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"We cannot let this happen again": Reversing UK flood policy in response to the Somerset Levels floods, 2014

Abstract

Kingdon's (1995) Multiple Streams Framework offers a theoretical account of how policy proposals move from latent possibilities to becoming favoured for implementation. We apply Kingdon's framework in the context of the policy response to the 2013-14 flooding of the Somerset Levels and Moors. Stakeholder interviews and analysis of news media coverage evidence the way in which a specific policy option that had fallen out of favour with the national Environment Agency - dredging - came to the fore and was eventually adopted during the period in which the conjunction of problem, policy and political pressures came to a head. Local political activists mobilised a wider campaign with the help of social media and capitalised on national political sensitivities to successfully promote dredging. What is less clear is the longevity of the policy reversal, given funding constraints.

Keywords

Flood policy; dredging; Kingdon; multiple streams; Somerset

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1. Introduction

Much debate surrounds the governance of flood risk in the UK today (Butler & Pidgeon 2011; Johnson & Priest 2008; Porter & Demeritt 2012; Scrase & Sheate 2005). Should the tried-and-tested practice of building 'flood defences' continue or should we be thinking about managing flood risk differently? As a fairly wet country, the UK has historically gone down the 'flood defence' route (Penning-Rowsell et al 1986). To transform wetlands into agriculturally productive farmlands, or simply to keep floodwaters away from densely populated areas, pumps have been used to drain land, dredge rivers, and erect embankments (Purseglove 1988). Total defence against flooding is, and always has been, an unrealistic and impractical goal, however. 'Hard' engineering solutions are giving way to 'softer' measures designed to work with nature, not against it. This gradual shift from 'flood defence' to 'flood risk management' is neatly encapsulated in the UK Government's most recent flood strategy: *Making Space for Water* (Defra 2005). The Flood and Water Management Act 2010 gives local authorities the lead responsibility for co-ordinating and co-operating in flood management efforts: such changes speak to the new 'localist' political discourse in the UK. Localism argues that "by taking into account the local context and needs of local actors, more democratic and better decision-making processes can be enabled" (Begg et al 2015: 689). In other words, those affected by flood risk should have a much greater say in how flood risk is managed locally.

Even with these political changes, and many decades of investment, flooding remains a major concern. The intensity and frequency of flood events, as well as associated costs, are expected to increase as part of a changing climate (Evans et al, 2004). In England and Wales, over five million people and two million properties are at-risk of flooding (EA 2009a). Budget cuts to the Environment Agency, the public body responsible for managing flood risk in England, have raised questions about the protection afforded to people and properties. Indeed, its flood policy of discouraging 'hard' engineering solutions came under intense scrutiny during the winter of 2013/2014. With the wettest winter of record, the Somerset Levels and Moors, an area of approximately 650km^2 in the southwest of England, was subjected to severe and prolonged flooding. More than 115km^2 of land were inundated. For several months, roads were impassable, businesses came to a halt, villages were abandoned and residents evacuated (House of Commons 2014). The sheer scale and extent of the floods drew considerable media attention as Government ministers and officials were asked what they planned to do. Under mounting pressure to visit affected areas, the

British Prime Minster, David Cameron, admitted to journalists that 'we cannot let this happen again' (Dominiczak 2014).

In response, local councils and residents were consulted and a 20-year action plan agreed to reduce flooding in the region. Under the £100million plan, new tidal barriers, sluice gates, and extra pumping stations are to be installed, but notably, the Environment Agency reversed its flood policy and agreed to dredge the Rivers Parrett and Tone (SCC 2014). This commitment to river dredging marked a key victory for local campaign groups who had fought for several years to put it back on the policy agenda (FLAG 2014). For local residents, dredging – the process of removing sediment from the bottom of a river to maintain/increase its channel capacity – was favoured as a visible, 'hard' engineering solution, to the problem of flooding. Yet the Environment Agency remained unconvinced. Lord Smith, the Chairman of the Environment Agency, insisted that although dredging could have potentially reduced the duration of the floods, it 'would probably make a small difference' and 'would not have solved the problem' (Smith 2014). After two decades of ignoring river dredging as an option for managing flood risk, irrespective of its local popularity (EA 2009), we seek to shed some light on the circumstances around the sudden (and perhaps temporary) reversal of a national flood management policy in this particular location.

More particularly, we argue that Kingdon's (1995) thesis of how policy proposals move from latent possibilities to becoming favored for implementation has considerable relevance here – though we also take the view that, while helpful, it is limited in its depth of explanation. Kingdon's (1995) thesis on policy change, known as the Multiple Streams Framework, offers a heuristic for understanding how and why environmental policies gain or lose political support in fields such as climate change (Keskitalo et al 2013; Pralle 2009), flood risk (Johnson et al 2005; Penning-Rowsell et al 2006), and food production (Ackrill & Kay 2011). For Kingdon, a major crisis can act as a catalyst for change, opening up 'windows of opportunity' that allow new ideas, or existing ones, to jump up the policy agenda as the three streams: (i) defining what is the *problem*, (ii) identifying what are the *policy* responses, and (iii) the *politics* of the situation at hand, all converge. We consider the re-emergence of river dredging in the Somerset Levels and Moors as a case study that closely corresponds with Kingdon's thesis, but that it quite likely also highlights the role of pre-existing and often longstanding advocacy coalitions (Sabatier 1999) that merit a follow-up study. We use national and local newspaper coverage as well stakeholder interviews to inform and evidence the shift in policy towards dredging.

In terms of the structure of the paper, first we turn to the conceptual and policy characteristics of Kingdon's Multiple Streams Framework and importantly how it's been applied in context of UK flood risk management policy. After discussing our data and methods, we explore how local and national newspapers have talked about the problem of flooding in the Somerset Levels and Moors, and to what the extent river dredging was advanced as a viable solution, prior to the 2013/2014 events. We then discuss how local and national newspapers reacted when the Somerset Levels flooded for the second time in two years, as political pressure grew on the government and the Environment Agency to deliver an immediate and long-lasting response. That is, to dredge the rivers. Our analysis is supported by ten interviews conducted with key stakeholders immediately who were involved in or familiar with the case. The paper closes by commenting on the extent to which the case study of the Somerset Levels and Moors is explained by Kingdon's thesis and what lessons the floods have for us in terms of flood policy design.

2. Theoretical and policy context

Whilst the development of flood policy in the UK has been gradual, it has also experienced punctuations: sudden policy shifts or responses triggered by public concern following a major flood event (Wilkins 2000). In this section we first describe Kingdon's account of such punctuations as well as provide an overview of flood risk management policy in the England. In this way, we aim to comment not only on how historical and current approaches have emerged and been adopted, but also on how flood risk management may develop in future, as an interplay of different factors, including the national political response to public opinion, are amplified by media coverage and come to reflect pre-existing coalitions.

2.1 Kingdon's Multiple Streams Framework

Kingdon's (1995) Multiple Streams Framework seeks to explain why particular policies gain prominence above others on the political or policy agendas. The framework describes the agenda setting process and how different, relatively independent streams – problems, policies, and politics – converge to form a policy or resolution. The *problem* stream describes the process by which an issue becomes perceived as something that requires a policy "solution" now. This occurs when those

involved in the policy making process agree that the situation needs attention and a consensus exists that this particular solution will remedy the problem.

Within the *policy* stream, a large number of policy recommendations and alternative solutions float in a "primeval soup". These ideas compete for acceptance in policy networks. The selection of a particular policy option, advocated by policy entrepreneurs promoting their preferred options, depends not simply on the quality of the idea, but rather the persuasiveness of the entrepreneur, the technical feasibility, the degree of fit with prevailing values and expectations regarding future constraints or limits to the proposed solution (Kingdon 1995). Finally, *politics*, including shifts in the national mood, interest group campaigns, or election results, can influence how public problems and potential solutions are defined and what criteria is used to assess them in the political stream. Each stream can act as a driver or barrier to placing a proposal on or off, or higher or lower, on a policy agenda (John 1998; Kingdon 1995).

The conditions under which these three streams are coupled allow a "window of opportunity" to appear. As the streams are constantly evolving, these windows may not be open for long and can be opened "by the appearance of compelling problems or by happenings in the political stream" (Kingdon 1995: 20). The opportunity may be expected, adhering to a political schedule or unpredictable, resulting from the "shock event" of a major flood, for example.

But why can an event such as a flood have such marked effect on policy? For Donaldson et al. (2013), flooding becomes controversial during the time immediately during or shortly after an event, particularly for those who have been repeatedly flooded. As a result, institutional failures are often perceived and inquiries held into their action (or lack thereof). Those affected seek to make sense of the situation and to attribute blame (Harries, 2013), a process that the news media can play an influential role in through amplifying and extending discussion through a 'blame game': of who is at fault or responsible and why (Cloke 2014; Porter 2014).

The Multiple Streams Framework has been widely applied to understand how policies develop and why. In the context of flood policy, Penning-Rowsell et al (2006) examined four major flood events in the UK and the policies step changes that followed. They provide empirical evidence in support of Kingdon's "windows of opportunity" thesis as well as highlighting long periods of relatively stable policies. For instance, they found that flood policy accelerations are most often (though not exclusively) based upon advancing existing ideas rather than developing new ideas. They

also suggest that there may be signals within the current policy discourse that are able to indicate or predict future policy shifts. Indeed, Johnson et al (2005) highlight how crises can act as catalysts for change where incremental policy changes, over long periods, feed into sudden policy shifts.

Applying the Multiple Streams Framework, Carter and Jacobs (2013) were also able to explain transformations in the UK's policies on climate change and energy from 2006 to 2010. However, they were only able to do so by incorporating elements of Baumgartner and Jones's (1993) Punctuated Equilibrium Model, which describes situations in which windows are open for much longer periods of time, defining phases of stability punctuated by shorter phases of change. Drawing on aspects of Simon's (1991) Bounded Rationality Model as well, Carter and Jacobs (2013) describe the ways in which actors make decisions in reaction to "shock events", with limited information and time and often reaching a more socially acceptable solution than one that may be preferable in terms of other, technical norms. Motives in such pressured contexts are rationalised by the uncertainties that actors feel regarding their precise objectives, leading to unduly rapid political decision-making (Zahariadis 2007).

Each of the studies listed above focuses on flood events that had national consequences; few studies have explored the applicability of the framework to environmental agenda-setting to other political systems or different scales (Carter and Jacobs 2013). The Somerset Levels and Moors case illustrates how different factors can raise the salience of a local case to such an extent that national policy needs to respond.

2.2 Brief overview of flood risk management in England

2.1.1 Flood risk responsibilities

In England, responsibility for flood risk management policy and its implementation is divided on a national-scale between the Department for Environment, Food and Rural Affairs (Defra), who formulates flood policies, and the Environment Agency, who oversees flood risk management operations and advises on planning control (Donaldson et al. 2013; Porter & Demeritt 2012). These different roles are laid out more clearly in Defra's most recent flood strategy: *Making Space for Water* (2005), and were re-emphasized in reviews following major UK floods in 2007 (Pitt 2008) and the passing of the Flood and Water Management Act 2010.

Whereas the Environment Agency provides a strategic overview in developing long-term approaches for tackling flood risk and coastal erosion problems via Catchment Flood Management Plans and Shoreline Management Plans, local partners including Internal Drainage Boards, Lead Local Flood Authorities (LLFA), district/borough councils, and water and sewage service providers are increasingly responsible for assessing and managing flood risk locally (Begg et al 2015; Butler & Pidgeon 2011). At the local level, LLFAs such as the Somerset County Council are required to "develop, maintain, apply and monitor a strategy for local flood risk management", investigate local flooding incidents, and assess the costs and benefits of new measures and importantly how they will be paid for (Trafford Council 2014). This push towards localism has gained increasing momentum since 2011 with Defra no longer fully funding flood defence schemes (Begg et al 2015; Defra 2011a). Instead, funding must come from other sources as well. Indeed, local councils and businesses are expected to contribute. Simply put, the idea is for Government to "encourage communities to invest in measures to protect them, so that more can be done whilst giving communities a bigger say" (Defra 2011b: 4).

For Johnson and Priest (2008), this joining-up of national and local actors should allow for greater transparency and participation between the state, communities and individuals as well as the public and private sectors, over how flood protection schemes are implemented. The extent to which this approach remains multi-agency means an inherent risk remains for poor coordination at the local level between different actors, particularly as there is limited formal guidance regarding ways of achieving and operationalizing flood risk management plans. This can be problematic in the pressured circumstances such as a major flooding event, in terms of who's in charge or responsible for different activities. In the case of the Somerset Levels and Moors 2013-14 floods, there was considerable debate as to where responsibilities lay (BBC News 2014b, FLAG 2014).

2.2.2 River dredging and flood risk management in the Somerset Levels and Moors

River dredging is a technique consistent with an emphasis on structural, 'hard' engineering solutions to contain large volumes of water in order to protect agricultural interests and to improve food productivity. It involves the widening and/or deepening of waterways to allow for more water to pass through a channel, as a means of alleviating flooding or draining land (CIWEM 2014). The process, however, is often site-specific due to variations in floodplains and river morphology.

Sediment removal can result in destabilizing consequences if not managed appropriately, including severe disruption to the flora and fauna of the ecosystem (House of Commons 2014). Due to natural fluvial processes, dredging is not a permanent flood management solution and in the context of inland waterways the process has to be repeatedly implemented every five to ten years (CIWEM 2014). Dredging is also a particularly expensive process, with estimates of up to £20,000 per kilometer along the Parrett River (SDBC 2012). Given these concerns, the Environment Agency had directed investment away from dredging, pushing it down, if not off, the policy agenda (EA 2009a). Moreover, the Environment Agency's budget has been tightened in recent years, with tougher targets introduced for flood risk management and defence schemes. For example, for every £1 of investment, an average of £8 of avoided damage is required (EA 2009a; House of Commons 2014). In areas with low population density, such as the Somerset Levels and Moors, it has become increasingly difficult to pass the economic thresholds for government investment.

While there has been a long history of dredging and river maintenance in the Somerset Levels and Moors, no dredging has happened in the region for 20 years prior to the 2013-14 floods (FLAG 2014). Sitting at an average of around three to four metres above sea level, the area is prone to both salt and fresh water flooding. Current coastal defences are in place to withstand a 1-in-200 year flood, while a series of river lock gates, drainage channels and ditches along the two major rivers in the area, the Parrett and Tone, have been designed to withstand a 1-in-50-year flood (Quinn et al, 2013). FLAG (2014), a local community campaign group, and the Somerset Drainage Boards Consortium (SDBC 2013) highlighted a 2012 modelling study by the Environment Agency, indicating that the Parrett and Tone river channels in key locations had been reduced to about 65% of their 1960 capacity. Although the rainfall experienced during this event was only 10% more than the previous wettest winter when there was no flooding event, the Environment Agency's modelling indicated that dredging would have reduced the level and duration of the 2013-14 flooding in modelled locations, but would not have prevented it (SDBC 2013).

2.3 Media influence on shaping policy

Despite many other flood events happening throughout the UK during the winter of 2013-14, the Somerset Levels and Moors case received extensive and prolonged national media attention. The role of the news media in policy development is the object of considerable academic interest. In the

specific context of flooding, Escobar and Demeritt (2014) have emphasized the influence played by the news media in shaping politics and management of flood risk by serving as a driver for policy development and also as a medium for communication between interest groups, policymakers, and the public. Policy change is often driven by the immediacy of the event (Wilkins 2000) and the news media provide a powerful means of emphasising a need for urgent action. This sense of urgency can risk compromising long-term approaches to risk reduction and tends to bring forward ideas that already exist (Penning-Rowsell et al 2006). In this case, engineering-oriented policy responses to previous flooding, since superseded in influence, became resurgent in the development of a new 20-year flood plan and the revitalization of dredging regional rivers.

3. Data and methods

Our research brings together two datasets collected during the summer of 2014. The first is a textual analysis of newsprint articles (n=275) on the subject of river dredging published in local and national newspapers over a twenty-year period, from 1st January 1994 to 31st January 2014, held in the LexisNexis database. Newsprint is only one news media type and certainly not the only influential form of news or communication media in this context, but it is analytically controllable in the sense of being a fixed, searchable source. The news articles show the changing frequency of media attention given to river dredging in Somerset, which we compared with the experiences and concerns raised by interviewees (n=10), who had either lived through and been affected by the 2013/14 Somerset Levels floods or who are involved professionally in flood risk management.

The newsprint analysis was conducted in June 2014, using an online search of the LexisNexis newspaper database, to identify relevant news articles in local and national outlets where river dredging was discussed. There were two parts to the analysis. First, as the Rivers Parrett and Tone in Somerset had not been dredged since the early 1990s (Smith 2014), we selected twelve Somerset-based newspapers to gauge local interest in the topic alongside four UK national broadsheets: *the Guardian, The Independent, The Times,* and *The Telegraph*, and their Sunday editions. Although broadsheet circulation "is not as high as the tabloids, British broadsheets enjoy greater agenda-setting influence over both policy and other media, which often run with stories first broached in the broadsheets" (Escobar & Demeritt 2014: 456; also see Carvalho & Burgess 2005). We used keywords including "flood*", "dredg*", and "Somerset" to search in the headline, lead

paragraph, or indexing of the articles. In total, 188 news articles were returned. We then applied an inclusion/exclusion criterion to leave only the most relevant articles (n=64 local and n=91 national sources, n=155 total) (see Porter et al 2014).

Second, to capture media reaction following visits from the British Prime Minister, David Cameron, and the Secretary for the Environment, Owen Pattison, to flooded areas in Somerset in late January 2014, we undertook another wave of media analysis for December 2013 and January 2014 using keywords "flood*" and "Somerset". A total of 229 news articles were found before the inclusion/exclusion criteria was applied (n=54 local and n=66 national, n=120 total). Each news article was examined and assigned a code based upon how dredging was discussed and sorted into one of three categories: (1) where dredging was neither argued for nor against; (2) where dredging was presented negatively or its use as a flood management option discouraged; and (3) where dredging was perceived positively as a solution to flooding problems. Mapping the frequency of these codes, and their temporal specificity, not only helps us better understand how the Somerset flood event unfolded but also indicates how river dredging gained traction as a policy response to the floods both locally and nationally.

Preliminary analysis of the media findings then informed a round of interviews conducted over the summer of 2014 with a purposeful sample of 10 respondents, spanning local government officials, Environment Agency staff, professional engineers and residents affected by the floods, to showcase the different views held in favour or against the introduction of dredging. Interviewees were encouraged to use their own words to talk about the floods; how dredging emerged as a policy response; and who they felt should be responsible for its implementation. Interviews were recorded (with consent) and transcribed. Interview transcripts were manually coded in NVivo, where thematic codes were identified and elaborated upon iteratively.

4. Results and discussion

Our results and associated discussion are separated into two parts to reflect analysis of, first the 20-year period preceding the 2013-14 floods; and second, the evolving coverage of the floods in detail.

4.1 Was river dredging a concern prior to the 2012 floods?

Those living in Somerset Levels and Moors are no strangers to flooding. Major flood events in 1919, 1966, 2000, 2012 and 2013/2014 remain constant reminders of the region's vulnerability. A long history of river maintenance has developed as a result as landowners have drained areas to increase agricultural production over the centuries, and looked to dredging as a way to manage and lessen floodwaters. Our research suggests that prior to 2012, however, dredging was a fairly low-key topic as far as the media were concerned. Fewer than a dozen local or national printing articles mentioned dredging at all (see Figure 1). Of these, the majority, 56%, were broadly positive about dredging, outlining its perceived benefits as a long-term and sustainable solution, enjoying local support. However 33% of articles, mostly in the national press, also focused on the negative environmental and wildlife effects of dredging, with ecologists warning, for example, that "dredging virtually wiped out the mussel [population]… and it has since failed to recover" (Hadlington 2003). Even the prolonged flooding experienced in the area in 2000 failed to generate any media attention on dredging, with local newspapers not publishing a single article on it between 1994 and 2009.

[FIGURE 1 – Newspaper Coverage For or Against Dredging in Somerset, 1994-2013]

Attention grew considerably and suddenly in 2012 as the "worst floods in living memory" struck Somerset in April and then again in December (Somerset County Gazette 2012). With the wettest winter since records began (Met Office 2013), floodwaters cut off access to communities for over 100 days. Between 2012 and mid-2013, 26 news articles (n=15 local and n=11 national, n=26 total) were written in response to the floods. Only 4% of these articles raised any concerns about dredging. By contrast, the majority, 81%, spoke strongly in favour of it. Farmers, landowners, local councillors, and engineers from the internal drainage board, pinned the blame for the floods on "the Environment Agency [for] failing to dredge the rivers" (Wells Journal 2013a). Yet the Environment Agency maintained that "in many cases dredging does not reduce the risk of flooding because rivers quickly silt up again naturally" (Morris 2012). Keen to rid affected areas of troublesome floodwaters the Environment Agency embarked on the country's largest pumping effort since the 1953 floods, bringing in 18 extra pumps in addition to the 20 permanent pumping stations (BBC News 2014b, House of Commons 2014). But with all 26 articles drawing attention to the Environment Agency's policy to only dredge rivers when it makes financial sense to do so, it came under pressure to justify its decisions (or lack thereof). A modelling study for the River Parrett and Tone was commissioned by the Environment Agency to assess what effect dredging would have had on the floods. It

concluded that whilst dredging could have reduced the duration of the floods from three months to three weeks it would not have prevented them (CIWEM 2014).

News stories continued in the wake of the floods as local government publicly announced its "commitment to prevent a reoccurrence of the floods", not only because of the adverse effect on residents' lives but also because of the knock-on effects on the transport and business revenues, as the news media described Somerset as "closed for business" and reported "tourists cancelling bookings" (Somerset County Council 2013). A meeting convened in mid-2013 by district and county councils affected by the 2012 floods kept local newspaper interest as local politicians, drainage authorities, residents and the Environment Agency gathered to discuss a plan of action. A 20-year plan to dredge and maintain the rivers was proposed with Somerset County Council committing £300,000, and seeking another £3 million to fund the project (Wells Journal 2013a, 2013b). How the remainder of the funding would be raised was unclear and became a hotly debated topic. For instance, Michael Eavis, the founder of the Glastonbury music festival, "launched a fighting fund to save the Somerset Levels from flooding", aiming to raise £4 million (Independent 2013). FLAG, the Flooding on the Levels Action Group, formed after the 2012 floods, also pledged its support to raise money. It set about a social media offensive using Facebook and Twitter to keep pressure on political actors to "Stop the flooding. Dredge the rivers. Then maintain [them]" (FLAG 2013). As one respondent told us:

> "The floods of 2012 really started to focus people's minds, certainly with the formation of FLAG and the lobbying of Lord Smith, who had become the chairman [at the Environment Agency]. [He] was lobbied in 2012 about dredging the rivers, so it's not a new thing; but I think the way it was portrayed and the attention it received after the 2012 floods was really the eventual catalyst" (Flood Officer 1, Environment Agency – Interview).

The plan to dredge the Rivers Parrett and Tone, and a subsequent delay, came into sharp focus during the 2013/14 floods. That winter became the wettest on record (Met Office 2014) as severe weather combined with high spring tides leading to widespread flooding across England, affecting over 7,000 properties nationally (CIWEM 2014). Of those properties, only 150 were in the Somerset Moors and Levels area (North Moor, Salt Moor, Fordgate and Moorland in Somerset). Nonetheless the flooding was extensive in area and duration: floodwaters cut off villages such as Muchelney for nearly a month, while places like Thorney had to be temporarily abandoned (House of Commons 2014). Between 15th December 2013 and 31st January 2014, the number of newspaper

articles on flooding in the area grew six-fold relative to coverage of the previous 2012 floods (n=54 local and n=66 national, n=120 total). As figure 2 shows, local press were first to cover the floods, with attention peaking towards the end of January as Somerset County Council and Sedgemoor District Council declared the event a "major incident" (Morris 2014). Only one local news article talked about dredging before 6th January 2014. Yet as the scale and extent of the floods worsened, local attention quickly turned to dredging. Of the 35 local articles published from 7th January 2014 onwards, 60% made explicit reference to dredging of which 77% threw their support behind it. Local politicians and drainage engineers called on the government and Environment Agency to provide "more funding to invest in dredging", especially for the plan to dredge the Rivers Parrett and Tone (Bridgewater Mercury 2014a; 2014b; Wells Journal 2013a), whilst farmers and residents likewise supported the plan as "the only way [to restore] trust and confidence amongst the farming and wider community" (James 2014).

[FIGURE 2 – Newspaper Coverage of the Somerset Levels and Moors Floods, 2013/14]

National newspapers gave less attention to the story during the same time period, as shown in figure 2. Of the 66 broadsheet articles published, the majority, 68%, focused primarily on why dredging had not taken place and the difference it might have made. Only 15% of these articles flagged up any concerns with dredging, with 67% focusing on its merits.

Several factors have worked to keep the profile of the story high and hold media interest. First, the volume of water, which covered huge swathes of land, made for visually striking pictures of people and their animals having to be rescued. This made for compelling storytelling as the "birds have gone… cars have been silenced… homes [left] ruined, businesses endangered and pastures destroyed, and many locals angry" (Moreton 2014). Second, controversy over whether to dredge the rivers, and the merits/concerns associated with it, pitted different experts against each other over government policy and funding, as "everything [got] caught up in politics" (Clover 2014). Third, the political makeup of the Somerset region - a mixture of Conservative and Liberal-Democrat constituencies - made for combative debates within the Coalition government over its public policy and who should be blamed.

Initially blame was levelled at the Environment Agency "for neglecting local rivers" and letting them "silt up" (Moreton 2014), with critics including the local campaign group FLAG, the celebrity Michael Eavis and the local MP (Warburton 2014). Critics then turned to the funding

allocated to the region by central government and the difficulty in satisfying the cost-benefit thresholds needed to fund dredging as stipulated by the Treasury (Telegraph 2014b) before finally focusing on the effect that austerity cuts were having on "the Environment Agency", who were threatened with "losing 1,700 staff and potentially a lot of expertise" (Clover 2014). Lastly, visits from influential figures such as the Secretary for the Environment, Owen Pattison, Chairman of the Environment Agency, Lord Smith, the British Prime Minister, David Cameron, and the Prince of Wales, served to keep the media's spotlight on Somerset (e.g. BBC News 2014a).

Not only did these media stories focus attention on the floods themselves but they also mobilised pre-existing, alternative policy options for how rivers should be managed, akin to Kingdon's heuristic. All three of Kingdon's streams are aligned here, as the *problem* of repeated, severe and long-lasting flooding converged with the *politics* of environmental protection funding, alongside a local groundswell of support for a pre-existing *policy* response based on dredging rivers. Heeding these concerns, the British Prime Minister David Cameron told reporters on 2nd February 2014 that the ongoing floods were "unacceptable and… overruled the Environment Agency to order dredging of nearby rivers as soon as possible" (Mason 2014). Within a relatively short space of time the government policy on dredging had been reversed – at least in this locality and at least for the time being.

4.2 Why did river dredging emerge as the answer to the 2013/14 floods?

As floodwaters receded in early March 2014, the Prime Minister, David Cameron, paved the way for an agreement between the Environment Agency, local authorities, drainage boards and the Department of Transport for a 20-year Flood Action Plan for the Somerset Levels and Moors. Lord Smith of Finsbury, Chairman of the Environment Agency assured the community that additional funds would be allocated to repair all flood defence assets for the future (House of Commons 2014: 6). Over the next two decades, £100 million is to be spent on dredging the rivers and providing extra pumping stations. This commitment marked a key victory for the pro-dredging campaign of local residents. It also pointed to the growing role of localist politics (Haughton and Allmendinger, 2014).

Why momentum for action gathered at this point and not immediately after the 2012 floods, appears to be related to two main catalysts. First, campaigners and newspapers began reporting that

the channel capacity of the Rivers Parrett and Tone had reduced to 65% of their 1960s levels (see Matlby 2013). Investigations following the 2012 floods led the Environment Agency to commission a modeling study to assess the effect of dredging the rivers. That study quickly became a focal point in news stories. As media interest intensified from 7th January 2014 onwards, 16% of local and national newspaper articles (26% of local newspaper articles) drew readers' attention to this (n=10 local and n=6 national, n=16 total out of n=99). Pro-dredging campaigners used the 65% figure to lend credibility to their claim that lack of maintenance silted up the rivers (Carter 2014). As a result, campaigners used the findings to mobilise support, as one of our respondents told us:

> "Because of what happened in 2012, we reviewed the modelling… and found that channel size makes a big difference to the volumes of water which pass through the channels. We knew dredging made a difference and would have reduced the duration and frequency of a flood except there was no way to fund it. So when the politicians asked about dredging after the recent floods, we were able to hand them all the evidence that we had gathered in support of it" (Engineer, Somerset Drainage Boards Consortium – Interview).

Second, the creation of the Flooding on the Levels Action Group (FLAG) kept pressure on the government and its agencies to justify its anti-dredging policy, explain why they had not acted sooner and importantly ensured that the floods remained a high-profile news story. On the one hand, FLAG helped to give a voice to local residents and allow them to vent their frustrations about the Environment Agency, whom they believed were ignoring the fact "that if the rivers had been dredged this would have cleared them of silt, making them wider and deeper and easier to maintain. This would create more capacity to carry away floodwaters, draining the flood plain far more quickly" (Carter 2014). FLAG's social media campaign on Facebook and Twitter was considered significant:

> "FLAG lived in the thick of it… [they're] a very powerful pressure group… [and their] use of social media was a real driver in the floods more than any other time… social media was at the fore of making things happen, almost instantly" (Flood Officer 1, Environment Agency – Interview).

On the other hand, why "angry residents… [had to] form an action group to campaign for river dredging as the best way of tackling weeks of floods" became a news story itself over the government failing to listen, or respond, to local needs (Weaver 2014). FLAG, as a consequence,

became an influential actor in the growing media coverage, with 82% of articles discussing its pro-dredging policy from 7th January 2014 (n=35 local and n=58 national, n=93 total). This political profile, coupled with the findings from the modelling study, made it harder to ignore river dredging as a viable flood management option.

The *problem* of floods happening too frequently was now tied to a *policy* response based on dredging rivers - yet the *politics* of why dredging has historically been ignored still needs to be explained. Here we provide an account of the circumstances in some depth, but the full reasons for the policy change remain debatable and open to further empirical investigation[1]. We were told that institutional and political constraints such as the Treasury's 1:8 cost-benefit ratio made it very difficult to fund dredging (Flood Officer 2, Environment Agency – Interview). Indeed, when "budgets are tight, maintenance — in particular, watercourse conveyance and dredging — is the first thing to be cut. In the face of limited budgets, low-priority areas such as farmland are sacrificed in favour of urban, highly populated areas" (House of Commons 2014: 3; see also Parker 1995; Johnson & Penning-Rowsell 2010). It "was a bit of a shock", therefore, when the "Prime Minster overturned' the policy by saying that this 'was a special case" (Flood Officer 2, Environment Agency – Interview).

Yet the politics of dredging suddenly changed. No longer was dredging in this locality subject to economic efficacy tests and no longer were its adverse environmental impacts viewed as an obstacle. As one of our respondent explained, "dredging is very visible. Everyone sees the machines and notices a difference in the rivers immediately afterwards… Dredging looks like it makes a difference. Maybe not economically but the communities can see it" (Flood Officer 2, Environment Agency – Interview). Whether or not dredging actually makes a difference matters very little compared to its ability to defuse a potentially tricky political problem:

> "Cameron's dredge pledge is like the badger cull. It is useless. It is counterproductive. But it keeps the farmers happy and allows the government to be seen to be doing something: something decisive and muscular and visible. And that, in these dismal times, appears to be all that counts" (Monbiot 2014).

[1] An anonymous reviewer suggests that one possibility, which we agree merits further investigation, may relate to particular attributes of some of the campaigners. Anecdotally at least, it appears not uncommon in successful local land use planning campaigns (e.g. Upham and Shackley, 2006) to find that some of the advocates are relatively well-resourced, including in terms of social and professional connections and status. This resourcing likely helps campaign processes. Quite how important this was (if at all) in this case, is unclear.

Flood experts we interviewed were similarly surprised by this sudden reversal in government policy. They shared the view that it was "untrue" to suggest that "if you dredged the rivers perfectly you would have no flooding… [as] volumes of water just don't act like that" (Flood Expert 1, University Professor – Interview). Not only is it "a cruel offer of false hope to those living in flood prone communities" to suggest that dredging would prevent future floods but it's "unsupported by both science and evidence" (CIWEM 2014: 3). This is not to suggest that dredging cannot play a role in reducing the frequency and duration of local flooding, but that its effect on river flow, wildlife/habitats and its erosion of riverbanks should be carefully considered (Hadlington 2003). Winter floods, for example, can provide summer irrigation for livestock and help sustain a rich diversity of wildlife. A high-water table, and regular flooding, means parts of the Somerset Levels and Moors are designated Special Protection Area and Sites of Special Scientific Interest because of the winter birds they attract (CIWEM 2014).

Unable to insure or mortgage their homes, local residents felt trapped. But possibilities other than dredging exist in principle: residents "could be offered assistance if they want to leave. We could buy their homes off them… it might be cheaper than trying to stop the flooding" (Flood Expert 2, University Professor – Interview). Furthermore, "farmers who receive subsidies for producing food could instead be paid for storing water" (Webster 2014). It is unclear whether the latter proposals would be feasible or suitable to other flooding events in the UK, especially given the understandable reluctance of people to leave their homes or community, with which they have strong emotional attachments (see Harries 2012). Dredging, by contrast, appears to offer a simpler, more immediate and visible solution. Yet closer reading of the Somerset Levels and Moors Flood Action Plan reveals that whilst £5.7 million has been allocated to return the Rivers Parrett and Tone to their 1960s profile in 2014 there is little detail about what happens afterwards, as one of our respondents remarked:

> "We are now approaching August [2014] and [the Environment Agency] finishes in October and, basically, we do not know what happens from there on. We don't know if there will be dredging next year or even the year after that; but if there isn't going to be some sort of ongoing maintenance, in another ten years or even five years we'll be back to square one. These rivers silt up terribly quickly" (Local Resident 2 – Interview).

Indeed the first phase of the 20-year Flood Action Plan has now been completed (this being in October 2014). The Environment Agency will no longer provide any funds, with responsibility

for raising money falling to the local authorities, drainage boards, and local residents in the Somerset Levels and Moors to complete the scheme (Flood Officer 1, Environment Agency – Interview). Given that the same local actors struggled to raise funds to dredge the rivers following the 2012 floods, the national policy reversal is beginning to look temporary rather than a signal of things to come (Penning-Rowsell et al 2005). It does, however, set an interesting precedent for future flood events both locally and nationally.

5. Conclusion: Reversing UK flood policy?

The policy response to the 2013-14 flooding of the Somerset Levels and Moors can be understood as arising from the conjunction of the three different streams of events that Kingdon (1995) posits (problem, policy and politics). Analysis of newsprint media coverage in the period before and during the event, supplemented by stakeholder interviews, provides evidence of the way in which dredging as a solution became highlighted and eventually adopted during the period in which the *problem*, *policy* and *politics* converge. Local political activists mobilised a wider campaign with the help of social media and capitalised on national and local political sensitivities, to promote their preferred policy solution. This involved a substantial change in Environment Agency policy, with a 20-year flood plan introduced that included dredging.

Less clear is the longevity of the policy reversal, especially given funding constraints and the dependence of dredging on sustained, costly intervention. From the perspective of Kingdon's framework (1995), crises provide an opportunity for enhancing social learning and accelerated policy change (Johnson et al 2005): it is those policies that are ready to be exploited during a window of opportunity and that are amenable to refinement during periods of stability and incremental change that are prime candidates for adoption. To be ready for adoption in a time of crisis, such policies require monitoring and knowledge of issues, actors and associated ideas. Such was the case in this event, in which local engineers in the Drainage Board Consortium concluded that dredging would be the most effective solution, contrary to the Environment Agency's position.

Nonetheless, the measures that were previously favored remain available (including addressing upper and mid-catchment management, urban run-off and increasing infrastructural resilience), ready for new crises to potentially shift circumstances back in their favour. Little-discussed, new options may also emerge, such as the potential for a tidal lagoon to provide off-shore

volume for flood drainage (BBC News 2014c). In this case, popular pressure helped to catalyze policy change in the context of particular national politics playing out locally. Local residents proved to be more influential than Environment Agency experts and Kingdon's framework helps to explain why. However, we can also observe that the framework is such a broad heuristic that it can hardly fail to capture the key influences - of course *problems*, *policies* and *politics* are involved in how and why policy changes. What the framework fails to do is inform understandings at higher levels of resolution, such as distinguishing between instances when popular pressure mediated by social and broadcast media may (or may not) achieve similar, catalytic effects. Moreover the framework suffers from temporality blindness: UK flood risk management policy in the UK remains in a state of flux, not least because of combined financial and climatic change pressures. It was always clear that dredging is a costly option that must be continually renewed. Kingdon's thesis can tell us little about to what extent this option will be relied upon in the long term, only that if there is further rapid policy change with respect to region-specific flooding, it is likely to involve pre-existing 'solutions' and to be politically advantageous to some. If any stakeholders have different, or preferred options, they would do well to prepare their case now, ready for the next crisis.

Returning to the issue of localism and flood risk management showcased by this case study, Green (2014) and Begg et al (2015) raise further concerns over the willingness of, and capacity for, communities to manage flood risk locally and the inequalities they may face. For instance, Green (2014) argues that the Somerset Levels and Moors communities cleverly mobilized the media and political attention over the need for urgent action rather than accept that they must adapt. Given the financial restrictions on public expenditure, Green (2014) argues that communities will have a stark choice to make in years to come: accept the risk of being flooded more frequently and intensely or pay to defend themselves. Yet our research suggests that responsibility for managing local flood risk is not only continually deferred upwards but communities may also struggle to secure the funding to protect themselves. After the 2012/13 floods, the council was unable to raise the £3million needed to dredge the Rivers Parrett and Tone. Unless the financial contribution expected from the local community is realistic and appealing little is likely to change.

Begg et al (2015), by contrast, point to the inequalities that localism can create. They ask: what happens to areas/communities that lack the local partners to fund flood risk measures? Rural communities like the Somerset Levels and Moors are a prime example. Either nothing will happen or communities will remain reliant on the state for help. Our research, however, highlights two

further inequalities. First, what happens in communities where a clear power imbalance exists between local partners? And where particular agendas proceed without much opposition? For instance, river dredging may satisfy the needs of the farming lobby but whether it's in the interests of others in the communities or wider environment, and how sustainable or effective it is, become almost secondary concerns. A network analysis is urgently needed for the recent 2015/16 flood events across Cumbrian and York to understand the influence different actors play in setting local flood risk agendas. Second, the local preference for physical, visible, hard engineering solutions such as river dredging over softer measures of working with nature to restore riverbanks, raises questions over their long-term effectiveness and sustainability are sidelined. Although these hard engineering solutions may be cheaper and quicker to yield results in the short-term, we need to ask whether the political convenience of these solutions comes at the expense of devaluing expert advice.

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Figure captions

FIGURE 1 – Newspaper Coverage For or Against Dredging in Somerset, 1994-2013

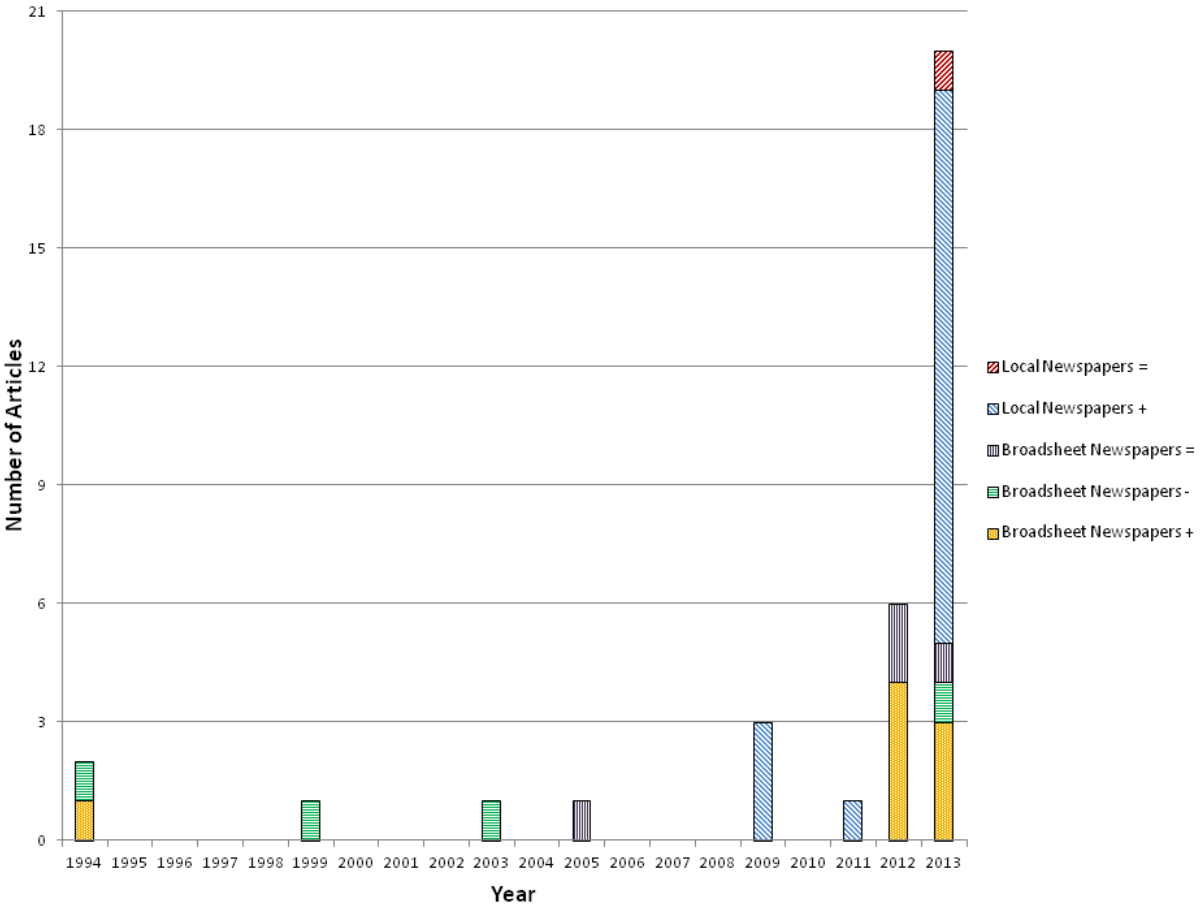

FIGURE 2 – Newspaper Coverage of the Somerset Levels and Moors Floods, 2013/14