

# LESSONS FROM THE PAST ARE NOT ALWAYS USED BUSINESS FLOOD PREPAREDNESS IN TWO NSW COMMUNITIES

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## Abstract

A grant from the Natural Disaster Mitigation Program (NDMP) is being used to develop and pilot a toolkit to help businesses be better prepared for flooding. Wagga Wagga and Kempsey have been chosen as the two locations to pilot the toolkit because they both have substantial business districts with similar flood risks but significantly different flood histories.

Before developing the toolkit, a baseline survey was undertaken of nearly 100 businesses in each location to get an appreciation of their awareness and preparedness for flooding. This paper discusses some of the significant differences between and within these two locations in terms of business flood awareness and preparedness and the reasons for those differences particularly in terms of different flood histories.

Some issues which need to be confronted include attitudes towards infrequent events, perceptions that insurance will carry the cost, awareness of flood warning systems, confidence that they will know what to do on the day and limited time and resources to devote to business continuity planning.

**Key Words: business continuity, Kempsey, Wagga Wagga, toolkit, awareness, preparedness, community education**

## Introduction

The direct and indirect costs of flooding on commercial properties can be significant and for some small to medium sized enterprises a flood can put them permanently out of business if the impacts are substantial American Red Cross (2004).

There is evidence that after receiving sufficient flood warning, well-prepared businesses are able to avoid substantial flood damages (Gissing, 2003). Smith, Handmer, Greenaway and Lustig (1990) quoted savings of over 80 per cent for commercial properties where owners were informed of their flood problem and took reasonable precautions. Total achievable savings could be extensive considering that 16 percent of Australia's

flood prone buildings have been estimated to be occupied by businesses (Smith, 1989).

There can therefore be significant social and economic benefits for commercial enterprises to have business continuity plans which help them be prepared to take appropriate actions in response to flood warnings.

Most businesses, however, do not have the skills to prepare such plans and often fail to see the benefit of being prepared in this way when there are other more immediate business priorities demanding their time.

The NSW State Emergency Service (SES) therefore saw benefit in a business continuity toolkit which communicates the good business sense of being prepared and then provides a self guided toolkit for managers to

develop a business flood plan for their business.

The SES sought and received funding from the Natural Disaster Mitigation Program (NDMP) to design a toolkit and pilot it in two locations in NSW. Molino Stewart was engaged by the SES to design the toolkit and assist with its piloting.

The project is to be undertaken in several stages. The first stage was to select two areas for piloting the toolkit and then to undertake baseline surveys of businesses in those locations to determine their level of awareness and preparedness and also to identify any motivators or barriers to encouraging improved preparedness.

This paper draws on the baseline survey results to highlight some lasting and some ephemeral effects that flood history and experience has on awareness and preparedness amongst business managers.

## **Pilot Areas**

### ***Kempsey***

Kempsey (pop. 8,455 (2001) is located within the Macleay River catchment on the New South Wales Mid North Coast. The Macleay catchment has an area of approximately 11,500 square kilometres, with Kempsey located in the lower third. Levees protect the city to an Average Recurrence Interval (ARI) ten year flood.

A warning system is in place delivering a minimum of 18 hours notice of an approaching major flood. Kempsey has recorded 21 major floods since 1838. The largest recorded in 1949, caused an estimated \$200 million damage and six deaths (Dutton, 2000).

**Figure 1: Flooded businesses in Kempsey, 2001**



The Kempsey CBD consists of approximately 200 businesses, all of which are flood prone. There is a wide variety of businesses, including retail, accommodation, car sales and service, and professional services.

In 2001 a large portion of the Kempsey CBD was flooded, causing direct damage to approximately 94 businesses and indirect damage to many more (Gissing & Blong, 2004). The flood was estimated to have an ARI of 12 years. It had been 38 years since the last major flood to inundate the entire CBD area in 1963 (ARI = 15 years).

### ***Wagga Wagga***

Wagga Wagga, home to approximately 55,000 people, is situated on the Murrumbidgee River floodplain. The city comprises an estimated 600 to 700 flood prone businesses in the areas of North Wagga, East Wagga and Central Wagga.

East Wagga, comprises over 100 businesses, primarily light industrial, service stations, wholesalers and motels. Not protected by a levee the area is affected by events more frequent than the 20 year ARI flood. This area was last flooded by the 1974 flood.

North Wagga, comprises approximately ten businesses, including a general store and two hotels. North Wagga is protected by a ring levee, offering protection up to a 1 in 20 year flood. The area was last flooded in 1974.

Central Wagga Wagga, comprises over 500 businesses primarily in Fitzmaurice and Baylis Streets. Central Wagga Wagga is protected by a levee, which offers protection up to the 1 in 70 year flood. Central Wagga

has not been flooded since 1956 when the levee had not been built. The 1974 flood was higher than the 1956 flood but did not overtop the levee.

A warning system is in place, typically delivering at least two days notice of flooding.

**Figure 2: Fitzmaurice St Wagga Wagga, 1956 flood**



## The Surveys

A fifteen minute, 62 question survey was designed to be carried out face to face with 100 business managers in each of the pilot areas. It asked questions about the business type and size, general business management practices, business continuity management, flood awareness and flood preparedness.

One hundred face to face interviews were completed in Kempsey but in Wagga Wagga it was far more difficult to get business owners to take an interest in being surveyed about flooding. Consequently only 12 of the Wagga Wagga surveys were carried out face to face and another 68 were filled out by business managers at their own convenience. Of the 68, several were returned incomplete.

This immediately highlighted a difference in attitude to flooding in the two communities which could be attributed to their different flood histories. Another influence on this result may have been the larger size and greater busyness of Wagga Wagga making it more difficult for managers to make time to do the surveys.

## Business Types and Exposure

Overall the profiles of business size and type in both locations were very similar. About 10% of businesses were sole traders and the biggest business employed about 50 people.

About 40% of businesses in Kempsey were in single storey buildings and in Wagga Wagga it was 60%. Ninety eight percent of all businesses occupied the ground floor.

Businesses traded on average for 45-50 hours per week. About half the businesses had less than \$50,000 worth of stock, 20% between \$50,000 and \$100,000 and the remainder more than \$100,000. Around 5% have more than \$500,000 worth of stock.

About half the businesses in both locations have less than \$50,000 worth of plant and equipment. In Wagga Wagga about one third have more than \$100,000 worth compared to one fifth in Kempsey.

Reconstituted wood products are used in the furniture or shop fittings of 85% of businesses in Kempsey despite their recent flood history. This compares to 65% in Wagga Wagga, although this may be under reported as it was apparent in the face to face interviews that not all interviewees knew what the furniture was made from.

Between 25% and 30% of businesses own their own premises which means that the majority of businesses in both locations have limitations on what they are able to do to make their premises flood proof or flood resistant.

In both locations businesses had been trading on average for about 20 years in the same location.

About 70% of businesses have written occupational health and safety procedures and business management procedures.

In summary, the two pilot areas are very similar in terms of these business parameters and given the flood probabilities in both places, have similar risk profiles.

## **Flood Awareness**

### ***Flood Probability***

The difference in recent flood histories however has had a significant bearing on flood awareness.

For example 94% in Kempsey believe their premises could flood and 72% were aware of that at the time that they purchased. In Wagga Wagga only 39% were aware that their premises could flood and 33% said they were aware of that when they purchased.

Despite this high awareness in Kempsey, only 4% said they took flood risk into consideration when choosing a location for their premises. In Wagga Wagga no businesses took flooding into consideration when choosing a business location. The majority of businesses indicated that they had chosen their existing location for commercial reasons such as it was a pre-existing business; it was the only available site; ample parking available; or that the location attracted customers.

Businesses were asked to select from a list of probabilities that their business would flood. The results are given in Table 1 in the Appendix.

In both locations all of the businesses have somewhere between a 1 in 10 and 1 in 100 chance of being flooded in any one year. Therefore, were the communities to be aware of their flood risks, 100% of the responses would have either been 1 in 10 or 1 in 100 for the risk of flooding next year. In Kempsey 79% of respondents believed that they were exposed to this level of risk while in Wagga Wagga it was only 26% of respondents.

Fifteen percent of respondents in Kempsey believed that they had a 1 in 1,000 risk of flooding in the next year and 2% believed they had a 1 in 1,000,000 chance. This compares to 22% and 32% respectively in Wagga Wagga.

Thirty two per cent of respondents in Wagga Wagga do not believe it will flood next year compared to 4% in Kempsey. The number who do not think it will flood next year could in fact be considerably higher than this if

those who did not answer this question did not answer because they did not believe it could flood. Some of the comments made by respondents in Kempsey would suggest this may be the case. If these numbers are added and taken as a percentage of the total interviewed then perhaps as high as 12% in Kempsey do not believe it will flood next year and 66% in Wagga Wagga. If the reluctance of Wagga Wagga business owners to participate in the survey was because of a perception that flooding was not a risk, then that percentage would be higher still.

While there was a perception among many respondents that the probability of a business flooding at least once will increase the longer the business is at the same premises, this was not understood by the majority. Were respondents who recognised a greater than 1 in 100 chance of flooding in the next year to understand this concept then they should have all indicated a 1 in 10 chance of their business being flooded in the next 10 years. Only 50% of respondents from both locations gave this response. This means that about half of those who think they have a 1 in 100 chance of being flooded in any year think they also have a 1 in 100 chance of being flooded at least once in 10 years.

The difference in perception of flood risk in both locations could be influenced by three factors. Firstly, in Kempsey numerous prominent blue and white signs showing the height of the 1949 & 2001 floods. This was often mentioned by respondents during interviews. Nothing similar exists in Wagga Wagga.

Secondly, 34% of businesses surveyed in Kempsey had experienced a flood through the premises in 2001. Though not recorded in the survey results, others indicated that they had experienced flooding through other premises in 2001 and had moved as a consequence. Yet others had seen the flood of 2001 even though it did not enter their premises and others still had witnessed floods in 1949, 1950 and 1963 although they had not experienced them while working in their current premises.

In Wagga Wagga only four respondents (5%) said they had experienced a flood through their current premises.

Thirdly, the SES has conducted two extensive community education campaigns in Kempsey; in 1999 to commemorate the 50<sup>th</sup> anniversary of the 1949 flood; and 2002 to capture the lessons learnt from the 2001 flood. These campaigns involved the distribution of FloodSafe brochures, street displays, public meetings and media promotion. Kempsey Shire Council has also recently posted extensive community education material on their website. Wagga Wagga has not received community specific community education programs to the same extent.

### ***Flood Consequences***

Three questions were used to get respondents to estimate the financial impacts of flooding on their business without the survey nominating flooding as the cause of the effects on the business.

There was little difference in opinion at the two locations about the financial impacts of one week's closure on businesses. About half of the businesses thought it would have little or no financial impact. Few if any thought that the business would have to close permanently and about 20% and 30% respectively thought that it would have severe or moderate impacts respectively.

Those in Kempsey on the other hand seen that stock or equipment loss was more likely to impose severe financial difficulties on the business or force it to close. Alternatively it may be that Wagga Wagga has a more robust economy and therefore such losses were not perceived to be as great a threat to business viability. Finally, more businesses in Wagga Wagga were part of a larger business chain which would make them more resilient to losses at a particular locality.

### ***Flood Risk***

The flood risk to a business is a function of probability and consequences of flooding. There was a question which measured respondents' perception of flooding as a business risk compared to other risks and

some questions on whether they thought they were insured against those risks.

In one questions respondents were asked to rank theft, fire, flood, storm damage and electricity blackout from 1 to 5 in decreasing order of financial risk to their business.

In both localities on average fire is perceived to be the greatest threat followed by flooding. The average rankings suggest that in Wagga Wagga the difference in threat from fire and flooding is perceived to be greater than it is in Kempsey.

In Kempsey 36% of businesses believe they have business interruption insurance and 20% believe they have flood insurance covering property. In Wagga Wagga there are 43% and 38% respectively who believe they have these insurances.

The reality is that flood insurance covering property or business interruption in Australia is particularly rare and very expensive. It is likely therefore that many businesses are unaware that their insurance policies do not cover flood.

## **Flood Preparedness**

### ***Business Continuity***

Business continuity planning ensures that abnormal or emergency conditions do not significantly affect the businesses profitability.

A general business continuity plan should reduce some of the business risks of flooding but in a flood prone area businesses would benefit from a plan which specifically addresses flood risks.

Table 2 in the appendix summarises the use of business continuity planning by businesses in both pilot areas. There are almost twice as many people in Wagga Wagga who have not heard of business continuity planning as there are in Kempsey while that ratio is reversed for those who have heard of it but not given it much thought. A similar percent have never done anything about it in both locations.

About one third of the businesses in Kempsey say they have formulated unwritten plans compared to about a quarter in Wagga Wagga. Nearly a quarter of those in Wagga Wagga said they have documented plans compared to about one fifth of those in Kempsey.

Of those who said they had some form of plan, whether written or not, about 50% of the respondents in Kempsey said they had a plan because they had experienced a flood. This means that about one quarter of businesses in Kempsey have been motivated to have some form of business continuity planning because of their flood experience.

No one in Wagga Wagga nominated flood risk as a reason for having a plan.

Yet in both locations half the businesses have developed continuity plans.

Almost 60% of businesses in Kempsey could nominate a regular action they took as part of their business continuity plan. These mainly involved regular staff meetings at which risk related issues were discussed. This compared to only 34% in Wagga Wagga suggesting that perhaps the Kempsey plans were generally more robust. This may be because they have had to deal with a real business continuity crisis in the near past.

In both locations about 60% of businesses back up computer files daily and a further 15% back them up weekly. Interestingly only 63% of Kempsey businesses store the backups off site compared to 77% in Wagga Wagga.

### ***Flood Planning***

The majority of business owners in Kempsey and Wagga Wagga believe that taking action ahead of a flood would reduce business losses as summarised in Table 3 in the appendix. While a significant reduction was estimated to be the outcome by the most number of respondents in both locations, a significantly greater proportion in Kempsey were likely to believe that to be the case than in Wagga Wagga.

It should be recognised that if there were businesses which closed as a result of the

2001 flood, these have not been included in the survey.

They were asked whether they would be interested in having a business continuity plan for flooding if they knew it could reduce business losses by up to 80 per cent.

In Kempsey 79% indicated that they would be interested and of those who said they were not almost half said that was because they either already had a plan or knew what to do. Another eight indicated in some way that it was not worth it for their business.

In Wagga Wagga only 51% indicated they would be interested in having such a plan. Of those who were not interested, 25% did not nominate a reason. Of those who did give a reason 90% believed they did not have a flood risk and 10% said it was not worth it.

### ***Flood Response***

In Kempsey, all but 2% of businesses nominated, unprompted, at least one appropriate action they would take in response to a flood warning such as lift stock and/or equipment, remove stock and equipment off site, evacuate staff. In Wagga Wagga on the other hand 28% of respondents did not nominate an appropriate action

A later question asked specifically who they would ask for assistance. In Kempsey 50% nominated the SES while 17% nominated friends and 12% staff or other branches of their business. Interestingly 8% specifically said "no one".

In Wagga Wagga respondents saw the answers to this open question so their responses cannot be directly compared. Nevertheless, 75% nominated the SES and 10% the local council. Thirteen percent nominated friends.

Respondents were asked if they had the items or took the actions listed in Table 4 which summarises their responses. Ten of the respondents in Wagga Wagga did not answer these questions and the percentages reported are percentages of the 70 who did.

Generally the percentages for each preparedness measure in Kempsey were equal to or higher than in Wagga Wagga. Indicating that Kempsey businesses are generally better prepared.

Businesses were best prepared for incidents or emergencies other than floods with 90% of businesses having a fire extinguisher or fire blanket and 84-91% having a first aid kit. This is probably because building regulations and occupational health and safety regulations require these items.

Kempsey was slightly better prepared with regard to emergency contact numbers for building and business owners with 83% and 98% of businesses having these respectively. This compared to 73% and 77% in Wagga Wagga which are also high.

With regard to building security there was a significant difference between the two locations with 89% at Kempsey saying they had procedures for securing the building compared to 37% in Wagga Wagga. The contrast was not as great but still significant with regard to arrangements to redirect calls with 54% of businesses in Kempsey reporting they had such arrangements and only 34% having them in Wagga Wagga.

With regard to measures specifically aimed at reducing the risks from flooding, Kempsey businesses seem far more prepared. For example, 63% of Kempsey businesses say they have procedures for moving stock and equipment compared to 20% and 27% respectively at Wagga Wagga. They are twice as likely to have procedures for moving hazardous material or wastes (27%) than those in Wagga Wagga (13%). Interestingly however, between 26% and 30% of businesses in both locations store stock and hazardous material and wastes on the ground.

Kempsey business owners are twice as likely to have occupational health and safety procedures for flooding (39%) than those at Wagga Wagga (21%).

With regard to other flood preparedness measures the level of preparedness is generally lower but the relative difference

between Kempsey and Wagga Wagga is generally greater. Between 8% and 25% of businesses in Kempsey adopt the remaining measures compared to between 0% and 7% in Wagga Wagga.

## Conclusion

It is clear from the baseline survey that flood experience has a significant impact on a business community's flood awareness and preparedness.

However, even where there has been recent flood experience, there can still be significant gaps or misunderstandings in the flood awareness of many. Furthermore, awareness does not necessarily translate into practical preparedness. Even amongst those in Kempsey who experienced a flood in 2001 and consider themselves well prepared, there are many improvements that could be made to reduce their potential for future losses.

This paper only covers those aspects of the survey which focussed on awareness and preparedness. This combined with other survey data on communication and action barriers and motivators will be used to design the business toolkits for the pilot project.

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## Appendix A

**Table 1: Business Managers' Self Estimated Probability of Premises Flooding**

Estimated Probability	Kempsey		Wagga Wagga	
	Next Year	Next 10 years	Next Year	Next 10 years
1 in 10	26%	50%	4%	13%
1 in 100	53%	38%	22%	16%
1 in 1,000	15%	6%	22%	25%
1 in 1,000,000	2%	2%	20%	25%
It won't flood	4%	4%	32%	21%
Total	100%	100%	100%	100%

**Table 2: Reported Use of Business Continuity Planning**

Actions	Kempsey		Wagga Wagga	
	Number	Percent	Number	Percent
Never heard of it before	17	17%	21	28%
Not given much thought to it	16	16%	7	9%
Thought about it but never done	14	14%	12	16%
Formulated unwritten plans	35	34%	18	24%
Documented Plans	19	19%	17	23%
Total	101	100%	75	100%

**Table 3: Perceived Impact of Taking Action on Business Losses**

<b>Taking action ahead of a flood arriving at the business would:</b>	<b>Kempsey</b>		<b>Wagga Wagga</b>	
	<b>Number</b>	<b>Percent</b>	<b>Number</b>	<b>Percent</b>
Make no difference	10	10%	5	7%
Reduce business losses slightly	7	7%	14	20%
Reduce business losses moderately	25	25%	17	24%
Reduce business losses significantly	53	52%	25	35%
Eliminate business losses	6	6%	10	14%
Total	101	100%	71	100%

**Table 4: Flood Preparedness Measures**

Measure	Kempsey		Wagga Wagga	
	Number	Percent	Number	Percent
OH & S procedures for flooding	39	39%	17	21%
First aid kit	92	91%	59	84%
Fire extinguisher or blanket	91	90%	63	90%
First aid trained staff	66	65%	47	67%
Portable radio with spare batteries	30	30%	19	27%
List of emergency service telephone no.	75	74%	35	50%
Emergency contact for building owner	84	83%	51	73%
Emergency contact for business owner	99	98%	54	77%
Documented evacuation procedure	38	38%	24	34%
Staff training in flood response	25	25%	3	4%
Markers showing possible flood levels	11	11%	0	0%
Map showing safe evacuation routes	8	8%	1	1%
Building features to prevent flood entering	12	12%	5	7%
Equipment to prevent flood entering	8	8%	2	3%
Water resistant shop fittings	17	17%	2	3%
Procedures to move equipment	64	63%	14	20%
Store all stock off ground	26	26%	21	30%
Procedures to move stock	64	63%	19	27%
Store all hazardous materials off ground	28	28%	19	27%
Procedures to move hazardous materials	27	27%	9	13%
Procedures to shut down utilities	55	24%	14	20%
Procedures to secure building	90	89%	26	37%
Arrangements to redirect calls	55	54%	24	34%
Arrangements to temporarily relocate	16	16%	9	13%
Training Drills of exercises for floods	10	10%	3	4%

## Author Biography



### **Steven Molino**

Steven Molino has considerable experience in a wide range of water cycle projects and has spent a substantial part of the last decade investigating flood damages, mitigation and flood preparedness.

He lead investigations into flood impacts on the Hawkesbury Nepean as project manager for the Warragamba Dam Safety EISs. Subsequently he provided expert advice to the Hawkesbury Nepean Flood Management Advisory Committee on the effects of flooding on communities and infrastructure.

He prepared a flood preparedness strategy for the Woronora River and has investigated flood warning technologies for the SES. He has also project managed the design, implementation and evaluation of numerous community education projects drawing together his own technical expertise and the communications and education expertise of his staff.

His knowledge of flood preparedness and evacuation planning have been used in independent reviews of the life safety risks of several significant developments. He has advised State Water on dam safety issues and has presented at Emergency Management Australia's community education course.

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### **Andrew Gissing**

Andrew Gissing joined the SES in 2002 as a Planning and Research Officer. Andrew has a Masters (Hons) degree in Science, specialising in flood management and a Bachelors Degree in Economics. His main flood related interests are in the preparation of flood emergency plans, community education, coastal flooding, business continuity planning, flood warning systems and geographic information systems applications.

He has undertaken research into commercial flood damage estimation, flood warning effectiveness and business continuity planning, which has been presented in industry journals and conference proceedings. He has also lectured at the Emergency Management Australia Institutes evacuation management course and is an Honorary Associate of Macquarie University.

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