

Ballater & Crathie Community Council (BCCC)

December 2015 Ballater Flood

Draft Report 2: Social & Economic Damage

BCCC has created a sub group known as the Flood Information Group (FIG). A key objective of the FIG is to produce the following 3 draft reports on the 2015 flood which seriously impacted Ballater:

Report 1: Causes, mechanism and uncertainties (Completed - Report issued Jan 2021)

What happened during the flood based on official reports & residents' experience and what remains uncertain.

Report 2 Social & Economic Damage (Draft Report issued July 2021)

Actual damage assessed – as a basis for considering Flood Protection proposals.

Report 3 Flood Protection Actions Taken & Future Proposals

Flood protection work to date & future flood protection proposals/options.

Draft reports will be issued by BCCC in paper and electronic form and provide the basis of a consultation process. The consultation will enable residents, and all other interested parties to provide feedback on each draft. **BCCC is particularly keen to get the experiences of residents & business owners during and after the flood to include more anonymous case studies in Report 2 – please contact FIG if you are willing to participate.** Please provide comments on this draft in writing to BCCC within [1] month. BCCC will then issue a final version and ultimately one combined Final Report before proceeding further.

These 3 reports should be viewed as a data and information gathering exercise. As such, they will not provide flood protection recommendations.

Flood protection recommendations will be developed after finalising these 3 reports into one final report. It is increasingly clear that the continuing COVID crisis and its impact on public finances means Central Government funds for flood defences are likely to be restricted for many years. It is therefore essential that the flood protection recommendations include a range of affordable lower cost options which will prevent or mitigate floods, in addition to the higher capital cost hard defences already proposed. [A thorough consultation process will be undertaken before finalising flood protection recommendations.]

BCCC would like to express its thanks to all who have contributed to making these 3 reports possible (by giving their time & providing information, photos and videos) including:

- Ballater Fire and Rescue Staff
- Ballater Police staff
- Ballater Golf Club Staff
- Numerous residents of Ballater
- Aberdeenshire Council, Tony Cox & Douglas Johnston, & SEPA.

Flood Information Group

December 2015 Ballater Flood

Report 2 Social & Economic Damage

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Abbreviations Use in this Report	
Aberdeenshire Council	AC
Ballater & Crathie Community Council	BCCC
Tony Cox and Douglas Johnston	BFG
Ballater Bridge	The Bridge
Ballater Golf Club	BGC
Centre for Research in Water	CREW
UK Department for the Environment, Food & Rural Affairs	DEFRA
People of Ballater & surrounding areas	Residents
RPS Consulting Services Ltd	RPS
Sluievannachie	SL

Summary

Report No.1 dealt with the causes and mechanisms of the 2015 Flood and set out those things that are still unknown.

This Report No. 2 brings together previous sources of information on health, social, economic and other losses and identifies the serious risk to life that a bund breach did and will cause.

(Most important information sources are: (1) DEFRA's 2006 Report assessing flood risk to people & (2) CREW (Centre for Research in Water) 2020 Report on the health, social and economic damage to Ballater & surrounding areas)

Risk to Life

Advice from DEFRA is clear that a breach to the Village Bund is a potential life-threatening event.

Conclusion on Risk to Life in Ballater based on DEFRA's Key Factors

Risk of Loss of Life in the 2015 Flood was "High" on all four of DEFRA's Key Risk Factors		
Primary Factors	Comment	Risk
Speed of flood water	Swollen river compounded by bund breaches	High
Depth of flood water	Assessed as dangerous by DEFRA	High
Speed of onset of flood water	Breached bund meant rapid onset. Residents had little time to react	High
Vulnerability of residents	Above average number of older residents. Many unable to evacuate without help	High
Based on the above primary factors the risk of loss of life in 2015 flood was high		

Economic and Other Losses

RPS estimated that the village suffered a total direct economic loss to the order of £32m as a result of the 2015 flood. We conclude that this may be an underestimate but is to the right order of magnitude.

Based on cautious estimates, the village suffered a total loss of £ 18 - 28m as a result of the 2015 flood.

Table 14: Total Losses in the Village from the 2015 Flood			
Type of loss	Min £m	Max £m	Comment
Personal	11.9	19.0	Likely to be understated
Business	4.0	7.8	Likely to be understated
Government & Utility	3.0	3.0	Likely to be understated
Total personal losses	18.9	29.8	

These figures will be revised based on feedback that is received on the Draft

To put the 2015 Ballater flood in context, it was 16 times more intense than the nearby, major Garioch flood. (Based on relative scale of homes damaged) This flood intensity reflected greatly on the level of social and economic impact.

The CREW Report highlights the severe psychological and indirect damages and losses also caused.

"Ballater isn't back to normal, it's not going to be back to normal for a couple of years, in actual fact I would say the whole community is suffering from post-traumatic stress, to be quite frank. As soon as it rains you can feel the tension levels rising and you talk to people who have gone back to their homes and they say they wake up and it's raining on the ceiling – you can hear the rain on the roof and 'I can't get back to sleep, just in case.'" Ballater interviewee – 2017

Further input from the community as to the damaging effects of the 2015 Flood is welcomed.

1. Introduction

1.1 Approach to Producing this Report

This report aim is to identify & quantify the social, health & economic damage caused by the 2015 Flood. Previous reports have focused mainly on technical aspects. (e.g., causes, mechanisms, mapping etc).

To produce this report, it was essential for BCCC to have the following additional information, which we did not have when Report 1 was produced:

- more detailed social, health & economic impact information &
- a framework for assessing the seriousness of the 2015 Flood.

1.2 More Detailed Social, Health & Economic Impact Information

A CREW (Centre for Research in Water) report (published May 2020 and commissioned by the Scottish Government) already contains in great detail the “voices of Ballater residents”.

CREW, part of James Hutton Institute, began this work in 2017, 18 months after the flood. CREW undertook the following, which reflected the “voice of Residents”:

- in depth interviews with Residents. (Interviewed 30% of flooded households & many non-flooded)
- In depth interviews with local Businesses. (Interviewed c 50% of flooded businesses)
- A series of interviews over a 3-year period to firmly establish the longer-term effects.

CREW produced early summary reports. However, the final CREW report was completed after and so was not reflected in the RPS Report.

1.3 Flood Assessment Framework

Many experts have been involved in the 2015 flood. Their assessments & points of emphasis have often differed, making it hard for decision makers to form a clear view. This is common in floods.

To resolve this common problem, DEFRA developed a flood assessment approach, which can be applied to any flood to assess its seriousness & risk to life. DEFRA’s approach is detailed & applied to the 2015 flood, so a clear and well supported assessment can be made.

1.4 Information Sources & Encouraging Further Feedback from Residents

This report uses these two new sources (1.2 & 1.3) plus earlier residents’ feedback to BCCC & other sources from Report 1, to give **Residents** a clear & concise view of the social & economic damage.

BCCC hope this Report acts as a catalyst for residents to share their own flood experiences with BCCC, so anonymised additional material can be added to inform & enrich this draft report.

2. Risk to Life in a Flood

2.1 DEFRA Methodology for Assessing Flood Risk to Life

DEFRA developed a method for assessing flood risk to life, and property, which is summarised in this section. This approach is applied to the Ballater flood in section 3.

DEFRA found flood risk to life is driven by three key factors:

- Depth and speed of flood water.
- Speed of onset of the flood.
- Individual personal vulnerability.

2.1 Depth & Speed of Water

- Adults are unable to stand in still floodwater 1.5m deep or greater.
- The depth of flowing floodwater where people are unable to stand is even less:
 - If the speed is 1m/s (2mph). some people will be at risk in a depth of 0.5m.

- If the speed is 2m/s (4mph), some people will be unable to stand in a depth of 0.3m.
- If the speed is 2m/s (4mph), most people will be unable to stand in a depth of 0.6m.
- In a flood situation, the maximum flood water speed can be significantly higher in narrow streets & other “pinch points”, which can greatly increase the risk in these environments
- DEFRA risk assessment of flood depth & speed is summarised in Table 1. This indicates the crucial impact water speed has in increasing risk during a flood:

Table 1: Risk of Death in a flood

		Water Depth (metres)					
		0.25	0.5	0.75	1.0	1.25	1.5
Water speed metre/sec	0						
	0.5						
	1.0						
	1.5						
	2.0						
	2.5						
	3.0						

Source: DEFRA Phase 2 Flood Risks to People: Guidance Document (FD2321/TR2) Mar06

Danger Levels: Yellow = for some people: Orange = for most people: Red = for all

2.2 Speed of Onset of Flood

- The speed with which a flood occurs has a major impact on whether people are exposed to floodwater - and therefore the risk of death or serious injury.
- If a flood onset is gradual & the rate of rise is slow, people have time to take action and, if necessary, leave the flood risk area.
- If flooding occurs very rapidly, people have little time to respond. (e.g., defence breached)

2.2.1 Flood hazard in areas defended by a bund – Overtopping

- Flooding behind defences (e.g., a bund) can occur from overtopping.
- In an overtopping, Table 2 shows how hazard varies with distance from a 2-metre bund for different flood levels (mild, moderate & severe flood), assuming a flat & clear floodplain.
- As flood water rises to 2 metres, no flooding occurs behind the bund.
- As flood water rises above 2 metres overtopping occurs and:
 - **This is normally slow**, so people have time to respond.
 - **The overtop is relatively small** as the bund is generally of “reasonable” height.
- When overtopping occurs, the bund remains effective in restricting the flood water.
- **The resultant flood impact is therefore not generally severe – but slow & limited.**

Table 2: Danger to people of 2 metre bund overtopping relative to distance from Bund

		Water level in excess of the floodplain (metres)				
		0.5	1	2	3	4
People’s Distance from Bund metres	100					
	250					
	500					
	1000					
	1500					
	2000					

Handwritten notes in the table: A box around the 1000m row for 1m and 2m depth is labeled "MILD to MODERATE FLOOD". A box around the 1000m row for 3m and 4m depth is labeled "SEVERE FLOOD".

Source: DEFRA Phase 2 Flood Risks to People: Guidance Document (FD2321/TR2) Mar 06

Danger Levels: Yellow = for some people (vulnerable): Orange = for most people: Red = for all

2.2.2 Flood hazard in areas defended by a bund - breaching

- Where a bund **breaches**, this may be in a situation where it has overtopped or not.
- The **breach** may be total, to floodplain level, or partial. (This section assumes a total breach)
- Table 2 shows the flood hazard with distance from the bund for different flood water levels above the floodplain (mild, moderate & severe flood), assuming a flat and clear floodplain.
- On breaching, a wall of water, the height of the flood above the floodplain is instantly released.
- Consequently, **breaching** normally occurs rapidly & people have very little time to respond.
- In a breach situation, the bund is ineffective in restricting the flood water.
- **As a wall of water is released rapidly this constitutes a serious danger – fast and unlimited.**

Table 3: Danger to people of a 2 metre bund breaching relative to distance from Bund

		Water level in excess of the floodplain (metres)				
		0.5	1	2	3	4
People's Distance from Bund metres	100	Yellow	Orange	Red	Red	Red
	250	Yellow	Orange	Red	Red	Red
	500	Yellow	Orange	Red	Red	Red
	1000	Yellow	Orange	Red	Red	Red
	1500	Yellow	Orange	Red	Red	Red
	2000	Yellow	Orange	Red	Red	Red

Handwritten annotations in the table:
 - A box around the 1000m row, 1m and 2m columns is labeled "MILD TO MODERATE FLOOD".
 - A box around the 1000m row, 3m and 4m columns is labeled "SEVERE FLOOD".

Source: DEFRA Phase 2 Flood Risks to People: Guidance Document (FD2321/TR2) Mar 06

Danger Levels: Yellow = for some people: Orange = for most people: Red = for all

2.2.3 Bund Risk Considerations

- For bund areas, the speed of flood onset is always considered to be rapid because of the unpredictability of bund breaches.
- As the speed of flood onset is a key risk factor, reducing the risk of breach is critical for residents' safety. This will include factors such as:
 - Ensuring bunds are regularly maintained, so weak areas do not develop.
 - Building bunds with as robust a structure as possible.
 - Building bunds to ensure they are sufficiently wide – as well as high.
- **Being aware that “breaches” constitute a much greater risk than “overtopping” is vital.**

2.3 Individual Personal Vulnerability

- A resident's ability to respond to a flood depends on their physical condition. Vulnerable people (old, disabled and sick) are less able to cope with floods & therefore at more risk, specifically:
 - % Of residents aged 75 years or over.
 - % Of residents suffering from long term illness.

2.4 Other Risk Factors (identified by DEFRA)

Debris in A Flood: Debris in a flood can be a significant additional hazard for people. Debris is a particular issue in urban environments, due to the many objects around.

Uneven Ground: The chances of people being unable to stand in floodwater is increased if the ground is uneven or there are holes beneath the water. (e.g., displaced service covers) It is difficult to see underwater obstructions even in shallow water, if it is silty or at night.

Building Type: If people are in a single-storey building, they will be exposed to floodwater. If they are in a multistorey building, they can avoid the floodwater by staying above flood level.

Inside or Outside: People are at greater risk if they are in a tent or caravan, as these are likely to be damaged or washed away in a flood.

People's Location: The chance of people being exposed to floodwater depends on where they are. If they are outdoors on foot or in a vehicle they may be at greater risk.

3. Risk to Life in the Ballater 2015 Flood

This risk can best be considered using the 3 key factors identified by DEFRA:

- Depth and speed of flood water.
- Speed of onset of the flood.
- Personal vulnerability

3.1 Depth and Speed of Flood Water

- Depth and speed of flood water varied in different parts of the village. The following aims to give an indication of this variety to map this on a DEFRA speed / depth chart.
- The volume, depth & speed of the flood water in the village was greatly increased by the multiple bund breaches identified in Report 1.
- **South** of the village, the depth/speed combination was sufficiently powerful to destroy all static caravans & much else. Near the Dee, flood depth was >1.5m & flow rates were >3m/sec.
- **North:** In the streets just north, water depth was a little less > 1m and flow rate was variable (1 – 3 m/sec), partly due to the impact of streets and pinch points.
- **Golf Road:** flood water depths were less < 0.3m but flow rates were still fast > 1m/sec.
- **East** of the Village, the confluence of flood waters from the village with further flood water direct from the Dee produced great variability: flood depths > 1m & flow rates > 2m / sec.
- The 4 village areas above are mapped in Table 4.

Most areas of Ballater are high risk on these key factors – speed and depth.

Table 4: Risk of Death in a flood

		Water Height (metres)					
		0.25	0.5	0.75	1.0	1.25	1.5
Water speed metre/sec	0						
	0.5						
	1.0						
	1.5						
	2.0						
	2.5						
	3.0						

Handwritten annotations on the table: 'GOLF RD' in a green box at (1.5, 0.25); 'EAST CENTRE' in a green box at (1.5, 0.75); 'SOUTH' in a black box at (2.5, 1.25).

Source: DEFRA Phase 2 Flood Risks to People: Guidance Document (FD2321/TR2) Mar06

- **Danger Levels:** Yellow = for some people: Orange = for most people: Red = for all

3.2 Speed of Onset of The Flood

- Residents in the south of the village, where the most serious flooding occurred, said that the flood waters rose very rapidly, in a few minutes from 20 centimetres to over 1 metre. Residents in the centre & east of the village, reported similar experiences of rapid water rise. These fast onset levels reflect the fact that bund breaches played a key role in the flooding here.
- Residents in the Golf Rd area experienced a slower rate of change in flood levels. The slow onset of flood reflects the fact that bund overtopping at SL was the flooding mechanism here.

Most areas of Ballater are high risk on this factor – speed of onset.

3.3 Individual Personal Vulnerability

- The central areas of the village have a high percentage of older people who are less physically able to manage in a flood situation and will often need support to evacuate their homes.

Ballater community's age profile is high risk on this factor

3.4 Conclusion on Risk to Life in Ballater based on DEFRA's Key Factors

Table 5: Risk of Loss of Life in the 2015 Flood was “High” on all four of DEFRA’s Key Risk Factors		
Primary Factors	Comment	Risk
Speed of flood water	Swollen river compounded by bund breaches	High
Depth of flood water	Assessed as dangerous by DEFRA	High
Speed of onset of flood water	Breached bund meant rapid onset. Residents had little time to react	High
Vulnerability of residents	Above average number of older residents. Many unable to evacuate without help	High
Based on the above primary factors the risk of loss of life in 2015 flood was high		

Other risk factors detailed in 2.4 further increase risk to life:

- There was much debris in the fast-moving flood water, presenting a serious risk to people.
- The most seriously flooded area contains a campsite, identified by DEFRA as especially risky.
- Fortunately, no people were in the campsite but over 100 static caravans were destroyed.

3.5 Evidence from Residents Supporting this Assessment of High Risk to Life

3.5.1 Comments from residents in interviews with FIG

South

- 100 static caravans washed off the caravan site and destroyed.
- Residents saw flood depths of c 2m & rapid flow at their homes – going to 1st floor for safety.
- An emergency services launched rescue boat was swept away in the current.
- Residents were evacuated by helicopter as emergency services unable to get to them.

Centre

- Residents saw flood water of > 1m & very rapid flow - which happened quickly.
- Residents evacuated by emergency services due to level of risk
- Many residents unable to evacuate their homes without support.
- Residents saw debris washed through the streets in the rapid flow.

East

- Residents saw flood water of > 1m & very rapid flow - so took safety on 1st floor.
- Residents saw large pieces of debris washed through the streets in the rapid flow.
- Oil tanks washed away, walls collapsing, etc made outside impassable.

Golf Road

- Residents saw flood water of > 0.3m & rapid flow at home.
- Resident attempting to protect their home washed over by the current.
- Water flows particularly strong on roads down to Victoria Rd.

3.2.2 CREW Interviews Support this Assessment of High Risk to Life

- In Ballater, there were accounts of people (both from the emergency services and members of the community) being in the flood waters, some of whom were old and vulnerable.
- Some interviewees stated that they were almost swept away by the sheer force of the water.
- It is remarkable no lives were lost on the day of the floods. (CREW conclusion)

Table 6: CREW Feedback on their Flood experience from Residents
<p>Residents were taken by surprise at how quickly flood waters rose and by how much of the village was under water. The flood waters were deep and fast flowing: at one point the emergency services had to abandon the use of evacuation boats because the current of the flood waters was so strong.</p> <p>CREW were told of residents getting stuck in vehicles and being caught off-guard by the force of the very cold flood waters. It was considered miraculous that no one was swept away by the flood waters.</p>

The rapid rate at which flood waters rose meant many of those who were interviewed did not have time to take any mitigating action. Some residents remained in their homes, some chose to leave their property and others left when instructed by the emergency services. Some interviewees who left their homes went to the homes of local friends and relatives and others went to the village hall, where a formal registration system was in action. Some people spent the night at the local army Barracks. A member of the local clergy hosted some evacuees from the local care home / sheltered housing complex. Others left the village before roads become impassable and stayed with friends or family who lived outside Ballater.

Source: CREW Report May 2020

3.6 Conclusion on Risk to Life - Supported by Residents, Observers & Researchers

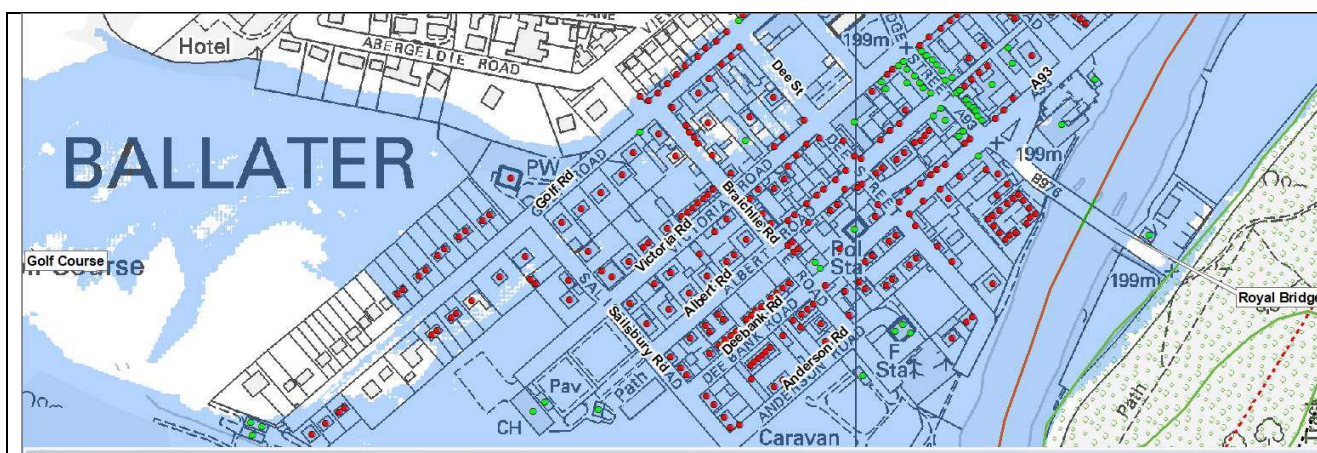
The 2015 Ballater flood was a life-threatening event in many areas

4. Scope of the 2015 Ballater Flood

When a serious flood strikes an area, the community impact is even greater if a large percentage of people are affected. In Ballater, the percentage of people, homes & business affected were all high:

	Affected	Total	%	Comments
Homes	307	1000	30%	Affected (RSP), total (incl 2 nd homes) estimated.
People	450	1460	30%	Total 2016: estimate by National Records of Scotland %age based on properties flooded
Businesses	60	100	60%	Actual flooded (RSP). Total businesses hard to estimate due to many informal smaller business

An RPS map indicates the location of homes damaged, reflects the widespread flooding impact. Although the map does not reflect the full damaged area, as it omits part of the caravan park and areas to the east and north east of the village, it does provide a reflection of the widespread damage suffered.



Source: RPS Report Appendix A

CREW contrasts this high impact level on Ballater with a second area struck by serious flooding in 2015: Garioch (on the Don). These 2 seriously flooded areas are compared in Table 6:

	Ballater	Garioch	Comments
Homes Flooded	307	88	Ballater had over 3x as many homes flooded

Population	1460	6790	Ballater is much smaller, one fifth the size of Garioch
Homes Flooded/ 1000 residents	210	13	Consequently, Ballater suffered an event with 16x greater impact than the severe flood experience by Garioch
Sources: CREW Report / population estimates National Records of Scotland (2016)			

Ballater flood was 16 times more intense than the Garioch flood. (Based on relative scale of homes damaged)

This flood intensity reflected greatly on the level of social and economic impact.

5. Impact on Health of Residents

5.1 CREW Study of Health Impacts of the 2015 Flood

The CREW research done in 2017 (1 year after the flood) and in the subsequent 2 years, tried to establish the effects on residents' health of the 2015 Flood - and how these changed with time.

In 2017, the following information was gathered from Ballater residents:

- 144 questionnaires were returned by residents
- 40 in depth interviews were done.
- 89 respondents had been flooded.
- Of the respondents: half were retired & almost half were aged over 65.
- 46% were employed, with self-employment common.

This Section reflects the voice of Ballater residents on their health as expressed to CREW.

5.2 Resident Health Issues Resulting from The Flood (from CREW Reports)

Shock of Being Flooded – Personal Danger

Residents experiencing in their homes rapidly rising flood water, which was cold, deep and fast flowing, suffered traumatic shock. This shock was compounded by the inability of many residents to evacuate themselves and the realisation they were in serious danger.

Shock of Being Flooded – Home & Possession Wrecked

Residents experiencing their homes and possession being destroyed and realising they were unable to rescue personal and irreplaceable items were further traumatised.

Shock of Return to Damaged Homes & a Wrecked Community

Some interviewees did not go back to their home for days after the flood peaked. Many talked of their shock at the extent of damage in their home, especially damage to furniture and personal belongings rather than to the building itself. Terrible smells and contamination were described.

Ruined belongings lining the streets where homes had been flooded proved distressing for residents, especially in cases where it took weeks for household items to be removed. Loss adjusters/ insurers gave different advice about whether belongings should all be disposed of or if householders should attempt to salvage what they could – causing further delay & stress.

Communications & Power Disruption was Hugely Disruptive & Upsetting:

Disruption associated with not having power and/or access to fixed and mobile phones was common during and for up to a month after the flooding. During the flooding, residents suffered the following:

- 45% had no home telephone connection,
- 66% had no electricity at their home,
- 47% had no functioning home broadband,
- 27% had no functioning mobile Internet signal, and

- 22% had lost the ability to make or receive mobile phone or text messages.

This made it difficult to get information as the flood happened, or to communicate with friends & family. It was also difficult to contact emergency services - and later insurance companies.

Disruption to utilities continued for up to a month after the flooding for many:

- 30% had no home telephone,
- 6% were without electricity in their home, and
- 28% had no functioning home broadband.
- 17% had no mobile internet signal

This continued state of disruption caused residents greatly increased stress levels

Residents were Unsettled in Temporary Accommodation

Interviewees in temporary accommodation said how unsettling it was for them & their families. The disruption was most acute for those in temporary accommodation for the longest time, (two thirds were in temporary accommodation over 6 months) and for those staying in multiple places. Challenges included: securing accommodation accepting pets, finding accommodation in a suitable place to travel to work and to their own home during renovation, as well as difficulties in being able to feel as relaxed as you would in your own home.

Stress of Insurance claims & Renovations

Residents were seriously affected by the discomfort and inconvenience they experienced while returning their property to its pre-flood condition (e.g., dealing with builders, decorators, etc.), and were also severely affected by the time & effort required to repair and renovate post-flooding.

As Ballater is a small, remote community, the rebuilding task needed many builders from far outside the area. This complicated & delayed the repairs, adding to resident frustration & increasing temporary stays.

<p>Table 9: Stressful Impact of Renovation on Flooded Families</p> <p><i>“We’ve heard so many horror stories. Somebody that had their kitchen cabinets...have fallen off the wall about three or four times, just because they haven’t been put on properly. One of our neighbours, who moved back into their house only about two months ago, were only in their house for three days and a fuse went, so he went to change it and, I dunno, he got a shock and he burnt his hand and he got his own electrician to come in and look, and they took the light-switches off downstairs and there was still mud in them. Now this insurance company had done the work and signed it off as finished, and they hadn’t changed any of the electrics in the house.” (Couple, Ballater, home flooded, Project Year 1 interview)</i></p> <p>Source: CREW Report May 2020</p>

Concerns about flooding

Interviewees rarely or never worried about flooding before the 2015 Flood. After the Flood, many said they ‘more often worry’ about flooding. Unsurprisingly, those whose homes flooded worried most: heavy rainfall bringing feelings of worry.

Job Security Concerns

Some residents were given compassionate leave by employers. However, it quickly became apparent that many local businesses had been seriously damaged by the flood, and their staff were at risk of being laid off.

Job insecurity & the consequent financial squeeze was a cause of serious anxiety. How long would it take for local businesses to operate as normal was unknown. Ballater’s key tourist industry was seriously affected (e.g., caravan park destroyed, much tourist accommodation damaged, etc) and CREW later assessed the impact reduced turnover by over 30% in the following 12 months.

Financial Pressures

The increased costs of living in temporary accommodation were a problem as these costs were often not covered by insurance. This was combined with a reduced level of income resulting from the seriously damaged local economy, especially tourism. The result was often serious financial concern.

By 2020, a further significant concern expressed was Residents had suffered falls in the value of their homes as a result of the Flood. In addition, they felt to a degree trapped as it was much more difficult to sell their home. **This feeling was increased by the perception nothing had been done to improve flood defences since 2015.**

Increased Anxiety & Stress

With all of the factors above, which many interviewees described in detail, it is no surprise many interviewees stated that in the months following the flood they were depressed & sought help from their doctor. Many said they had higher levels of anxiety after the flooding, feelings they still felt 18 months after the event.

At the time of the Flood, some interviewees were going through stressful life events (e.g., redundancy). The additional stress associated with the Flood compounded the impact of non-flood related challenges.

Some parents who were interviewed felt children were more worried than adults; frequent references were made to children of varying ages being depressed or emotionally shaken-up as a result of the Flood.

Both flooded and non-flooded interviewees felt their mental health had been adversely affected by the Flood, as they were living in a flooded community.

Impact of Stress on General Health

Increased stress as reflected above, was identified by many Residents as a factor contributing to other aspects of their health, some examples given were:

- Deterioration in physical health was reported by many respondents (59.3%)
- The spouse of one interviewee caught the stomach bug helicobacter from dirty water (diagnosed by GP).
- Some interviewees who had already been in poor health before the winter Flood, felt that the flooding had made their health even worse, or made it difficult to manage specific conditions.
- Some Residents got physically ill following the Flood and then took longer than would be expected to recover. (e.g., bronchitis that would not clear and a repeat episode of shingles)
- Other interviewees talked about new health problems such as uncontrollable blood pressure and weight loss attributed to stress.
- Some interviewees said that they were drinking or smoking more heavily, one who had given up smoking for some time had started again.
- A few interviewees said they were exhausted, were not sleeping, or could not get back to sleep when they awoke, conditions they attributed directly to effects of the flooding.
- There were also interviewees who described physical conditions that had occurred since the flooding but who did not associate those with the flooding.

Premature Deaths

A theme raised both in Project Years 1 and 2 was the perception that premature deaths of older people (or younger adults with existing medical conditions) were attributable to the flooding. There were accounts from interviewees of a number of older people they knew who had died since the flooding. In most cases, it was thought that although these elders had apparently coped well before the flooding there was a clear inference that being flooded had hastened their death

The research team are not medical professionals and are thus unable to verify the claims. However, the belief that the flooding and its aftermath had considerably affected many individuals and played a significant role in hastening deaths was widespread among interviewees and other community members.

One such instance, of which CREW were aware is summarised in Table 11:

Table 10: Premature death reported in CREW 2020 Interviews
<p>One person interviewed in Project Year 1 passed away before Year 2 interviews were arranged. During the Year 1 interview, this person recounted the physical injury she sustained when living in temporary accommodation as follows:</p> <p><i>“There was another, I would say, incident, that probably prolonged my stay out of my own house. I was washing the dishes one day in the flat and I must have blacked-out, because I have no idea what happened. I came-to on the floor with my head at a silly angle against the kitchen units and the...I’ve one of these community button things and I just pressed that. I thought, ‘oh, you’re in trouble here.’ So, I pressed that and [close relative] actually is at the top of the list and she came around in a hurry and they realised that I had done something nasty to myself so I was taken into the ARI. It was, let me think, em...just a day or 2 after New Year, I think [...] And they said, ‘oh, you’ve broken your (name of bone)’” (Female, Ballater, home flooded, Project Year 1 interview)</i></p> <p>In Project Years 1, 2 and 3, a younger close relative of this individual also took part in the project. The younger woman attributed the injury her older relative sustained to having to live in unsuitable temporary accommodation and believed her death would not have occurred if Ballater had not been flooded in December 2015. Her sentiments are described in the following quote:</p> <p><i>“[name of close relative] was another one that died because of the flood. Okay, it was two years later but she was in very good health before the flood and she just went downhill, and downhill...and as many people did. Some people died very quickly, some – no-one died at the time but I can think of a good half dozen of deaths that can be directly attributed to the aftermath of the flooding. Imagine how it would be, her family home, (hadn’t) been flooded ever [...] she broke her (name of bone). Which would never have happened at home.” (Female, Ballater, home flooded, Project Year 3 interview)</i></p>
<p>Source: CREW Report May 2020</p>

5.3 Supporting the Health of Residents

Having highlighted the health issue, Residents confirmed there were some compensating support measures that greatly assisted those flooded.

Community: In Ballater, the local community pulled together during the flooding: justifying the many accounts of “community spirit”. Overall, quick voluntary responses were made by members of the community to help flood victims, including organising emergency accommodation on the night of the flood and the co-ordination of donations. Many interviewees considered the 2015 Flood experiences have left the community better prepared to respond to a future emergency.

Statutory and Voluntary agencies: The presence of members from these agencies at the time of the flood was important for interviewees. Absences in attendance were noted, yet awareness of resources being spread thinly due to floods elsewhere was appreciated. Interviewees felt statutory agencies need to be in attendance during such flooding & be visible & proactive. It is imperative that the roles & responsibilities of statutory & voluntary agencies are clarity to residents. It is also crucial promises made to community members are kept.

Emergency Grant Funding: Emergency grant funding from the Scottish Government to help households directly affected by flooding was coordinated by AC. Emergency grants availability of was viewed positively. Many interviewees said the flood led to additional expenses, over & above those covered by insurance.

Conclusion on Current Residents’ HealthAs expressed in the CREW report:

“Ballater isn’t back to normal, it’s not going to be back to normal for a couple of years, in actual fact I would say the whole community is suffering from post-traumatic stress, to be quite frank. As soon as it rains you

can feel the tension levels rising and you talk to people who have gone back to their homes and they say they wake up and it's raining on the ceiling – you can hear the rain on the roof and 'I can't get back to sleep, just in case.'"

Ballater interviewee – 2017

5. Economic Impact of the Flood

Flood impact research indicates there are 3 groups suffering economic losses:

- **Individuals:** losses include property/possessions damage, additional costs arising from being made temporarily homeless and loss of income due to work disruption.
- **Businesses:** losses including property/asset damage, business interruption & longer-term impacts on their customer base etc. Ultimately, a business may never recover from the flood.
- **Public sector/utilities:** losses include asset damage (roads/bridges etc), additional support costs incurred & loss of revenue. (e.g., council tax, business rates)

5.1 Individual Losses

The CREW survey asked residents about their losses. These residents covered 30% of flooded households and spread across all the streets affected. They should therefore be typical of all flooded residents and were used as a basis to estimate the total personal losses. The personal loss estimates are:

Type of loss	Min £m	Max £m	
Home & Personal Assets	10.4	16	Claims made from insurance companies & uninsured losses – includes buildings, vehicles & possessions.
Static Caravans	1.0	2.00.6	Losses due to static caravan destruction & contents. These losses may not be suffered by local residents
Loss of Income	0.5	1.0	Income lost due to inability to work due to businesses being disrupted or closed
Total personal losses	11.9	19.0	

These loss estimates reflect the serious damage done to the village. Both the violent nature of the flooding itself and the large numbers of people and properties affected contribute greatly.

A further crucial point is the highly variable nature of losses. Instances where neighbours experienced similar flood conditions resulted in dramatically different flood damage costs.

- Residents in some instances remained in their homes through serious flooding, and tried to protect their properties with personal flood defences, PLP or otherwise restricting the damage. Consequently, damage was limited and they did not have to move to temporary accommodation.
- Some neighbours who left their homes suffered much more extensive damage. They had to move to temporary accommodation, often for many months, & their homes repairs were much more extensive.

BCCC would greatly value any information from Residents which would further inform this.

5.2 Business Losses

The CREW survey asked 28 businesses about their losses. These covered c50% of flooded businesses. However, it is not clear they are typical of flooded businesses. BCCC used this to estimate business losses as:

Type of loss	Min £m	Max £m	
Business Assets	2.6	4.2	Claims made from insurance companies & uninsured losses – includes buildings, stock & other assets.
Loss of Income	1.4	3.6	Income lost due to inability to trade or through reduced sales as a result of the flood
Total Business losses	4.0	7.8	

These estimates reflect the serious damage done to businesses due to direct flood damage & resulting closures. The longer-term damage of reduced turnover from residents & tourists is also reflected in the above.

BCCC considers these estimates, based on limited information, seriously underestimate the damage suffered. BCCC would greatly value further information from businesses to better inform this. (BCCC fully understands the sensitivity of commercial information & will ensure this is kept totally confidential)

5.3 National & Local Government, Public Sector and Utilities Losses

There has been some information released but this has generally been to indicate the level of support offered to the community, rather than the total costs incurred.

Costs incurred have been gathered from press articles, RPS Report, CREW Reports and other sources. BCCC has used this information as a base to estimate these losses. These estimated losses are:

Type of loss	Est £m	
Support grants	1.1	Grants to provide support for flooded residents and business – plus grants to support residents in installing PLP
Council tax waived	0.9	AC waiving of Council Tax for those affected by the flood in the recovery period post flood.
Damage	0.6	Repair of damaged facilities in the village – fire station, police & ambulance stations, telephone exchange, electricity supplies, water supplies, etc
Support Staff	0.3	Staff supporting the village either locally or remotely through and in the recovery period after the flood.
Clean up	0.1	Cost of staff and assets deployed to clean up the flood damage immediately after the flood.
Total Public losses	3.0	

These loss estimates reflect the serious damage done to the infrastructure & public facilities in the village as a result of direct flood damage as well as the need to provide public support in the recovery phase.

These costs exclude the 2015 flood damage external to the village – e.g., repair cost of The Bridge, rock armour bund reinforcement, Polhollick & Cambus O’May bridge repairs, etc. The costs in Table 9 are therefore the Public Sector costs that would have been saved had the village not flooded.

BCCC considers these estimates, based on limited information, seriously underestimate the damage. BCCC would greatly value further information from the public bodies & utilities, to better inform this.

5.4 Total Losses suffered Due to 2015 Flood

Based on the above, the village suffered a total loss of £ 18 - 28m as a result of the 2015 flood.

Type of loss	Min £m	Max £m	Comment
Personal	11.9	19.0	Likely to be understated
Business	4.0	7.8	Likely to be understated
Government & Utility	3.0	3.0	Likely to be understated
Total personal losses	18.9	29.8	

Other estimates of the flood loss suffered and the basis of calculation are:

- RPS Feasibility Study (March 2019)

Type of Loss	Amount	Basis of Calculation
Personal	£ 25 m	Theoretical calc based on 471 homes at risk
Business	£ 7 m	Theoretical calc based on 107 businesses at risk
Government	£ 0 m	Not considered
Total	£ 32 m	

- BFG (included in presentation given 13/5/16)

Type of Loss	Amount	Basis of Calculation
Personal	£ 29 m	Est insurance claims
Business	£ 71 m	unknown
Government	£ 0 m	Not considered
Total	£100 m	

The shape of the BCCC estimated losses is similar to that of RPS, with personal losses running at about 3 times the level of business losses. BCCC believe feedback is expected to increase the total level of losses.

Attachment 1: Information Sources

Author	Report
DEFRA	Phase 2 Flood Risks to People - Guidance Document (FD2321/TR2) March 2006
CREW	Long-term impacts of flooding following the winter 2015/16 flooding in North East Scotland: Comprehensive Report (27 th May 2020)
CREW	Long-term impacts of flooding following the winter 2015/16 flooding in North East Scotland: Summary Report (11 th Feb 2020)
CREW	Impacts of winter 2015/2016 flooding in and around Ballater and in the Garioch: Project Year 2 Summary (2 nd April 2019)
CREW	Impacts of winter 2015/16 flooding in and around Ballater and in the Garioch: overview of findings from Project Year 1 (16 th April 2018)
RPS	Ballater Flood Protection Study Feasibility Report (March 2019)