be further described as ecological or evolutionary, both of which involve the idea of “bouncing forward” and the transition to a “better” state with elements of learning (Davoudi et al., 2013; Hegger et al., 2016). Ecological resilience is non-linear and understands that a disruption will lead to the system moving to one of multiple equilibria available. In contrast, evolutionary resilience emphasises continual change as opposed to reaching the stability of an equilibrium (Davoudi et al., 2013).

These different, and often competing (i.e., resisting or embracing change), perspectives result in problems when translating resilience into policy-making and practice. The theoretical ambiguity and a consequent lack of guidance on resilience in practice has led to a focus on short-term, reactive approaches and “optimistic rhetoric” as opposed to more transformative, longer-term thinking (Davoudi, 2012; Twigger-Ross et al., 2014, p. 2; White & O'Hare, 2014). Furthermore, resilience is often assumed to be a positive attribute/goal with limited reflection on who benefits and who loses (Davoudi, 2012; White & O'Hare, 2014). Issues of power dynamics and justice affect the operationalisation of resilience in practice, but there are limited reflections of these issues, partly due to the natural science origins of resilience (Twigger-Ross et al., 2014; White & O'Hare, 2014). Consideration of these issues requires attention to the varying capacities and resources of individuals and communities and their representation in resilience approaches (Coates, 2015; Forrest et al., 2017; Restemeyer et al., 2015).

This paper considers the above issues in developing a conceptual framework that considers civil society contributions to local flood resilience as withstanding and then recovering from flooding in the traditional engineering perspective of resilience. Furthermore, the paper also integrates aspects of ecological and evolutionary resilience to also consider the potential for civil society contributions to cause changes in place, as opposed to the local level focusing on “returning to normal,” in the form of adaptation and transformation. In discussing and integrating these perspectives into a conceptual framework, the paper aims to also address previous concerns (e.g., White & O'Hare, 2014) over the lack of theoretical clarity when providing frameworks for understanding flood resilience in practice.

2.3 | Analysing flood resilience over time

In disaster-management literature, the time relative to the disaster is commonly used for the analysis. This paper adopts a similar approach and designates the flood disaster as the central point of the flood resilience analysis. The flood disaster is understood as the moment the natural hazard (e.g., flooding) meets a social system and its vulnerabilities (Wisner et al., 2004). This approach recognises the role of existing vulnerabilities and weaknesses that are exposed by a flood hazard.

Understanding a flood disaster in this way acknowledges the significance of social systems in the production of disasters and allows greater focus to be placed on how planners and policy-makers need to continuously consider and engage with existing social systems and not focus only on resistance measures. This approach also considers the pre-disaster phase, in addition to the during- and post-disaster phases.

Following this logic, this paper understands flood resilience as the capacity of actors at the local level to mitigate and prepare (pre-flood), to resist and respond (during the flood), before being able to recover from, adapt and transform after a flood event (post-flood). This approach can help to better highlight opportunities and shortcomings of civil society contributions and produce an understanding of the potential contributions of civil society to local flood resilience. This definition is visually represented through phases (Figure 1), such as pre-flood (no immediate danger; flood imminent), during flood (withstanding floodwater; response to defence failures) and post-flood (immediate recovery; longer-term recovery). It is important to note that all of these phases continuously cycle from one to another in a loop and the moment when the post-flood phase becomes the pre-flood phase will depend on the time between flood events. Although the overlap creates a “grey area” between the two phases, it does help to illuminate the contributions of civil society across the disaster cycle as a whole.

The *pre-flood phase* (Figure 1) includes mitigation, comprising “pro-action” and “prevention,” and preparedness (ten Brinke et al., 2008; Khalilia et al., 2015; Messer, 2003; Schelfaut et al., 2011). The pro-action mitigation focus is on spatial planning measures to eliminate “structural causes of ... disasters” and to prevent disasters from occurring at all (ten Brinke et al., 2008, p. 94). They can include building restrictions in high-flood-risk areas (ten Brinke et al., 2008), land use controls, the incorporation of sustainable urban drainage systems and stronger building codes (Messer, 2003; White, 2010). Prevention measures aim to control the hazard to avoid flooding (Thieken et al., 2007) and focus on the development of physical areas, such as nature-based approaches to reduce flood risk, embankments and sea walls.

Preparedness focuses on building capacities of citizens and institutions in order to have an effective response to potential flooding (Messer, 2003). When there is no imminent threat the focus is on the promotion of community action and flood-risk awareness (Schelfaut et al., 2011), as well as the creation of evacuation plans and the pre-stocking of relief items (Messer, 2003). When a flood is imminent, this focus changes to moving assets out of harm's way, erecting property-level protection (PLP) measures and disseminating flood warnings (Thieken et al., 2007).

The *during-flood phase* (Figure 1) includes robustness (Restemeyer et al., 2015) and responses to the flood (Thieken et al., 2007). Robustness is the ability of the local structures/infrastructure to withstand flooding and is underpinned by previously mentioned mitigation measures. The response focuses on minimising the potential consequences of actual flooding

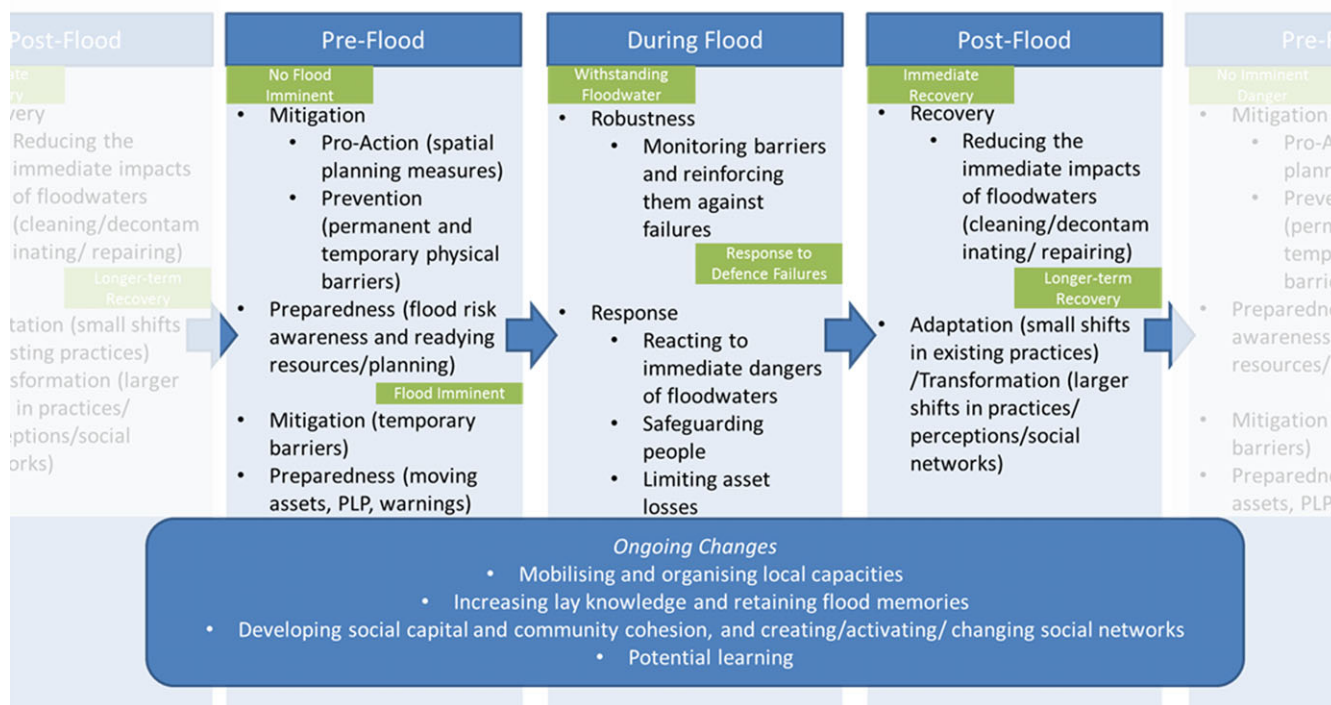


FIGURE 1 A representation of local level flood resilience and the potential contributions by civil society. [Colour figure can be viewed at wileyonlinelibrary.com]

and can include using search and rescue teams (Messer, 2003) and pumps to reduce the spread of flooding with the aim of safeguarding people and limiting asset losses.

The *post-flood phase* (Figure 1) includes the immediate recovery process, namely restoring utilities and services, and repairing flood-damaged buildings and infrastructure (Messer, 2003), setting up emergency centres, providing immediate aid and cleaning/decontaminating property. Longer-term recovery includes rebuilding and may mean adjusting the local level so that, while flooding occurs, it does not cause substantial damage (Restemeyer et al., 2015).

There are *ongoing changes* (Figure 1) that influence local level flood resilience and are not contained within a single phase. These refer to social processes that are not necessarily related to FRM, but could influence local level flood resilience in terms of mobilising and organising the capacities of local level actors. These could include changes in social capital, social networks, community spirit, place attachment, and access to social resources (Aldrich, 2012; Aldrich & Crook, 2008; Cutter et al., 2010; Jalali, 2002). These capture the connection between individuals, their local context and communities (Coates, 2015; Cutter et al., 2010). These issues are relevant in the context of local FRM as those more strongly connected are likely to be involved in civil society groups to provide resources and “neighbourly” support. However, these social processes may also have negative impacts at the local level. For example, the strengthening of social capital may also lead to the exclusion of certain citizens, the creation of powerful community voices at the expense of others, and the curtailment of participation (Rydin, 2016). These unequal power dynamics and potential for exclusion support the need for greater attention to power and reflection on resilience of what, to what, for whom, to what purpose, and who gets to decide (Carpenter et al., 2001; Davoudi, 2012; Lebel et al., 2006).

Ongoing changes also include the accumulation and retention of flood memories and lay knowledge, which are important for flood resilience but tend to fade over time (McEwen et al., 2017). Social processes can allow the transfer of lay knowledge vertically between generations and horizontally within social networks, which can also be understood as social learning (McEwen et al., 2017). However, lay knowledge may conversely result in uncertainty over appropriate FRM actions or more optimistic (but unrealistic) assessments of flood risk (Twigger-Ross et al., 2014) and may need refining by experts (McEwen & Jones, 2012) to prevent maladaptation. The potential for learning or the capacity to learn, which is referred to in several flood resilience definitions (e.g., Haase, 2013; Liao, 2012), is an important part of adaptation and transformation in evolutionary resilience.

In addition to the three time phases outlined above, this paper will therefore pay attention to the ongoing changes, to identify and analyse the contributions of civil society to local flood resilience.

3 | RESEARCH METHODOLOGY

Data were first collected in the Upper Calder Valley in May 2015 as part of an attempt to better understand the role and relevance of flood groups for flood resilience across England (see Forrest et al., 2017). However, after the initial data collection, several towns in the Upper Calder Valley experienced devastating flooding during Boxing Day (26 December) 2015. This presented an opportunity to explore not only the contributions of civil society to local level flood resilience in preparation for a potential flood event, but also their contributions during and after the disaster.

Interviews were held before the floods in May 2015 and again one year after the floods in Todmorden, Hebden Bridge and Mytholmroyd (Table 1). The first round of interviews were conducted after the 2012 floods, but were framed around a reasonable expectation of future flooding, set in a context where the interview focus was on measures that could reduce the consequences of future flooding. The second round of interviews was held in the post-2015 flood period, but the respondents were explicitly asked (during regular as well as the walking interviews) to reflect on the time of the actual flood events and activities by civil society actors in retrospect. Walking interviews allowed interviewees to visit and connect to local places with their flood experiences and reflect on the flood event better in retrospect (see Trell & van Hoven, 2010). To explore changes in experiences, activities and perceptions, the aim was to interview the same individuals/organisations in 2015 and 2017 as well as interviewees from national/regional levels with relevant knowledge of the Boxing Day flood event in the Upper Calder Valley. Interviews were recorded and transcribed with permission from interviewees. The transcripts were deductively coded along the three disaster phases (Figure 1) using Atlas.ti qualitative data analysis software.

There are inherent considerations relevant to collecting data during a disaster event and in the immediate aftermath: from the ethical perspective, flooding is a traumatic event and those affected need privacy to deal with it; pragmatically, the unpredictable nature of disaster events means that researchers cannot (and perhaps should not) plan to be present. Due to the traumatic nature of a flood event, we waited a respectful period of time after the floods to conduct the second round of

TABLE 1 Interviewees overview

Organisation	Number of interviewees	
	2015	2017
National level		
Defra (Department for Environment, Food and Rural Affairs) ^b	1	–
National Flood Forum ^a	1	1
Regional level		
Environment Agency (EA) ^b	1	2
Calderdale Council ^b	1	2
VBA (a joint venture of VolkerStevin, Boskalis Westminster and Atkins)	–	1
Treesponsibility ^a	–	2
Community Foundation for Calderdale ^a	–	1
Local level		
Mytholmroyd Flood Warden Group (MFWG) ^a	1	1
Hebden Bridge Community Association ^a	–	1
Hebroyd Flood Group (HFG) ^a	2	2
Todmorden Flood Group (TFG) ^a	2	2
Local residents (not flooded) ^a	–	2
Total	9	17

^aCivil society. ^bState organisations.

interviews, which collected data for both during the flood and post-flood phases. Interviewees' memories of traumatic flood events may change over time and therefore the post-flood phase interview data about civil society contributions during the floods in the immediate aftermath were triangulated using secondary data sources.

These secondary sources reported on civil society contributions during the flood and in its aftermath and were newspaper articles and data from Facebook. Relevant newspaper articles were found through the Lexis Nexis Academic database. A limited time-period (25/12/15–15/01/16) was chosen to identify information reported during the flood and its immediate aftermath. Originally, 174 articles were identified, which reduced to 73 results when grouped by moderate similarity. Only a small number of these articles explicitly focused on civil society contributions in the towns of interest, which led to the selection of six key articles for the analysis. To capture local activities at the time of the floods, we also analysed posts in the public Facebook Group, "Calder Valley Flood Support Group": we only reviewed posts made by known flood wardens in the three towns.

Additional data for all phases were collected by attending the Community Foundation for Calderdale (CFFC) AGM, and from documents and local websites (e.g., Calderdale Flood Commission, 2016; HebWeb, 2016) recommended by the interviewees.

4 | THE 2015 BOXING DAY FLOODS

The Upper Calder Valley is located in West Yorkshire and consists of several towns located along the River Calder. This paper focuses on the three towns of Todmorden, Hebden Bridge and Mytholmroyd, which are affected by flooding from the river and hillside surface run-off. River flooding is exacerbated by heavy rainfall and can overflow into nearby canals that are then overwhelmed.

The three towns experienced minor flooding incidents between 2005 and 2011, severe flooding in 2012 and a "near-miss" in November 2015, before all being flooded in the 2015 Boxing Day floods. The three towns experienced less rain in the 2015 Boxing Day floods than in 2012, but the 2015 floods were preceded by large volumes of rain in November and December that saturated the ground and led to both river and surface water flooding. The Boxing Day floods were described as "extreme" by several interviewees, including one from the Environment Agency (EA). The flood impacts included electricity and gas being cut off, assets (e.g., sheds, household goods and business equipment) being washed away, damaged buildings (Figure 2a), residents being trapped in their homes due to floodwaters and the sludge that remained after they receded, and local transport routes becoming impassable.

In addition to the civil society actors interviewed, the research identified flood groups created in response to the 2015 floods (e.g., Slow the Flow), the Calder Valley Search and Rescue Team, and regional/national-level volunteers as civil society actors that were relevant in contributing to local flood resilience. Flood groups in Hebden Bridge, Todmorden and Mytholmroyd formed after the 2012 floods with financial support from Defra's Flood Resilience Community Pathfinder Scheme, which focused on planning for future flooding through community action (Twigger-Ross et al., 2014). This led to Calderdale Council and the EA supporting the flood groups with help-in-kind and expert knowledge (Forrest et al., 2017). However, it was reported that this support was waning at the time of interviews in June 2015 as there had not been further floods since 2012. The EA also provided flood wardens with training on monitoring river levels and then reporting flood risks to the EA.

5 | CIVIL SOCIETY CONTRIBUTIONS TO LOCAL LEVEL FLOOD RESILIENCE

5.1 | Pre-flood

5.1.1 | No flood imminent

There was evidence of NGOs (e.g., Treesponsibility) contributing to pro-action measures regarding changes to spatial planning. The NGO was involved in small-scale nature-based approaches, such as tree-planting, thereby contributing to flood



FIGURE 2 (a) The floods did considerable damage to the buildings and roads in Mytholmroyd. (b) Watermark poster with words describing the 2015 floods. (c) Reminder of the 2015 floods. (d) Tree-planting on a slope.

Source: Author's own images [Colour figure can be viewed at wileyonlinelibrary.com]

resilience (Figure 2d). Civil society actors interviewed were found to have only limited involvement in prevention measures and were not involved in typical FRM issues like sustainable urban drainage or developing embankments.

The data showed that civil society actors were prominently involved in preparedness measures aimed at building capacities of citizens and institutions to improve responses. Local flood groups were found to be advocating policy on FRM and pre-stocking relief items in “flood stores” in the three towns. These flood stores were metal containers located at strategic points across the towns with equipment such as sandbags, road diversion signs and cleaning/decontamination equipment. The equipment varied in each town and depended on the choices made by the local flood groups, which is an example of civil society being able to ensure context-specific flood needs are met (see Rumbach et al., 2016). These groups also encouraged the installation of PLP measures and the modification of properties (e.g., hard floors and raising items) to reduce damages from flooding. Furthermore, local flood groups and flood wardens also contributed to local flood-risk awareness through Facebook pages, publicity events and flyers.

5.1.2 | Flood imminent

Civil society actors contributed to preparedness as it became evident that a flood was imminent. In the days leading up to the Boxing Day floods, flood wardens and flood-group members reported going door-knocking with businesses to warn them about the likelihood of flooding in Hebden Bridge and to encourage them to put flood gates up and move things higher up.

There was evidence of civil society actors’ contribution to flood preparedness and prevention on the night before the Boxing Day floods. Interviewees reported that local flood groups and flood wardens encouraged citizens to move their assets to safe places out of reach from the floodwater, which was confirmed by secondary data sources (CVFSG, 2015). Flood sirens alerted local residents to the potential for a flood event and approximately 40 of them assembled in the town centre. A Hebden Bridge flood warden reported organising these volunteers in erecting temporary barriers (i.e., prevention) to protect the terrace houses and premises along Market Street.

Both the communication of flood warnings and the mobilisation of these volunteers for erecting barriers were important civil society contributions. Local authorities were not able to do this and it was made possible as these civil society actors lived locally, were able to act on short notice and during a public holiday, and were more able to activate and use the informal social networks in their towns.

5.2 | During the floods

5.2.1 | Withstanding floodwater

Local flood wardens and flood-group members erected temporary barriers and activated PLP measures, installed after the 2012 floods, in response to the imminent flood. There were cases of temporary barriers and PLP measures being overtopped overnight due to the sheer volume and pressure of water. In some areas, these were still withstanding the floodwater during the morning on Boxing Day, and local flood wardens and residents monitored and reinforced them with sandbags and sheeting from the flood stores where possible. Interviewees and secondary data sources reported that civil society actors were able to monitor these defences, but that they were not able to monitor them during the entire night (CVFSG, 2015).

5.2.2 | Response to defence failures

Flood-group members reported that they had a limited role in this phase as many were themselves flooded, although secondary data sources show that they supported road closures and helped neighbours (CVFSG, 2015). Local flood wardens were able to respond to the failure of permanent and temporary flood defences by acting as “local leaders” and directing residents in their attempts to use plastic sheeting to reduce flooding and traffic cones to cordon off roads. Interviewees and secondary data sources (CVFSG, 2015; Taylor, 2015) reported that flood wardens and voluntary search-and-rescue teams also supported in monitoring and evacuating elderly residents from flood-affected areas. At this point “outside” help was not available and the three towns relied on local volunteers, citizens and the flood stores.

Civil society actors were also involved in communication and fundraising when the flood defences failed. Interviewees and secondary data sources show that local flood wardens continued to update residents and the EA about the flood conditions in Todmorden and Mytholmroyd (CVFSG, 2015). However, flood wardens in Hebden Bridge were unable to report their flood conditions as landline and mobile phone systems were disrupted. During the CFFC AGM it was described how

the CFFC also started an online flood fund to collect donations for flood-recovery efforts at the onset of the flooding, which was also shared by flood wardens on Facebook.

5.3 | Post-flood

5.3.1 | Immediate recovery

Local residents were the “first responders” (similarly found by Masterson et al., 2014) as “traditional,” but non-local, emergency responders were not able to reach towns for up to 36 hours after the flooding began due to disrupted transport connections. Interviewees and secondary data sources reported that citizens had to rely on themselves to recover in the immediate aftermath: restoring utilities and services back to their previous pre-flood state, helping to remove flood debris and cleaning flood-contaminated buildings (Ashworth, 2016; CVFSG, 2015). It was reported that “Hebden Bridge flood volunteers ‘became an anchor’ for victims” (Ashworth, 2016, n.p.) and interviewees believed that the timing of the flood event in the Christmas holiday period was important: there was an enhanced ability to access nearby social networks and resources as many residents, including tradespeople, were not working and instead able to support the recovery.

In the absence of local authorities, the local flood-group members and flood wardens reported being seen as sources of flood knowledge by residents who were reported to have sought them out for advice. At first, these efforts emerged in a largely uncoordinated way and appeared to be examples of self-organisation as seen in the aftermath of previous disasters (see Comfort, 1996):

People got the town hall open, the trades club open, people were out in the streets helping ... It was an anarchic operation in the way that everyone came together. (Treesponsibility Interviewee, 2017)

Tierney (2014, p. 235) reports that “resilience is achieved when novel behaviors, groups, and networks emerge that are responsive to disaster conditions.” In the immediate recovery, interviewees and secondary data sources (Ashworth, 2016; HebWeb, 2016) reported examples of networks and groups emerging through the unplanned creation and operation of emergency centres called “flood hubs” by networks of different civil society actors (flood groups/flood wardens, community foundations, community associations and local residents) in each of the three towns. The flood hubs “sprang up” (HebWeb, 2016, n.p.) and were an example of the emergence of novel behaviours and improvisation to the flood conditions: their unplanned usage arose because many of the council buildings and large buildings were flooded. The flood hubs became focal points in the immediate recovery for both volunteers to mobilise from and for donations in Hebden Bridge, Todmorden and Mytholmroyd.

The flood hubs embodied many traits associated with transformation, such as innovation (Davoudi et al., 2013), changes in patterns of interaction and organisational arrangements (Folke et al., 2010), in addition to changing the nature of the system (Walker et al., 2004) in that civil society actors were taking leadership roles in the absence of state actors. However, the flood hubs existed as a temporary transformation in response to the dramatic local level (i.e., system) change as a result of the floods. Over the following weeks and months, the dramatic local level change had faded and while they had served a particular purpose in the immediate recovery, they then “deactivated” when they were no longer needed. The flood hubs acted as a source of help “inside” the flood-affected areas for when “outsiders” were not able to access the towns.

Interviewees from civil society, the EA and local council all reported that regional/national-level volunteers, both individually and as part of organisations such as Khalsa Aid, travelled from across England to the flood-affected areas to support the recovery. This highlights the important fact that flood resilience at the local level does not exist in its own contained “bubble,” but is influenced by multiple scales. The role of social media and online fundraising platforms, in allowing details of the flood event to be broadcast beyond the local level through Twitter and in allowing regional/national-level actors to pledge financial assistance online, supported local civil society contributions. Flood-hub volunteers also used Facebook groups to offer help to local residents as well as to communicate live updates and advice on how to access help.

The CFFC AGM reported that there were online donations, including from the UK Government (£1.5 million match-funded), to the CFFC's online flood fund that raised a total of £3 million. Some of these funds were distributed relatively quickly to individuals, as cash payments for repairs and replacement of damaged items, despite uncertainty over the exact flood damages (reported at the CFFC AGM). The CFFC did not need to conduct damage assessments before distributing funds, unlike local authorities, and were therefore able to distribute the funds more quickly and with greater flexibility.

5.3.2 | Longer-term recovery

Civil society actors were involved in the longer-term recovery with activities that aimed to support “bouncing forward” and ongoing changes. The CFFC AGM reported how the CFFC used part of the online flood fund to create the “Water-Mark” (Figure 2b) and “FloodSave” schemes, both of which aim to raise funds in anticipation of the next flood event. These schemes are examples of adaptation to flooding as they are incremental changes that contribute to the local level's flexibility and resourcefulness so that the impacts of future flooding can be lessened. The UK Government's matching-funding is an example of the state-backed efforts that are needed to support civil society actors and allowed the CFFC to actively build up financial reserves for future flood events: however, smaller civil society actors may struggle to do the same.

There was evidence of reorganising and restructuring (i.e., transformation as described by Walker et al., 2004) of the local level in terms of the institutionalisation of flood hubs into formal emergency plans. Furthermore, there was evidence of shifts in social network configurations and institutional arrangements (i.e., transformation as described by Folke et al., 2010) in the creation of new civil society groups post-flood (e.g., Slow the Flow Calderdale and the Catchment Flood Studies Network). This shows an ambition to change the existing systems and for local residents to take a greater role in contributing to local flood resilience, as well as to challenge the previous FRM role of citizens.

Shifts in perception and meaning are examples of transformation given by Folke et al. (2010), which in this context would refer to changes in local citizens' flood-risk awareness. Interviewees reported that the 2015 Boxing Day floods and the previous 2012 floods both led to increases in flood-risk awareness. However, this appeared to be a short-lived, temporary transformation, with interviewees in both 2015 and 2017 reporting that citizen apathy regarding flooding and the flood groups' work had become more prominent as time since the flood increased. One interviewee attributed this to a mixture of both citizen beliefs that “somebody else will sort it out” and that citizens were so anxious and frightened by the floods that they wanted to ignore the issue of flood risk. The latter is also a sign of “active forgetting,” where those affected by flooding actively repress their memories of the event or defer responsibility for FRM to others (McEwen et al., 2017; Twigger-Ross et al., 2014). Flood groups and flood wardens were also trying to persuade citizens to take greater responsibility for their own flood risk and for them to put preventative measures into place before a flood. However, an interviewee reported a sense of complacency among local citizens:

Very much a feeling that it wouldn't happen again, it'll be alright ... Even now, when you talk to people in the valley, they're like oh, floods, yeah that happened didn't it. Unless you've been physically affected by it, lost your business, your house, or had someone affected by it, people forget about it really quickly. (TFG Member, 2017)

5.4 | Ongoing changes to local level flood resilience

Civil society actors influenced the ability to mobilise and organise the networks of social resources that exist at the local level. These were mainly through changing social capital and networks, as well as community spirit, all of which were reported as being important in the flood (Figure 2b). Interviewees reported that there were changes in social network configurations and patterns of interactions (i.e., transformation as described by Folke et al., 2010) through the door-knocking and Facebook activities of the flood groups and flood wardens. There was also evidence of social networks being “activated,” in the sense that they existed in a loose form, but came into use in response to the 2015 flood event. For example, both flood-group and flood-warden interviewees reported that neighbours sought advice from them as they knew about their flood-group and flood-warden roles. A sense of community spirit (i.e., residents sharing resources and supporting each other) among those affected or at flood risk was also formed online through Facebook groups, such as the “Calder Valley Flood Support Group” (CVFSG, 2015).

The creation of new citizen initiatives and groups was a result of citizens being more involved and creating new networks. However, in the case of one town, interviewees familiar with both the existing and new group reported conflicts between them, which were influencing their ability to collaborate and contribute to flood resilience at the local level. These conflicts were driven by questions surrounding which individuals get to decide the way in which FRM activities are undertaken (Davoudi, 2012) and on who is able to participate and lead them.

Civil society actors sought to support the accumulation and retention of flood memories and lay knowledge throughout the phases. The flood groups and flood wardens initiated activities to increase flood-risk awareness at the local level

through their “Eye on Calderdale” website and the running of open information sessions. The links fostered by the Pathfinder scheme meant that the flood groups supported the exchange of knowledge between local citizens and the EA:

The EA want us to be eyes and ears on the ground, and passing their info down to local people and us passing info back up to them. (HFG Member, 2017)

This contribution to knowledge exchange can be something that local authorities struggle with as they do not always have the same types of personal relationships with citizens. Therefore, this civil society contribution is contributing to local level flood resilience in a manner that local authorities are not able to do as well. However, state actors interviewed were aware that the flood groups may miss people and their needs as they may not be in the same social networks or may choose not to engage.

The flood groups also provided a way for local citizens with relevant lay knowledge, such as on drainage systems, to share their knowledge with other local citizens. There were also attempts by the CFFC to encourage “active remembering” (McEwen et al., 2017) by placing quotes from the floods and other reminders in the town hall (Figure 2c), by having a small art exhibition on the floods in the town hall and by displaying newspaper articles about the flood impacts. However, the use of local knowledge of previous flooding to guide future flood-risk protection measures led to maladaptation with the overtopping of the PLP measures.

In addition to these forms of social learning, there was evidence of medium-term learning with the flood stores (i.e., the need to stock more supplies and to use whiteboards to communicate with other volunteers). Longer-term measures include Calderdale Council's development of a new communications system that can withstand future flooding and the formalisation of the flood-hub role in preparation for future hazard (not limited to flooding) events. The CFFC AGM reported that their fund, in creating FloodSave and Watermark, is learning from the impacts of the 2015 floods and supporting appropriate adaptation measures.

5.5 | Critical considerations: Civil society and flood resilience

In terms of the sustainability of civil society contributions, interviewees identified time pressures for volunteers (e.g., attending meetings with formal actors) and volunteer fatigue as obstacles that they faced. Volunteers interviewed were motivated to volunteer by their desire to help their local place and communities to be better prepared and able to handle future flooding. Involvement in civil society, in flood groups or as flood wardens, was dynamic, with low levels in the pre-flood phase. During this phase, flood groups in Mytholmroyd and Hebden Bridge merged to form HFG due to a lack of volunteers from Mytholmroyd: some volunteers felt that they were not getting “enough traction” with local authorities and decided to stop. The Boxing Day 2015 flood event led to an increase in citizen involvement and in the willingness of local residents to organise and help run flood groups and to become flood wardens. This was especially noticeable in Mytholmroyd, where local residents were unhappy with the flood group's efforts during the flood, which in part was due to a lack of volunteers. However, reported post-flood citizen apathy (previously mentioned) could undermine the sustainability of civil society actors in the long term and their eventual contributions in the case of a next flood event are unclear.

Interviews with the EA and the local council acknowledged this and post-flood the latter created specific “Neighbourhood Coordinators” who work with flood groups and wardens. This “state support” aims to support the longevity of flood groups and wardens by reducing the organisational/administrative burden on volunteers (i.e., reducing volunteer fatigue) as well as trying to institutionalise their local knowledge. However, state support may also be temporary and funding is not guaranteed for the long term.

Flood groups became a desirable form of civil society contribution, with post-flood policy documents recommending supporting existing ones and encouraging more of them in surrounding areas (e.g., Calderdale Flood Commission, 2016). It is important to monitor whether this potentially empowered and stronger civil society, and their “powerful community voices,” will lead to the exclusion of others (Rydin, 2016) and their local knowledge. Both pre-flood and post-flood, the flood groups had disagreements about the siting of flood stores, highlighting that the aims of flood groups do not always match the local residents' wishes. The disagreements centred on the flood stores being an “eyesore” and the worry that they would cause property damage if dislodged during a flood.

The varying levels of capacities in the different towns was also recognised by civil society actors who attempted to direct support towards them pre-flood (2015), although there was uncertainty about how it would work in a flood event:

Flood store equipment really for the vulnerable, the elderly and infirm, but when there is a flood, everyone will be there wanting the equipment because they haven't prepared beforehand. (HFG interviewee, 2015)

Furthermore, interviewees familiar with the distribution of CFFC flood funds in the post-flood phase also observed that poorer areas were less likely to be aware of and apply for CFFC funding.

6 | CONCLUSION

Flood-risk management is experiencing two important shifts towards a greater role for non-state actors (Mees et al., 2016; Meijerink & Dicke, 2008) and an approach change from flood defence towards flood resilience (Restemeyer et al., 2015; Schelfaut et al., 2011; Scott, 2013). However, the literature is currently missing a detailed understanding of this new role for non-state actors and their contributions towards flood resilience. This paper sought to address both of these shifts by exploring the contributions of civil society to local level flood resilience before, during and after a flood event.

Three key findings can be distilled from this paper. First, the issue of time was important and local civil society contributions were found to be pervasive and dynamic, with an intense initial response to the flood event. However, the contributions of civil society appeared difficult to sustain across the three towns and their activity was found to diminish over time after the flood due to apathy, active forgetting (McEwen et al., 2017) or lack of further exposure. Issues of representation and volunteer fatigue within civil society were also reported and approaches to address this need to be identified. Therefore, caution must be urged when looking to transfer responsibilities from the state to these non-state actors, with state support remaining crucial for local level flood resilience (as suggested by Begg et al., 2015).

Second, the paper identified the importance of place and that the local ad hoc response to floods in the Upper Calder Valley was based on the distribution of flood exposure and social processes. Those interviewed had strong relationships with their local place and community, which motivated their involvement in the civil society groups and therefore positively influenced local level flood resilience. This paper extended previous findings (Masterson et al., 2014) and found civil society actors acting as the first responders, in response to the flood, before the arrival of local state actors and emergency services. Living locally meant that they could more quickly offer support than actors from outside the area. Although increasing the involvement of civil society may be an attractive FRM option for policy-makers in the context of continuing austerity and restricted resources, the varying levels of capacities in different flood-affected places needs critical consideration. For example, areas with lower levels of social capital and less active citizens may struggle to replicate the contributions highlighted in this paper. Putting increasing emphasis on “community flood resilience” in these areas could lead to the creation of inequalities within flood resilience practice, with more active/affluent people and areas receiving more attention, as they have a strong civil society and social bonds, and becoming more flood resilient, while other local people and areas are forgotten.

Third, this paper reflected on flood resilience in theory and practice. A lack of theoretical clarity of the concept has led to a lack of guidance and a focus short-term bounce back approaches instead of more transformative, longer-term thinking (Davoudi, 2012; Twigger-Ross et al., 2014, p. 2; White & O'Hare, 2014). This paper identified examples of this, such as the short-term focus on flood stores as a means to bounce back from flooding. The analysis suggests that a long-term perspective based on a flood experience will be difficult to sustain. Although in the post-flood phase, the paper identified approaches (e.g., Watermark and FloodSave) that reflected learning and longer-term thinking. A greater understanding of potential contributions was achieved by using the paper's framework to structure the data over time. Although the framework did not initially capture the elements of power and representation, they emerged as relevant factors influencing civil society contributions and were included in the data analysis and should be used in future research. Furthermore, the varying capacities and resources of individuals also need to be considered, especially within the context of shifting responsibilities from state to non-state actors.

To conclude, issues of time and place emerged from this research as important in understanding the ways in which civil society actors can contribute to local level flood resilience. The involvement of civil society actors, particularly citizen groups and initiatives, can lead to a more local, context-specific approach to flood resilience that integrates existing state-backed efforts with civil society actors and resources. This time-based framework appeared valuable in gaining insights into civil society contributions, but could benefit from further consideration of place-based capacities. Policy-makers are recommended to recognise the importance of both temporal variation for citizen involvement and place-based capacities in developing local flood-resilience policies. Future FRM research would benefit from critically assessing the role of other

non-state actors, involved in upland land use and management as well as urban development, and of the varying capacities of communities to support civil society contributions.

ACKNOWLEDGEMENTS

We would like to thank all of the interviewees for sharing their experiences with us, especially the members of Hebden Bridge Flood Action Group, Mytholmroyd Flood Group, and Todmorden Flood Group. We would also like to thank the three anonymous reviewers and the editor for their valuable critique and for their suggestions to improve the paper.

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REFERENCES

- Aldrich, D. (2012). Social, not physical, infrastructure: The critical role of civil society after the 1923 Tokyo earthquake. *Disasters*, 36, 398–419. <https://doi.org/10.1111/j.1467-7717.2011.01263.x>
- Aldrich, D., & Crook, K. (2008). Strong civil society as a double-edged sword: Siting trailers in Post-Katrina New Orleans. *Political Research Quarterly*, 61, 379–389. <https://doi.org/10.1177/1065912907312983>
- Ashworth, S. (2016, January 11). How Hebden Bridge flood volunteers ‘became an anchor’ for victims. *The Guardian* (online). Retrieved from <https://www.theguardian.com/voluntary-sector-network/2016/jan/11/floods-hebden-bridge-yorkshire-volunteers> (accessed 20 February 2018).
- Begg, C., Walker, G., & Kuhlicke, C. (2015). Localism and flood risk management in England: The creation of new inequalities? *Environment and Planning C: Government and Policy*, 33, 685–702. <https://doi.org/10.1068/c12216>
- ten Brinke, W. B. M., Saeijs, G. E. M., Helsloot, I., & van Alphen, J. (2008). Safety chain approach in flood risk management. *Proceedings of the Institution of Civil Engineers – Municipal Engineer*, 161, 93–102. <https://doi.org/10.1680/muen.2008.161.2.93>
- Calderdale Flood Commission (2016). *Final Report*. Calderdale Council. Retrieved from <https://www.calderdale.gov.uk/v2/sites/default/files/Draft-Final-Report-July-06-2016.pdf> (accessed 11 September 2017).
- Carpenter, S., Walker, B., Anderies, J., & Abel, N. (2001). From metaphor to measurement: Resilience of what to what? *Ecosystems*, 4, 765–781. <https://doi.org/10.1007/s10021-001-0045-9>
- Cheshire, L. (2015). ‘Know your neighbours’: Disaster resilience and the normative practices of neighbouring in an urban context. *Environment and Planning A*, 47, 1081–1099. <https://doi.org/10.1177/0308518X15592310>
- Coates, T. (2015). Understanding local community construction through flooding: The ‘conscious community’ and the possibilities for locally based communal action. *Geo: Geography and Environment*, 2, 55–68. <https://doi.org/10.1002/geo2.6>
- Comfort, L. K. (1996). Self-organization in disaster response: The Great Hanshin Japan earthquake of January 17, 1995. *Quick Response Report* 78 (Revised), Boulder, CO.
- Cutter, S. L., Burton, C. G., & Emrich, C. T. (2010). Disaster resilience indicators for benchmarking baseline conditions. *Journal of Homeland Security and Emergency Management*, 7, 1–22. <https://doi.org/10.2202/1547-7355.1732>
- CVFSG (2015, December). Calder Valley Flood Support Group. *Facebook*. Retrieved from <https://www.facebook.com/groups/cvcsg/> (accessed 20 February 2018).
- Davoudi, S. (2012). Resilience: A bridging concept or a dead end? *Planning Theory & Theory*, 13, 299–333. <https://doi.org/10.1080/14649357.2012.677124>
- Davoudi, S., Brooks, E., & Mehmood, A. (2013). Evolutionary resilience and strategies for climate adaptation. *Planning Practice & Research*, 28, 307–322. <https://doi.org/10.1080/02697459.2013.787695>
- Folke, C., Carpenter, S. R., Walker, B., Scheffer, M., Chapin, T., & Rockström, J. (2010). Resilience thinking: Integrating resilience, adaptability and transformability. *Ecology and Society*, 15, 1–20. Retrieved from <http://www.ecologyandsociety.org/vol15/iss4/art20/>
- Forrest, S. A., Trell, E.-M., & Woltjer, J. (2017). Flood groups in England: Governance arrangements and contribution to flood resilience. In E.-M. Trell, B. Restemeyer, M. M. Bakema, & B. van Hoven (Eds.), *Governing for resilience in vulnerable places* (pp. 92–115). Oxon, UK: Routledge. <https://doi.org/10.4324/9781315103761>
- Haase, D. (2013). Participatory modelling of vulnerability and adaptive capacity in flood risk management. *Natural Hazards*, 67, 77–97. <https://doi.org/10.1007/s11069-010-9704-5>
- HebWeb. (2016). The real story of the Calder Valley floods: Restored communities and faith in humanity. *HebWeb* (online). Retrieved from <http://www.hebdenbridge.co.uk/news/2016/004.html> (accessed 20 February 2018).
- Hegger, D. L. T., Driessen, P. P. J., Wiering, M., Van Rijswijk, H. F. M. W., Kundzewicz, Z. W., Matczak, P., Crabbé, A., Raadgever, G. T., Bakker, M. H. N., Priest, S. J., Larrue, C., & Ek, K. (2016). Toward more flood resilience: Is a diversification of flood risk management strategies the way forward? *Ecology and Society*, 21, 52. <https://doi.org/10.5751/ES-08854-210452>
- Jalali, R. (2002). Civil Society and the State: Turkey after the Earthquake. *Disasters*, 26, 120–139. <https://doi.org/10.1111/1467-7717.00196>

- Johnson, C. L., & Priest, S. (2008). Flood risk management in England: A changing landscape of risk responsibility? *International Journal of Water Resources Development*, 24, 513–525. <https://doi.org/10.1080/07900620801923146>
- Khalilia, S., Harre, M., & Morley, P. (2015). A temporal framework of social resilience indicators of communities to flood, case studies: Wagga wagga and Kempsey, NSW, Australia. *International Journal of Disaster Risk Reduction*, 13, 248–254. <https://doi.org/10.1016/j.ijdrr.2015.06.009>
- Lebel, L., Anderies, J. M., Campbell, B., Folke, C., Hatfield-Dodds, S., Hughes, T. P., & Wilson, J. (2006). Governance and the capacity to manage resilience in regional social-ecological systems. *Ecology and Society*, 11, 19. <https://doi.org/10.5751/ES-01606-110119>
- Liao, K. (2012). A theory on urban resilience to floods – A basis for alternative planning practices. *Ecology and Society*, 17, 15. <https://doi.org/10.5751/ES-05231-170448>
- Masterson, J. H., Peacock, W. G., van Zandt, S. S., Grover, H., Schwarz, L. F., & Cooper, J. T. Jr (2014). *Planning for community resilience: A handbook for reducing vulnerability to disasters*. Washington, DC: Island Press. <https://doi.org/10.5822/978-1-61091-586-1>
- Matthews, E. C., Sattler, M., & Friedland, C. J. (2014). A critical analysis of hazard resilience measures within sustainability assessment frameworks. *Environmental Impact Assessment Review*, 48, 59–69. <https://doi.org/10.1016/j.eiar.2014.05.003>
- McEwen, L., Garde-Hansen, J., Holmes, A., Jones, O., & Krause, F. (2017). Sustainable flood memories, lay knowledges and the development of community resilience to future flood risk. *Transactions of the Institute of British Geographers*, 42, 14–28. <https://doi.org/10.1111/tran.12149>
- McEwen, L., & Jones, O. (2012). Building local/lay flood knowledges into community flood resilience planning after the July 2007 floods, Gloucestershire, UK. *Hydrology Research*, 43, 675–688. <https://doi.org/10.2166/nh.2012.022>
- McIlwaine, C. (2009). Civil society. In R. Kitchin, & N. Thrift (Eds.), *International encyclopedia of human geography* (pp. 136–141). Amsterdam, The Netherlands: Elsevier. <https://doi.org/10.1016/B978-008044910-4.00081-X>
- Mees, H., Crabbé, A., Alexander, M., Kaufmann, M., Bruzzone, S., Lévy, L., & Lewandowski, J. (2016). Coproducing flood risk management through citizen involvement: Insights from cross-country comparison in Europe. *Ecology and Society*, 21, 7. <https://doi.org/10.5751/ES-08500-210307>
- Meijerink, S., & Dicke, W. (2008). Shifts in the public-private divide in flood management. *International Journal of Water Resources Development*, 24, 499–512. <https://doi.org/10.1080/07900620801921363>
- Messer, N. M. (2003). *The role of local institutions and their interaction in disaster risk mitigation: A literature review*. FAO Corporate Document Repository, Economic and Social Development Department. Retrieved from <http://www.fao.org/docrep/006/ad710e/ad710e03.htm#bm03> (accessed 11 September 2017).
- Nye, M., Tapsell, S., & Twigger-Ross, C. (2011). New social directions in UK flood risk management: Moving towards flood risk citizenship? *Journal of Flood Risk Management*, 4, 288–297. <https://doi.org/10.1111/j.1753-318X.2011.01114.x>
- Restemeyer, B., Woltjer, J., & van den Brink, M. (2015). A strategy-based framework for assessing the flood resilience of cities – A Hamburg case study. *Planning Theory and Practice*, 16, 45–62. <https://doi.org/10.1080/14649357.2014.1000950>
- Rumbach, A., Makarewicz, C., & Németh, J. (2016). The importance of place in early disaster recovery: A case study of the 2013 Colorado floods. *Journal of Environmental Planning and Management*, 59, 2045–2063. <https://doi.org/10.1080/09640568.2015.1116981>
- Rydin, Y. (2016). Communities, networks and social capital. In N. Gallent, & D. Ciaffi (Eds.), *Community action and planning* (pp. 21–40). Bristol, UK: Policy Press.
- Schelfaut, K., Pannemans, B., van der Craats, I., Krykwow, J., Mysiak, J., & Cools, J. (2011). Bringing flood resilience into practice: The FREE-MAN project. *Environmental Science and Policy*, 14, 825–833. <https://doi.org/10.1016/j.envsci.2011.02.009>
- Scott, M. (2013). Living with flood risk. *Planning Theory and Practice*, 14, 103–140. <https://doi.org/10.1080/14649357.2012.761904>
- Smith, A., Porter, J. J., & Upham, P. (2017). “We cannot let this happen again”: Reversing UK flood policy in response to the Somerset Levels floods, 2014. *Journal of Environmental Planning and Management*, 60, 351–369. <https://doi.org/10.1080/09640568.2016.1157458>
- Taylor, M. (2015, December 27). Hundreds evacuated after further flooding in northern England – Latest updates. *The Guardian* (online). Retrieved from <https://www.theguardian.com/environment/live/2015/dec/27/hundreds-evacuated-flooding-northern-england-latest-updates> (accessed 20 February 2018).
- Thieken, A. H., Kreibich, H., & Müller, M. (2007). Coping with floods: Preparedness, response and recover of flood-affected residents in Germany in 2002. *Hydrological Sciences Journal*, 52, 1016–1037. <https://doi.org/10.1623/hysj.52.5.1016>
- Tierney, K. (2014). *The social roots of risk: Producing disasters, promoting resilience*. Stanford, CA: Stanford University Press.
- Trell, E.-M., Restemeyer, B., Bakema, M. M., & van Hoven, B. (2017). *Governing for resilience in vulnerable places*. Oxon, UK: Routledge. <https://doi.org/10.4324/9781315103761>
- Trell, E.-M., & van Hoven, B. (2010). Making sense of place: Exploring creative and (inter)active research methods with young people. *Fennia*, 188, 14.
- Twigger-Ross, C., Kashefi, E., Weldon, S., Brooks, K., Deeming, H., Forrest, S., Fielding, J., Gomersall, A., Harries, T., McCarthy, S., Orr, P., Parker, D., & Tapsell, S. (2014). *Flood resilience community pathfinder evaluation: Rapid evidence assessment*. London, UK: Defra.
- Walker, B. H., Holling, C. S., Carpenter, S. R., & Kinzig, A. (2004). Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society*, 9, 5. <https://doi.org/10.5751/ES-00650-090205>
- Walker, B., & Salt, D. (2012). *Resilience practice: Building capacity to absorb disturbance and maintain function*. Washington, DC: Island Press. <https://doi.org/10.5822/978-1-61091-231-0>
- White, I. (2010). *Water and the city: Risk, resilience and planning for a sustainable future*. Oxon, UK: Routledge.

- White, I., & O'Hare, P. (2014). From rhetoric to reality: Which resilience, why resilience, and whose resilience in spatial planning? *Environment and Planning C: Government and Policy*, 32, 934–950. <https://doi.org/10.1068/c12117>
- Wisner, B., Blaikie, P., Cannon, T., & Davis, T. (2004). *At risk* (2nd ed.). Oxon, UK: Routledge.
- Woltjer, J., & Al, N. (2007). The integration of water management and spatial planning. *Journal of the American Planning Association*, 73, 211–222. <https://doi.org/10.1080/01944360708976154>

How to cite this article: Forrest S, Trell E-M, Woltjer J. Civil society contributions to local level flood resilience: Before, during and after the 2015 Boxing Day floods in the Upper Calder Valley. *Trans Inst Br Geogr*. 2019;44:422–436. <https://doi.org/10.1111/tran.12279>