Senate Standing Committee on Environment & Communications

Inquiry into Recent Trends in and Preparedness for Extreme Weather Events

Submission by Green Cross Australia

February 2013

Green Cross Australia
Inquiry into Recent Trends in and Preparedness for Extreme Weather Events

Committee Secretary
Senate Standing Committee on Environment & Communications Committee

February 1 2013

Dear Secretary

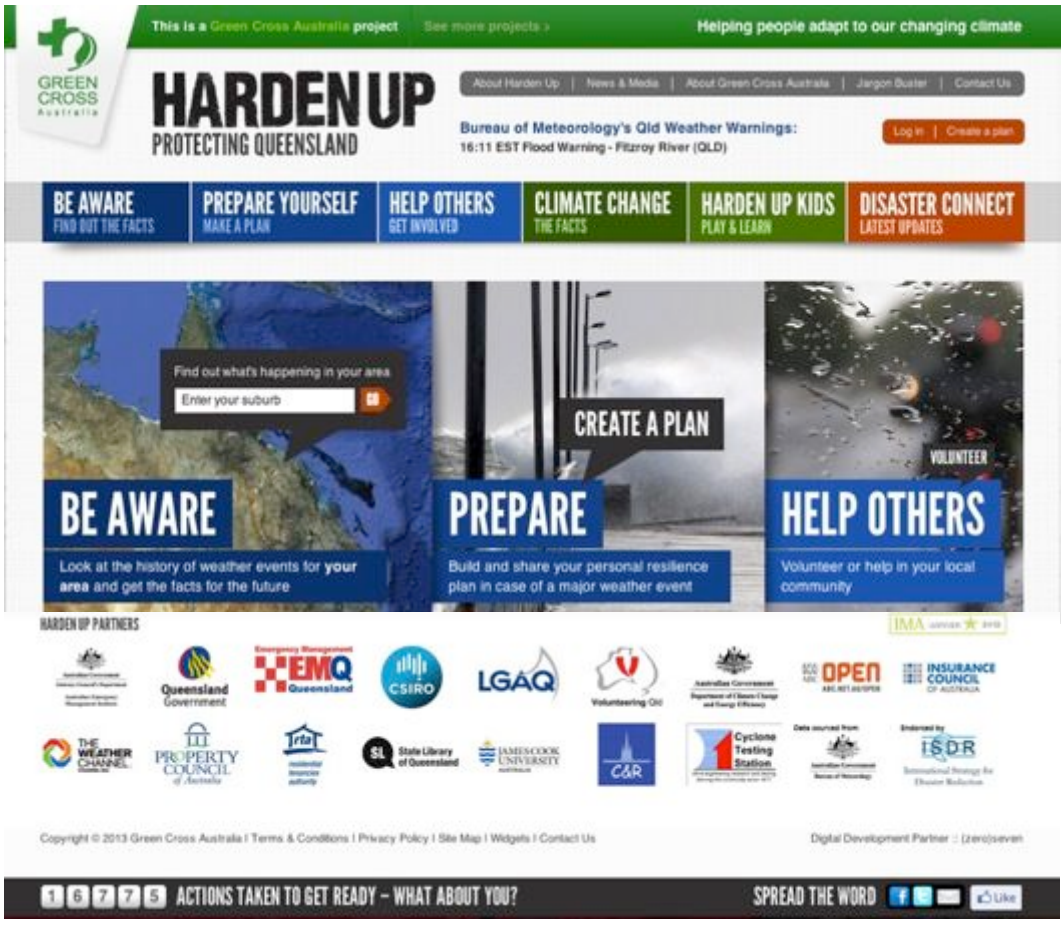
Thank you for the opportunity to provide a submission to the Senate Environment and Communications Committee **Inquiry into Recent Trends in and Preparedness for Extreme Weather Events**. This inquiry is timely provides an opportunity for the wider Australian community to reflect on our growing exposure to severe weather risks, our preparedness for responding to these risks, and the importance of disaster resilience as we prepare for 21st century climate change impacts.

Green Cross Australia is a not-for-profit with a mission of fostering a values shift towards a secure and sustainable future. We help people to adapt to the impacts of climate change with an emphasis on supporting a culture of self-resilience to natural disasters. We are not an advocacy group – rather we empower the community to take practical actions to prepare for, respond to, rebuild from and mitigate severe weather risks.

To deliver our programs we catalyse community, business, government and research partnerships, building digital platforms that reach specific audiences and motivate and measure practical community actions that advance disaster resilience and environmental sustainability.

Our digital outreach model includes 6 platforms that have reached 278,000 Australians who have accessed 1.08 million pages of content since early 2009. Each of our six websites is framed by climate and weather research and data from the scientific research community.

For example, "Harden Up – Protecting Queensland" includes extensive severe weather historical information, regional and suburb level climate trends, as well as information about how IPCC scenarios are developed and how our severe weather trends are observed from NASA/JPL climate scientists.



Green Cross Australia addresses this Inquiry in the context of the following initiatives:

Green Lane Diary: Primary school environmental education program reaching 612 schools with 78,000 students participating since 2010, delivered in print, web and interactive iPad magazine formats. The program features ten curriculum-aligned modules around different elements of sustainability, including one focused on disaster resilience.

Harden Up – Protecting Queensland: Disaster preparedness portal offering Queensland residents a localised severe weather history as well as projected trends for climate change, along with tools to develop "Personal Resilience Plans" to protect homes, families and communities. So far Queenslanders have taken 16,775 actions to prepare for severe weather using this platform.

Build it Back Green: Tools and case studies encouraging bushfire affected Victorians to rebuild stronger, more hazard resilient and sustainable homes and communities (this portal is used by 53,000 Australians across all States and Territories).

Extreme Weather Heroes: Social media network inspiring GenY to rejuvenate our aging emergency volunteering base by becoming emergency volunteers (SES, Red Cross, St John Ambulance, RFS/CFA).

Witness King Tides: Community photography project designed to raise awareness of coastal impacts of gradual sea level rise combined with severe weather risks. We are part of an international network including NOAA and the US EPA and Canadian agencies supporting similar coastal initiatives.

The Green Cross Australia Submission addresses each of the Committee's Terms of Reference and includes fifteen recommendations.

Please note that our references are hyperlinked.

Please contact us if you wish to discuss or clarify any aspects of our submission.

Mara Bun
CEO
Green Cross Australia

Green Cross Australia Submission

Terms of Reference a) recent trends on the frequency of extreme weather events, including but not limited to drought, bushfires, heat waves, floods and storm surges;

Major weather events linked to climate change

On 14 March 2012, CSIRO and the Bureau of Meteorology (BOM) released the latest 'State of the Climate' report. It stated that long term warming trends have not changed:

> "Each decade has been warmer than the previous decade since the 1950s. Global-average surface temperatures were the warmest on record in 2010 (slightly higher than 2005 and 1998). 2011 was the world's 11th warmest year and the warmest year on record during a La Niña event. The world's 13 warmest years on record have all occurred in the past 15 years".

In an article in The Conversation published on January 18 2013 titled "What's causing Australia's heatwave?" five BOM experts including the Head of Climate Monitoring and Prediction Services made the following:

> "In essence, every weather system and ocean current operates in a climate system that is now, on average, a degree warmer than a century ago. In this way, the impact of global warming is clearly observed in a distribution shift of daily weather, as well as shifts in monthly and seasonal climate, to higher temperatures.
>
> As is now communicated by many climate scientists, the warming planet is loading the climate dice in favour of warmer conditions.
>
> So, while the "cause" of an individual weather event, including heat waves, is always proximally linked to antecedent weather conditions — it is possible to determine the influence of climate change on the frequency of occurrence of such an event. This is expressed by the increased likelihood that these extreme events will occur in comparison with the past, or in comparison with climate modelling scenarios of an unchanging climate."

This article concludes as follows:

> We expect extreme warm weather events will occur more often
>
> Future warming of the climate due to greenhouse gas emissions will very likely lead to further increases in the frequency of unusually hot days and nights and continued declines in unusually cold days and nights.
>
> These changes will result in weather events which are increasingly beyond our prior experiences.
>
> And it's not just temperature extremes. Climate model projections indicate that the frequency of many different types of extreme weather will change as the planet warms.

Trend data must be locally relevant and accessible

Scientific research is often not accessible to the general public and business. Severe weather research findings addressed in the context of our changing climate are too often politicised in the popular media against worrying trends relating to Australia's scientific literacy. A 2010 a national survey of 1500 Australians conducted by the Scientific and Technological Societies revealed that less than 4% of respondents correctly answered six basic questions.
For example, 30% of respondents thought dinosaurs and humans were alive at the same time.

We observe a growing confidence within our research community and their international peers about the linkages between current severe weather and warming, and the implications for what we must urgently prepare for as 21st century climate impacts are felt. However, a polarised community remains disengaged in relation to preparing for future extreme weather events with foresight instead of hindsight.

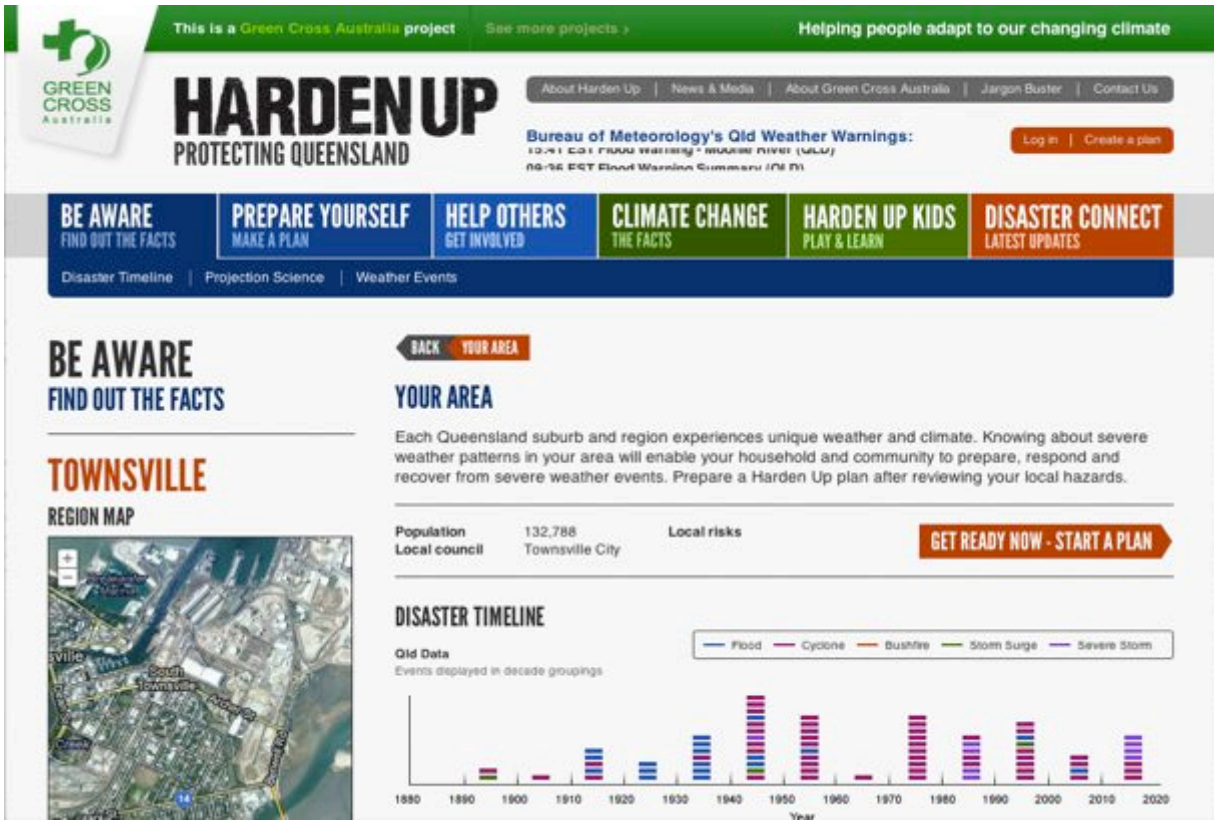
Recommendation 1: Green Cross Australia believes there is an opportunity to educate all Australians about our localised severe weather history in order to 1) motivate preparedness for future events, and 2) build a dialogue about how the future is likely to be different from the past because of measurable impacts of human induced climate change within recent collective memory.

The importance of offering this information in a locally relevant context cannot be understated – given the different circumstances confronting our diverse regions, and quite localized cultures of self-organised disaster response which draw on historical understandings.

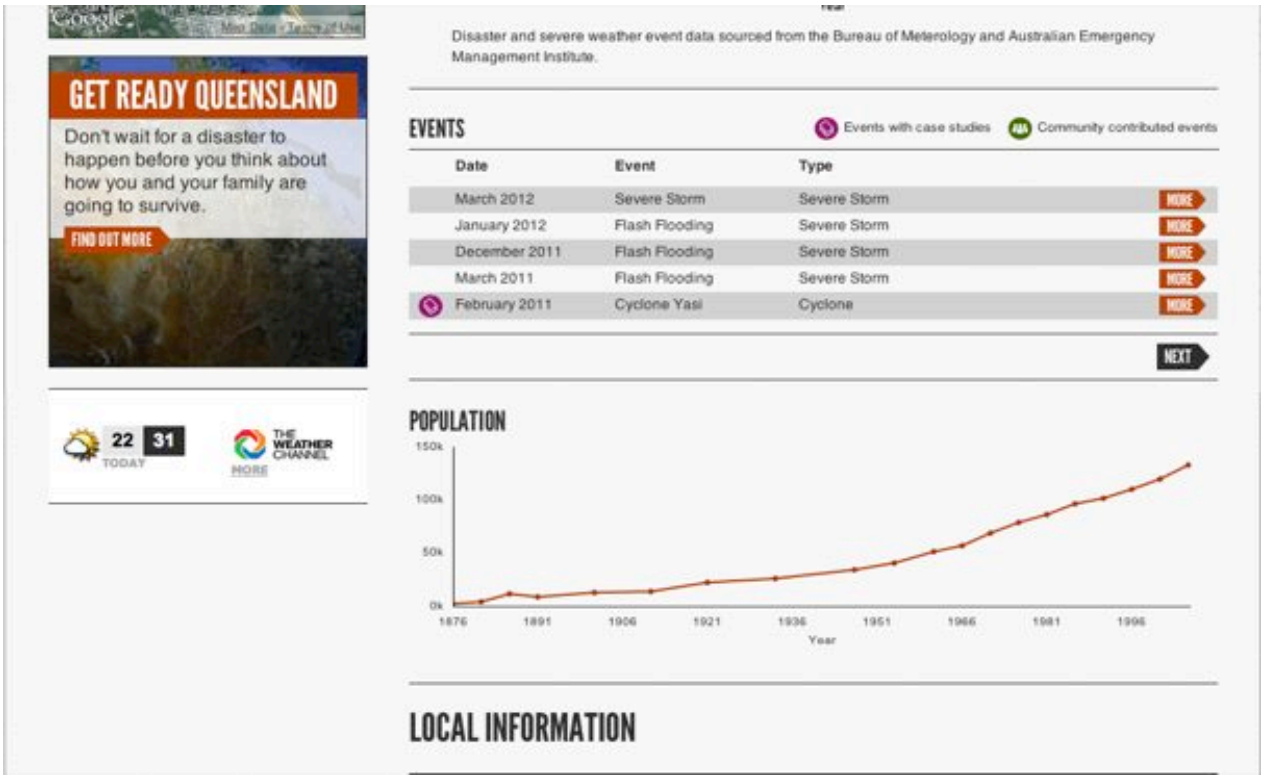
For the Harden Up portal (funded by the Natural Disaster Resilience Program through Attorney General's Department and the Queensland Department of Community Safety), Green Cross Australia worked with experts to develop a Queensland severe weather events database that includes over 3,000 floods, cyclones, severe thunderstorms, bushfires and storm surge events going back to 1850. Each of these events is listed across 3,275 suburbs that may have been impacted, based on the methodology described below.

Core data used in the Harden Up severe weather events database is sourced from a number of Bureau of Meteorology (BoM) databases and from the Attorney-General's Department Disasters Database which is managed by the Australian Emergency Management Institute (AEMI). Events are updated using BoM and AEMI's regularly updated information.

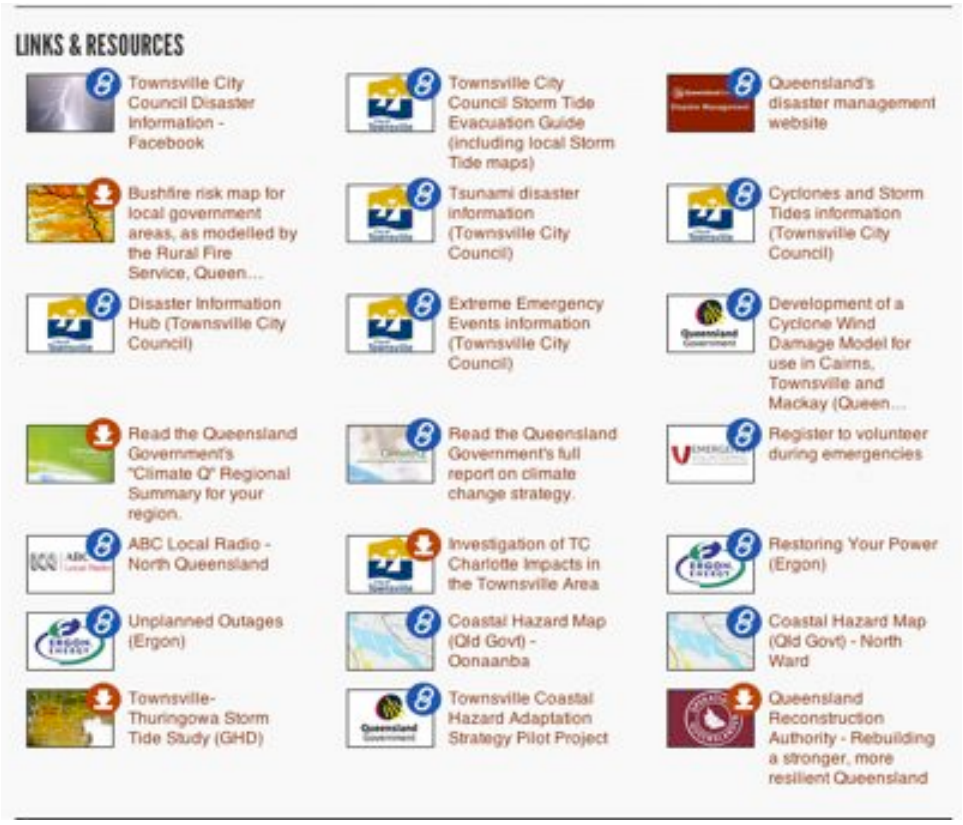
We have found that localizing relevant information, and integrating disaster response resources with climatic change information that is locally relevant can develop strong public traction.



Above we present how a Townsville resident, for example, can visualize the history of local severe weather events located within the inner city. Importantly we have drawn population history data from the Queensland Treasury to make the point that recurring events – which can be reviewed going back to 1846, occur against the backdrop of a growing population.



Links to vital locally relevant preparedness and awareness information from government agency, media and service provider websites are then served up to portal visitors, to build trust and access to relevant materials including local flood maps that can be difficult to find on government websites.



Archived photographs from the State Library of Queensland's collections, against the background of projections for this region of Queensland in relation to climatic trends are also presented.

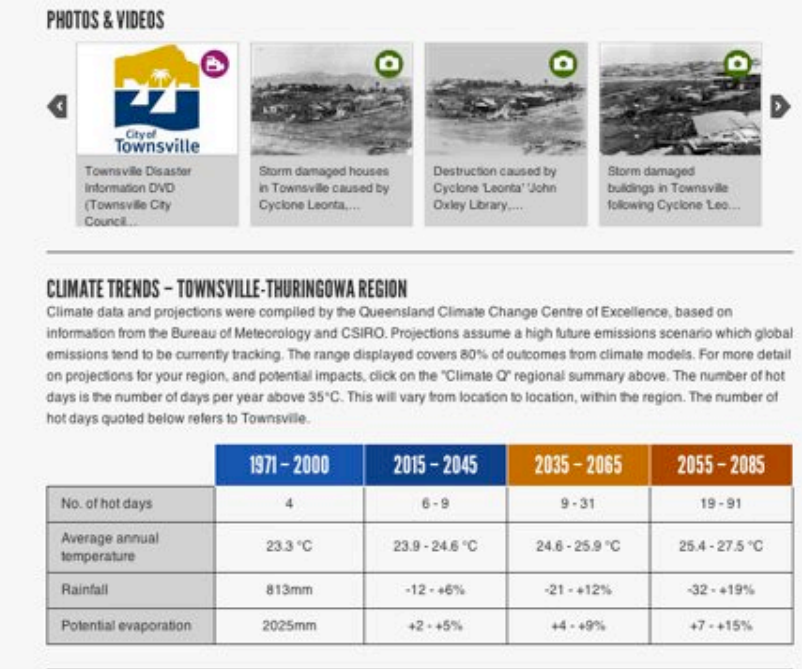
By serving up case studies and images that resonate with older local members of the public, we are able to cut through to living memories in order to cultivate a renewed culture of self-reliance and awareness.

To offer context for climate projections, we offer disaggregated rainfall and temperature data to the closest of 1000 statewide measuring points in order to offer annual trendline information in a transparent way that helps to communicate why future projections trend in this direction and how these projections have uncertainty boundaries.

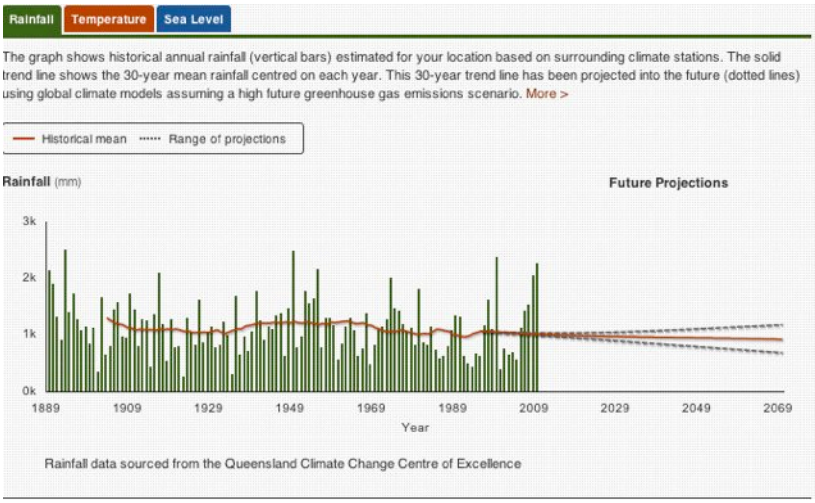
Here we present the actual measured annual rainfall and temperature data for Townsville (measured to the closest data collecting station) which forms part of the regional forecast and ends up influencing CSIRO's modeling that feeds into global IPCC storyline scenarios.

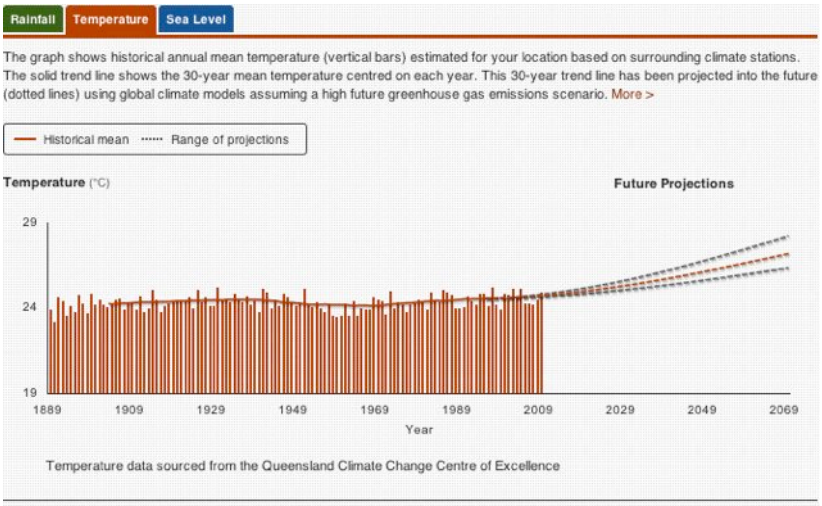
Depending on which suburbs you search for in Harden up, members of the public are able to learn how regional patterns of rainfall and temperature differ quite a bit.

Users also are able to appreciate the historical shifts between El Nino and La Nina patterns visualizing local data, which helps us to communicate variability and build a deeper understanding of how climate modeling works. We discuss modeling in detail here.



	1971 – 2000	2015 – 2045	2035 – 2065	2055 – 2085
No. of hot days	4	6 - 9	9 - 31	19 - 91
Average annual temperature	23.3 °C	23.9 - 24.6 °C	24.6 - 25.9 °C	25.4 - 27.5 °C
Rainfall	813mm	-12 - +6%	-21 - +12%	-32 - +19%
Potential evaporation	2025mm	+2 - +5%	+4 - +9%	+7 - +15%





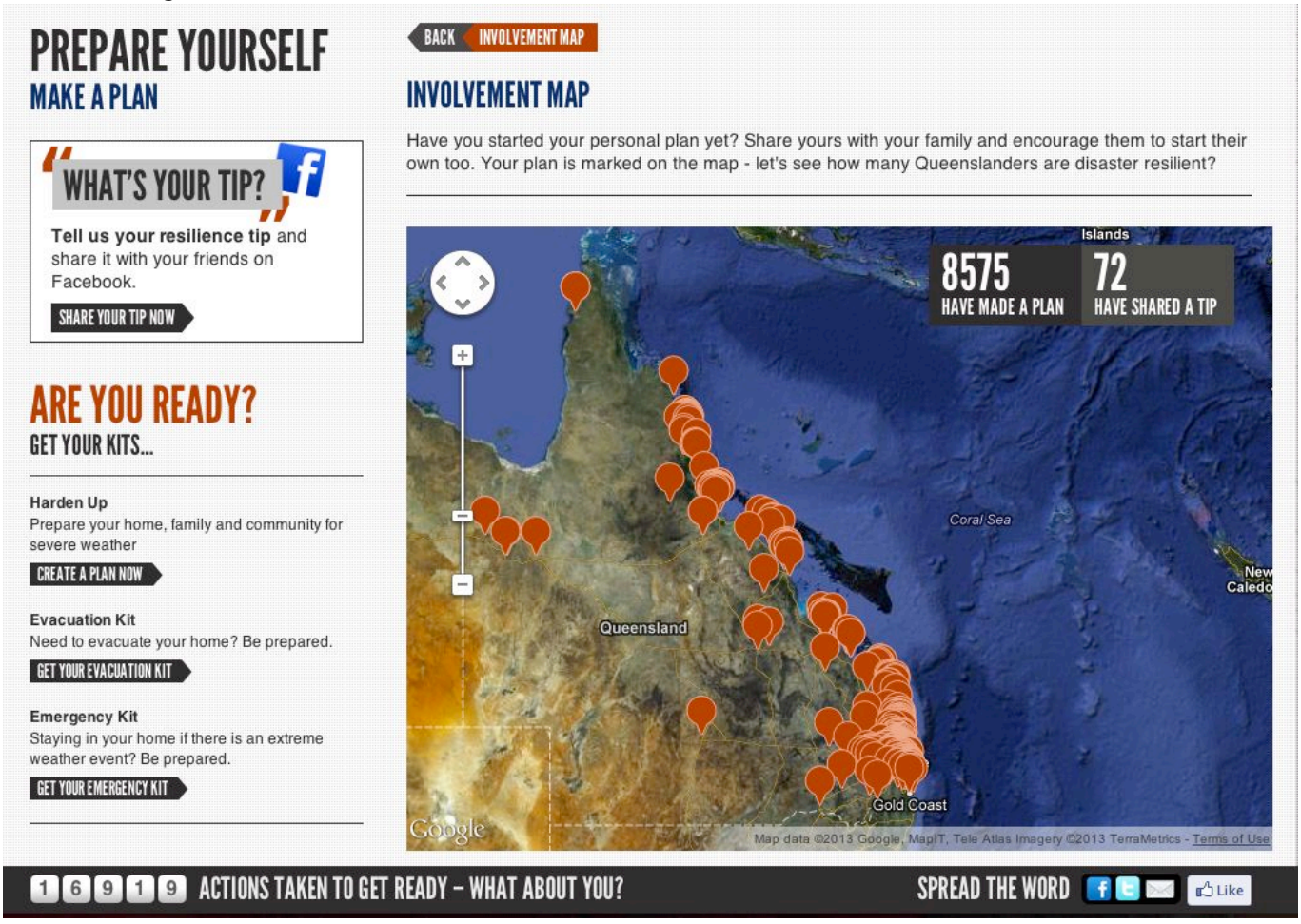
34,613 visitors have accessed 153,643 pages of content on the Harden Up platform since it was launched in October 2011.

Practical preparedness actions build self-reliance

More importantly, as of today, 8,575 Queenslanders have started to develop Personal Resilience Plans using the Harden Up program, and collectively they have taken nearly 19,000 discrete, measurable actions in preparation for our next major weather event. These actions are based on advice from Queensland's disaster management community (SES, RFS, EMQ, Red Cross, Volunteering Queensland, Queensland Police), offered in an easy to use interactive tools that can be shared on Facebook.

Harden Up resilience tools are personalized: depending on which hazards you face, what type of dwelling you have, and what your family circumstances are. Relevant information is served up in an easy to use interactive process that results in a tailored plan that can be shared with friends and family on social media.

The Australian community is highly engaged with online information and social media tools, and there is a significant desire for trustworthy, accessible and personally relevant disaster management tools.



Other imaginative disaster preparedness tools have been funded under the Queensland Natural Disaster Resilience program including Volunteering Queensland's Step Up program with its spontaneous volunteering, leadership workshops and online preparedness tools.

Recommendation 2: Disaster preparedness information offered in the context of local severe weather trend data motivates people to take action to prepare for disasters. Interactive tools such as Harden Up and Step Up should be available for all Australians. Investment in preparedness pays off through reduced insurance claims, lower rebuilding costs and human health costs.

The 20th century was a relatively quiet severe weather period

Having reviewed the importance of understanding severe historical weather events, we have become aware of concerns by some experts that these events may underestimate the magnitude of emerging extreme weather patterns – quite apart from those driven by human induced climate change.

Through Green Cross Australia's research in developing the Harden Up major events database and determining the technical parameters for a storm surge animation of a Yasi like event hitting Townsville, we have learned that there is growing concern amongst some experts about reverting to a more intense meta-cycle.

The Australian Bureau of Meteorology was established in 1906 and hold data records for the past 150 years. However, we need to look beyond modern day records and turn to palaeogeological investigations to better understand long-term trends.

In 2010, Professor Jonathan Nott published an article in the prestigious science journal 'Nature' that investigated the intensity of prehistoric tropical cyclones over the past 5,000 years along the Great Barrier Reef. The study found that super cyclones – cyclones with central pressures less than 920 hPa - occur every two to three hundred years. According to the records, it has been a couple of hundred years since the last one hit the region around Cairns. We know that Europeans haven't been in north Queensland since the last super cyclone hit. We must assume that one will occur in the relatively near future.

Consider for example Cyclone Mahina, which hit around Bathurst Bay in 1899, which is reported to have cause a storm surge in excess of 14 metres spreading inland for more than 5 kilometers though these figures are disputed by some.

Jeff Callaghan, retired senior forecaster for the Bureau of Meteorology, Chairs the Steering Committee for Harden Up and was instrumental in assisting the development of the events database. Please watch the short video interview available here to understand Jeff's concerns about a reversal of weather patterns into the 21st century.

We note that the Green Cross Australia YouTube channel features more than 30 videos about severe weather trends across Queensland regions as well as 14 interviews with three leading NASA/JPL experts addressing severe weather risks from the perspective of satellite observation. You can find Harden Up severe weather research interviews with CSIRO and NASA/JPL experts here, and other Harden Up regional trend videos by scrolling down on this page.

Green Cross Australia is concerned that discussion about disaster preparedness and resilience in Australia has not taken into account the possibility of important cyclical severe weather trends in conjunction with addressing the longer term impacts associated with human induced climate change.

Recommendation 3: Green Cross Australia recommends the Inquiry invite James Cook University Professor Jonathan Nott and retired BOM senior forecaster Jeff Callaghan to offer their views about the possibility that Australia is entering a cycle of more intensive major events based on historical records – apart from the additional impacts of warming.

Data transparency and accessibility

Green Cross Australia is delighted that Geoscience Australia has been funded to deepen and aggregate Australia's flood mapping resources and to enable growing methodological consistency in mapping as well as a compilation of all related national resources in this vital area.

Over coming decades our nation confronts the significant challenge of how to protect and support the 7% of Australians exposed to regular floods, the sprawling peri-urban communities exposed to bushfires on the outskirts of our major urban population centres and across our regions, and communities located in high-risk cyclone areas. In each of these areas population growth and migration have reduced our collective living memory about past major events. In some cases more recent developments have been situated in particularly natural hazard-exposed locations.

To the extent that there is asymmetry of information between government, insurers and the public – the public is least well informed about local risks. This is partly because disclosure of the history of major events impacting a building or location is not required when a property is bought, rent or built.

Whereas there are differences in the understanding of flooding impacts between all levels of government and insurers across Australia, the most significant knowledge gap that remains is access to local flood risk maps for Australian residents.

It is important that easy to access, standardized flood and other hazard maps are made available to the public because we confront the risk that a proportion of our current dwellings and potentially released new pockets of land may be more and more difficult to insure and protect. The hazard maps should be in formats that can be updated as more localised risk profiles are developed over time, and as climatic scenarios are updated.

Geoscience Australia is a world-class science agency – however it is not routinely tasked with science communications nor does it consider public engagement to be its core business. We believe it is vital for the federal government to invest in making the flood and hazard mapping resources developed by Geoscience Australia available to the general public through engaging digital programs designed to make the information locally relevant and easily navigable.

Likewise it is our understanding that the Attorney-General's Department is funding a study to review all recorded significant bushfire events in recorded Australian history. We likewise believe this vital information should be made available to the public in a format that is accessible and locally relevant.

Green Cross Australia does not, with respect, have confidence in the capacity of government to build engaging community online information portals based on past history.

Recommendation 4: Green Cross Australia recommends the Federal Government make vital emerging natural disaster resources available to the Australian community through engaging web tools. We recommend that the government tender for delivery of world-class online platforms able to engage the public with local information of historical trends and projected impacts. Australia's emerging robust community of consultants and not-for-profit organisations specialising in disaster resilience can add significant value to our adaptive capacity in this way.

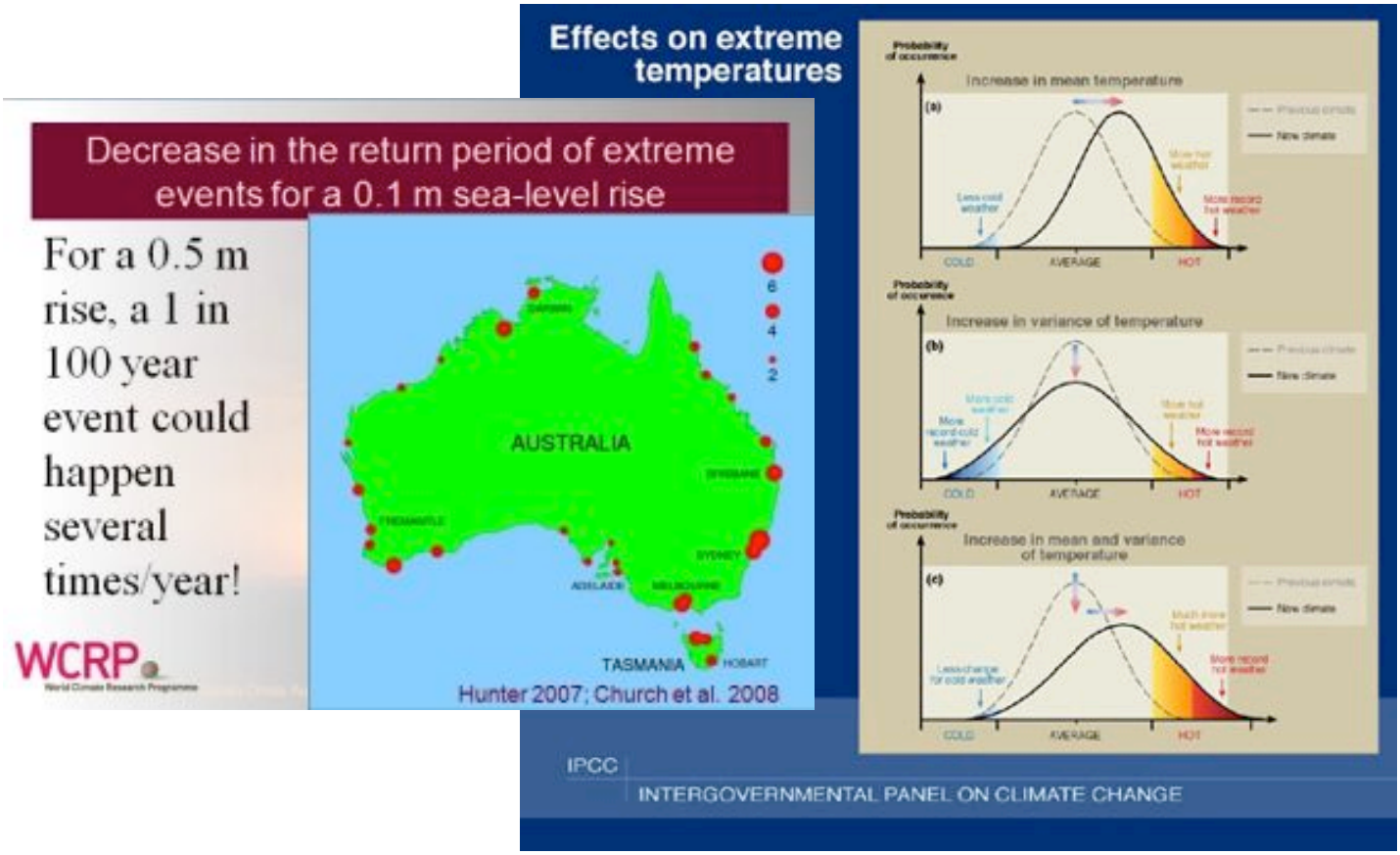
Terms of Reference (b) based on global warming scenarios outlined by the Intergovernmental Panel on Climate Change and the Commonwealth Scientific and Industrial Research Organisation of 1 to 5 degrees by 2070;

Communicating complex science to empower resilience

Communicating how IPPC scenarios are developed is a daunting task, yet without some sense of how scientists model the future, it is difficult for the public to evaluate how to prepare for possible future scenarios.

Understanding climate science requires an appreciation of variability (shifts between El Nino and La Nina patterns) and uncertainty (including uncertainty about how future greenhouse emissions will trend, whether recent trends will accelerate and at what pace, the impacts feedback mechanisms, the timing of thermal inertia in the climate system, and how major shocks such as the melting of ice sheets play out against the background of more known gradual impacts).

Given science literacy levels, it is especially challenging to communicate how small shifts in key indicators can lead to large outcomes resulting in severe weather. These two graphs convey extremely important information – yet without supported deliberation it is likely that many if not most Australians would not understand their meaning.

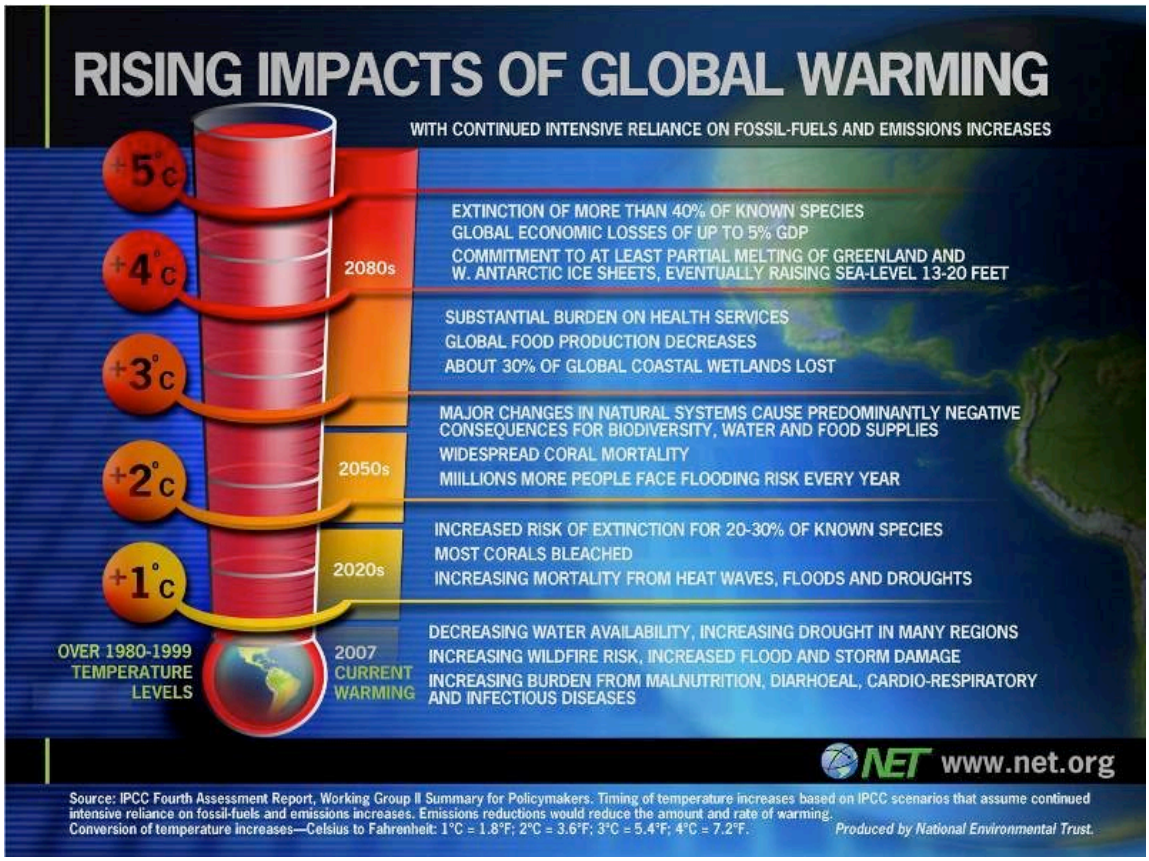


On top of communicating variability and uncertainty, scientists are challenged to communicate the likely spatial occurrence of projected impacts in different regions of the world and within Australia. This area of research is vital yet significantly underfunded.

Within this communications context, given the polarization of climate change as a political issue in Australia, it is virtually impossible for ordinary citizens to grasp the implications of a 5-degree temperature increase within the lifespan of our children if not ourselves.

To address how we motivate the community and business to invest in preparing for and adapting to growing severe weather risks we confront the contrast between:

- ever-growing concerns within the scientific community that upper ends of IPCC scenarios are becoming conceivable and,
- the public's intolerance for overly dramatized fear mongering.



Green Cross Australia believes greater emphasis needs to be placed on basic education around the scientific method, how scientists develop models of future climate scenarios, and how the process of peer review calibrates good science.

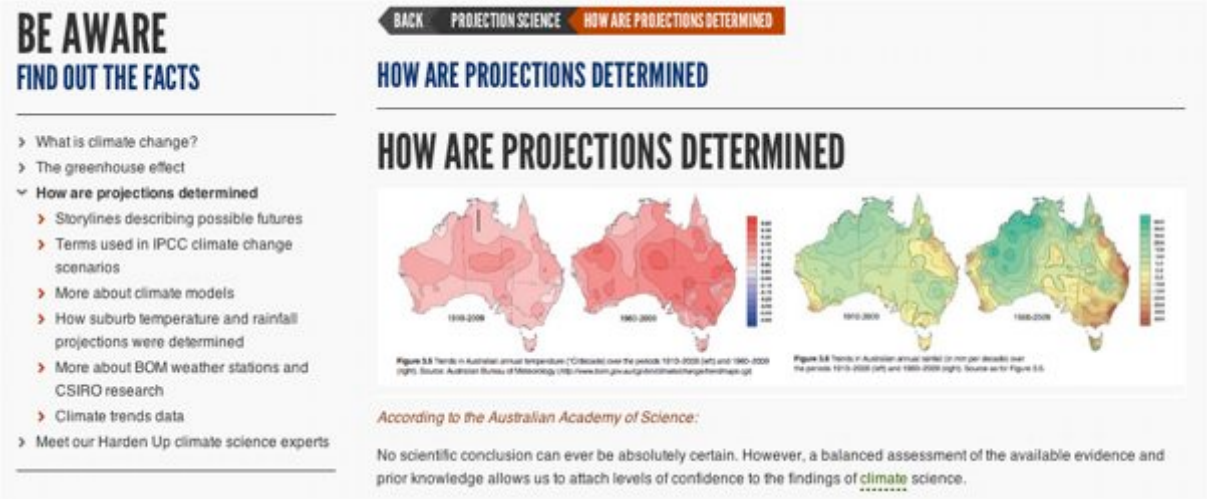
(i) Projections on the frequency of extreme weather events, including but not limited to drought, bushfires, heatwaves, floods and storm surges

Separating science from policy to diffuse politics

Green Cross Australia has taken the approach of offering layered depth of information in our portals, enabling diverse audiences to find relevant information as they journey through content. We believe it is possible to gradually build public trust through an ecosystem of trusted partners by linking our programs to the online materials of all levels of government, universities, industry associations and large businesses. This helps us to engage with the public about climate change and extreme weather preparedness without a political tone.

We draw our climate projections and related educational materials from the Australian Academy of Science, Bureau of Meteorology and CSIRO. We do not address political policy debates such as how or whether to price carbon – we simply help the community to understand why there is growing concern about climate change and why we need to take practical actions in response.

Communicating how scenarios are developed is a complex task. To visit the 7 detailed pages where we address IPCC storylines and local linkages in the Harden Up program, visit: http://hardenup.org/be-aware/projection-science/how-are-projections-determined.aspx



Educating youth about climate forecasts

Young Australians will inherit and advance our nation in the context of an inevitable warming pattern. The pace of warming and its consequences remain uncertain, but are becoming increasingly clear as evidence of warming mounts. Older Australians have an obligation to equip our young people with an appreciation of the shifting extreme weather risks that lie ahead, as well as equipping them with the skills and resources required to play a role in how our nation adapts to climate change.

We also have an obligation to build the science literacy of young Australians because they will need to understand how and why scientists research our climate, and how climate modeling and projections are developed in order to participate meaningfully in 21st century citizenship.

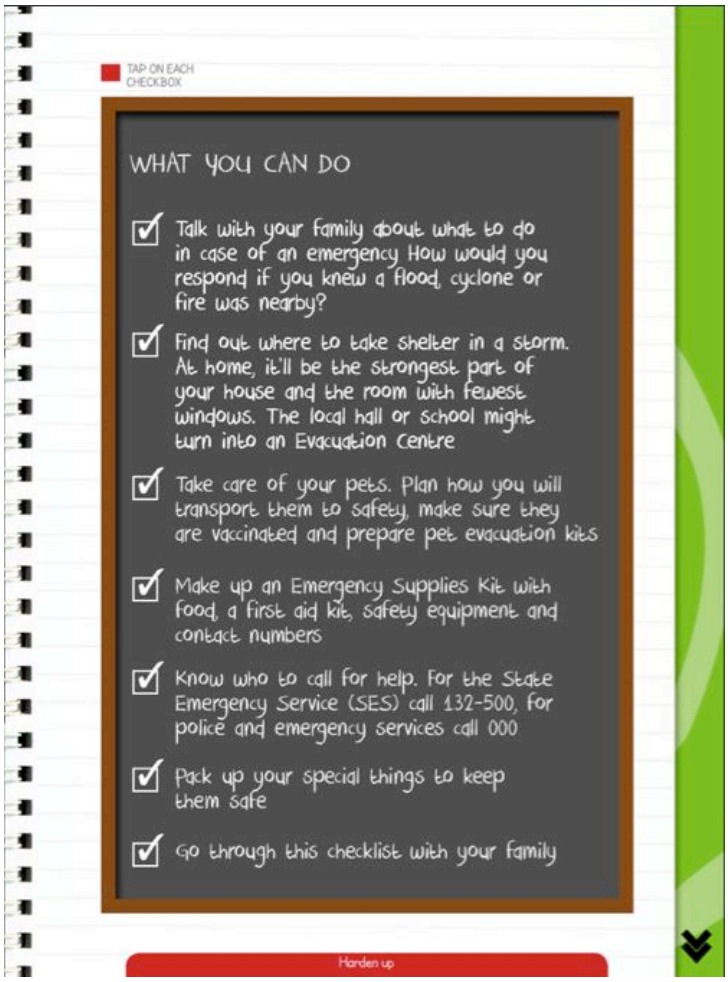
Green Cross Australia's award winning primary school education program Green Lane Diary addresses natural disaster preparedness, technology challenges and solutions and the scientific method for a youth audience in order to help build our science literacy and capacity to understand future climate scenarios and their implication for our well-being and future development.

Green Lane Diary is a ten-week, national curriculum aligned environmental education program. This initiative has reached 78,000 primary school students from over 600 schools nationally. It is delivered using print, web and iPad magazine formats.

Green Lane Diary can be downloaded for free from the Apple App Store and includes the following modules as an example of how we foster greater understanding about severe weather preparedness and climate change impacts.

On the following pages we offer examples of how disaster preparedness educational materials can be fun and engaging, in the hope that a diversity of resources develops over coming years

aligned the National Curriculum as it is interpreted across States and Territories. The online module of Green Lane Diary addressing disaster resilience can be viewed here: http://www.greenlanediary.com/our-environment/harden-up.aspx. Examples of iPad magazine content are provided below.



CONTENTS

How science works

GOOD SCIENCE: THE GREAT BIG ARGY BARGY

Even though scientists debate about who's right and wrong, there's a method to the madness! It's called *The Scientific Method*. *The Scientific Method* is all about investigating something, gaining new knowledge about it, or correcting old and potentially wrong knowledge based on what you have learned so that the explanation makes sense. It works like this:

HOME STEP 1 STEP 2 STEP 3 STEP 4 STEP 5 TAP EACH CIRCLE

Before scientific research is published, other qualified scientists review the research. It's like a quality control system to make sure research is good enough to be published. Once these super smart checkers are happy with your work, you can submit it to be published in a scientific journal. That way you can share your ideas and findings with the whole world! Sounds cool, doesn't it?

WHEN IS IT NOT GOOD SCIENCE?

It's only real science if the hypothesis is published and then reviewed by other scientists. There are plenty of wild, whacko ideas floating around, but the ones that are based on good science are always published in respected journals. That's what separates good science from bad science.

Sometimes not-so-good science still makes it into some scientific journals, so scientists need to stay on their toes when reviewing each other's work.

CONTENTS

Modelling the future

HOW DO SCIENTISTS MODEL THE FUTURE?

If we know something has happened heaps of times in the past, we can often work out what may happen in the future. That's how weather forecasts are developed: we use data from the past to figure out the future.

Working out how Earth's climate may change in the long term is pretty complex. Think about how far back our planet's history goes. There is a lot of historical data to be considered, so we use computer models to help us.

SUPERCOMPUTER

Around the world (including Australia), there are some complex computer programs running on very powerful supercomputers to help climate scientists understand our future climate based on historical data.

There are a few supercomputers - the world's most powerful computers - crunching away to solve some big math equations that describe how different parts of our climate work. One of the biggest is called Gaea and its based in the US Department of Energy's National Laboratory in Oak Ridge, Tennessee. Gaea (or Gaia) means 'Mother Earth' in Greek mythology. These equations have variables that change (like rainfall, temperature, greenhouse gas amounts, sea levels) and

SCROLL TAP

Recommendation 5: Green Cross Australia recommends all levels of government promote and invest in disaster preparedness and science engagement primary school resources. We support greater focus on disaster awareness in the National Curriculum.

(ii) the costs of extreme weather events and impacts on natural ecosystems, social and economic infrastructure and human health, and

Adapting with foresight: the unfunded challenge

According to Australian Bureau of Statistics' review of 2011 events (as of May 2012),

"The total cost of relief and recovery will not be completely realised for some years, but the recovery assistance for the 2010–11 natural disasters are well above the historical average. Queensland received an advance payment of $2.256 billion under the Natural Disaster Relief and Recovery Arrangements for relief and recovery activities associated with the floods and Tropical Cyclone Yasi, while Victoria received a $500 million advance payment for its flood recovery work."

"The Australian Government Disaster Recovery Payment (AGDRP) supported over 700,000 Australians adversely affected by these disasters, including:

- Queensland floods in December 2010 and January 2011
- New South Wales floods in January 2011
- Victoria floods in January and February 2011
- Tropical Cyclone Yasi in February 2011
- Western Australia floods in December 2010 and
- Western Australia bushfires in February 2011"

Near the end of 2011, Insurance Council of Australia reported that insurers had received nearly 190,000 claims with a total reserved value of $4.352 billion in relation to 2011 events.

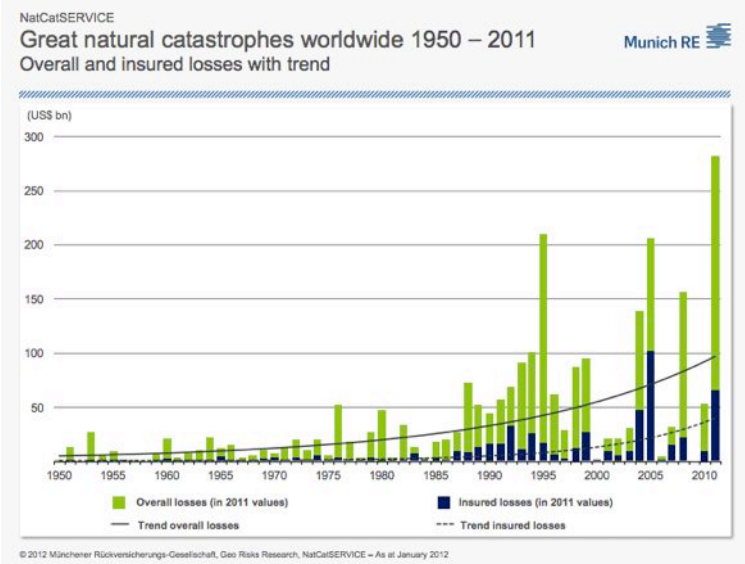
Events of 2013 will add significantly to this cost – not to mention to wider social, economic and health costs experienced by growing numbers of impacted Australians.

Catastrophe	Number of claims lodged	Total reserved value of claims
Queensland floods	58,463	$2.4 billion
Cyclone Yasi	72,203	$1.33 billion
Perth bushfires	410	$35 million
Victorian floods	7,952	$122 million
Victorian severe storms	49,396	$412 million
Margaret River bushfires	392	$52.3 million
TOTAL	**188,816**	**$4.35 billion**

Queensland Premier Newman recently said, "It has been an extremely damaging event and I can tell you today that early estimates put the damage bill at at least $2.4 billion. Sadly I think that figure will rise." The 2011 flood was widely regarded as the most devastating in Queensland history, but Mr Newman said the current crisis could be even worse, albeit with less loss of life. "When you see what has happened in Bundaberg you will be blown away and I am sure all Queenslanders will be blown away."

Recent extreme weather events in Australia fall into a broader international cost pattern that reflects population growth and the replacement value of more expensive urbanization and infrastructure patterns over recent decades.

According to Munich Re, the international pattern for overall and insured losses over the past 60 years reveals growing insured losses, and even more worrying for nations managing tight fiscal environments, a growing gap between overall losses and insured losses.



Reasons for this range from our higher standards of living, increased density of settlements in exposed regions as populations grow, the exposure that our modern technological societies introduce compared to how we lived decades ago, and, notably, the change in environmental conditions presented by climate change.

Here we pause for reflection.

Within the context of 1) tight government and household budgets, 2) competitive pressures on businesses responding to a high Australian dollar and multi-speed economy, and 3) what appears to be a very strong likelihood of mounting future uninsured natural disaster costs especially in highly vulnerable hazard exposed locations – Australia finds itself largely unprepared to fund the significant costs of building an adaptive society that mitigates natural disaster risks to a standard we have become accustomed to as a modern society.

Indeed, we have not yet even calculated these costs, though they will compete (whether from our families, businesses or taxes) for funding with the national disability scheme, a revitalized education system through the Gonski review, maternity leave, and health care costs associated with an aging population.

Given the amounts of money we have spent on disaster recovery and are likely to spend over coming years, it is worth asking why durability is not the centrepiece of Australian disaster recovery. Why do we continue to rebuild infrastructure and homes to the same standard as previously existing, if we understand the growing risk of event recurrence? Given our tight budgets that could be leveraged for multiple benefits – it is also worth asking why sustainability is not an integrated aspect of each disaster recovery, especially since we have the opportunity to mitigate future drivers of climate change by shifting our energy mix each time as we recover.

Australians are famously generous in the aftermath of natural disasters. However our recoveries are more generous in their humanitarian gestures than they are intelligent in physical design and construction.

Why build back the same?

Australia rebuilds from disasters with hindsight, not foresight.

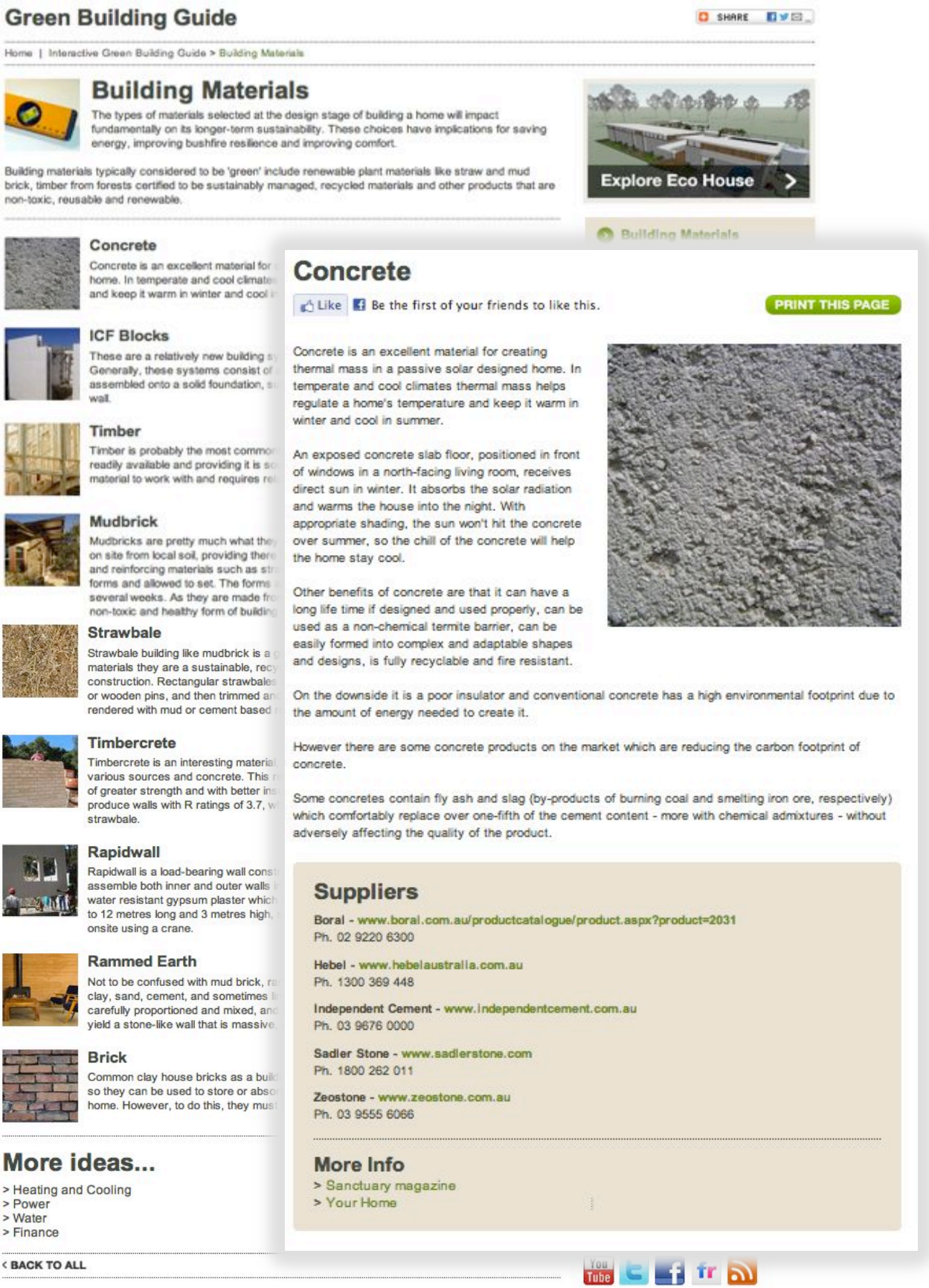
Since Black Saturday, Green Cross Australia has been nurturing the "Build it Back Green" initiative which draws on the successful overseas 2007 tornado recovery in Greensburg Kansas and work underway in New Orleans led by our US affiliate in the Hurricane Katrina recovery.

Our philosophy is to embrace the most hazard resilient building materials, design and practices in order to mitigate future impacts from similar extreme weather events, while introducing sustainability measures that enhance the well being of residents and workers while also delivering lower future energy, water and waste bills, further enhancing our well being and capacity to adapt to weather variability and major events.

In 2010, Sustainability Victoria funded the Build it Back Green portal to support 2,000 families impacted by Black Saturday to rebuild their homes using online resources that make it easy to achieve the above benefits while complying with Bushfire Attack Level and other building codes.

The BIBG portal includes an interactive Green Building Guide that features over 70 product and service categories and lists more than 600 suppliers ranging from highly insulating bushfire resilient windows with novel glazing to novel prefabricated panels, cement and composite materials.

For example, we include nine types of materials in the guide, and for each material type we offer additional information supported by a listing or reputable suppliers. Green Cross Australia has partnered with Alternative Technology Association to develop this guide, which currently features products and services available to Victorians from local and national suppliers.



The BIBG website has won a major international award and is used extensively by bushfire affected Australians.

Since it's launch in September 2010 the site has been visited 67,025 times by 54,434 visitors who have accessed 162,293 pages of practical content, as well as case studies of families living in Kinglake Ranges and Flowerdale who have rebuilt to high eco-resilient standards.

Quietly, Green Cross Australia has been developing a marketplace for bushfire resilient products and services while also supporting suppliers of environmental solutions able to enhance well-being and sustainability outcomes.

> As the US disaster-management agency, FEMA, put it on Earth Day 2011: 'The growing emphasis on creating sustainable communities, whether through innovative green building practices or reducing the materials and energy footprints, creates opportunities to build safer and greener, both before and after disasters. By building green and taking steps to protect your property at the same time, you not only help protect the environment but also protect your property against the forces of nature.'[1]

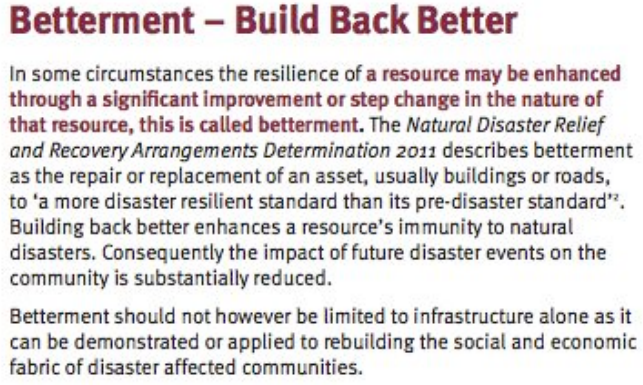
Cost/speed trumps innovation in recovery

After 2011 Queensland events, Green Cross Australia endeavored to catalyse a similar Build it Back Green response. We hosted a stakeholder workshop at Parliament House in Brisbane with over 100 participants and enthusiastic support from our many BIBG partners including Property Council of Australia, Green Building Council of Australia, Australian Green Infrastructure Council, CSIRO and others. Appendix 1 includes the report from this workshop, which directly addresses the benefits of "betterment" as well as integrating sustainability with durability to rebuild with foresight.

At the heart of contributions to this workshop from Australian Green Infrastructure Council (via GHD) and Green Building Council of Australia's extensive contributions to this was the fairly straightforward point that if we calculate the future financial benefits of resilience and sustainability in the context of likely similar events and ongoing maintenance costs, rebuilding stronger green infrastructure and buildings makes excellent economic sense. These industry associations and their members present also made the point that environmental costs of rebuilding-like for like were also higher in the context of longer-term ecosystem resilience and biodiversity outcomes.

Unfortunately in the end, (short term) "value for money" was the dominant theme in the Queensland recovery. Queensland Reconstruction Authority (QRA) has strongly encouraged the principles of resilience in its outreach programs, including the importance of strengthening partnerships between communities, the not-for-profit sector, industry, the private sector and tiers of government.

In its materials copied to the right, QRA addresses the opportunity to invest in "betterment" in existing Natural Disaster Relief and Recovery Arrangements which enable replacing roads and buildings to "a more disaster resilient standard than its pre-disaster standard". The idea is good because additional funding is necessary to reach higher



Betterment – Build Back Better

In some circumstances the resilience of a resource may be enhanced through a significant improvement or step change in the nature of that resource, this is called betterment. The *Natural Disaster Relief and Recovery Arrangements Determination 2011* describes betterment as the repair or replacement of an asset, usually buildings or roads, to 'a more disaster resilient standard than its pre-disaster standard'[2]. Building back better enhances a resource's immunity to natural disasters. Consequently the impact of future disaster events on the community is substantially reduced.

Betterment should not however be limited to infrastructure alone as it can be demonstrated or applied to rebuilding the social and economic fabric of disaster affected communities.

standards. In practice betterment is rarely applied in Australian disaster recovery.

Indeed the current Queensland government laments that higher standards were not applied in the 2011 recovery, because infrastructure recently rebuilt has been wiped out yet again.

> ABC News, 30 January 2013
>
> Queensland's Deputy Premier Jeff Seeney has questioned building standards after newly repaired infrastructure was again washed away. Expensive repairs to some roads and bridges damaged in 2011 had only just been finished when they were washed away by ex-cyclone Oswald.
>
> That prompted Mr Seeney to declare the infrastructure must be rebuilt more strongly.
>
> "To see a new bridge that was completed just before Christmas destroyed a couple of months later raises questions about the engineering standards, the design standards that we're using, and we have to address that," he said.

The tension between capping short term recovery costs and building back quickly (in response to media coverage and short term politics) versus rebuilding stronger communities embracing innovate, sustainable design is discussed in an essay written by Green Cross Australia CEO Mara Bun for the January 2012 edition of Griffith Review. This essay as included as Appendix 2 to this submission.

Deliberative democracy: power to the people

The essay discusses how severe weather recoveries can become politicized with media pressure influencing short-term decisions that have significant long-term costs. It also raises the question of whether community based, informed in-depth deliberation about future climatic scenarios and available approaches to rebuilding with foresight can guide recoveries that are more adaptive and resilient by nature.

Green Cross Australia has worked with New Democracy Foundation, University of Western Sydney (around which Australia's leading deliberative democracy academic research is clustered), and the Victoria Department of Sustainability and Environment to explore models for post-disaster deliberation that can facilitate "betterment" of infrastructure through recovery as well as enhancing new models of economic and community development. More information about that work is

CASE STUDY: An inspiring example of integrated planning comes from Greensburg in the United States

On 4 May 2007 an EF5 rated tornado - equivalent to a category 5 cyclone - tore through Greensburg, Kansas USA, leveling 95 per cent of the town and killing eleven of its fourteen hundred residents. What happened next was unexpected. Greensburg decided to rebuild itself green.

Soon after the storm hit, Public Square Communities, a Kansas-based organisation that helps towns build social capital through 'positive conversations' about the future, quietly assisted in a process that pulled together the town's disparate groups to map a vision for recovery. A dream emerged: to become America's most sustainable and tornado-resilient town, deploying the most advanced clean technologies and encouraging like-minded people to join the effort. Greensburg established a Sustainable Development Resource Office, to develop sustainable building programs and certification processes that ensured public facilities were of the highest standard, powered by renewable energy, with household energy alternatives devised to ensure affordability in an area that has bitter winters and hot summers.

Four years on, many homes are emerging that meet the coveted highest green international building standard, LEED Platinum. Greensburg now has the Midwest's most environmentally high-performing hospital and city hall, water-efficient streetscapes and a geothermal-powered urban centre. Every LEED Platinum-certified project in Kansas is located in Greensburg[1]. John Deere Renewable Energy built and maintains the town's wind farm, with funding from the US Department of Agriculture and Rural Development. The wind farm supplies all the town's power needs and sells the substantial excess back to the grid[1]. A review found that 'the rebuilding effort did not focus on the environmental benefits of green buildings, but rather on the goals of creating a more resilient, more efficient community[1].'Resilience - of property, commerce and community - is at the heart of Greensburg's recovery.

available here: http://www.greencrossaustralia.org/our-work/deliberative-democracy/democracy-after-disasters.aspx

We are exploring opportunities for the Build it Back Green initiative to support the Tasmanian bushfire recovery, though it is too early to build a dialogue about recent Queensland events.

Green Cross Australia is exploring opportunities to partner with Insurers and their rebuilding supply chains to see whether we can introduce top ten value-for-money bushfire resilience measures as part of the claims handling process. While it is early days for this work it sheds light on opportunities ahead as we build our nation's adaptive capacity.

We are working with Arup's bushfire technical experts to develop a list of the top ten value for money bushfire resilient measures that can be incorporated into a bushfire residential rebuild. We are in dialogue with BlueScope Steel who are eager to contribute to our technical capacity given many of their products address integrated durability/sustainability features. For example, stronger, more insulated roofs able to withstand greater wind speeds can also be painted white for greater reflectivity to reduce severe heat impacts.

The approach we support through Build it Back Green is a powerful theme in the Hurricane Sandy recovery, influenced by Mayor Bloomberg's clear understanding of climate change trends and the excellent disaster resilience leadership of Rockefeller Foundation.

As Mara Bun's Griffith Review article concludes, "In January 2010 the US Institute for Sustainable Development convened an expert group funded by the Rockefeller Institute, in co-operation with the US Department of Housing and Urban Development and the Department of Homeland Security."

"The group found that 'after a disaster, the focus of the federal government is on immediate response and rebuilding, not on assisting communities with sustainable long-term recovery... The emphasis on the speed, rather than quality, of recovery impedes the ability to integrate hazard-mitigation measures into rebuilding processes. Solutions proposed mirror the thrust of this reflection, to institutionalise processes that build community support around a common vision, allow communities to capitalise on opportunities that disasters present to rebuild better and minimise the impact of future disasters, and integrate climate adaptation and mitigation to ensure that new renewable energy systems can withstand climate change."

Recommendation 6: Build it Back Green style initiatives should be incorporated as a standard aspect of Australia's recovery from major events, including broadening of tools to address cyclone, flood, severe storm and storm surge rebuilding practices and products and services. Exemplar infrastructure and commercial/government buildings should also take the "betterment" approach of rebuilding to a higher standard so we can cultivate valuable intellectual property that can be commercialised and exported in the future. Households rebuilding from natural disasters should be supported by targeted rebates and subsidies for green products and services (solar PV, heat pump, water tanks etc) to improve their longer term wellbeing and reduce operating costs.

Recommendation 7: Communities impacted by natural disasters should be supported by in-depth deliberative consultation processes where future scenarios are evaluated, imaginative better models of recovery are explored, and local values are embedded in recovery priorities including community infrastructure. This can take time (nine weeks in the inspiring case of Greensburg Kansas which now enjoys a dynamic and job creating tornado recovery) and does not need to involve the media, politicians or advocacy groups – rather it is an opportunity for the community itself to deliberate informed by Australia's best experts as needed. CSIRO' Science in Society Group would be well placed to support such deliberation.

(iii) the availability and affordability of private insurance, impacts on availability and affordability under different global warming scenarios, and regional social and economic impacts;

In a recent interview on the ABC's Inside Business program, Suncorp Personal Insurance CEO Michael Milliner stated that insurance claims increased across Australia on average by around 10 to 15% since 2011 events. Mr. Milliner went on to say that 7% of Australians lived in highly flood-exposed areas, and that the increase had mostly impacted those areas.

Recognising the uninsurable

Green Cross Australia does not advocate a view in relation to whether or how current insurance models might evolve to address affordability for that portion of our community which is highly exposed to flood, storm surge, severe winds or bushfire.

We make the obvious observation that it will become increasingly expensive to maintain properties and infrastructure (public and private) in such areas. To the extent that information about exposure to recurring significant hazards exists, it should be made available to all market players including ordinary property-owning Australians.

We also observe that there are some areas in Australia where we need to plan for managing significant loss and possible longer-term dislocation or significant investments in mitigation given their size and exposure.

Munich Re identifies such an example in its overview of Gold Coast and Sunshine Coast risks in Queensland.

Munich Re characterizes South East Queensland as an example of an "extremely exposed region" given population density and rapid population growth (over 500,000 new residents have moved to the Gold and Sunshine coasts between 1961 and 2006).

Munich Re suggests South East Queensland is Australia's highest exposed values concerning tropical cyclones and represents our nation's highest loss potential.

South East Queensland is exposed

If you search for "Surfers Paradise" on the Harden Up "Be Aware" section you will find a 150 year history of major events that have impacted on the Gold Coast including severe thunderstorms, floods and cyclones.

Cyclones sometimes veer just off the coast of SEQ, with potential for severe winds, storm surge and major beach erosion. In 1967, a series of three cyclones veered off the Gold Coast resulting in significant devastation: Cyclones Glenda, Barbara and Dinah. A major East Coast Low deepened the impact. According to retired Senior Forecaster Jeff Callaghan's archive of Cyclone Dinah for example, "Dinah 24- 31 January 1967 probably generated the largest waves observed in Southern Queensland and Northern NSW over the last century."

"Storm surge also affected the Gold Coast and water lapped the decking of the Jubilee Bridge, which is about 1.5 metres above highest astronomical tide. A similar storm surge occurred on the Tweed River isolating Fingal with six houses awash. Large waves caused a section of the esplanade to collapse at Surfers Paradise and the unprecedented 1967 severe erosion on the Gold! Coast had begun." According to Jeff Callaghan, who at the time was a young surf life saving volunteer at the Kirra Surf Life Saving Club.

Cyclone Dinah was estimated to cost $250 million including South East and Northeast Queensland, damaging or destroying over 500 homes seriously (and another 2,500 moderately) and costing 20 lives. At the time there were just 42,000 residents living on the Gold Coast.

Planning for a big Gold Coast event

Griffith University's Professor Roger Tomlinson has been studying Gold Coast coastal weather patterns for two decades. He is concerned that records reveal major recurring events like those of 1967 every twenty or thirty years – but we have not experienced one since the late 1960s.

In a video interview for Green Cross Australia, Roger Tomlinson describes the scenario where a major offshore event tracks into the shallow water environment of Moreton Bay and surges back out to sea over the Gold Coast Broadwater, through major residential developments and infrastructure. He assesses the storm surge potential to be as high as four to five metres.

In order to raise awareness of this risk and to engage stakeholders in a scenario that is more probably than not in the not too distant future, Green Cross Australia and Property Council of Australia hosted a "Cyclone Hypothetical" in Parliament House, Canberra in 2010, moderated by ABC Radio National's Fran Kelly. Together with then Climate Change Minister Penny Wong and Shadow Cities Minister Bruce Billson, we discussed the scenario likely to unfold with CEO and Director level leaders of Lend Lease, CSIRO, Swiss Re and Lonergan Edwards.

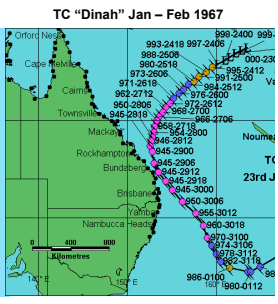
Hypothetical outcomes are captured in an "open letter" we wrote to then Premier Anna Blight, Brisbane Lord Mayor Campbell Newman, and Gold Coast Mayor Ron Clarke. See Appendix 6.

To the extent that there is one region that might be prioritised in relation to how this Committee might investigate innovative insurance models, disaster preparedness programs and investments in mitigation, Green Cross Australia suggests it should be the Gold Coast.

Economic impact if Queensland cyclones move further south

- **If TC Dinah (1967, Cat 3) took place today, but only 100-150km further south, it would affect Brisbane, Gold Coast & Sunshine Coast.**
- **Munich Re estimated that potential insured losses would be US$8-14 billion (2006)**

(Source: Munich Re, Topics Geo Natural Catastrophes 2006)



Visualising impacts with new technologies

Given the tremendous awareness and interest in SEQ severe weather risks within the insurance community, local government, service providers and researchers, Green Cross Australia remains concerned about low levels of awareness of big event risks among ordinary Gold and Sunshine Coast residents beyond "old timers" who have experienced such events in their lifetimes.

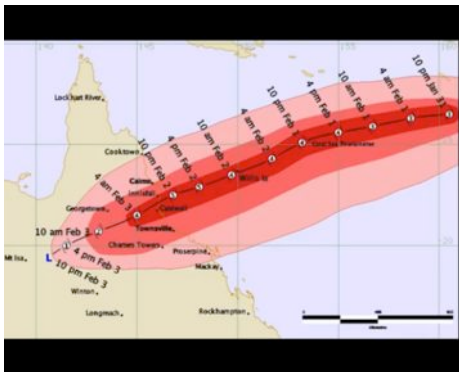
Like rapidly growing population centres further North in Queensland such as Cairns and Townsville, significant new migrants to Queensland do not have a real life understanding of the impacts of a major cyclone event despite Yasi and Larry memories – which resonate mostly for people directly impacted by these events.

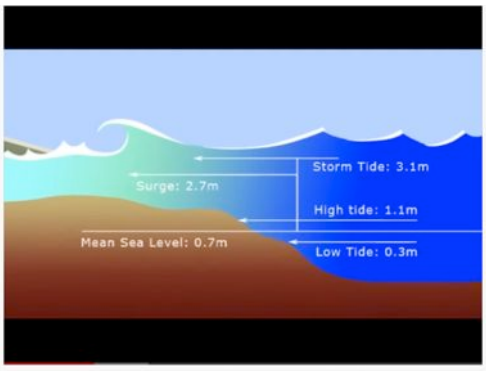
To demonstrate how a storm surge might affect a coastal city like Townsville, CSIRO researchers worked with Green Cross Australia and Townsville City Council to create a model that shows how quickly water can move and how soon it reaches low lying homes and businesses.

The technical details supporting the fluid dynamic mathematical model created for this awareness raising feature of Harden Up are available here.

The animation includes practical preparation tips from Greg Goebel (former head of Red Cross Queensland), Dr David Henderson (Director of the James Cook University Cyclone Testing Unit), Jelenko Dragisic (CEO of Volunteering Queensland), Jeff Callaghan (retired BoM weather forecaster) and Mara Bun (CEO of Green Cross Australia).

You can watch the animation which has been viewed more than 2,000 times. We believe similar rigorously defined animations (not simple "bathtub" water splashing models" should be developed to support the awareness and preparedness of communities living in tropical cyclone exposed, densely populated areas of Australia.





***Recommendation 8*:** Green Cross Australia recommends investment rigorously researched models of potential cyclone inundation impacts in populated coastal centres around our cyclone-exposed areas. Actual historical events can be modeled against the background of existing developed communities for a valuable wake-up call to residents and local businesses.

Art softens human health costs

In an essay for Volunteering Queensland's October 2012 "Innovate" research bulletin, Green Cross Australia Director Bruce Esplin (retired Victorian Emergency Services Commissioner and Deputy Chairman of Regional Arts Victoria) offered the following insights in relation to art and disaster resilience:

> "I have a collection of DVD's, CD's and books of photos, poetry, songs and stories given to me by individuals and communities I have worked with. I have been invited to open sculptures commissioned by communities, listened to choirs and steel-pan bands, watched plays and read books written by survivors of nature's fury. I have seen children participate in circus training and watched with amazement as other school children were safely taken into the burnt bush on a repeated basis over time and encouraged to sketch what they saw. I witnessed their sketches evolving from totally black and grey, to the inclusion of patches of the vibrant reds and greens of the first regrowth, to more and more green and finally the addition of drawings of the slowly returning wildlife.
>
> I have watched silently as adults in the twilight of their lives are encouraged to paint, or sew, or knit, or sing, or dance or write or record their experiences digitally - their initial hesitation and reluctance turning to enthusiasm - even to joy.
>
> More importantly, I have watched and listened as they start talking, start sharing what they have been through - a critical element of recovery.
>
> I have watched the young and the not so young - slowly, even reluctantly, finish their chosen artistic activity and return to the huge task of grieving, of rebuilding their lives, and ultimately, of recovering. They go to this task in a better mindset. I would argue - and there is some psychological theory to support this - they take that creativity with them and are more able to cope with what lies ahead, and what can certainly be daunting to even the most resilient of individuals.
>
> I believe art plays a critical, but perhaps undervalued role in this process. However, it is not a spectator activity - it is the participation, the involvement in the creative process that makes the difference.
>
> Art works for both the community and the individual dealing with trauma. By its very nature art is investigative and thoughtful, it can enable the individual to explore their emotions and tensions. The outcome of creating something or doing something, is satisfaction; A satisfaction that something now exists that wasn't there before.
>
> Art can play such a vital role in the recovery of individuals and of communities, and the building of community resilience, but it won't just happen. It needs to be better supported by all levels of Government and included as a formal part of disaster recovery arrangements."

Green Cross Australia has worked with Black Saturday affected communities since 2009 and we are persuaded of the importance of investing in community arts as a vehicle for individual and community resilience in the context for disaster preparedness and response.

Recommendation 9: Green Cross Australia recommends investment in community arts programs – especially programs involving youth - as part of our national disaster recovery arrangements and our disaster resilience program more broadly.

Social media and mental health: Research needed

In the aftermath of the Japanese Tsunami, Facebook founder Mark Zuckerberg visited Japan disaster zone and "told Japan's Prime Minister that the terrible Tsunami that had struck the country in 2011 had inspired him to find ways that the social network could help people after natural disasters."

Shaili Jain, MD services as a psychiatrist at California's Veteran Affairs Palo Also Health Care System. She is a researcher affiliated with the US National Centre for Posttraumatic Stress Disorder and a Clinical Instruction affiliated with the Department of Psychiatry and Behavioural Sciences and the Stanford University School of Medicine. Her medical essays have appeared in the New England Journal of Medicine and the Journal of the American Medical Association.

In a compelling blog about the link between social media and mental health consequences of disasters, Shaili Jain asks this raises the key question: Can social media bolster the social networks of post-disaster survivors and, in turn, prevent the negative mental health consequences of exposure to disaster?

She comments,"Social Media (e.g. blogs, chat rooms, discussion forums, YouTube Channels, LinkedIn, Facebook and Twitter) have, in recent years, played an increasing role in disaster management. They have been used as ways to disseminate crucial information (social media sites rank as the fourth most popular source to access emergency information) and also, more actively, as emergency management tools e.g. using social media to receive victim requests for assistance or monitoring user activities to establish situational awareness."

Of the many important insights of this blog, Green Cross Australia takes particular interest in this point: "Information and communication technology researchers have identified a new online practice around disaster response—virtual memorials being created by "image aggregators" when new Flickr groups are created immediately after a disaster."

We believe Australia's deep research capacity in social media should be funded to explore whether and how social media can help improve mental health outcomes after disasters.

Recommendation 10: Green Cross Australia recommends investment research about how social media can be used to improve post-disaster mental health. A particular focus on strategies to address access to social media for vulnerable, disadvantaged disaster survivors is needed, mindful to broadband access challenges for regional communities who are affected in this way.

Terms of Reference (c) an assessment of the preparedness of key sectors for extreme weather events, including major infrastructure (electricity, water, transport, telecommunications), health, construction and property, and agriculture and forestry;

Green Cross Australia plays a "catalysing and convening" role in developing our disaster resilience initiatives. In this section we offer examples of how we are working to address gaps in preparedness, especially around how stakeholders can together address local hazards, and how industry sectors can come together to envision innovation that anticipates more intensive if not more frequent severe weather events as well as the gradual projected impacts of climate change.

Example 1: City of Melbourne Adaptation Network

In early 2012, Green Cross Australia worked with City of Melbourne to undertake a stakeholder engagement process in order to inform options for maximising impact of a newly established reference group: the Melbourne Adaptation Reference Network (MARN).

City of Melbourne has identified the municipality's key climate change risks in the June 2009 Climate Change Adaptation Strategy. This document identifies four potential extreme event scenarios for Melbourne that together embody the range of climate change risks for the municipality. These are:

- Reduced rainfall and drought
- Extreme heatwave and bushfire – including heat island effect
- Intense rainfall and wind storm – including flooding risks
- Sea level rise – including inundation risks

The Climate Change Adaptation Strategy is framed within a risk management approach that aims to reduce the likelihood or consequence of the risks identified and to increase control over these risks.

However, City of Melbourne recognised that it has limited direct control over key risks identified. A range of government, business and community stakeholders together play vital and sometimes interlinking roles when major extreme event scenarios unfold. Hence, in addition to active management where possible, City of Melbourne established MARN with the following aims:

1. Join up inner Melbourne conversations around preparing for the risks identified, so that key stakeholders are able to understand risks as a group and can better address and align their individual responses; and

2. Develop a basis for aligning internal and especially external communications leading into major events to minimise public confusion and maximise risk management.

GCA and City of Melbourne have consulted with eighteen government, business and community organisations to ensure that their feedback is reflected in GCA's recommendations about proposed MARN operations. In addition to scoping Melbourne stakeholder feedback, we have reached out to Adelaide and Sydney based organisations involved in similar networks to ensure their insights were captured.

Stakeholder consultation revealed an overlapping interest in key dimensions of each of the hazards identified by City of Melbourne. These overlapping stakeholder interests are shown on the following page.

Melbourne Adaptation Reference Network

Stakeholder scan

Participants		Topic alignment								
	Public health	Transport logistics	Heat impacts	Infrastr ucture	Inundation Impacts	Supply Chain Mgt	Community Outreach	Climate Science	Disaster Resilience	Urban Planning
1. AIG		✓	✓	✓	✓	✓		✓	✓	
2. Clean Energy Council				✓		✓		✓	✓	
3. Property Council of Australia			✓	✓	✓	✓	✓	✓	✓	✓
4. City West Water	✓		✓	✓	✓		✓	✓	✓	
5. Melbourne Water	✓		✓	✓	✓		✓	✓	✓	
6. South East Water	✓		✓	✓	✓		✓	✓	✓	
7. VIC Transport		✓	✓	✓	✓	✓			✓	
8. VIC Health	✓	✓	✓	✓	✓		✓	✓	✓	
9. VIC Sustainability & Env.	✓		✓	✓	✓		✓	✓	✓	✓
10. VIC Planning & Comm. Dev.	✓	✓	✓	✓	✓		✓		✓	
11. VIC Human Services	✓	✓	✓	✓	✓		✓		✓	
12. Sustainability Victoria			✓	✓	✓		✓	✓		✓
13. Places Victoria		✓	✓	✓	✓		✓	✓	✓	✓
14. Port of Melbourne				✓	✓	✓	✓	✓	✓	
15. Red Cross	✓		✓				✓	✓	✓	
16. SES	✓	✓	✓	✓	✓	✓	✓	✓	✓	
17. VCCAR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
18. Telstra			✓	✓	✓	✓	✓	✓	✓	✓
19. VCCI		✓	✓	✓	✓	✓		✓	✓	✓
20. Commissioner for Environ. & Sustainability			✓	✓	✓		✓	✓	✓	✓
21. CitiPower		✓	✓	✓	✓	✓	✓	✓	✓	
22. CSIRO Climate Change Adaptation Flagship	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

MARN has now held two meetings with over twenty engaged participants, including briefings through CSIRO, Monash University, University of Melbourne, SES and others. Feedback from the first two sessions has been positive and the program continues to unfold.

See Appendix 4 for an overview of MARN.

***Recommendation 11*:** Green Cross Australia recommends that similar adaptation networks able to catalyse dialogue about shared risk management of severe weather hazards be established in targeted regions of Australia. We need to exchange business cards before major events occur and align insights and communications programs in advance of events in order to facilitate joined-up, effective responses.

Example 2: Green Cross Australia CIBSE (Chartered Institution of Building Services Engineers) Tour

Over coming months, Green Cross Australia's Head of Development Jeremy Mansfield (a corporate volunteer with a day job as Sustainability Leader for Lend Lease in Queensland and NT) will be leading a national tour with CIBSE to raise awareness of the need for the property sector to build with foresight, in light of severe weather trends. This work is being undertaken in

light of low levels of awareness and preparedness for natural disasters within our built environment sector.

Traditionally, building codes have only regulated for life-safety issues. Every building is designed for a specific range of considerations such as peak temperatures, storm surges, precipitation, earthquake and hurricanes. However, recent events throughout Australia and New Zealand have demonstrated that these conditions can be easily undermined and that future unpredicted weather events and challenges to our infrastructure have the potential to further undermine these assumptions and increase risks to people and property.

The capability of our current buildings to withstand the challenges of the next four or five decades rests heavily with our current dependency on compliance with codes and practices. These codes and practices are based on the learning's of hindsight, which falls well short of considering building preparedness for emergencies, business continuity and environmental challenges into the future.

Building codes in Australia have a history dating back to Federation. The foundation of the codes is drawn from over 100 years of historic climate experience and data. The codes tend to look back to the past to tell us how to build for the future. The ABCB has traditionally relied on historical climate and weather data in setting standards. However, more recently the ABCB has sought to utilise scientifically based climate change projections in its review of wind standards for construction in cyclone-affected areas. But it has not yet led to any changes being made to codes to take into account climate change impacts.

"We need to challenge our current premise that a minimum standard is good enough, as it has worked in the past and is what the 'market' desires. The increasing need to cope with adversity in our climate will make redundant those design decisions based on hindsight," according to Jeremy Mansfield.

2013 Chartered Institution of Building Services Engineers (CIBSE) seminar series
2013 Chartered Institution of Building Services Engineers (CIBSE) seminar series will open engaged discussion on measures that can be taken to gain meaningful levels of resilience in existing and new building stock and infrastructure and will consider key issues such as:

- Location and access of key building services
- Adequacy of redundancy and future availability and reliability of infrastructure
- Insurers' attitudes to risk, building resilience and future claims
- Issues uncovered in diligence surveys of buildings that lead to building failure
- Risk associated with not informing stakeholders of known building resilience weaknesses.

As part of the series Jeremy Mansfield will lead a series of property sector half-day seminars across Australia and New Zealand in March and April. Supported by experts from the insurance and building services industries, the team will discuss a range of issues that now present real challenges to the industry's ability to deal with climate related events and why business as usual approaches are no longer acceptable.

Seminar schedule:
Brisbane – 12 March; Sydney – 13 March; Melbourne – 14 March; Perth – 26 March; Adelaide – 27 March; Wellington – 17 April; Christchurch – 18 April.

Media contact: Call Monica Love of CIBSE +61 422 759 807; Mara Bun, CEO Green Cross Australia 0448 848 860; Jeremy Mansfield 0403 755 670.

Recent extreme events show that new buildings have been performing well in terms of preventing structural collapses but property and content losses could still be considerable. The broadening of the regulators mandate to include building durability (property protection) will however take time given overall impact on the building regulation framework and the role of private sector insurance, along with potential cost impacts to industry. For further information, see ABCB Submission to the Productivity Commission.

Given that 97% of our buildings are existing stock, how many organisations do a post-disaster audit, rather than just fixing up the obvious damage? We need to be addressing problems that can manifest again in the future.

Due to the non-retrospective nature of building regulation, the National Code of Construction (formally Building Code of Australia) is not applicable to existing buildings, which form the

majority of the building stock. Clearly a greater focus will also need to be placed on how existing buildings and infrastructure can be made more resilient to the affects of climate change. There will be particular challenges in retrofitting.

***Recommendation 12*:** Green Cross Australia recommends that industry development agencies within all levels of government facilitate dialogue within key sectors to enable common understanding of the adaptation challenges ahead (particularly for existing buildings), and to build the case for investment in mitigation given anticipated positive longer-term economic returns.

Example 3: Green Star Communities Resilience Guideline

The residential property sector is building its capacity to address climate change adaptation and severe weather resilience, though it is early days.

Through the Harden Up initiative Green Cross Australia partnered with the Green Building Council of Australia to introduce a new community resilience guideline that developers of master planned communities can use to assist new residents to understand and prepare for local severe weather risks. See more about this development here: http://hardenup.org/news-media/harden-up/it-takes-a-village-to-prepare.aspx.

Sometimes our newest communities are our most vulnerable, and because of pressure to release new land for development, they can be located in areas that are increasingly vulnerable to natural disasters.

Because we are not an advocacy group, Green Cross Australia does not take a policy position on whether or where particular developments should occur. Other stakeholders are addressing that issue. Rather we work with the property sector to support greater resilience in light of existing and planned new developments.

When master plan developments are constructed, new residents can come from all over Australia. However, they may not know or understand what the area's weather history is or how to prepare for it.

To help address this, Green Cross Australia is working with Manidis Roberts, the Urban Land Development Authority (now Economic Development Queensland), Stockland, Lend Lease and others to develop a guideline to assist developers to produce "Local Resilience Reports" for new masterplan/urban developments. The guidelines aim to ensure that developers equip residents in new developments with an awareness of natural hazards and work proactively to improve community education in order to better prepare for disaster events.

The project is initially targeted at new urban communities where residents' local knowledge of the area and its associated hazards is low. However, the guideline could be utilised by existing communities around Australia.

The guideline has been tested in four Queensland pilot case studies and is being finalized for use by Green Building Council of Australia members.

Green Building Council of Australia's new Green Star Communities – Pilot Rating Tool rating tool evaluates the environmental design and construction of entire communities, including elements such as community preparedness. Green Cross Australia's Community Resilience Checklist is listed as an option for developers to achieve credit within the Green Star Communities rating tool "Climate Adaptation and Resilience" credit.

***Recommendation 13*:** Green Cross Australia recommends that Green Star Community Resilience guidelines should be rolled out to all new masterplan developments to ensure communities are appropriately assisted to prepare for disaster events. We are working with Manidis Roberts and Green Building Council of Australia to build momentum in this area.

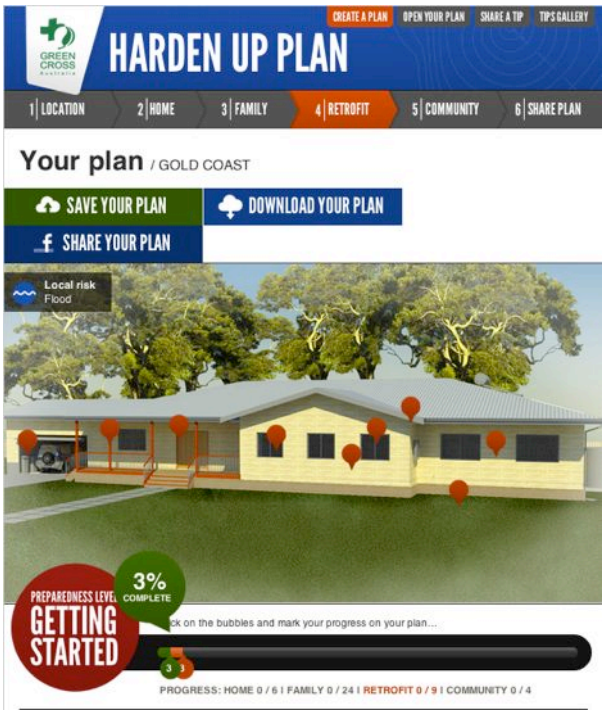
We also believe existing master planned communities and indeed any self-organised community – particularly those located in areas which are vulnerable to flood, storm surge, severe storms and bushfire – would benefit from applying these guidelines with support from all levels of government and local disaster management agencies. Government support for this work is recommended.

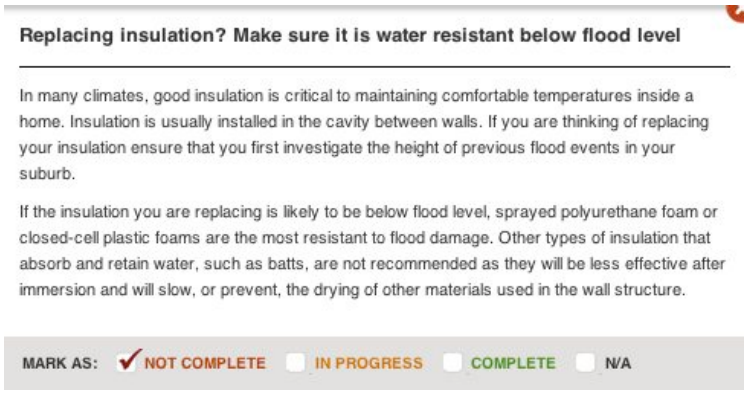
Example 4: Building Resilience Rating Tool

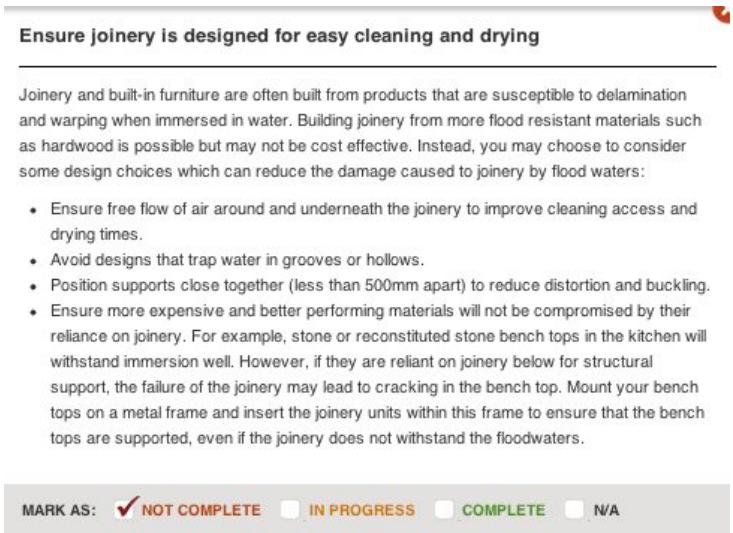
As part of the Harden Up initiative, Green Cross Australia has worked with Insurance Council of Australia and Edge Environment to develop a robust set of retrofitting recommendations to Queensland residents wishing to harden their properties to relevant local hazards.

Users can access nine practical retrofitting ideas if they are flood exposed – and can implement these ideas while rebuilding as well.

Two examples are offered here.







This advice is small component of a new tool being developed by Edge Environment and multiple partners as part of the Insurance Council's Australian Resilience Taskforce. Over time the tool will enable users to rate the property resilience of their home. Hopefully this will enable insurers to reduce premiums for families who mitigate their risks – Green Cross Australia supports this important effort.

Terms of Reference (d) an assessment of the preparedness and the adequacy of resources in the emergency services sector to prevent and respond to extreme weather events;

The capacity that Australia builds in its early 21st century emergency response system will define our longer-term ability to actively cope with greater intensity and frequency of events.

Green Cross Australia believes that as a community we must make increasing investments in the following interrelated areas:

- **Official agency capacity**
  human, technical, infrastructure and public communications campaigns
- **Emergency volunteering capacity**
  particularly recruitment of young volunteers and mentoring and leadership programs to cultivate their ongoing participation
- **Self-reliance initiatives – especially community led**
  programs that empower the community to foster greater civic participation and the ability to self-organise in the event of an event, as well as programs that encourage peer-to-peer sharing of preparedness stories and advice drawn from official sources and the community itself

In particular, we wish to comment on the importance of investing in open data programs and tools that enable social media participation before, during and after extreme weather events occur.

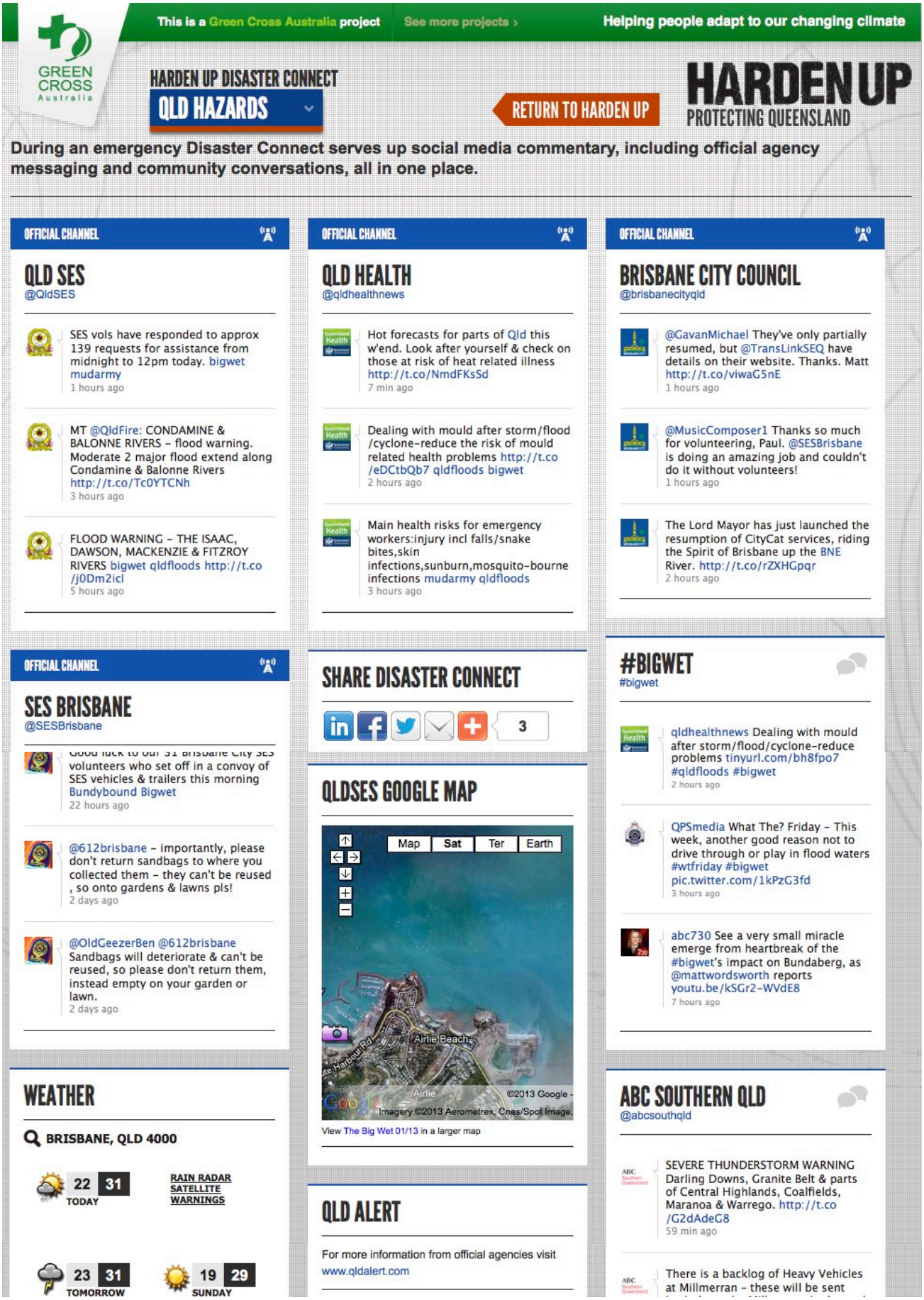
As an example of one of multiple innovative digital commons initiatives recently funded under the Natural Disaster Resilience Program's Harden Up grant, Green Cross Australia recently launched 'Disaster Connect', This platform enables the public to follow multiple official agency website updates, Facebook and Twitter comments in real time, alongside social media conversations that are community led and large event Twitter hashtags.

Disaster Connect is a "one stop shop" for following an event through the lens of social media, and enables users to quickly cut to official sources of important information including the ABC, BoM, Police, SES and transport and power authorities. A screenshot of Disaster Connect is provided on the following page is offered to support the recommendation below.

As this tweet from the Australian Emergency Management Knowledge Hub indicates, these kinds of community initiatives do not compete with or replace vital agency information exchange. They simple open the "information commons" when disasters occur.

Bruce Esplin states in his Volunteering Queensland essay (attached as Appendix 3, *resilient communities are informed.* "They know where to find information - they are assisted in learning how to use that information when they receive it before a crisis situation occurs - and finally, they expect and are given timely, accurate, relevant and honest information when they require it - including before during and after emergencies - by government and its agencies."

***Recommendation 14*:** Green Cross Australia recommends funding be provided to cultivate innovative social media communications channels that can empower the community to prepare for and follow events during major weather events. Continued funding of official agency social media programs is also strongly supported.


This is a Green Cross Australia project
See more projects ›
Helping people adapt to our changing climate
GREEN CROSS Australia
HARDEN UP DISASTER CONNECT
QLD HAZARDS
RETURN TO HARDEN UP
HARDEN UP
PROTECTING QUEENSLAND
During an emergency Disaster Connect serves up social media commentary, including official agency messaging and community conversations, all in one place.
OFFICIAL CHANNEL
QLD SES
@QldSES
SES vols have responded to approx 139 requests for assistance from midnight to 12pm today. bigwet mudarmy
1 hours ago
MT @QldFire: CONDAMINE & BALONNE RIVERS – flood warning. Moderate 2 major flood extend along Condamine & Balonne Rivers http://t.co/Tc0YTCNh
3 hours ago
FLOOD WARNING – THE ISAAC, DAWSON, MACKENZIE & FITZROY RIVERS bigwet qldfloods http://t.co/j0Dm2icl
5 hours ago
OFFICIAL CHANNEL
QLD HEALTH
@qldhealthnews
Hot forecasts for parts of Qld this w'end. Look after yourself & check on those at risk of heat related illness http://t.co/NmdFKsSd
7 min ago
Dealing with mould after storm/flood /cyclone-reduce the risk of mould related health problems http://t.co/eDCtbQb7 qldfloods bigwet
2 hours ago
Main health risks for emergency workers:injury incl falls/snake bites,skin infections,sunburn,mosquito-bourne infections mudarmy qldfloods
3 hours ago
OFFICIAL CHANNEL
BRISBANE CITY COUNCIL
@brisbanecityqld
@GavanMichael They've only partially resumed, but @TransLinkSEQ have details on their website. Thanks. Matt http://t.co/viwaG5nE
1 hours ago
@MusicComposer1 Thanks so much for volunteering, Paul. @SESBrisbane is doing an amazing job and couldn't do it without volunteers!
1 hours ago
The Lord Mayor has just launched the resumption of CityCat services, riding the Spirit of Brisbane up the BNE River. http://t.co/rZXHGpqr
2 hours ago
OFFICIAL CHANNEL
SES BRISBANE
@SESBrisbane
Good luck to our 31 Brisbane City SES volunteers who set off in a convoy of SES vehicles & trailers this morning Bundybound Bigwet
22 hours ago
@612brisbane – importantly, please don't return sandbags to where you collected them – they can't be reused , so onto gardens & lawns pls!
2 days ago
@OldGeezerBen @612brisbane Sandbags will deteriorate & can't be reused, so please don't return them, instead empty on your garden or lawn.
2 days ago
SHARE DISASTER CONNECT
3
#BIGWET
#bigwet
qldhealthnews Dealing with mould after storm/flood/cyclone-reduce problems tinyurl.com/bh8fpo7 #qldfloods #bigwet
2 hours ago
QPSmedia What The? Friday – This week, another good reason not to drive through or play in flood waters #wtfriday #bigwet pic.twitter.com/1kPzG3fd
3 hours ago
abc730 See a very small miracle emerge from heartbreak of the #bigwet's impact on Bundaberg, as @mattwordsworth reports youtu.be/kSGr2-WVdE8
7 hours ago
QLDSES GOOGLE MAP
Map
Sat
Ter
Earth
Airlie Beach
Airlie
©2013 Google -
Imagery ©2013 Aerometrex, Cnes/Spot Image
View The Big Wet 01/13 in a larger map
WEATHER
BRISBANE, QLD 4000
22 31
TODAY
RAIN RADAR
SATELLITE
WARNINGS
23 31
TOMORROW
19 29
SUNDAY
QLD ALERT
For more information from official agencies visit www.qldalert.com
ABC SOUTHERN QLD
@abcsouthqld
SEVERE THUNDERSTORM WARNING Darling Downs, Granite Belt & parts of Central Highlands, Coalfields, Maranoa & Warrego. http://t.co/G2dAdeG8
59 min ago
There is a backlog of Heavy Vehicles at Millmerran – these will be sent

Terms of Reference (e) the current roles and effectiveness of the division of responsibilities between different levels of government (federal, state and local) to manage extreme weather events;

As the terms of reference to this Inquiry suggest, climate change impacts reach across multiple government departments and all levels of government.

We will not address the much-discussed challenge of integrating roles and responsibilities across different levels of government, as we do not have expertise in this area.

We are encouraged by apparent consensus within COAG about the importance of nurturing natural disaster resilience across Australia, yet we remain concerned about gaps in natural disaster exposure across portfolios tasked with for example, regional development, skills shortages and infrastructure planning. Examples of areas that would benefit from a whole of government approach to managing extreme weather events include:

- Vulnerability of communities residing in areas of high extreme weather risk with constrained electricity and bandwidth supply
- Vulnerability of tradespeople during heat waves given pressure to conform to mining and property development timetables
- Lack of assessment of how our roads, railways and airports response to extreme heat and inundation conditions as we build new infrastructure and expand existing assets.
- Aging of our emergency response volunteer base
- Lack of disaster response training and continuity planning in child care and aged care sectors
- Lack of integrated dialogue across industry associations in anticipation of common challenges including supply chain and HR management issues

***Recommendation 15*:** Green Cross Australia recommends funding of cross-departmental dialogue involving business and community stakeholders to identify gaps and linkages across sectors exposed to major natural disaster risks.

(f) progress in developing effective national coordination of climate change response and risk management, including legislative any regulatory reform, standards and codes, taxation arrangements and economic instruments;

Green Cross Australia has not developed policy positions in relation to taxation of economic instruments associated with climate change coordination.

We offer the observation that climate adaptation remains an embryonic agenda in Australia, with initial funding provided to research impacts, and little left for practical solutions or development of community and business networks able to innovate and self-organise in response of evidence of growing risk exposure.

Responding to natural disasters is certain to become a more expensive recurring cost, yet it remains neither funded nor prioritized for action, partly because of the uncertain and variable nature of anticipated trends.

We support a national dialogue about how better to fund our preparation and response to this growing risk.

(g) any gaps in Australia's Climate Change Adaptation Framework and the steps required for effective national coordination of climate change response and risk management; and

In closing, we observe an important gap in Australia's adaptation framework.

While the Dutch rapidly commercialise technologies associated with sea level rise protection and the Americans commercialise disaster responses technologies cultivated through Florida's legendary evacuation planning, Australia does not seem to understand the enormous commercial potential for developing and exporting innovative local adaptation technologies, products and services.

Green Cross Australia is exploring the opportunity to create a new Climate Adaptation Industry Association supported by corporate partners from the property, building materials, clean technology insurance and banking sectors. We believe the research community would greatly benefit from linking into commercial networks involved with advancing adaptation innovation, and we believe there is an opportunity for creating a vibrant responsive adaptation industry in Australia. Ideally technologies that integrate adaptation with climate mitigation could be cultivated through this approach. Our capacity to convene multiple stakeholders is ideally suited for this approach.

Attachments to this submission

Appendix 1 - Queensland Build it Back Green Stakeholder workshop report:
http://www.greencrossaustralia.org/media/9891044/gca_bibgqld_stakeholder%20workshop_report.pdf

Appendix 2 - Essay in Griffith Review: 'The path to resilience: More haste, less speed":
http://www.greencrossaustralia.org/media/9899227/marabunthepathtoresilience.pdf

Appendix 3 - Bruce Esplin essay published in Volunteering Queensland's "Innovate Research Bulletin" edition 7:
http://www.volunteeringqld.org.au/web/documents/Innovate%20Research%20Bulletin%20-%20Edition%207.pdf

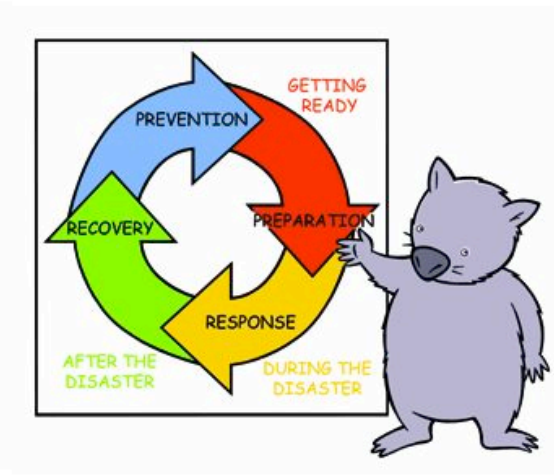
Appendix 4 – Inner Melbourne Climate Change Adaptation Network:
http://www.greencrossaustralia.org/media/9904830/city%20of%20melbourne%20climate%20adaptation%20reference%20network%20-%20summary%20overview.pdf

Appendix 5 – "Adapt or Survive – from hindsight to foresight", article in Property Council of Australia's newsletter The Fifth Estate foreshadowing the upcoming Green Cross Australia tour with CIBSE reaching out to the building services industry in Australia and New Zealand.
http://www.thefifthestate.com.au/archives/43610/

Appendix 6 – South East Queensland Cyclone Hypothetical Open Letter to Premier Bligh and Mayors Newman and Clark.
http://www.greencrossaustralia.org/media/9898027/open_letter_cyclone_hypothetical_final(1).pdf

More Juicy Stuff...

ADULT ALERT! WHAT THEY ARE DOING TO HELP.
When disasters occur EVERYONE pitches in - volunteers, firefighters, neighbours, leaders, builders, teachers. We plan for events so we know what to do if they happen. Plans are created to deal with prevention (stopping disasters), preparation (getting ready), response (during the disaster) and recovery (after the disaster).



PREVENTION
* Clearing leaf litter from drains
* Laws for total fire ban days
* Building flood levees
* Warning systems

PREPARATION
* Telling people and evacuation
* Protecting property and animals
* Arranging supplies

RESPONSE
* Arranging accommodation for people
* Arranging relief funds

RECOVERY
* Clean up
* Rebuilding
* Support for people affected

http://www.greenlanediary.com/our-environment/harden-up.aspx