



CENTRAL QUEENSLAND IN FLOOD – A SHORT HISTORY – 1918 TO 2014



Fitzroy Bridge, Rockhampton, 1918

Photographer: Unidentified **Location:** Rockhampton, Queensland, Australia

Description: View of the Fitzroy Bridge during the flood of 1918. Men, women, and children are standing in the foreground of the photograph looking at the overflowing waters of the Fitzroy River. Sandbags have been put in place near the bridge to contain the deluge.

[About this photograph](http://pictureqld.slq.qld.gov.au/); Information about State Library of Queensland's collection: pictureqld.slq.qld.gov.au/



1. Introduction

Big floods are not a new phenomenon to either the governments or communities who live along, or depend upon the bounty and magnificence of the Fitzroy River Basin. Even over the relatively recent history of European settlement of the region in the latter half of the 19th Century, there have been several “big flood” events that have taught families and governments many a lesson about where to build, or not, and the importance and land and ecological advantages of a big flood event.

More recently, however, despite the technological advantages and early warning systems that give people extra time to prepare for an entirely predictable overland flow, the amount and velocity of floodwater and topsoil lost to the sea seems to be increasing, along with the on-land repair bills, with drought conditions returning sooner than ever before. What is going on?

2. Rockhampton in Flood 1918

Ferry boats at corner of East and William Street, Rockhampton, 1918



Ferry boats at corner of East and William Street, Rockhampton, 1918. Central Queensland Collection, Central Queensland University Library; **Source:** Central Queensland Collection, Central Queensland University Library

Theme: [Development](#), [Survival](#); Related: [Rockhampton's great flood of 1918](#); Keywords: [boat](#), [disaster](#), [floods](#); Location
Node: East Street Rockhampton, QLD Australia; Date of copyright: 2 November 2010

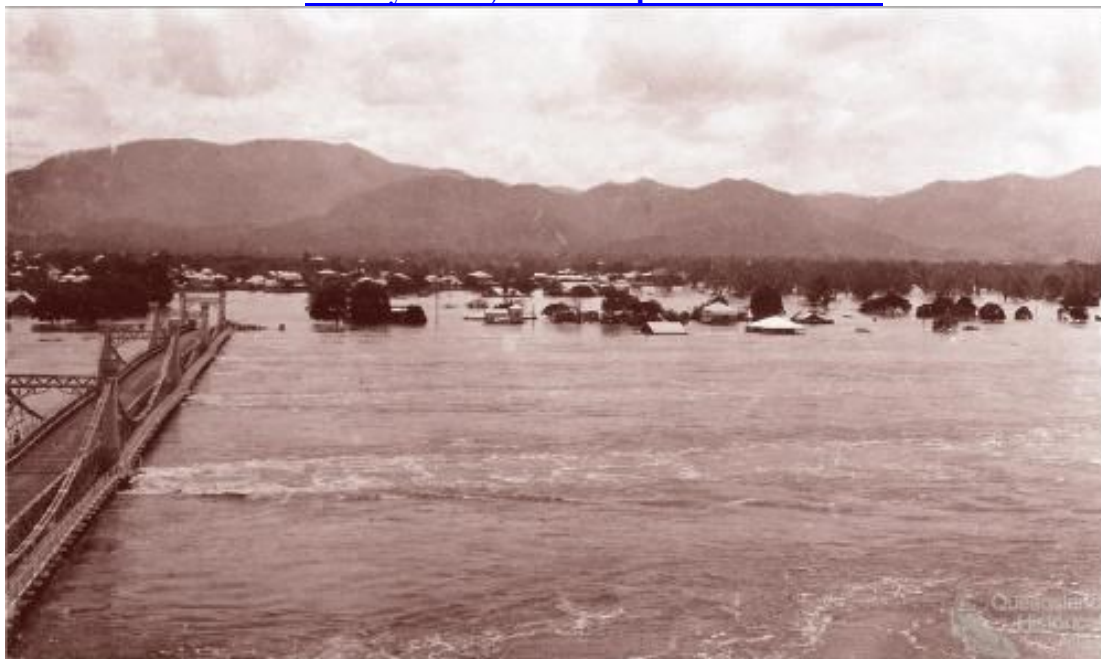


Swimming outside the Globe Hotel, Rockhampton, 1918



Swimming outside the Globe Hotel, corner of Bolsover and South Street, Rockhampton, 1918. From the *Capricornian*, Central Queensland University Library; **Source:** Collection of the Central Queensland University Library

Fitzroy River, Rockhampton in flood 1918



Fitzroy River, Rockhampton in flood 1918, looking towards North Rockhampton.

Source: Central Queensland Collection, Central Queensland University Library.

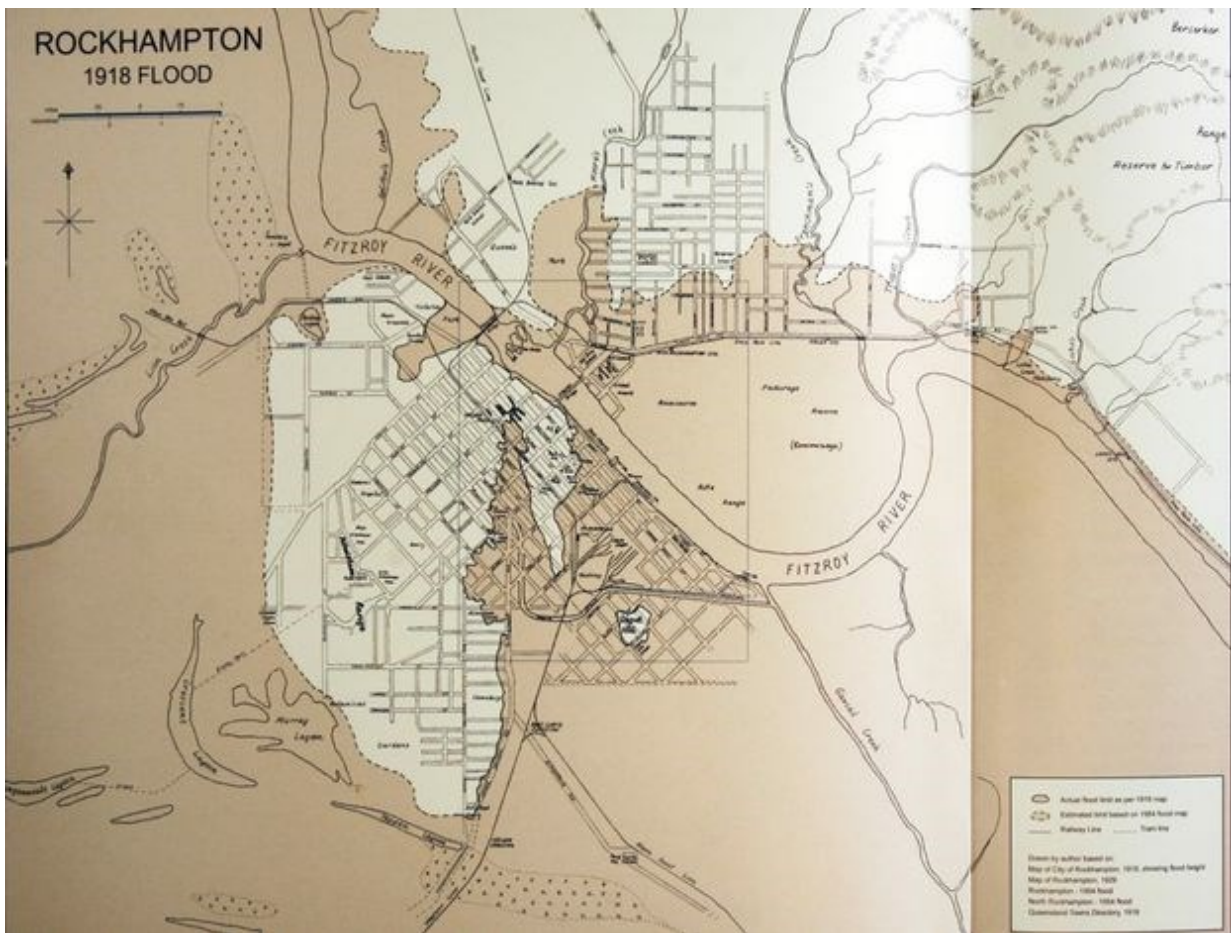


[Going to work, Rockhampton flood, 1918](#)



Above: Going to work, Rockhampton flood, 1918.

Source: Central Queensland Collection, Central Queensland University Library



Above: Map showing the extent of the 1918 flood in Rockhampton.
Map supplied by Rockhampton and District Historical Society.

Note: From the above map, aerial photos on public display of the big flood that also affected Mackay that same year, it cannot be credibly argued (as has been) local governments did not know of flood risk and which areas were most vulnerable.



3. Rockhampton in Flood 1954

Memories of the 1954 Flood Part 1: ABC Radio, 21 February 2014, 9:35 AM by Jacquie Mackay



Above: The house above is 5 Rennie St North Rockhampton.

It's 60 years ago this week that Central Queensland experienced one of the biggest floods in recorded history. The 1954 flood affected communities all over the region with the Fitzroy river reaching a peak of 9.4m. It was a long lasting flood with waters continuing to be very high for at least two weeks.

Some tremendous stories have come in from those who well remember their experiences of 60 years ago - we'll hear some of them today, and some on Monday. This morning we heard stories from Alan Bambrick, Marguerite, Daryl Kelly and Elsie Larkings.

[Download audio](#)



Photos are courtesy of Tom Hegarty.

<http://blogs.abc.net.au/queensland/2014/02/memories-of-the-1954-flood-part-1.html>



4. Rockhampton in Flood 1991



Above and Below: Although technically a bigger flood event (9.4m) than in 2011 (9.2m) note less turbulent profile of flow compared to that of 2011. Note: Photos by Bernadette George.





5. Rockhampton in Flood - 2011



Flooding in Rockhampton – January 2011. Picture: Rob MacColl

<http://www.heraldsun.com.au/ipad/dig-deep-to-help-flood-victims/story-fn6bn88w-1225980141037?nk=cb6403e6ce3206db9580a0405081ef89>



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Rockhampton floods: Damage done to the Leichhardt Highway: The Leichhardt Highway between Banana and Theodore is severely damaged by flood water. January 5, 2011.

<http://www.abc.net.au/news/2011-01-05/rockhampton-floods-damage-done-to-the-leichhardt/1355970>



General Views of the Flooding In Rockhampton, Queensland, 2011.



Above: The 2011 floods in Rockhampton, Central Queensland, Australia are still rising, and are expected to peak on Thursday, 6th January, 2011 at a height that will equal the 1954 flood where the Fitzroy River reached 9.5 metres. Authorities believe that there is a possibility that it will be the biggest flood in history, eclipsing the 1918 level of 10.2 metres.

(January 3*, 2011 - Source: FlynetPictures.com)

(* Note: Approx. one week before river peaked at 9.2m. Note velocity of flow, compared with calmer waters in 1918 peak flood of 10.1m)



General Views of The Flooding in Rockhampton, Queensland 2011 cont'd...



"The 2011 floods in Rockhampton, Central Queensland, Australia are still rising, and are expected to peak on Thursday, 6th January, 2011 at a height that will equal the 1954 flood where the Fitzroy River reached 9.5 metres. Authorities believe that there is a possibility that it will be the biggest flood in history, eclipsing the 1918 level of 10.2 metres." (January 3, 2011 - **Source:** FlynetPictures.com)

<http://www.zimbio.com/pictures/H84w9NIents/General+Views+Flooding+Rockhampton+Queensland/jnBMvKzjqPn>

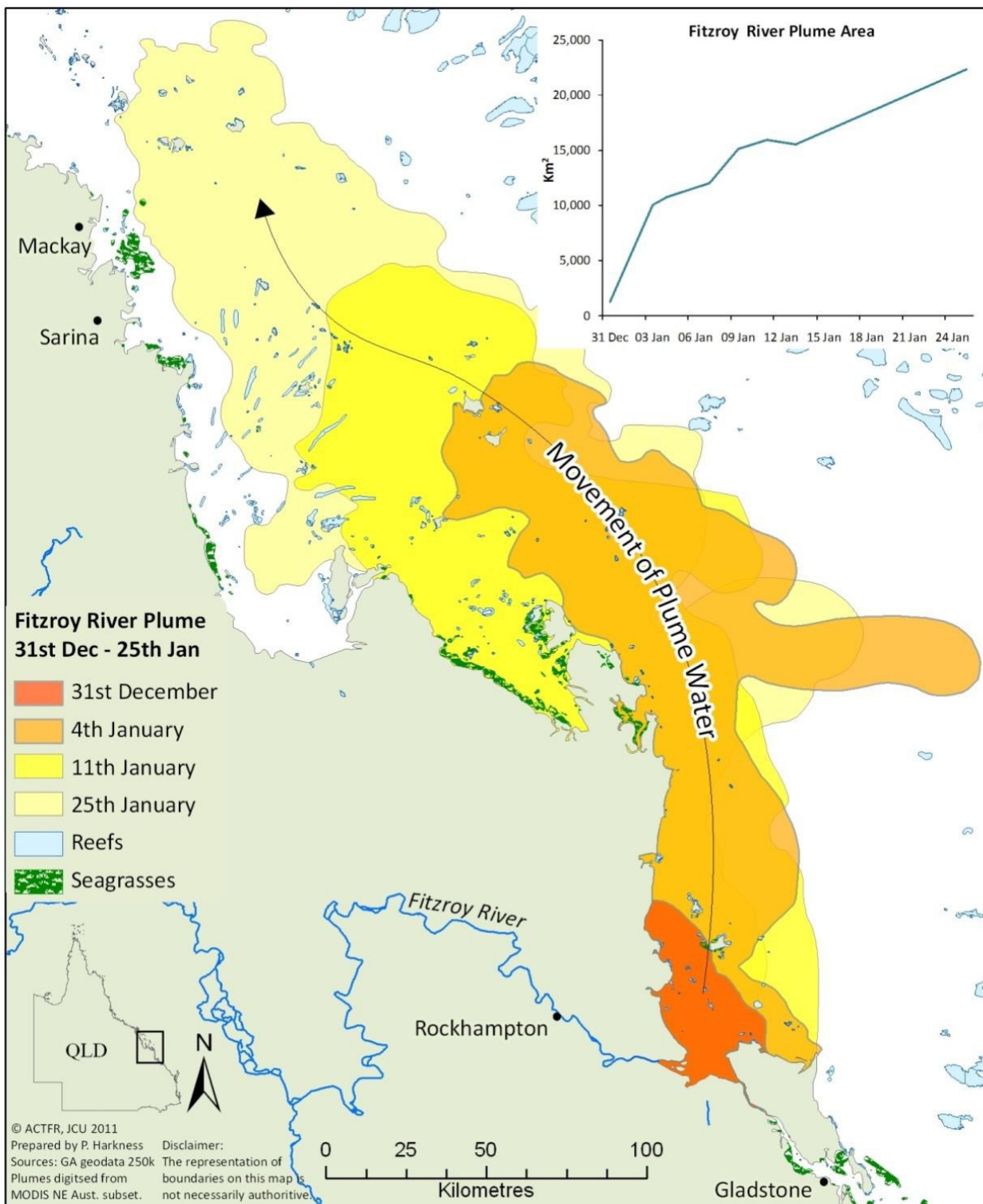
Extract from: Reef Rescue Marine Monitoring Program: Flood Plume Monitoring Annual Report 2010, pa 67-68.

"The surface exposure of flood plume waters is presented in Figure 6.5. This simply is the movement and frequency of the 2011 flood plumes overlaid and presented in 5 frequency classes (very high, high, medium, low, very low) for the three NRM regions. This indicates the movement of the surface plume water and the area which is likely to be influenced by plume waters. Note that this mapping exercise only identifies the surface plume water and is not identifying scale or extent of impact.

The surface exposure maps (Figure 6.5) show clearly that for a period of weeks, surface plume water were detectable north of the major Wet Tropic Rivers, Burdekin and Fitzroy Rivers for large distances (up to 480km) and also on a few occasions (<3) moved offshore past the central GBR. The number of coral reefs and seagrass beds within the "very high" (over 18 plume days) and high (15 –18 plume days) varied for each NRM region, but varied between 75 (Burdekin) and 232 (Fitzroy) coral reefs and 66 (Wet Tropics) and 71 (Fitzroy) for seagrass beds (Table 6.1)."



Figure 6-1. The areal extent of the Fitzroy plume mapped over 2 weeks, with plume extents identified for the 31 December 2010, 4 January and 11 January 2011.



http://www.gbrmpa.gov.au/data/assets/pdf_file/0004/28255/MMP-Flood-monitoring-Report-2010-11.pdf



6. Comment

Technically, the 2011 flooding of the Fitzroy River at Rockhampton was markedly lower (9.2m) than the record flood of 1918 (10.2m) and yet, the above image, at least three full days prior to the flood peak, shows markedly greater water velocity at Rockhampton compared to that indicated in the images presented in relation to the 1918 event. Likewise, from the author's first hand observation, the velocity of flow at Rockhampton during the (higher but comparable) 1991 flood event, which peaked at 9.4m, was still markedly less than that indicated in the image above and news video footage at the time (January 6, 2011).

This begs the following key research / policy questions:

- a) Why was the speed of overland flow so much greater in 2011 than in bigger flood events?
- b) What is the estimated *additional* quantity of water and topsoil lost[^] to the sea of Keppel Bay, compared to more "natural" events such as the 1918 flood, when there was markedly greater tree cover along drainage contour lines that would have slowed the overland flow ?**
- c) What is the estimated economic value of one tenth of the water and topsoil volumes lost to sea?
- d) What was the economic and environmental cost of the *excess* flood sediment suffocating coastal sea grass beds and corals?[^]

Notes:

[^]Yes, floods are a natural function of rivers and especially so of major coastal river systems in Queensland and NSW and, as such, play an important ecological function for native flora and fauna. However, without a proper benchmark of "typical" water and topsoil loss during a big flood event on the Fitzroy, prior to or at the time of the 1918 flood, we don't really know how much water and topsoil flow is "normal" for a healthy big flood event, compared to what has been lost since, say, 1991 and certainly during the 2011, flood events. Until we have that benchmark modelling, no one can argue credibly as to how much water and topsoil loss from land to sea is "natural" and therefore acceptable, in terms of environmental consequences for both land and sea.

** From the recent demonstrably troubled history of the management of the Murray – Darling River system, there is an understandable high level of scientific reticence and caution towards any proposals for new dams (or weirs or man-made billabongs?) on other major river systems, such as the Fitzroy. However, there is clearly a need to recognise the impact extensive upstream land clearing has already had on "natural" river flows during flood events and the consequence this inevitably has had on total net loss of water and topsoil, in the flood event, as well as the opportunity cost of lost deep seepage due to increased overland flow.

It is suggested, both these impacts warrant further research by the Bureau of Meteorology and Australian Bureau of Agriculture and Rural Economics.



7. Lessons from an Ancient Civilisation with Similar Challenges – China 1985



Above: Fish farming, as part of localised sewerage treatment system, Guangzhou, China, December 1985.

Note: Similar system has been in place at Werribee, Victoria, since the start of 20th Century but rarely replicated elsewhere in Australia: why? Too expensive? Too much land area required? Queensland is not short of space.



Above: Pumping station for aqueduct – surrounding farmland
Changsha, China. December 1985



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Above: Aqueducts facilitating gravity fed water distribution to surrounding farmland.
Changsha, China, December 1985.



8. Summary of Key Issues

- **Need for Better Water, Soil Resource Management, especially in Queensland:**
 - o The best options? Dams V Weirs V Billabongs and Aqueducts
<http://www.abc.net.au/radionational/programs/bushtelegraph/outback/5827524>
 - o Increased velocity of overland flows during flood events cause additional topsoil loss and erosion, above and beyond a “normal” flood event when greater tree cover;
 - o Additional loss of topsoil is a “double negative” for farmers and Great Barrier Reef
 - o *Present Situation Lose, Lose, Lose: Land is “hemorrhaging” water, topsoil, doubt underground aquifers are replenished; land drying out faster; meanwhile coastal marine environs being suffocated by excessive flood plumes and sediment.*
- **Need for Better Infrastructure Management (loc’n, type, design and funding priority):**
 - o Need for newwater and transport infrastructure
 - o Better distribution – more equitable, ecologically sensible
 - o Potential benefits of better protecting existing transport and other infrastructure from flood damage further downstream
- **Need to Learn from the Past: Murray – Darling mismanagement;**
 - o Over-allocation of water rights upstream Vs downstream?
 - o Un-even and unfair distribution of social and economic impacts (costs / benefits)
 - o Downsides of large dams, upsides (water, soil, local and broader social, economic and environment) of smaller, ecologically sound weirs and man-made billabongs.
- **Need to Acknowledge Lessons from Catchment Management Authorities;**
 - o Often unscientific, prone to local political dynamics
 - o Often opaque and unaccountable decision-making
- **Defining Components of Net Community Benefit Assessment:**
 - o Recent La Nina sponsored wet seasons in Queensland saw excessive loss of topsoil and water from land to coastal / Great Barrier Marine Park Area, above and beyond “normal” and “natural” major flood events – Economic and environmental costs;
 - o Potential benefits of pasture improvement / land rehabilitation;
 - o Potential economic, social and environmental benefits of improved water deep seepage into soil, maintaining moisture content in the soil and safeguarding evapo-transpiration natural ecological process of making rain;
 - o Geographic area and population catchment (existing and potential) to benefit from any / each proposed improved water storage strategy;
 - o Potential protection of existing downstream settlements and infrastructure;
 - o Potential improved health and preservation of Great Barrier Reef.



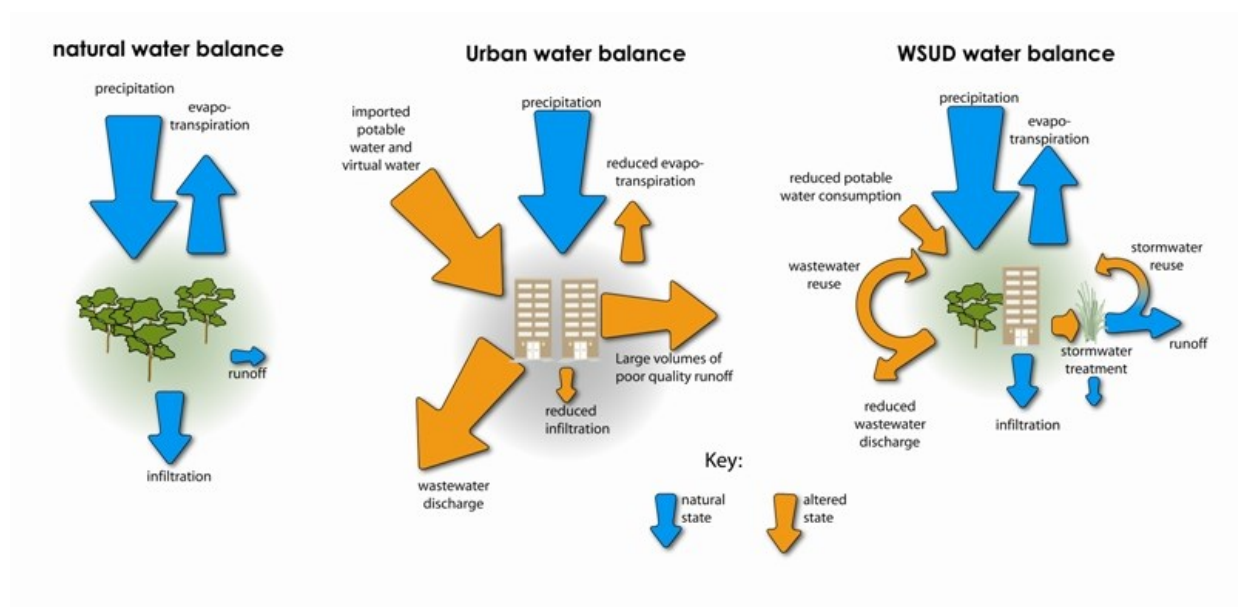
9. A Word about Water Sensitive Urban Design & Renewable Water Supply

What is Water Sensitive Urban Design?

Water sensitive urban design (WSUD) is an approach to the planning and design of urban environments that supports healthy ecosystems, lifestyles and livelihoods through smart management of all our waters.

The National Water Commission defines water sensitive urban design as ensuring “...that urban water management is sensitive to natural hydrological and ecological cycles. It integrates urban planning with the management, protection and conservation of the urban water cycle”.

The three diagrams below illustrate how the water-cycle works in natural and urban areas. The diagram on the right highlights the potential benefits of Water Sensitive Urban Design in achieving a more natural hydrologic regime.



Some specific WSUD objectives are to:

- minimise impacts on existing natural features and ecological processes
- minimise impacts on natural hydrologic behaviour of catchments
- protect water quality of surface and ground waters
- minimise demand on the reticulated water supply system
- improve the quality of and minimise polluted water discharges to the natural environment



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- incorporate collection treatment and/or reuse of runoff
- reduce run-off and peak flows from urban development
- re-use treated effluent and minimise wastewater generation
- increase social amenity in urban areas through multi-purpose greenspace, landscaping and integrating water into the landscape to enhance visual, social, cultural and ecological values
- add value while minimising development costs (e.g. drainage infrastructure costs)
- account for the nexus between water use and wider social and resource issues
- harmonise water cycle practices across and within the institutions responsible for waterway health, flood management, pollution prevention and protection of social amenity.

(Source: The National Water Commission [website](#)).



10. Summary of Further Research and Information Requirements:

- Economic cost / benefit of protected urban and regional infrastructure downstream;
- Economic benefits of greater preservation of soil and water upstream;
- Varying environmental impacts (costs / benefits) of greater water storage options, between dams, weirs and a series of billabongs / retention basins;
- Economic, social and environmental benefits of protecting and preserving existing downstream urban settlements, compared to more localised (and misguided) new infrastructure projects e.g. touted flood levee bank for Rockhampton;
- Varying social impacts (costs / benefits) of greater distribution of water storage options along selected river systems (e.g. Fitzroy Basin, Burnett River);
- Exploration of optimum existing natural geomorphology along river networks for network of weirs / billabongs etc.

Note: For photo essay of flood damage along the rural and urban sections of the Burnett River as a result of ex-Tropical Cyclone Oswald, see link below.

<http://www.abc.net.au/radionational/programs/bushtelegraph/outback/5827524>



11. Funding Options and Contextual Issues:

- Comparative Equity Issues

- History of over-allocation of infrastructure funding support from Federal Govts for the major southern cities is arguably unfair and counter-productive as Sydney and Melbourne now suffering dis-economies of scale, historic consequences of poor planning;
- History of poor governance in Queensland, culminating in \$16billion repair bills from 2011 and 2013 floods (and ill-conceived or corrupt development approvals) and \$2.2billion cost overruns for hospitals – See Appendix 1. And 2.
- Opportunity Cost of \$18 billion not spent on more economically, environmentally and socially responsible and beneficial water resource management in Qld alone.

- Public – Private Partnerships on Construction (only)

- Given the speed and ease with which a funding model could be established for Melbourne's East West Link proposal, including \$3billion allocation from Federal Govt, there is plenty of public and private sector funding available.

- Cost Benefit Assessment of new works to factor in flood protection benefits for downstream settlements too

- Essential to set the parameters for Triple Bottom Line Cost Benefit Analysis and Net Community Benefit test accurately, geographically and in terms of current and potential economic productivity / export growth etc.

Bernadette George***
Social and Sustainability Planner
Emu Park, Capricornia

24th October 2014



*****About the Author**

Qualified with a Master of Urban Planning (University of Melbourne) and Arts – Business Degree (Central Queensland University) Bernadette has three decades of national and international urban planning, transport and water resource management experience and an exemplary professional track record.

Added to her professional training and experience, Bernadette carries the wisdom and learnings of parents and grandparents who actively shared the history of major flood events they and relatives lived through, from Clermont to Bogantungan, to Rockhampton and beyond.

Along with her own five decades of close observation of how the Fitzroy River and coastal environs “behave” in a big wet, Bernadette has noticed how this has changed over more recent years. In particular, it is considered significant that during the more recent floods, communities were physically and economically more vulnerable than in 1991, while environmental impacts on land and sea were markedly more pernicious in 2011. And yet, with even still good wet seasons in Capricornia over 2013-14 too, much of central and northern Queensland is again in drought, while the coastal marine environs of the Great Barrier Reef has been suffering ever greater inundation of sediment and other contaminants, after showing distinct signs of recovery in 2010.

Without wanting to pre-empt outcomes of the current debate about “the need for more dams” in Australia, Bernadette believes there’s a need to do much better in managing fresh water and soil resources, while resisting the temptation for psychologically reassuring “big dams” that risk making many of the mistakes of the past, made so abundantly clear by the over-allocation of water rights and redirection of flows along the Murray – Darling system, which became so apparent in the later years of the Millennium Drought.



APPENDIX 1: OPPORTUNITY COST #1 OF POOR STANDARDS OF GOVERNANCE

Productivity Commission draft report recommends state and local governments pay a greater share of disaster re-build

[QLD Country Hour](#) by [Craig Zonca](#)

Updated 27 Sep 2014, 4:41pmSat 27 Sep 2014, 4:41pm



Photo: [The Productivity Commission draft report recommends major reforms to the current Natural Disaster Relief and Recovery Arrangements.](#) (Steve Brennan: AAP)

Map: [Brisbane 4000](#)

The Productivity Commission has recommended a substantial cut in Commonwealth funding for post-disaster re-builds.

The Commission's [draft report](#) describes the current Natural Disaster Relief and Recovery Arrangements as a 'disincentive for state and local governments to invest in mitigation and insurance'.

The Commission calls for major reform and recommends reducing the Commonwealth's contribution for reconstruction works from 75 percent to 50 percent, with state governments to make up the difference.

"We found that natural disaster funding is overwhelmingly biased towards rebuilding and needs to focus more on planning to actually reduce disaster risk and cost," said Commissioner Karen Chester.



"The total natural disaster spend by the Australian Government, three per cent is on mitigation and 97 per cent is on post-disaster recovery.

"We'd like to see that balance changed so the Australian Government's spending about 20-25 per cent of its budget allocation to natural disasters on mitigation."

[Audio: The Productivity Commission recommends sweeping reforms to current disaster recovery funding \(ABC Rural\)](#)

The Queensland Local Government Minister, David Crisafulli, believes the Commission has it 'drastically wrong'.

"No state would be impacted more than Queensland," he said.

"If this had to go through, we would be left exposed in a big way.

"Either it would be ratepayers who would have to foot the bill or communities would not be able to pick up the pieces; they would be left in tatters."

The draft report also recommends local councils should be forced to pay the first \$2 million dollars for reconstruction works, an eight-fold increase from the current threshold of \$250,000.

Local Government Association of Queensland (LGAQ) chief executive Greg Hallam says the idea 'beggars belief'.

"We're very concerned by the increase in the deductible, we're very, very concerned by this notion that somehow we can get insurance...and thirdly, we think the 50/50 split is unfair," he said.

"That's a massive burden on Queensland and a big cost shift from the Commonwealth to George Street [State Parliament]."

Since the 2010-11 Queensland floods, Mr Hallam estimates all three levels of government have spent a combined \$16 billion on post-disaster works.

He says previous LGAQ investigations into possible disaster insurance have returned quotes in the order of \$400 million.

Mr Hallam argues that's a cost most councils can't afford to bear, particularly those in the most disaster-prone areas of Queensland with a small rate base.

"It would be the size of their budgets, if not greater."

However, the LGAQ does take a positive from the Commission's draft report.

The organisation is running a long-term campaign in an effort to overturn a Federal Government directive to use contractors over council labour for repair and recovery works.

Mr Hallam believes the Commission's criticism that the current restrictions on reimbursing the use of council labour leads to 'wasteful spending' and prevents 'state and local governments from pursuing the most efficient recovery options', will help strengthen his argument.



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The Federal Justice Minister Michael Keenan has welcomed the draft report but says 'the Government will not pre-empt' the final recommendations of the Commission.

"There is an opportunity for reform, to better protect our communities from harm and improve the living standards of Australians," he said.

"The release of the Productivity Commission's draft report is an important step in this process."

Public submissions on the draft report are open until October 21.

Topics: [community-development](#), [federal---state-issues](#), [disasters-and-accidents](#), [brisbane-4000](#)

First posted 27 Sep 2014, 4:14pm

<http://www.abc.net.au/news/2014-09-25/disaster-funding-changes-productivity-commission/5769470>



APPENDIX 2: OPPORTUNITY COST #2 OF POOR STANDARDS OF GOVERNANCE

Three new Queensland hospitals cost \$2.2 billion more than promised, auditor-general says

By John Taylor

Updated about an hour ago, Tue 21 Oct 2014, 3:00pm



Photo: The main entrance of the new Gold

Coast University Hospital. (Supplied)

Map: QLD

Queensland's auditor-general has uncovered a multi-billion-dollar debacle in the planning and delivery of three new hospitals.

A report tabled in Parliament found the cost of building the three tertiary hospitals - promised by then premier Peter Beattie in 2006 - was underestimated by \$2.2 billion.

Auditor-general Andrew Greaves found many failures in how the Beattie government planned and approved the building of the Gold Coast University Hospital, the Lady Cilento Children's Hospital and the Sunshine Coast Public University Hospital.

The expected final cost of the three projects is \$5.08 billion - some \$2.2 billion more, or 77 per cent higher, than initial estimates.

"Initial cost estimates for each project were announced before business cases were developed," Mr Greaves said.

"There were no caveats on the reliability or completeness of estimates when they were made public."

If you thought health payroll was bad, this is the mother of all waste scandals in the health area

Premier Campbell Newman

The report also said it was impossible to conclusively show whether the hospitals were worth building.

"None of the projects can objectively demonstrate how the new hospitals will improve health outcomes in their communities compared to defined targets, because they did not identify and set a baseline for the benefits," the reports said.



Premier Campbell Newman said the report shows why it was necessary for Queenslanders to vote the former government out.

"If you thought health payroll was bad, this is the mother of all waste scandals in the health area," he said. "(The) \$2.2 billion would have totally cleared waiting lists in Queensland (or) built another two hospitals."

Labor defends record on health investment

Apart from cost blowouts, the auditor-general also found there was another \$171 million in costs to find "interim solutions" to meet the healthcare needs in the regions, while the hospitals were being built.

The report said that when the project was announced by the Beattie government, detailed planning had not been completed, leading to costly "reactive planning" down the track.

The auditor-general also found there were major flaws in the Queensland Health agreements on land acquisition, relocation of affected parties, car park development and operation and purchase of services.

Queensland Health transferred economic benefits worth at least \$190 million to third parties across the three projects, the report said.

"However, it has not consistently transferred the risks commensurate with the value of these economic benefits, meaning it has retained risks without the potential benefits," Mr Greaves wrote in the report.

Opposition Health Spokeswoman Jo-Ann Miller said Labor had not read the report but that if there were any lessons to learn, they would be for all governments to take heed of.

She said Labor was proud to have invested in health.

"People in those regions have thanked us for building capacity in their area," she said.



APPENDIX 3: ABC NEWS AND PHOTO SUMMARY – BURNETT RIVER FLOOD 2013

River of destruction: the Burnett River in flood

5 February, 2013 8:52AM AEST

As the waters of the Burnett River rose thanks to the rain from ex-tropical cyclone Oswald, the flow of water damaged farms, homes and livelihoods along the length of the river and its tributaries.

[Switch to big picture mode](#)

ABC Open Producer Brad Marsellos had the opportunity to ride-along with the crew of an Army Blackhawk helicopter as they surveyed the damage to roads and infrastructure along the Burnett River.

You can read his blog post '[River of Destruction](#)' on the [ABC Open](#) page.

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<http://www.abc.net.au/local/photos/2013/02/03/3682078.htm><http://www.abc.net.au/local/photos/2013/02/03/3682078.htm>

[Map Bundaberg 4670](#)

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