Monitoring the impacts of

severe weather

SWIMS Event Summary Report for Kent & Medway
Winter 2013 -14

Full Report

Improvement and Efficiency South East

Kent County Council kent.gov.uk

Contents

1. Introduction to this report

This report summarises the impacts of severe weather during winter 2013-14 on public service providers in Kent and Medway, compiled from information captured by services through the Kent Severe Weather Impacts Monitoring System (SWIMS) and from wider sources referenced at the end of this report (see References on p24).

SWIMS is a decision-support tool that can be used by any public service provider in Kent and Medway. Using the tool, services can capture the impact of severe weather on their service currently, and use the evidence base collected to better prepare their service for the future.

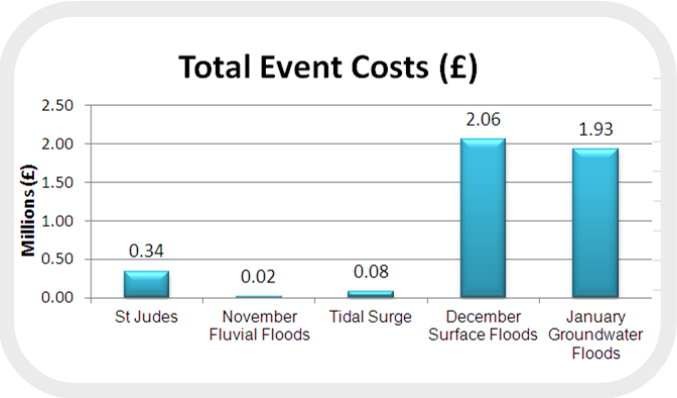

Figure 1: Comparison of total event costs

1.1 How this report can be used

As with the SWIMS tool itself, this report aims to provide a useful evidence base of the impacts on Kent and Medway services from severe weather. It is designed to draw together the data captured from SWIMS and highlight some cross-cutting issues and considerations, to support services in their business continuity and resilience planning. Please extract information and figures as appropriate for your service's planning needs and reference SWIMS in any materials or plans produced. This report also aims to support those working day-to-day on county-wide resilience, such as the Kent Resilience Forum (KRF) and Kent Resilience team (KRT) as part of wider severe weather intelligence and reporting processes.

1.2 Caveats

This report summarises the impacts of five storms and gales events logged on SWIMS. For information on previous severe weather impacts, please read our 2012 summary report. This report is a summary of information captured through SWIMS and does not encompass all activities undertaken by services over the winter. Please refer to the reports of other organisations for a detailed account of the actions taken by services over the winter, e.g. KCC Cabinet report 'Christmas/New Year 2013-14 Storms & Floods'[i] and Environment Agency Kent and South London areas Winter Flood Report.

This report is based on current available figures only. There are a number of gaps, outstanding costs and exclusions (to avoid risks of double counting) in this report. Until these costs are captured, the true scope and impact on Kent and Medway from these events is underestimated.

It is also important to note that at least 150 services[ii] were involved in the events over winter. Of these 30 services, from 15 organisations recorded impacts and responses through SWIMS[iii] and so we know current figures are an underestimate and we will review sign up to SWIMS to improve data collection.

2. Overview of the winter weather

Five successive weather events were recorded through SWIMS over a period of five months (28 October 2013 to 28 March 2014) across Kent and Medway. This unprecedented sequence of events comprised:

- The St. Jude's storm (28 October 2013)
- Fluvial (river) event (1 November 2013)
- East coast tidal surge (5 to 6 December 2013)
- Fluvial & surface water floods (20 December'13 to 28 March'14)
- Groundwater floods (25 January 2014)

Kent received 242% of the long term average rainfall for the 2013/14 Winter. The highest rainfall intensity recorded by the Met Office was at Goudhurst in Kent, where rain fell at 6.8mm in one hour in October. In December wind speeds reached 76 mph onshore (see Fig 2).

Fig.2: Weather statistics

- **Met alerts:** 43 Yellow and 7 Amber weather warnings for Kent as part of the National Severe Weather Warning Service[iv].
- **Flood Alerts**[v]: 63 for Kent
- **Flood Warnings**[v]: 41 for Kent
- **Highest Rainfall Intensity**: 6.8mm/hr at Goudhurst, 28/10/2013[vi]
- **Highest Wind Speed:** 76 mph recorded at Langdon Bay on 23/12/2013[iv].

3. The headlines: key impacts

The events over winter cost Kent and Medway services over £4.4 million[1], with 30 services[iii], from 15 organisations recording 173 impacts and responses through SWIMS. Staff and services spent the equivalent of 1,230 days[2] to prepare, respond and deal with the impacts experienced across the county, as well as taking steps to improve the resilience of their services for the longer-term.

Public and private sector service providers dealt with damage to over 3,000 properties over the winter period as a result of storm and flood damage, power cuts, transport disruptions (road, rail and marine) and even sinkholes. Over 1,300 service users were affected. These impacts had wider implications for the services themselves, increasing workloads at a time when services are usually reduced (the December holiday period), affecting thousands of staff and disrupting the ability to deliver a normal service to Kent residents.

The key impacts and responses of services over the winter are detailed in the following sections of this report.

Fig.3: Key Statistics

Cost to services (£ million)[1]	4.4
Costs invested by services (£ million)[1]	11.2
Cumulative impact on services (in days)	> 1,230
Properties/Land affected	> 3,102
Calls received	30,856
Staff affected	1,876
Service users/ residents affected	>1,327
Fatalities	1
Services impacted[ii]	>150

[1] This accounts for actual costs incurred so far, based on available data as of 20/08/2014.
[2] Staff days based on the average working day of 7.5 hours, week as 5 days, and month as 20 days.

3.1 Key financial costs

The financial impact on county services totalled £4.4 million1. Kent County Council Highways and Transportation (KCC H&T) was the most heavily impacted service across all events, incurring £1.5 million during the fluvial and surface water floods alone, as a result of damage affecting the road and highways network.

Transport disruption had the largest impact on service budgets, costing £3 million (see Fig. 5), however this was influenced by costs across other sectors such as road closures and damage to highways from fallen trees and flooding. Costs from property damage and staffing, to deal with the substantial impacts occurring across the county, posed further financial burdens.

Other costs included the use of community buildings as rest centres, equipment and contracted services from the voluntary sector and military.

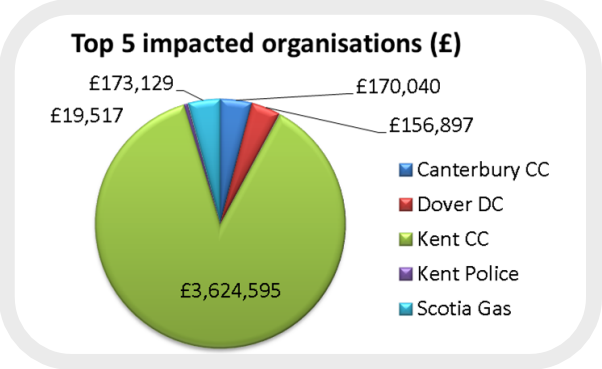

Fig. 4: Organisations most financially impacted (to date)

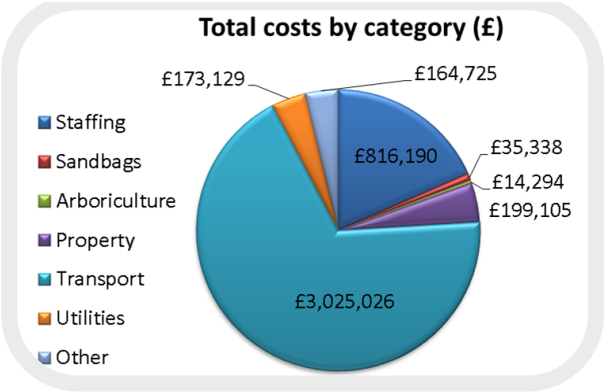

Fig. 5: Total financial costs by category

Fig. 6: Cost summary by organisation (known to date)

Organisation	Description of Costs	Costs (£)
Canterbury City Council (CC)	Staffing and provision of sandbags and other equipment.	£170,040
Dartford Borough Council (BC)	Carrying out emergency planning related duties.	£1,500
Dover District Council (DC)	Providing one rest centre, staff and sand. Dealing with tree works and property repairs.	£156,897
Gravesham Borough Council (BC)	Staffing and preventative use of 200 sandbags.	£2,000
Maidstone Borough Council (BC)	Tankers and drain clearance.	£25,870
Kent County Council (KCC)	Providing staff, amenities and contractors to deal with tree, flood, property and highways issues. Providing emergency cash payments to residents, residential placements for disabled or elderly residents and support at Rest Centres.	£3,624,595
Kent Police	Activating Gold/Silver control centres, testing plans and evacuating residents.	£175,317
Sevenoaks District Council (DC)	Providing materials, transport and out of hours staffing.	£10,300
Swale Borough Council (BC)	Repairs to eight properties.	£5,800
Thanet District Council (DC)	Repairs to 25 properties.	£68,479
Scotia Gas	Dealing with storm and flood issues to the gas network.	£173,129
Boughton Monchelsea Parish Council (PC)	Production of a metal sluice gate, inundation maps and tanker hire.	£13,878
Total		**£4,427,805**

3.2 Health & Wellbeing[vii]

Many services were involved in safeguarding our most vulnerable people in Kent during the harsh winter weather conditions.

During December/January pressure across Kent and Medway Health and Social Care system required co-ordinated action from all Health and Social Care organisations. In February a residential care home was identified at risk of flooding. A Clinical Commissioning Group (CCG)-led planning group, including KCC FSC and home owners, produced a multi-agency contingency plan for mitigating risk, evacuation and relocation. The group worked for 10 days on contingency planning with the primary objective to prevent evacuation of residents from the care home. The contingency plan was effective in minimising risk to the property from the flooding situation. The planning included 53 placements for potential evacuees; representing a significant incident in the region.

Rest Centres were opened; 2 in Maidstone, 1 in Tonbridge, 1 in Wateringbury, 1 in Canterbury with 218 KCC FSC staff on stand-by at any time to respond managing a 24 hour continuous response. Emergency residential placements were provided for disabled or elderly residents unable to live safely in their own home due to flooding. One fatality occurred in Tunbridge Wells as a result of a falling tree.

Currently, information about the impact on the health and wellbeing of staff and residents is largely unrecorded through SWIMS. Actions have been detailed in Section 8.1 of this report, to improve the collection of these impacts through the system.

3.3 Property & Infrastructure

Over 1,300 affected properties were recorded through SWIMS by services across winter, however wider reports identified impacts on almost 30,000 properties across Kent and Medway (see Fig. 7). These properties ranged from transient structures (caravans and portacabins) to homes, businesses and council offices, damaged as a result of fallen trees, strong winds and flooding.

Gravesham BC bore the brunt of property damage, with 1,370 council properties damaged purely by storms. Many properties were repeatedly affected as the five weather events hit successively over the winter. Other key impacts included:

Fig. 7: Number of properties affected (to date)

Flooded homes and businesses	768
Storm damage	> 1,700
Homes without power[viii]	28,500

- **£15,102** - cost to Thanet DC from storm damage to 25 housing properties
- **700** - homes flooded in Yalding[ix]
- **361** - council owned social housing in Dover suffered from damage to roofs, fences, walls, gates, glass, downpipes/guttering, doors, windows, aerials and chimney stacks.
- **102** - homes (and 19 businesses) were flooded in Tonbridge[x].
- **40** - homes in Faversham, Sandwich and Strood were flooded[xi].

3.4 Public and private transport

The storms and flooding over winter had a devastating impact on transport across the county. Transport by road, rail, sea and on foot was widely affected, with significant backlash from the public about those services responsible for the transport network. The structural integrity of key infrastructure was also compromised, with sinkholes appearing and bridges and pathways incurring damage.

These impacts on the transport network had wider repercussions for the rest of Kent, and in some cases the UK. Five ferry sailings delayed at Dover, whilst causing a direct loss of revenue to the Port of Dover itself, had a wider indirect impact on UK revenue streams, and global commercial transit; whilst road, bridge, tunnel closures and rail suspensions caused widespread disruption to those travelling through Kent, as well as residents. Key impacts included:

- **Infrastructure:** 13 bridges damaged. A road collapsed in Walmer[xii] and a 10-mile stretch of the M2 was closed following the appearance of a 15ft sink hole[xiii]. More sinkholes were reported in Maidstone (Leeds area), Gravesend and Thanet.
- **Pathways:** over 6km of Public Rights of Ways in Kent have been damaged as a result of flooding.
- **Service suspensions:** train services were suspended across Dartford[xiv] and Dover. A landslide at Wadhurst caused suspension to train services in Sevenoaks and Tonbridge[xv].
- **Closures:** numerous roads were closed by KCC H&T, the Highways Agency and Kent Police as a result of flooding, fallen trees and potholes— leaving roads impassable. The QEII Bridge at Dartford was closed on the 23, 24 and 27 December 2013[xiv].
- **Ports:** operation stack was enforced in February, after 80mph winds caused gridlock from ferry traffic unable to board in the high winds; this caused motorists to become stranded in mile-long traffic queues for up to 4 hours[xvi]. In December five ferry services were delayed and up to 900 passengers were kept on a P&O ferry offshore for 14 hours on safety grounds[xvii].
- **Increased service demand:** KCC highway operational teams were inundated with calls relating to collapse and obstruction of the highways (150 calls), and reports of potholes (3370 calls).

3.5 Utilities

Over 28,500 homes were left without power as the strong winds uprooted trees and brought down power lines. Four days after the storms in December, UK Power Networks confirmed 1, 745 customers remained without power and announced industry standard payments would increase from £27 to £75 for those customers without power for 48-60 hours, with additional payments to those cut off for longer[xviii]. Scotia Gas spent over £173,000 dealing with the winter events between October 2013 and February 2014.

Image 1: a flooded Yalding

Several villages and towns in Kent lost power over the festive period, with villages in Eastry, Nonnington and Worth losing power on Christmas Eve until Boxing Day. Some public libraries closed due to power loss; whilst in the private sector, aggregate suppliers Cemex UK lost all power during the December tidal surge to a number of critical nodes across its aggregates berth, based at Dover Port. Power was not restored for a number of weeks, resulting in the complete closure of the facility and affecting staff employed at the site.

3.6 Staff and service disruptions

At least 150 services were involved in these events. Of these 30 services[iii] recorded impacts on SWIMS, and staff across all levels of these organisations were involved, ranging from Directors, Heads of Service and Council Leaders through to technical and supporting officers. Overall services spent £816,000 to divert staff away from their normal work activity. This often affected the day-to-day service delivery of services involved in the events, with key impacts including:

- **1,140** Kent Police staff were involved in the December floods alone. Ranks involved all from Chief Superintendent to Constable.
- **247** Environment Agency staff worked across three consecutive months and maintained an Area Incident Room for 83 days.
- **13** staff worked **4,057 hours** over the festive period in the KCC Emergency Planning team, costing £78,711.
- The substantial storm/flood damage delayed inspections and repairs at Gravesham Borough Council (BC) impacting the council's reputation negatively.
- **28 staff** and **36 clients** of KCC FSC were affected by hazardous travel conditions, and the subsequent delays to service provision.
- **167** staff in KCC H&T were affected for four weeks. All operational teams were stretched to their maximum and 81 non-emergency repairs had to be rescheduled. The service spent over £113,000 on staff (including doubling the amount of staff on standby to deal with calls).
- The use of sandbags as flood prevention throughout winter put additional demand on waste services.

3.7 Calls and call outs

Services were inundated with calls as a result of the severe weather over winter, dealing with a total of 30,856 calls over the five months. The most impacted service was the KCC contact centre (Contact Point) which dealt with 14,580 calls. All staff were affected, and the high call volumes reduced the level of service to 64% (compared to 75% on a normal day) and the answer rate to 84% (compared to usual rates of 90%). Other calls included:

1,370 about storm damage to council properties in Gravesham.

7,484 dealt with by KCC H&T in early December, with 548 classified as 'emergency calls'.

2169 to Kent Police to report surface water flooding, trees down and cables down.

Many services also dealt with numerous calls requesting advice, sandbags and to report damage.

Fig.8: Busy Christmas for KFRS (23—26 December '13)[xix]

Mobilisations of fire appliances (of which 33% were weather related)	1,066
Weather-related emergency calls to Control	437
Peak number of fire appliances, simultaneously deployed on 24 December	24
Officers deployed simultaneously on 24 December to attend incidents and support multi-agency 'Silver' control centres	15
People rescued in weather related incidents (including 75 on Christmas Eve)	129

3.8 Arboriculture

Services incurred £14,000 to deal with over 1500[viii] damaged and fallen trees across the county. The wind thrown trees impacted on a variety of services county-wide causing road closures, disruptions to rail services and damage to property. Other key impacts comprised:

- Highways crews worked throughout the early hours of Monday to clear more than 100 trees[xx].
- 117 trees felled or damaged in Dover, costing the local authority £4,100.
- KCC H&T were inundated with over 1,925 calls related to fallen trees throughout December.
- KCC Regulatory services staff spent £2,420 clearing wind thrown trees, re-establishing access on nature reserves, and contracting specialists to deal with trees that were too complex for the service to deal with 'in-house'.

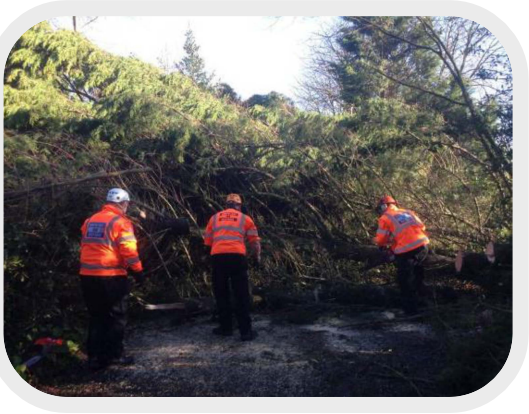

Image 2: South East 4x4 tree response in Harrietsham, Kent

3.9 Impacts on the natural environment and biodiversity

Alongside arboriculture impacts, the storms and floods had significant affects on wildlife and on highly valued natural landscapes. Key impacts included:


Plants and animals lost to tidal surge damage

Image 3: headline from KM East Kent Mercury, 19/12/2013, p5.

- Huge chunks of chalk fell at Abbot's Cliff, Dover.
- Over 1,300 metres of bank erosion and several landslips reported.
- Damage to one protected tree species at Trinity House, Ashford.
- Salt water flooding killed fish and uprooted dozens of trees at Gazen Salts Nature Reserve[xxi]
- Flooding threatened habitats at Westgate Gardens, Canterbury.
- Fish were killed by sewage pollution in the Loose Stream, between Coxheath and Tovil.
- Subsidence led to a collapsed sewer, causing sewage pollution at River Len Nature Reserve[xxii].

Fig. 9: Lessons learnt to improve resilience - reporting fallen trees

As a result of over 500 calls in early December reporting fallen trees, KCC H&T and Kent Police reviewed their process for reporting between the organisations. A process was introduced to report fallen trees directly from the Police STORM system via email, rather than phone, with the caveat to ensure serious situations and priority roads were dealt with urgently.

By January, this process had already improved the co-ordination between both services, reducing telephone calls by 500 and lost time from congested phone lines and enabling other priority calls (such as those relating to flooding) to be handled. Further discussions are taking place to include all types of severe weather emergencies, to ensure consistency. The longer term plan is to roll the process out with the other emergency services.

Contact: Andrew Loosemore, Highways Management Centre, at Andrew.Loosemore@kent.gov.uk

3.10 Reputation

Services experienced both praise and criticism during these events. Media reports were overwhelmingly positive during the October storms and November tidal surge due to the prepared response by services to safeguard the public; however media reports turned negative during the surface and groundwater floods, focusing on a lack of warnings, the flood response and the disrupted provision of transport services and utilities.

Image 4: Yalding received national media attention during a visit from the Prime Minister.

The Positives

- **KCC Contact Point, Community Wardens and KCC FSC** were praised for the way they handled calls, dealt with priority issues and checked on the most vulnerable during the storms.
- **Canterbury CC** received praise from Fordwich PC for their response and residents were pleased to receive early flood alerts and door-knocking from **Dover DC**.
- **Highways services** worked around the clock to repair the damage caused to roads[xxiii].
- Residents saw hours of time put in by the police and emergency services[xxiv].
  Kent Police, the district council, and Environment Agency (EA) "went full steam ahead to protect life and property" (KM East Kent Mercury)[xxv].

The Negatives

- **Utilities:** "All of my neighbours have got their power back, but we're still cut off. I think it's really poor" (Kentish Express: Romney Marsh)[xxvi].
- **Roads & Highways: "**Just sort the drains out – now!" (KM Dartford)[xxvii].
- **Southern Water** pump sewage into stream in bid to ease flooding (KM Faversham)[xxix].
- "I feel abandoned" (Dover Express)[xxx].
- **Gravesham BC:** the large amount of damage and subsequent delay for inspections caused a negative impact.
- **Floods:** "MPs call for urgent improvements to the Leigh Barrier" (Tonbridge Courier)[xxxi]. "Failed by flood barrier again" (Edenbridge Courier)[xxxii].
- **Sandbags:** complaints that sandbags should be taken to residents in the Dover District. Criticism of sandbag littering once floodwaters had receded. No sandbag provision in Deal and Swale.

Image 5: headlines from KM group©[xxviii]

4. The headlines: responding to events

Amid widespread flooding and storm damage to thousands of properties across the county, the collaborative response of services was critical in minimising damage, preventing loss of life and safeguarding Kent residents. In December, emergency services evacuated 80 people from little Venice Caravan site, which quickly flooded[xxxiii] (see Fig.12), whilst the Kent Support and Assistance Service (KSAS) (see Fig.14) helped residents in dire need of basic amenities. In Boughton Monchelsea the PC spent 89 days protecting 100 homes from flooding (see Fig.13). Services spent the equivalent of 1,230 days[2] to prepare for these events, respond to emergencies, and learn from these events to inform planning for the long-term. Key responses are detailed below:

4.1 Highlighting good practice: a prepared response

- **Multi-agency telephone conferences** were held before events through the Kent Resilience Forum Severe Weather Advisory Group (SWAG).
- **Canterbury CC** built contingency into their regeneration project timeline to account for flood risks, minimising disruptions as a result.
- **KCC IT services** were able to maintain service continuity irrespective of local conditions due to the centralisation of servers into data centres, before the winter events.
- **Kent Police** set-up Gold and Silver controls to test plans, activate rest centres and co-ordinate the multi-agency response. EA data was also utilised to ensure assets were in place.
- Temporary flood barriers protected 219 properties in Sandwich[xxxiv].
- **Gravesham BC** deployed sandbags and prepared for an evacuation. Bronze and silver commands were established and regular calls were made to Gold on the situation.
- **Dartford BC** checked all flood gates individually and placed housing officers on alert, costing £1500.
- **Port of Dover** activated its emergency response in advance of the tidal surge to ensure the port was fully prepared prior to the flooding.
- **KCC FSC** initiated its Severe Weather and Surge Capacity Plan, activated Strategic Incident Response Team, and appointed local officers to manage the response in each response area including shift changes[vii].

Services checked floodgates and delivered over 22,000 sandbags[xxxv] to residents.

Fig.10: Proactive Communications (Warning & Informing)

- **Kent Police officers and other agencies** door-knocked to notify residents to evacuate in advance of the flooding. No casualties were recorded.
- **KCC Trading Standards** proactively issued alerts and warnings to highlight the dangers of rogue traders.
- **KFRS** warned people not to drive through roads that were still flooded[xxxvi].
- **Several local authorities** used social media to keep residents abreast of service suspensions.
- **Swale BC** issued an e-bulletin, advising local businesses of the flood warning.
- **KCC FSC** issued alerts and warnings to providers to ensure actions required to protect the most vulnerable were in place.

Fig.11: A coordinated communications network in Canterbury

Canterbury City Council set up a highly effective coordinators and communications network during the flood period to ensure that local residents and people dealing with residents were kept regularly updated on the situation in the most affected areas of the district. In addition to the council's emergency room being open around the clock, emergency coordinator meetings with all services involved (Council, Police, EA, KFRS) took place twice a day for updates which were swiftly followed by emails with key updates and messages twice a day (or more regularly) to all local stakeholders including city, parish and county councillors. The council's website was updated regularly with advice and guidance backed up by messages through social media and the local media.

Image 6: emergency coordinator meetings

A permanent information centre for local residents was set up in Bridge village, one of the worst hit areas and public briefings were held twice a day with a regular presence of all the emergency services and support services.

Contact: Celia Glynn-William, Head of Communications, at Celia.Glynn-Williams@canterbury.gov.uk

4.2 The emergency response

Despite good levels of preparation, the quick succession of severe weather events meant that many services were required to respond without warning to deal with the emergency. Responses included:

- **EA** pumped water from flooded areas in Sandwich[xxxvii].
- Several services including the Red Cross, NHS, social services and Women's Institute manned rest centres.
- **KCC FSC** activated its process for identifying vulnerable residents, during power failure. The service also engaged with a CCG led co-ordination group in response to a flooding threat to a residential care home. During the tidal surge, 218 staff were on stand-by across three areas and four shifts, with 12 staff deployed[vii].
- **Dover DC** spent over £24,000 on staff time, pumps at Eastry and Alkham, sandbags and protective clothing.
- **KFRS** deployed officers and crews across the county to assess, and where appropriate, pump floodwater to protect property and lives; as well as rescuing people from flooded homes.
- **KCC Emergency Planning** spent £90,000 on equipment and to draft in help from the MoD and voluntary sector.

Fig.12: Evacuations

Image 9 KFRS used High Volume Pumps (HVP) to protect residents from floods in the Canterbury district.

- **1,000** homes in Sandwich, Seasalter, Faversham and Medway were evacuated[xi].
- **£887** cost to Dover DC for use of Sandwich Sports Centre as a rest centre.
- **3** areas in the county where KFRS formed part of multi-agency evacuation operations.
- **55** NHS staff evacuated in Ashford.
- **80** people evacuated at Little Venice Caravan Site[xxxiii].
- **48** evacuees were supported by KCC FSC across five rest centres during the surge event[vii].

Fig. 13: a critical response at Parkwood Farm Reservoir (aka Brishing Dam)

The quick action taken by two members of Boughton Monchelsea PC, with support from KCC along with the EA and KFRS prevented the potential flooding of up to 100 homes in 'The Quarries' road over winter.

Last May, after a successful bid to Defra, the PC implemented a sluice gate system, manually managed to divert flood water to an area of natural unused agricultural land, away from The Quarries road historically prone to flooding.

Over winter, the PC at times, held back up to 64,000 m^3 of water through manual operation of the sluice gate, to stop excess water flowing into the residential area; however due to the intensive and prolonged rainfall, the full capacity of the reservoir and adjacent flood area was exceeded. Together with the EA and KCC, further actions were taken by the PC to prevent the flooding, temporarily increasing the height of the reservoir overflow control in order to increase the capacity of the flood storage area; and hiring tankers to pump water away from the rapidly flooding road. KFRS also spent some days at the height of the rainfall pumping water out of the stream from upstream of the flood area, thus reducing the amount entering the flood area. In total, the PC spent 89 days dealing with the flood emergency and £13, 877.87 to protect residents and housing in The Quarries.

As next steps, the EA and Boughton Monchelsea PC will discuss future resource and capacity for operating the sluice gate at Parkwood reservoir.

Contact: Steve Munford, Boughton Monchelsea PC, at stevemunford@maidstone.gov.uk.

Fig. 14: helping Kent residents through the Kent Support and Assistance Service (KSAS)

The Kent Support and Assistance Service (KSAS) launched in April 2013 to provide a discretionary social fund to help Kent residents during times of extreme difficulty.

Throughout the winter period, KSAS provided 88 flood victims within 44 households across Teston and Yalding with essential cash, goods and services.

These goods, ranging from food parcels and clothing vouchers to cash awards, furniture, carpets and white goods, totalled £9994 (and counting). The service and its 15 staff worked with Kent Community Wardens and KCC Commissioned Services to visit displaced families, providing further food deliveries and applications for awarding cash through the Support Fund.

Contact: Michael Akerman, KSAS Team Leader, at Michael.Akerman@kent.gov.uk.

Image 10: Flooding in Yalding, Kent

4.3 Repairs

The most costly repairs included:

- **£500,000** spent to repair the 6km of affected rights of way by KCC Regulatory Services[xxxviii].
- **£80, 000** spent by Dover DC to repair structural damage to the Kingsdown promenade, with emergency funding from the EA requested.
- **£1.3 million** spent by KCC H&T for 181 highways maintenance jobs and flood clearance by drainage teams.

Fig. 15: Sandbag Statistics

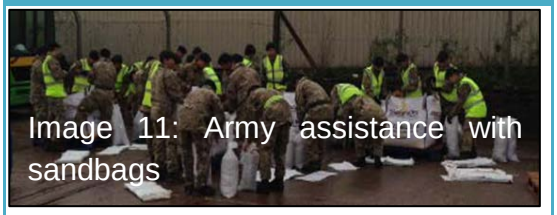

Image 11: Army assistance with sandbags

- **7,000** delivered across Sandwich[xxxv].
- **15,000** issued by Canterbury CC[xxxv] **xxxv**.
- **£160,900** spent by Canterbury CC on sandbag provision, staff time and other equipment.
- **£2,000** spent by Gravesham BC on the preventative use of 200 sandbags, delivered out of hours to residents.

4.4 Service Suspensions

- KCC H&T work above ground level was suspended until wind speeds dropped below 50mph.
- Some council's suspended refuse collections and closed parks on safety grounds.
- At least five farmer's markets were cancelled across Kent on safety grounds, affecting at least 100 producers. The closure of Faversham Market resulted in a loss of takings approximating £7,600.
- Dover port and Dartford bridge closed during high winds.

4.5 Staff Redeployed

Hundreds of staff were redeployed within and across organisations to deal with emergencies:

- **Canterbury Engineering:** 12 staff taken off normal duties to work through nights and weekends.
- **Gravesham BC:** three staff were redeployed to monitor floodgates and be on site overnight.
- **Sevenoaks Street Cleansing** personnel were redeployed to prepare and deliver sandbags to assist flooding prevention, costing £10,300.
- **Swale BC:** five staff were redeployed to provide support at a rest centre in West Faversham.
- **KCC:** Regulatory services redeployed two staff to carry out path checks, costing £2,400, and eight additional staff to prevent rogue trading. KCC FSC staff were redeployed from normal duties to check on the welfare of clients living alone. KCC H&T used support from Roadworks and Inspectorate teams, costing £21,478. Community Wardens redeployed 42 staff.

Fig.16: Funding and investment

£5, 000	Government grants to fund flood protection for flood-prone homes[xxxix].
£600,000	Improvements to the Leigh Flood Barrier, announced by the EA.
£3,000,000	KCC investment to make pothole repairs.
£650,000	Approximate commitment to make repairs to public rights of way and replace missing or damaged bridges[xxxviii].

4.6 Preparing for the long-term

Positively, as a result of the lessons learned and impacts experienced during these events, many services are taking longer-term actions to improve their service resilience, in case similar events occur into the future:

- **Planning & Monitoring** KCC H&T will convert its operational status alert into a formal Weather Emergency Policy, utilising weather emergency mapping to ensure events are managed effectively. An emergency response dashboard will also be developed to identify the major strategic and locally important roads making it easier to prioritise the enquiries needing attendance.
- **Training:** the Port of Dover amended its training schedule to incorporate groundwater flood risks.

5. County-wide trends

Hotspots of vulnerability were identified (see Fig.17) as services and the media reported locations and properties repeatedly affected by floods.

Sinkholes and fissures occurring over the winter correlated with some existing areas of land instability along the highways network although it is unclear if the severe weather was the cause of collapse. More information on land instability in Kent can be found in a URS study on the water situation in Kent[xl].

Fig.17: Trends - flood hotspots

The following locations and assets were repeatedly affected throughout winter:

- **Buildings:** the Cube, Folkestone; and Sevenoaks Adult Education Centre (AEC).
- **Residences:** Residents in Homestead Lane, East Studdal, Dover were flooded three times in 10 days.
- **Environmental assets:** Gazen Salts Nature Reserve.
- **Transport assets:** Eastern Docks, Dover Port. Highways in Edenbridge, Penshurt, Tunbridge Wells and Maidstone (A20, Broadway and Lower Boxley Road).

The locations and structures most affected by flooding included:

- **Locations:** Maidstone and Yalding; Stour and Nailbourne catchment area; East Kent coastal towns.
- **Structures most affected:** Parkwood Reservoir (Brishing Dam); and Kingsdown promenade, Dover.

6. Highlighting lessons learned

A number of services learnt from the issues identified during these events. Key lessons included:

- **Improved communications:** a Recovery Co-ordinating Group (RCG) meeting was held amongst emergency responders to co-ordinate a 'one-stop-shop' for advice after the surge. KCC Emergency Planning also asked for situation reports from emergency responders, in order to address key issues and keep individuals fully informed.
- **Coordination and resource management:** KCC H&T is reviewing available support from other services through its management forum. The team also plans to track its fleet vehicles to improve the deployment of vehicles during emergencies.
- **Staff Welfare:** KCC H&T will ensure Out of Hours (OOH) Managers are supported with a back up manager; and a staff rota for emergencies is enforced to manage staff welfare.
- **Assets Review:** the Port of Dover will review its electrical distribution systems to ensure continuity of supply during floods.

7. Areas for improvement and county-wide considerations for the future

The data captured through SWIMS across the winter highlighted a number of cross-cutting areas where service delivery may be improved into the future.

This section of the report details cross-cutting improvements based on the evidence collected through SWIMS providing suggested measures that could be considered by services to enhance business continuity plans and support any resilience planning being undertaken by teams, post-event. These considerations aim to support the Kent Resilience Forum and Kent Resilience Team alongside the actions already being progressed in other winter reviews (e.g. the KCC Cabinet Report on Christmas/New Year 2013-14 Storms and Floods[i]) plans, procedures and monitoring systems (such as the Kent Environment Strategy Implementation Plan). Specific actions related to SWIMS have been detailed in section 8 of this report, along with a recommended action plan in section 8.1.

7.1 Communications

1. **Public messaging:** services recorded high call volumes through SWIMS. For example, KFRS reported 556 calls where no attendance was required and where some signposting occurred. This could suggest that emergency contact information and the different roles of emergency responders, could be communicated more explicitly to the general public, and across partners, during severe weather.
2. **Customer confidence:** a trend of road users ignoring 'road closed' signs and travelling through flood water caused difficulties for the KCC H&T service; this caused further issues for residential property, where bow waves flooded homes as vehicles passed through the flood water. This suggests public warnings could be improved to increase public confidence in the messages and warnings being issued.
3. **Assessing and communicating risk:** Wider de-brief meetings and reports of the winter events (for example using evidence from the KCC Cabinet report 'Christmas/New Year 2013-14 Storms & Floodsi) highlighted the differences across organisations in escalating an 'emergency response' and 'recovery phase' which, at times, inhibited the effective co-ordination of resources across services.
4. **Non-verbal communications:** through the KCC de-brief of the winter events, some services reported damage to their reputation where there was a perceived lack of attendance by services. This was largely attributed to the use of hired contractors who did not wear the service logo and branding.

Considerations for the future:

1. Services could develop mechanisms to communicate their public roles and responsibilities more widely to the general public. This may reduce the time-burden on services in dealing with calls and call-outs; and improve customer service for the general public.
2. Organisations could investigate further training opportunities on severe weather warnings and alerts, to support emergency responders in deciding when to escalate/ de-escalate emergencies, and to support the development of protocols already underway through the Kent Resilience Team (please see recommendation 11 from the KCC Cabinet Reporti).
3. Services may benefit from a review of their organisational branding when working with contractors to ensure a visible presence is maintained throughout events.

7.2 Coordinated resource provision

1. **Sandbag provision:** negative press from the tidal surge event in December centred on the lack of sandbag provision in some areas.
2. **Diverting staff to emergencies:** The KCC H&T service experienced difficulties in dealing with the high demand for its services during the winter events. Issues of lower staff levels over the festive period were compounded by the use of 'term-time' contracts meaning contractors shut down over the winter period. At times it was reported that other teams offering support was not as good as the emergency required, whilst wider debrief meetings highlighted additional resources that were not used, due to a lack of co-ordination and communication between partners[xli].

Considerations for the future:

1. A review of how sandbags are coordinated county-wide, and how this is communicated to the public, may improve resource management across services and reduce the level of negative press and dissatisfaction with sandbag deployment.
2. A review of the supply chain to improve resilience could alleviate staffing issues during weather emergencies. This could include a review of 'term-time' contracts to enable contractors to support during emergencies; and a review of goods, to ensure key supplies can be delivered during severe weather conditions.
3. Services could review further opportunities to coordinate their emergency preparedness and response, to improve service delivery. This could include a review of Corporate Emergency Response Schemes (CERS) to ensure sufficient staffing during emergencies and avoid negative effects on staff welfare.
4. A review of available skills, data, assets and other resources (e.g., plans, on-call staff, flood data, 4x4 vehicles) could be undertaken to optimise joint emergency responses.

7.3 Staff welfare

With over 1,200 staff hours spent dealing with the winter events, services reported the risks to staff welfare from long shifts and out of hours work. Due to the difficulties in providing additional staff over the festive period, some services relied heavily on skeleton staff. 12 members of the KCC Emergency planning team alone spent over 4,000 staff hours dealing with the events.

Considerations for the future:

1. A review of staff protocols and policies during emergencies could help to safeguard the welfare of staff, both on the front line responding to events and of those managing the response overall. Other considerations could include identifying opportunities for training staff in health, social care and safety practices as well as establishing volunteers across organisations.

7.4 Ground-level/and sub-ground assets

Many services experienced flood damage to their assets not only at ground level, but to those beneath the ground as a result of groundwater flooding. These assets ranged from ground-floor electronic equipment, car parks and cabling to flood protection assets themselves (e.g. damage to sea walls and flood defence barriers).

Considerations for the future:

1. A review of the current resilience and management of assets to severe weather events and related impacts (such as floods) may help to identify and protect assets at risk.

7.5 Decision-making

Given the breadth of the disruption on services and the wider Kent community, it is hoped that SWIMS and, this report, can support senior managers and decision–makers in their service reviews post-event. The evidence base collected through SWIMS, and summarised in this report, can be used by services to inform business plans and decisions to improve service resilience; and strengthen business cases for action.

Considerations for the future:

1. Incorporating a review of the data captured through SWIMS into existing severe weather intelligence and review processes, could help officers and senior managers identify actions for improving service resilience.
2. The financial information collected through SWIMS could be reviewed post-event to inform contingency budgets in case of future severe weather disruptions.

8. Improving SWIMS as an evidence base for decision-making

Over 150 services were involved in the winter events to some degree, however only 30 services recorded data directly through SWIMS and so there is the risk that current figures widely underestimate the impacts experienced, and the true impacts and costs are being lost. Key data missing from the SWIMS evidence base includes the involvement of healthcare services, utility providers and private transport providers. Financial data gaps have also made it difficult for organisations to claim for emergency funds, such as the Bellwin Scheme. To improve SWIMS as an evidence base, a number of actions have been recommended:

1. The SWIMS Administration Team, with support from SWIMS users, should review SWIMS and guidance produced to ensure that information captured can better support funding claims and reduce duplication of effort.
2. SWIMS users should record financial data and break-down costs to assist service resilience planning and emergency funding claims (e.g. Bellwin Scheme)
3. Impacted services who did not enter data on SWIMS should do so to ensure a complete picture can be acquired. This can support funding claims and business cases for action. In particular details on the involvement of the EA, health services, utilities and transport providers, Medway Council, Marine & Coastguard Services should be captured through the system. Opportunities to involve the voluntary sector in SWIMS should also be explored.
4. SWIMS users should record any impacts on the health and wellbeing of staff and residents. With widespread damage to homes, livelihoods and people themselves, it is anticipated that the negative repercussions on physical and mental wellbeing is significant and wide spread. It is also recommended the NHS is more widely represented on SWIMS.

8.1: Recommended actions for SWIMS users

Theme	Action	Action Lead/ Supporting partners	Timescale
System Review	**Review SWIMS** to ensure data can be captured to better support funding claims and reduce duplication of effort. The review should include identification of the key data that services need to collect and identifying where SWIMS can be better aligned to assist this data collection. A Task and Finish user group should be set up to facilitate the review.	Kent SWIMS Administration team	October 2014, in line with KES monitoring
Guidance & Training	**Develop clear guidance** on recording financial and non-financial impacts of severe weather events through SWIMS	Kent SWIMS Administration team	October 2014, in line with KES monitoring
Improving the evidence base	**Impacted services who did not enter data on SWIMS should do so** to ensure a complete picture can be acquired. This could support funding claims and business cases for action.	EA, health services, utilities and transport providers, Medway Council, Marine & Coastguard Services and voluntary organisations	End of August 2014
	Record financial data and break-down costs to assist service resilience planning and emergency funding claims (e.g. Bellwin Scheme) **Record any impacts on the health and wellbeing** of staff and service users.	All SWIMS users All SWIMS users	Ongoing
	It is recommended that **voluntary organisations are involved** in SWIMS and **the representation of NHS services is increased.**	Kent SWIMS Administration team	October 2014, in line with KES monitoring

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