

BENDIGO, 9-11 NOVEMBER 2010



7th Biennial Victorian Flood Conference



Connecting Rivers, Floodplains, People



NORTH CENTRAL
Catchment Management Authority
Connecting Rivers, Landscapes, People



**CITY OF GREATER
BENDIGO**



Table of Contents

North Central Catchment Management Authority	4
Conference Program	4
MC – Ian McBurney	8
Keynote Speakers	
Jane Doolan, Department of Sustainability and Environment	8
Ian Rutherford, Department of Sustainability and Environment	8
Bruce Esplin, Emergency Services Commissioner, Victoria	9
Rob Gell, Greening Australia	9
Krey Price, Tetra Tech Australia Pty Ltd	9
Trevor Budge, La Trobe University	9
Conference Venue	10
Map of Bendigo and Venues	11
Bus Tour	12
Workshop	12
Social Program	
Welcome Reception	13
Conference Formal Dinner	13
Conference Informal Dinner	13
Abstracts	14
Sponsors and Suppliers	37



Connecting Rivers, Floodplains, People

7th Biennial Victorian Flood Conference

Bendigo, 9-11 November 2010

Welcome to Victoria's most prominent and important environmental and risk management forum: The **7th Biennial Victorian Flood Conference**. The North Central Catchment Management Authority (CMA) is proud to host this biennial event, especially given the recent flood events across our state and across Australia. The conference revolves around the theme Connecting Rivers, Floodplains and People. It will showcase research and innovation, and address in detail the issues being faced by floodplain management practitioners, communities and the environment.

Flooding remains a significant community issue throughout the whole of our state and country. The average annual cost of damages from flooding in Victoria alone is greater than \$100 million, and the physical and social impacts of flooding on communities can be devastating. On the other hand, floods provide the essential environmental connection between rivers and their associated floodplains. This year's conference will build upon a high standard, as set in previous conferences, and we are sure that you will gain further knowledge and contacts during your time in Bendigo.

The 7th Biennial Victorian Flood Conference 2010 has a wealth of features, including:

- Delegates from both the private and public sectors, such as researchers, consultants, all tiers of government, floodplain managers, urban planners, emergency and community services, engineers and catchment and natural resource managers;
- Distinguished keynote speakers and high quality presentations;
- A regional bus tour highlighting the diversity of our area and our floodplain areas and places of interest; and
- A workshop highlighting the recent flood events in Victoria, of which the North Central CMA was very much involved in.

The main conference itself is being held in Bendigo's beautiful and historic downtown buildings, with social functions highlighting some of the wonderful things Bendigo has to offer. The North Central CMA, in conjunction with its major sponsor the City of Greater Bendigo, is proud to host this influential conference and we know that you will gain a lot from attending, and we thank you for your patronage.

Kind regards,



Geoff Williams

Chairman
North Central CMA



Damian Wells

CEO
North Central CMA



North Central Catchment Management Authority

The North Central Catchment Management Authority (CMA) plays a pivotal strategic role in managing North Central Victoria's diverse and valuable natural resources in an area covering over 13 per cent of Victoria and a population of over 200,000 people.

The North Central CMA works to protect and improve rivers and the natural environment in North Central Victoria. This involves:

- undertaking projects to restore river health
- funding onground works to protect and improve the environment
- overseeing the use of environmental water to improve the region's rivers and wetlands
- using the best available science in all projects
- investing in biodiversity improvement along rivers and other sites with high environmental value
- monitoring the effectiveness of its activities to achieve the best results for investment.

We are committed to ensuring we invest our human and financial resources wisely and productively; how we manage our natural resources - land, water, biodiversity and climate - is what will ultimately sustain our social and economic wellbeing for future generations.

Conference Program

Pre Conference Registration

Monday 8 November 2010

6.00pm – 8.00pm Welcome Reception and Pre-Conference Registration
Venue: Hotel Shamrock , Cnr Pall Mall & Williamson Street, Bendigo



Connecting Rivers, Floodplains, People

Day 1

Tuesday 9 November 2010

8.30am	Conference Registration	
9.00am	Welcome to Country Uncle Brien Nelson (Jarra Jaara Elder)	
9.05am	Board Chair Welcome Geoff Williams (North Central Catchment Management Authority - CMA)	
9.15am	Mayoral Welcome Cr Rod Campbell (City of Greater Bendigo - CoGB)	
9.30am	Key Note Speaker Dr Jane Doolan (Department of Sustainability and Environment - DSE)	
10.00am	Key Note Speaker Rob Gell (Greening Australia)	
10.30am	Morning Tea	
	Concurrent Session 1 (4 x 20 minute presentations)	Concurrent Session 2 (4 x 20 minute presentations)
11.00am	Maximising the Effectiveness of Managed Flood Events on the Mid Murray Floodplain Melanie Tranter (North Central CMA)	Direct Rainfall - Loss Modelling Approaches Rob Swan (Cardno Lawson Treloar)
	Management Options for Environmental Flooding of Gunbower Forest Ben Tate (Water Technology)	Backwater effects of Bridge Piers and Abutments in 2D Joel Leister (BMT WBM)
	Leading the Community to an improved understanding of environmental watering Darren Wilson (Mallee CMA)	Flood Measurement Technique Using Acoustic Doppler Technology Rohan Oliver (Thiess)
	Review of Environmental Flow Requirements for the Lower Loddon System Bonnie Atkinson (SKM)	How unusual were the Victorian Floods in September 2010? Philip Pedruco (BMT WBM)
12.30pm	Lunch	
1.15pm	Key Note Speaker Dr Ian Rutherford (DSE)	
	Session 3 (3 x 20 minute presentations)	
2.00pm	Flood Management Plans for Melbourne and the Port Phillip Westernport Region Phil Neville & Erin Davies (Melbourne Water)	
	Impacts of Climate Change on Coastal Flooding Warwick Bishop (Water Technology)	
	Planning Considerations in Relation to Extreme Flooding David Dreverman (Murray Darling Basin Authority - MDBA)	
3.00pm	Afternoon Tea	
	Concurrent Session 4 (4 x 20 minute presentations)	Concurrent Session 5 (4 x 20 minute presentations)
3.30pm	Floodplains are not just for Floods Neville Atkinson (Shepparton Rural City Council)	SA Flood Hazard Leader Ed Pikusa (Department of Water, SA)
	The Rub of the Green – Steering Environmental Outcomes in NSW Central Murray Floodplain Management Plans Peter Nankivell & Paul Bendeich (Department of Environment, Climate Change and Water, NSW)	Risk Management Approach in Practice - the Gateway Island Experience Roel Von't Steen (North East CMA)
	Guide to the Proposed Murray Darling Basin Plan Sharon Davis (MDBA)	Random and Protracted Consequences of a Short Downpour Susan Davie (Department of Human Services - DHS)
5.00pm	Comparison of Germination from Winter versus Spring Flooding Cherie Campbell (Murray Darling Freshwater Research Centre)	What Makes a Good Flood Study - Consulting Towards Grey Hair Steve Muncaster (Water Technology)
6.00pm – 11.30pm	Conference Formal Dinner Venue: Bendigo Town Hall, Hargreaves Street, Bendigo	



Day 2

Wednesday 10 November 2010

9.00am	Key Note Speaker Trevor Budge (La Trobe University)	
9.45am	Key Note Speaker Krey Price (Tetra Tech Australia Pty Ltd)	
10.30am	Morning Tea	
	Concurrent Session 6 (4 x 20 minute presentations)	Concurrent Session 7 (4 x 20 minute presentations)
11.00am	Ocean versus River - Coastal Interfaces, Climate Change and Flood Analysis Rob Swan (Cardno Lawson Treloar)	Brushy Creek Flood Mitigation and Waterway Improvement Project Paul Rasmussen (Melbourne Water)
	Implementation of the SBRI Technique to Establish Catchment Wide Flood Risk in a Victorian Catchment Michael Turnley (BMT WBM)	An Update on Flood Warning Services in Victoria Elma Kazcic (Bureau of Meteorology)
	Storm Tide Dynamics and Significance to the Assessment of Coastal Inundation Risks Tim Womersley (Water Technology)	Is this a flood protection levee? Daniel Manoloche (FM Global)
	Emergency Management of Flash Flooding Andrew Gissing (Victoria SES) & Steve Opeer (New South Wales SES)	Getting More From your Flood Model: Integrating Evacuation Planning Sharon Wallace (BMT WBM)
12.30pm	Lunch	
	Day 2 activities (choose one option only)	
1.15pm	Option 1: Bus Tour	Option 2: Workshop: My role in the rise and fall of the September 2010 floods
3.00pm	Afternoon Tea	
5.00pm	Conclusion of bus tour	Conclusion of workshop
6.30pm – 11.30pm	Conference Informal Dinner Venue: Big Hill Winery, Big Hill (Buses depart 6.00pm from The Capital Theatre) <i>Buses return half hourly from 9.30pm</i>	



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Day 3

Thursday 11 November 2010

9.00am	Key Note Speaker Bruce Esplin (Emergency Services Commissioner, Victoria)
9.30am	Floods and Memories John Riddiford (North East CMA)
10.00am	A New Approach to Community Flood Education Neil Dufty (Mollino Stewart)
10.30am	Morning Tea
	Session 9 (3 x 20 minute presentations)
11.00am	The Future of Flood Warning Emergency Management in Victoria Andrew Gissing (Victoria SES)
	Insurance Risks in a Changing Climate Samantha Zimmerman (Victorian Managed Insurance Authority)
	Taking a Wider View - Local and Regional Flood Studies Steve Muncaster (Water Technology)
12.30pm	Close of Conference & Closing Address Take away lunch provided



Master of Ceremonies



Ian McBurney

Live eco•logical

Ian McBurney describes himself as an ecological sustainability mentor for government, business and communities.

Ian has a degree in environmental engineering and has spent seven years at the cutting edge of environmental education. Most of Ian's work is in guiding businesses towards ecological sustainability, from management goal setting to organisational systems, symbols and understandings.

Ian is a lively, passionate and thought-provoking master of ceremonies who is sure to entertain and inform delegates.

Keynote Speakers



Dr Jane Doolan

Department of Sustainability and Environment

Dr Jane Doolan is Executive Director of Sustainable Water Environment and Innovation at the Office of Water (Department of Sustainability and Environment), in Victoria. She has spent the last 20 years working in the field of waterway management, as an exponent of Australian river health, driving key policy in issues of environmental water allocations and river-related catchment management.

Jane has led a number of pivotal developments in river health management, including the establishment of Victoria's Catchment Management Authorities, and the creation of the Victorian River Health Strategy (2002), the first state framework for integrated management of rivers within a catchment context. She also led the development of environmental watering policy for the Victorian Government's long term water security plan, Our Water Our Future (2004)

Jane is the Victorian representative on a number of national river health and water resource committees, such as the Murray Darling Basin Natural Resource Management Committee and National Water Commission committees. Among her other responsibilities, she currently oversees Victoria's implementation of the environmental delivery component of The Living Murray program, and is a board member of eWater CRC (Cooperative Research Centre).



Dr Ian Rutherford

Department of Sustainability and Environment

Dr Ian Rutherford is the Director of River Health in the Sustainable Water and Environment Division of the Victorian Department of Sustainability and Environment. In this role he is responsible for developing policy to protect and improve the health of Victoria's rivers, wetlands and estuaries. He is also responsible for a major program that supports Catchment Management Authorities to invest in works that improve the condition of aquatic systems. Ian is seconded into his present position from the University of Melbourne, where he is an Associate Professor in the Department of Resource Management and Geography. Ian's research revolves around river processes, including hydrology, hydraulics, geomorphology, and riparian functions. Increasingly this research targets the restoration and rehabilitation of aquatic systems.

Ian has worked as a consultant and researcher across Australia, South Africa, South East Asia and North America; and has published over 120 research papers, books and reports.



Connecting Rivers, Floodplains, People



Bruce Esplin

Emergency Services Commissioner, Victoria

Bruce Esplin was appointed Victoria's first Emergency Services Commissioner in June 2000. Bruce is an advocate for an inclusive approach to emergency management, and encourages collaborative partnerships between community, all levels of government, the emergency services and the private sector. He is a passionate and committed spokesperson for the emergency management sector, particularly in Victoria where he is well-known and respected as a leader in the future direction of emergency management. In 2003 Bruce was awarded a Centenary Medal for outstanding service to emergency management in Australia.



Rob Gell

Greening Australia

Rob Gell is a coastal geomorphologist by training; he taught Environmental Science and Physical Geography at a tertiary level, then for 30 years he presented television weather. Rob works as an environmental and communications consultant and is a Director of World Wind Pty Ltd. He is National President of Greening Australia Limited, Chairman of the Mornington Peninsula and Westernport Biosphere Reserve Foundation Ltd., a member of the Victorian Coastal Council, and Patron of Geography Teachers Association of Victoria, and Wildlife Victoria. He is also a Life Ambassador for Australia Day and a life member of Life Education Victoria. Rob is a published author and photographer.



Krey Price

Tetra Tech Australia Pty Ltd

Krey Price is a design engineer with 15 years experience in water resource engineering of river and wetland rehabilitation projects. Krey has university degrees in civil engineering and environmental water resources. He has served as the lead engineer and technical consultant for over 30 environmental rehabilitation projects in the United States, ranging geographically from the Arizona desert to the Alaskan tundra. His projects include major floodplain reconnections completed for the U.S. Army Corps of Engineers in the Mississippi River Basin, the Colorado River Basin, and the Columbia River Basin. Krey has a technical background in hydrological, hydraulic and sediment transport modelling. Krey relocated to Australia with his family in 2009, and he currently serves as the director of water and environment for Tetra Tech Australia Pty Ltd, a newly established, local branch of the environmental consulting firm Tetra Tech.



Trevor Budge

La Trobe University

Trevor Budge is a geographer-planner who has worked in urban, rural, regional, statutory and strategic planning since 1975; in Bendigo, Melbourne and Tasmania. He has undertaken studies throughout rural and regional Australia. He has organised seven major conferences on planning issues and has led eight international study tours for planners. His experience covers a wide variety of planning projects. His work has involved him in rural regions, small country towns, outer metropolitan areas and major regional centres. Trevor has given numerous lectures on planning at Universities in Australia and the United States, presented papers at Conferences in Australia, the United States, Canada, Sri Lanka, New Zealand, Finland, India and Turkey. Trevor is widely acknowledged for his work in integrating land-use planning with natural resource management plans and strategies, and for his work in the planning and development of country towns where he has conducted over 400 workshops and community consultation programs.

Trevor was a Ministerial appointee on the Victorian Catchment Management Council for six years. He has a National Lifetime Achievement Award from the Planning Institute of Australia and is Life Fellow Planning Institute of Australia. Trevor is the Chairperson of the National Education Committee for the Institute and chairs their post-tsunami Recovery Project. He is an Adjunct Professor at RMIT University and is Faculty Campus coordinator at La Trobe University's Bendigo campus for the Faculty of Humanities and Social Sciences' and is the Convener of the Community Planning and Development Program.



Conference Venue



The Capital Theatre

50 View Street, Bendigo

The Capital Theatre - Bendigo's Performing Arts Centre - is located in the heart of Bendigo. An example of magnificent Victorian architecture, it boasts the finest entrance to any arts centre in the nation, with towering Corinthian columns and an interior that has been restored to its original Victorian splendour and grandeur. Today, The Capital Theatre is a hive of activity, hosting some of the best live theatre, musical, dance and comedy in the country, as well as numerous events and conferences. The beautiful heritage architecture, comfortable facilities, fine food and professional support create a welcoming environment.

Car Parking

Ample parking is available directly behind The Capital Theatre. Access is from View Street next to the Queen Elizabeth Oval, at a rate of \$2.00 per day.

Train Station

The Bendigo train station is located at Railway Place (off Mitchell St), an approximate 15 minute walk to The Capital Theatre. For more information on train times, please see www.vline.com.au or call 03 5440 2765

Wheelchair Access

A ramp and a lift are available to assist those using wheelchairs.





Wednesday's Activities

(optional – choose one)

Bus Tour

Date: Wednesday 10 November, 1.15pm-5.00pm

Venue: Bus departs from The Capital Theatre, View Street, Bendigo

Itinerary to be provided at the commencement of the tour. Please ensure that you bring along a hat and sturdy shoes. Afternoon tea and refreshments will be provided.

Workshop

Date: Wednesday 10 November, 1.15pm-5.30pm

Venue: The Capital Theatre, View Street, Bendigo

Title: My role in the rise and fall of the September 2010 floods

Facilitated by **Viktor Brenners** (DSE).

Until just recently, North Central Victoria had not experienced such wide-spread flooding since the 1990s. Predictive and emergency services were hard tested in many locations. Numerous agencies and communities had to think and act together quickly and efficiently to achieve the best result. For many days there was the spectre of more rain leading to a protracted event. The media and others had a lot to say. There was a lot of impact assessment and mopping up to do in the hours, days and weeks after the flood peak had passed.

Too often after emergency events we don't have the time to adequately reflect upon what went well and what could be improved. As this conference is only two months after the recent major flood event, this is a perfect opportunity to ask a number of those who were intimately involved to tell their story and let others ask questions or chip in with their views.

Workshop Program

Title	Presenters
Introduction	Viktor Brenners
How the weather forecast unfolded	Elma Kazazic (Bureau of Meteorology)
Control agency viewpoint: Managing the statewide operation	Tim Wiebusch (VIC SES)
Control agency viewpoint: Managing the operation from an ICC perspective	Keith O'Brien (VIC SES)
Control agency viewpoint: Ensuring timely community warnings and information	Lachlan Quick (VIC SES)
Support agency viewpoint: CMA	Guy Tierney (GB CMA)
Providing additional flood intelligence: a consultant's viewpoint	Steve Muncaster (Water Technology)
Local perspectives: a council MERO, a community representative	Warren Hemopo (Buloke Shire), Paul Haw (Boort farmer)
Clean up and recovery: OESC, DPI, DHS	Myles O'Reilly (OESC), Anthony Patterson (DPI), Susan Davie (DHS)
Cost of the damages Vs benefits to the environment	Ian Rutherford (DSE)
Participant notice board	(interactive)
Summary of participant notice board activity	Viktor Brenners (DSE)



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Social Program



Welcome Reception

Date: Monday 8 November, 6.00-8.00pm

Venue: Hotel Shamrock, Cnr Pall Mall & Williamson Street, Bendigo

Come join us for welcome reception drinks and pre-conference registration.



Conference Formal Dinner

Date: Tuesday 9 November, 6.00-11.30pm

Venue: Bendigo Town Hall, Hargreaves Street, Bendigo

Held at the beautiful Bendigo Town Hall, the conference formal dinner will be a three-course meal that you won't forget, with entertainment from 'The Colin Band'.



Conference Informal Dinner

Date: Wednesday 10 November, 6.30-11.30pm

Venue: Big Hill Vineyard, Big Hill

- Buses will depart at 6.00pm from The Capital Theatre and will return to The Capital every half hour between 9.30pm and 11.30pm.

This is a great chance to relax and socialise with fellow delegates at the picturesque Big Hill Vineyard, with entertainment by the band 'The Regular Joes'.



Abstracts and Speaker Notes

Conference Day 1: Tuesday 9 November

“RIVERS”

KEYNOTE SESSION

RIVERS

9.30-10.00am

DR JANE DOOLAN, Executive Director Sustainable Water and Environment, Department of Sustainability and Environment

Notes:

KEYNOTE SESSION

CLIMATE CHANGE IMPACTING RIVER HEALTH

10.00-10.30am

ROB GELL, National President, Greening Australia

Notes:



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CONCURRENT SESSION 1

MAXIMISING THE EFFECTIVENESS OF MANAGED FLOOD EVENTS ON THE MID MURRAY FLOODPLAIN

11.00-11.20am **MELANIE TRANTER**, North Central CMA

Abstract: Over the past ten years the North Central CMA has been delivering the Flooding Enhancement of Gunbower Forest project which seeks to restore flooding within the forest to maintain and enhance its environmental values. A range of hydraulic models have been used to inform the future management of environmental water to gain an understanding of:

- the relationship between flows in the River Murray and flooding within Gunbower Forest
- the water requirements of the different vegetation communities within the forest
- the shortfall in water requirements based on current and predicted climate change conditions
- how structures being built through the Living Murray program can be operated to meet this shortfall
- providing appropriate triggers to stimulate breeding in native fauna, and
- the water consumed at the site through the implementation of this operating strategy

An assessment of the potential social, cultural and environmental risks and benefits of the operating strategy has been undertaken. The hydraulic model outputs were fundamental in assessing the effectiveness of the proposed operating strategy in maximising the environmental outcomes sought by the North Central CMA.

Authors: Melanie Tranter and Anna Chatfield, North Central CMA

Notes:

MANAGEMENT OPTIONS FOR ENVIRONMENTAL FLOODING OF GUNBOWER FOREST

11.20-11.40am **BEN TATE**, Water Technology

Abstract: Water Technology in conjunction with North Central CMA has undertaken detailed investigations into water management options for Gunbower Forest over the past 5 years. The detailed hydrodynamic modelling, result processing and presentation/analysis of results has greatly assisted North Central CMA in the decision making process and has led to the April 2010 Investment Proposal submission to the Murray-Darling Basin Authority, which details the preferred water management solution for Gunbower Forest.

This paper outlines what management options were considered, the options assessment process, the types of outputs produced, and finally, details the preferred management solution.

Authors: Ben Tate – Senior Engineer, Water Technology; Warwick Bishop – Director, Water Technology; and Melanie Tranter – Gunbower Forest Project Manager, North Central CMA

Notes:



LEADING THE COMMUNITY TO AN IMPROVED UNDERSTANDING OF ENVIRONMENTAL WATERING

11.40-12.00pm **DARREN WILSON**, Mallee CMA

Abstract: The change in the Sunraysia community's attitude to environmental watering is a practical case study of how a controversial issue can be handled by developing strong community partnerships and supporting these relationships via proactive, transparent communication.

It must, however, be recognised that, even today, the community does not unanimously support environmental watering. However, the level of community understanding about environmental watering, the science behind it and the need for it, is enough to ensure there is sufficient support for environmental watering to continue in Sunraysia.

Author: Lauren Murphy, Mallee Catchment Management Authority

Notes:

REVIEW OF ENVIRONMENTAL FLOW REQUIREMENTS FOR THE LOWER LODDON SYSTEM

12.00-12.20pm **BONNIE ATKINSON**, SKM

Abstract: The Loddon River system downstream of Loddon Weir is characterised by major distributary channels that carry water from the main river onto the floodplain. Regulation throughout the whole Loddon River catchment has reduced the magnitude of all flow types in the lower Loddon River system and has significantly reduced the frequency of flooding.

The recent drought has compounded the hydrological stress and most of the system between the Loddon Weir and Kerang has been completely dry for the last three years. The Loddon River downstream of Kerang carries water from Pyramid Creek and has more permanent flow, but it has also experienced significant flow reductions in recent years.

SKM recently used the FLOWS method to review the environmental flow requirements for the lower Loddon River system. In conducting the review, we considered potential effects of climate change and the capacity to deliver flows with existing infrastructure.

Authors: Andrew Sharpe, Paul Boon, Bonnie Atkinson, Peter Sandercock, Robert Morden, Erin Murrphy and Simon Treadwell, SKM

Notes:



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CONCURRENT SESSION 2

DIRECT RAINFALL – LOSS MODELLING APPROACHES

11.00-11.20am **ROB SWAN**, Cardno Lawson Treloar

Abstract: In hydraulic modelling, more and more assessments are being completed using the direct rainfall methodology (also known as Rainfall on the Grid). These models generally extend to the catchment boundary, and as result, replace standard hydrological modelling approaches. Hydrological models use a series of well understood approximations to allow for various rainfall losses, with standardised parameters. Of particular importance is the initial and continuing losses if how the standard values used in the hydrological models are applicable to the direct rainfall approach.

This paper examines a large storm event modelled in both the traditional and direct rainfall approaches. 20 different combinations of loss and catchment parameters were examined as part of the direct rainfall approach in an attempt to match both the recorded flood levels and the traditional approach. The paper provides guidance with regards to how loss parameters affect the modelled flood levels and considers the advantages and disadvantages of each combination of parameters when used in a direct rainfall approach.

Authors: Rob Swan, Manager – Water and Environment, Cardno Lawson Treloar; and Kunye Goh, Project Engineer, Cardno Lawson Treloar

Notes:

BACKWATER EFFECTS OF BRIDGE PIERS AND ABUTMENTS IN 2D

11.20-11.40am **JOEL LEISTER**, BMT WBM

Abstract: Bridge embankments and structures can significantly influence flooding patterns and levels on floodplains. It is important to reliably estimate these influences to properly understand and mitigate their impacts to properties and communities on the floodplain. The literature (Austroads 1994; Bradley 1978) provides details of how to estimate contraction and expansion losses and pier losses for desktop analysis. However, limited guidance is provided as to the application of these losses in a 2D modelling environment. As 2D flood modelling is now the industry standard for floodplain investigations, further guidance is required as to the application of the data presented in the literature.

BMT WBM is currently undertaking research that involves the replication of physical flume models tests (undertaken at Colorado State University by Liu, Bradley and Plate, 1957) in the 2D hydraulic model, TUFLOW. The data from these physical flume tests formed the basis of all current literature into the contraction and expansion losses and pier losses of bridges.

This paper will present the research that has been undertaken by BMT WBM and discuss its implications for the representation of key structures in 2D flood models.

Authors: Joel Leister, Senior Environmental Engineer, BMT WBM Pty Ltd, Melbourne, Australia. Phone: 03 8620 6100, email: joel.leister@bmtwbm.com.au; and Mark Jempson, National Practice Leader – Flooding and Hydraulics, BMT WBM Pty Ltd, Melbourne, Australia

Notes:



FLOOD MEASUREMENT TECHNIQUE USING ACOUSTIC DOPPLER TECHNOLOGY

11.40am-12.00pm **ROHAN OLIVER**, Thiess

Abstract: Hydrographic Groups around the world have historically relied upon conventional methods to produce continuous flow records for stream gauging stations. Conventional methods include recording of water level by a sensor and storing the data in an electronic data logger; undertaking periodic discharge measurements, using mechanical or acoustic current meters for a range of stages experienced over a period; and developing of a stage-discharge relationship, also called a rating curve, to convert recorded water level into continuous flow records. The conventional method is generally applicable only in steady flow periods i.e., when parameters such as velocity and water level do not change with time at a discrete location. If those parameters do change throughout a flood event this signifies a variable energy slope, the stage discharge relationship forms a loop; namely a hysteretic rating curve also known as the loop-rating curve.

The flow propagation in natural rivers meandering within flood plains is more complicated. The interaction between main channel and the flood plain or inundated valley is the one of the most important factors affecting flood propagation. During the rising limb of a flood wave, water flows into the inundated valley from the main channel and flows back into the main channel during the falling limb of the flood wave. Therefore the flood plain has significant impact on the wave celerity, because the flood wave progress more slowly in the inundated valley compared to the wave in the main channel, which causes variable backwater, and forms series of loops in the loop rating curve during the flood.

Historically, several algorithms, including the well-known Jones formula, have been introduced to correct the steady-state discharge value and to estimate the unsteady-flow stage-discharge relationship. The equations in these methods are derived from the 1-D shallow water momentum equation by disregarding one or more terms, assumptions are made, and the numbers of coefficients are used introducing some uncertainty in estimated flows and volume.

To more accurately understand river flows and behaviour during flood events Thiess Services have developed a methodology to increase the accuracy of measured flows. The methodology developed involves the temporary installation of an acoustic velocity meter to record stream velocity at a selected profile through a flood event. The relationship between recorded velocity and mean velocity is then developed and when multiplied with recorded areas; flows are produced. The development of the relationship between recorded and mean velocity is referred to as an index velocity relationship and can more accurately calculate flow volumes throughout both rising and falling limbs of events. As a result, obtaining discharge and volume for the flood periods from directly measured velocity and the area of cross section produced more accurate results than converting the stage into the flow using steady flow rating table at much comparable costs.

Author: Rohan Oliver, Regional Hydrographer, North West Victoria – THIESS Hydrographic Services, PO Box 554 Kerang VIC. 3579

Notes:

HOW UNUSUAL WERE THE VICTORIAN FLOODS IN SEPTEMBER 2010?

12.00-12.20pm **PHILIP PEDRUCO**, BMT WBM

Abstract: How unusual were the Victorian Floods in September 2010?

The September 2010 floods in Victoria were described as the worst flooding in more than a decade, following 13 years of drought in Victoria. Given the below average rainfall in the preceding 13 years how unusual were these events?

An analysis of the rainfall, antecedent conditions, stream flow and other significant hydrological conditions such as snowfall has been undertaken to examine how unusual these flood events were.

Author: Philip Pedruco, BMT WBM

Notes:



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KEYNOTE SESSION

1.15-1.45pm

DR IAN RUTHERFURD, Director of River Health, Sustainable Water and Environment Division of the Victorian Department of Sustainability and Environment

Notes:

CONCURRENT SESSION 3

FLOOD MANAGEMENT PLANS FOR MELBOURNE AND THE PORT PHILLIP WESTERNPORT REGION

2:00-2:20pm

PHIL NEVILLE & ERIN DAVIES, Melbourne Water

Abstract: Flood management agencies in greater Melbourne and the broader Port Phillip and Westernport Region are working collaboratively to improve flood management and coordination, through the development of council based Flood Management Plans.

Melbourne Water's Port Phillip and Westernport Region Flood Management and Drainage Strategy recognised the need for a more coordinated and integrated approach to dealing with flood risk in the Region. One of its objectives is to improve collaboration between flood management agencies. A key action arising from this is to work in partnership with councils (and Victoria State Emergency Service as a key stakeholder) to develop a Flood Management Plan for each municipality.

The objectives of the Flood Management Plans project are to:

- promote improved collaboration between councils, Melbourne Water and SES Victoria
- understand flood risks and identify extreme/intolerable flood risks and 'hot spot' areas
- identify gaps and improvement actions to address these risks and better prepare for and manage floods
- gain clarity of roles and responsibilities
- ensure that the objectives of the Port Phillip and Westernport Region Flood Management and Drainage Strategy are met within each municipality

A Flood Management Plan outlines roles and responsibilities and describes, at a high level, council and Melbourne Water's key flood management planning and management activities. It contains an improvement plan detailing actions required to address any key gaps identified. Improvement actions may be in areas such as flood modelling and mapping, planning controls, asset management, information/flood intelligence sharing, capital works planning or community flood education.

Flood Management Plans are being developed by council and Melbourne Water aims to have Plans in place across the whole Port Phillip and Westernport Region by June 2013. Eight Plans are currently being developed (later when completing the final version of the paper we may say xx plans have been completed) out of a total 38 municipalities.

There are many benefits to be gained through the Flood Management Plan process that will improve the understanding and management of flood risks and better coordination by flood management agencies.

Authors: Phillip Neville, Nicole Biscan and Erin Davie, Melbourne Water

Notes:



IMPACTS OF CLIMATE CHANGE ON COASTAL FLOODING

2.20-2.40pm

WARWICK BISHOP, Water Technology

Abstract: Over the past few years, growing awareness of the potential impacts of climate change has driven a need for incorporation of these risks into planning processes. Whilst all levels of government are in the process of developing policies and practices to deal with this challenge, technical details are required to underpin the planning process. Information on the nature of flooding now and under various climate change scenarios is required to develop the appropriate planning or adaptation response for a particular area.

Compared to traditional flood studies at the coast, present and future investigations must pay greater attention to coastal engineering issues which require an extended skill set compared to inland flood situations.

The paper highlights the technical challenges in accounting for climate change impacts on flood studies that are influenced by sea level across Victoria and suggests measures to address these. The Port Fairy flood study is used as a detailed case study.

Authors: Warwick Bishop and Tim Womersley, Water Technology Pty Ltd, Unit 15 Business Park Drive, Notting Hill VIC 3168; and Marcus Little and Matthew Hayes, Glenelg Hopkins CMA, 79 French Street Hamilton

Notes:

PLANNING CONSIDERATIONS IN RELATION TO EXTREME FLOODING

2.40-3.00pm

DAVID DREVERMAN, Murray Darling Basin Authority

Abstract: Extreme floods have a low probability of occurrence but would have significant impacts on communities. Ultimately, it is possible to conceive a flood of such magnitude that it exceeds the capacity of a dam which would potentially lead to dam failure and an even larger flood downstream.

Accordingly, dam owners take very seriously their responsibilities to ensure that their dams have appropriate flood capacity.

This presentation will cover some of the planning considerations that have been addressed by the Murray-Darling Basin Authority and its relevant Constructing Authorities in working towards resolving what constitutes acceptable spillway capacity if risks are to be held “as low as reasonably practicable”.

Author: David Dreverman, Executive Director, River Murray, Murray-Darling Basin Authority

Notes:



Connecting Rivers, Floodplains, People

CONCURRENT SESSION 4

FLOODPLAINS ARE NOT JUST FOR FLOODS

3.30-3.50pm **NEVILLE ATKINSON**, Shepparton Rural City Council

Abstract: The Goulburn River and its floodplain have major spiritual and cultural connections with Traditional Owners.

This paper details the RiverConnect initiative championed by the Greater Shepparton City Council and the Goulburn Broken CMA to connect communities to use and value: the history, the wide range of attributes (including social, spiritual, cultural, ecological, recreational and educational) that the river and floodplain has to offer. It will also provide an insight to some of the floodplain ecology programs along wetland systems.

Authors: Neville Atkinson, Indigenous Coordinator, Goulburn Broken CMA, nevillea@gbcma.vic.gov.au, 03 5820 1100; Renee Warren, RiverConnect Project Officer, Greater Shepparton City Council, renee.warran@shepparton.vic.gov.au 03 5832 9700; Greg McKenzie, Manager Sustainability & Environment, Greater Shepparton City Council, greg.mckenzie@shepparton.vic.gov.au 03 5832 9700; and Guy Tierney, Statutory Planning and Floodplain Manager, Goulburn broken CMA, guyt@gbcma.vic.gov.au 03 5820 1100

Notes:

THE RUB OF GREEN – STEERING ENVIRONMENTAL OUTCOMES IN NSW CENTRAL MURRAY FLOODPLAIN MANAGEMENT PLANS

3.50-4.10pm **PETER NANKIVELL & PAUL BENDEICH**, NSW Department of Environment, Climate Change and Water

Abstract: Rural floodplain management plans (FMPs) prepared under the NSW Water Act 1912 are used to assess approvals for flood control works (levees, channels and other earthworks). The plans aim to minimise flood risk to floodplain occupiers and support the needs of the floodplain environment. Mapped floodway networks designed for the free passage of floodwaters are a key element of the FMPs. In the central Murray area of NSW between Tocumwal and Swan Hill, plans have been adopted for two floodplain areas while a further three plans have recently been publicly exhibited and are nearing completion.

The Central Murray Floodplain Management Committee (CMFMC), a long-standing committee consisting of representatives of landholder groups, some government agencies and individuals concerned with local flooding issues, was approached by the then Department of Land and Water Conservation in the late 1990s to take an advisory role in preparing rural FMPs. Environmental issues have been a major consideration in the preparation of the plans. The central Murray floodplains contain large areas of ecologically productive wetlands; however, works constructed over many years had disconnected many wetlands. Environmental assessment criteria, developed in consultation with the committee, were prepared to individually assess these isolated wetlands with the aim of identifying those with higher environmental value that were practically suitable for having flood access restored. The criteria were subjected to independent scientific review and were finally adopted following rigorous and transparent discussion.

The paper will describe in detail how development of the environmental criteria for the Tuppal-Bullatale Creeks FMP created unease with some CMFMC members who were concerned that environmental data from the FMP could be used to restrict farm management. This led to some landholders seeking alternative field inspections of their properties. The results from field inspections using an independent assessor funded by local landholders were found to lack sufficient detail to support the agreed environmental criteria and after some deliberation were not accepted by the CMFMC. Desktop assessments of the affected properties proceeded and the results were finally endorsed as the criteria were considered to reasonably address practicality issues.

Following completion of the Tuppal-Bullatale FMP, extensive and rigorous discussions on environmental issues continued throughout preparation of the subsequent FMPs. Ultimately, the plans prepared in consultation with the committee will realise considerable environmental benefits with about 1,000 ha of wetlands identified for reconnection to the flooding regime. The success of the plans can be largely attributed to maintaining transparency in decision-making, using specialist information to inform decision-making and keeping focused on environmental objectives.

Authors: Peter Nankivell and Paul Bendeich, NSW Department of Environment, Climate Change and Water

Notes:



GUIDE TO PROPOSED MURRAY DARLING BASIN PLAN

4.10-4.30pm **SHARON DAVIS**, Murray Darling Basin Authority

Abstract: The Murray–Darling Basin Authority (MDBA) was established by the Water Act 2007 (Cwlth) and charged with preparing a plan — the Basin Plan — which will provide a foundation for managing the water resources of the Murray–Darling Basin in an enduring and sustainable way.

The Guide to the proposed Basin Plan was released on 8 October 2010 followed by a series of community information in regional centres and capital cities. This document presents proposals to the community for discussion on key decisions the Authority is required to make under the Water Act 2007 (Cwlth). In particular, the Authority has proposed new limits on the amount of water that can be taken from the Basin, known as long-term average sustainable diversion limits (SDLs), which will apply to both surface water and groundwater.

The proposed Basin Plan (a legislative instrument) will be released early next year followed by a 16 week consultation process. Ultimately it is up to the Commonwealth water minister to make a decision on the Basin Plan and table it in parliament.

In addition to the sustainable diversion limits, the Basin Plan will include: an Environmental Watering Plan; Water Quality and Salinity Management Plan; and water trading rules. The Basin Plan will be put into effect through new state water resource plans made once the current plans expire.

Authors: Sharon Davis, Murray darling Basin Authority

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COMPARISON OF GERMINATION FROM WINTER VERSUS SPRING FLOODING

4.30-4.50pm **CHERIE CAMPBELL**, Murray Darling Freshwater Research Centre

Abstract: The timing of environmental water delivery can often be determined by non-ecological considerations, such as availability and financial year constraints. This project aims to determine if environmental water delivered in winter provides the same ecological outcomes (in terms of plant species abundance and composition) that would be achieved if the water was delivered in late spring/summer.

This project was undertaken at Webster’s Lagoon on the Lindsay Island Floodplain in north-west Victoria. Since the construction of the Murray River Lock and Weir No. 6 in 1930, Webster’s Lagoon was permanently inundated until a regulator was built in 2006. Since then, drying and wetting phases have been reintroduced.

For this project, soil was collected from the dry wetland in May 2009, prior to an environmental watering event in June 2009. A portion of the soil was inundated in June 2009 to simulate a winter flood event and this was repeated in November 2009 to simulate a spring/summer flood event. The composition and abundance of plant species that germinated were recorded. The results of the two germination trials will be presented and discussed in terms of the implication on management and the importance of timing.

Author: Cherie Campbell, Vegetation Ecologist, Murray-Darling Freshwater Research Centre, P.O. Box 3428, Mildura, cherie.campbell@latrobe.edu.au

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Connecting Rivers, Floodplains, People

CONCURRENT SESSION 5

SA FLOOD HAZARD LEADER

3.30-3.50pm **ED PIKUSA**, Department of Water, SA

Abstract: South Australia has, since 2006, adopted the model of 'Hazard Leaders' to coordinate management of its main emergencies. There are 10 Hazard Leaders in SA, including Flood Hazard. This model is unique to emergency management across Australian jurisdictions.

The Flood Hazard Leader is the Department of Water, Land and Biodiversity Conservation. This agency does not:

- respond to floods,
- issue flood warnings
- approve development on or off of floodplains
- own significant drainage infrastructure
- promote community education to prevent flood damage
- run recovery efforts

And yet it assesses flood risk, determines the hazard, and sets priorities to address them.

This paper explores what exactly the flood Hazard leader does do, and reflects on the benefits and shortcomings of the role after it began 3 years ago.

The current priorities of managing flood hazard in SA are presented, along with key stakeholders, and some case studies illustrating how the role works well, and where it could be improved.

Author: Ed Pikusa, Department of Water, SA

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RISK MANAGEMENT APPROACH IN PRACTICE – THE GATEWAY ISLAND EXPERIENCE

3.50-4.10pm

ROEL VON'T STEEN, North East CMA

Abstract: In Victoria the flood related overlays in Municipal Planning Schemes have put CMAs in a strong position to advise Councils on new developments within the 100 year ARI floodplain. While this is more or less successful an undesirable side effect is that the general public and also Councils are convinced that areas immediate above or adjacent to the 100 year ARI floodplain do not flood and can be fully developed. However SCARM Report 73 Floodplain Management in Australia – Best Practice, Principles and Guidelines (CSIRO 2000) recommends that the Risk Management Approach should apply for all new development within the PMF floodplain. This includes areas within or outside the 100 year floodplain where the Hazard Degree could be medium due to hazardous or impossible access and egress during a major flood event. Within the low and medium hazard areas some type of (over)development should be discouraged.

This cautionary approach has been used by the North East CMA not to sterilise the area but allow for to limited (future) development on relative high sections on Wodonga’s Gateway Island. This paper will describe:

- The known history of flooding of the island and the development to date
- The current zoning, planning controls and Municipal Strategic Statement related to this land
- The assessment of the accuracy of the 100 year ARI floodplain
- The risk assessment of floods larger than the 100 year ARI floodplain
- The process to determine which development , and to what extent is allowable
- The planning process to achieve this
- The conditions to planning permits

This approach could be useful for other areas in Victoria where development on “floodplain islands” is considered.

Author: Roel von’t Steen, North East Catchment Management Authority

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Connecting Rivers, Floodplains, People

RANDOM AND PROTRACTED CONSEQUENCES OF A SHORT DOWNPOUR

4.10-4.30pm **SUSAN DAVIE**, Department of Human Services

Abstract: With current predictions of ongoing climate change leading to more extreme weather events impacting on communities, severe storm events may become more common. These events have potential to have significant impact on both emergency responders and recovery agencies.

A storm event in Bendigo in March 2010 resulted in novel circumstances for emergency recovery agencies dealing with flash flooding.

On 5 March 2010, parts of Bendigo experienced up to 160 millimetres of rain in 2 hours. This caused flash flooding impacting on numerous properties. Local government and Department of Human Services emergency recovery became aware of 16 households in which the residents were displaced due to flooding.

The Emergency Management Act 1986 states that recovery is “the assisting of persons and communities affected by emergencies to achieve a proper and effective level of functioning.” (Sec 4A). The process involves cooperation between all levels of government, non-government organisations, community agencies and the private sector.

The properties affected were dispersed and did not correlate to Bendigo’s flood overlay. This made it very difficult to identify potentially affected properties as traditional flood overlays were of little assistance.

The emergency recovery efforts were presented with some unique challenges as a result of the random impacts on properties. It was difficult to identify properties which may have sustained damage to target recovery efforts as not all were in low lying areas and many of the impacts on buildings were not apparent from the outside of the property. There was the added obstacle that many impacted households did not seek assistance from emergency response agencies rather were self-reliant or sought assistance from family, friends and neighbours. This resulted in protracted impact assessment measures with local government and DHS becoming aware of affected properties over the following week.

Whilst the actual event lasted around 2 hours, some residents remained displaced up to 6 months after the event whilst their homes were repaired.

Author: Susan Davie, Department of Human Services

Notes:



WHAT MAKES A GOOD FLOOD STUDY – CONSULTING TOWARDS GREY HAIR

4.30-4.50pm

STEVE MUNCASTER, Water Technology

Abstract: Over the last thirty year, tens of flood /floodplain management studies (if not more) have been undertaken in Victoria. With ever changing institutional arrangements, evolving technology and increasing community involvement, the approach employed in flood studies has changed considerably over this time. This paper reviews the key changes, and paper suggests a number of key elements to maximise the effectiveness of the public investment in flood related investigations. The paper draws on the experiences of the authors as consultants for numerous flood studies across Victoria. In particular, the paper addresses, amongst others, the following aspects:

- Client’s (agency’s) role
- Community consultation & communication
- Uncertainties in the technical analyses
- Reasonable expectations of the accuracies of flood mapping.

The paper highlights and good, bad and ugly of the delivery of the flood studies across Victoria, and suggests possible measures to improve this delivery.

Authors: Steve Muncaster, Associate, Team Leader - Floodplain Management and Mapping. Water Technology Pty Ltd, Unit 15 Business Park Drive, Notting Hill VIC 3168, www.watech.com.au, steve.muncaster@watech.com.au; and Warwick Bishop, Director, Group Leader – Water. Water Technology Pty Ltd, Unit 15 Business Park Drive, Notting Hill VIC 3168, www.watech.com.au, warwick.bishop@watech.com.au

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Connecting Rivers, Floodplains, People

Conference Day 2: Wednesday 10 November "FLOODPLAINS"

KEYNOTE SESSION

FLOODPLAINS

9.00-9.45am **TREVOR BUDGE**, Senior Lecturer, La Trobe University

Notes:

KEYNOTE SESSION

FLOODPLAINS

9.45-10.30am **KREY PRICE**, Water Program Manager, Tetra Tech Australia Pty Ltd

Notes:



CONCURRENT SESSION 6

OCEAN VERSUS RIVER – COASTAL INTERFACES, CLIMATE CHANGE AND FLOOD ANALYSIS

11.00-11.20am **ROB SWAN**, Cardno Lawson Treloar

Abstract: The interface between river and ocean flooding is becoming of significant importance to the assessment of flooding in coastal areas.

There are a number of areas where the interface between land based flooding and coastal based flooding may interact. The increase in ocean levels, as a result of climate change, adds an additional level of complexity into any assessment and the likelihood of a joint event where coastal and riverine flooding interact is not well understood.

Using real world data, this paper examines the current state of knowledge and provides advice on appropriate downstream boundary levels and the joint probability of ocean and riverine flooding.

Authors: Rob Swan, Manager Water and Environment, Cardno Lawson Treloar; David Provis, Principal Oceanographer, Cardno Lawson Treloar; and Kristen Orange, Senior Coastal Engineer, Cardno Lawson Treloar

Notes:

IMPLEMENTATION OF THE SBRI TECHNIQUE TO ESTABLISH CATCHMENT WIDE FLOOD RISK IN A VICTORIAN CATCHMENT

11:20-11:40am **MICHAEL TURNLEY**, BMT WBM

Abstract: The Susceptibility to Broad-scale Risk of Inundation (SBRI) technique (Barry, et al 2006), was first applied to the Far North Coast region of New South Wales to provide indicative flood extents suitable for planning. The technique is fast and informs the council planning process without the need for detailed hydraulic modelling. It employs a novel methodology that requires only good quality digital elevation model data of the region of interest. The technique is not a substitute for hydraulic modelling, but is a method that can be used at the broad scale, catchment-wide strategic planning stage, prior to area-specific hydraulic modelling. This paper presents the outcomes of a review of the technique and its application to a Victorian Catchment. Conclusions about its applicability for providing guidance to the planning process are also drawn.

Authors: M. Turnley, BMT WBM, Melbourne, VIC, michael.turnley@bmtwbm.com.au; and M. Barry, BMT WBM, Brisbane, QLD, michael.barry@bmtwbm.com.au

Notes:



Connecting Rivers, Floodplains, People

STORM TIDE DYNAMICS AND SIGNIFICANCE TO THE ASSESSMENT OF COASTAL INUNDATION RISKS

11.40am-12.00pm **TIM WOMERSLEY**, Water Technology

Abstract: Inundation of floodplains adjacent to estuaries and coastlines can be caused by extreme coastal water levels. Variations in coastal water levels are caused by a number of different oceanographic and astronomical tidal phenomena. Each of these phenomena is dynamic and behaves differently in shallow coastal zones.

The term 'storm tide' is generally used to describe extreme coastal water levels associated with the combination of the astronomical tidal and oceanographic water level variations. The coastal inundation risks posed by extreme storm tides are attracting increased attention due to the increases in mean sea level predicted this century.

In order to accurately determine the level of flood risk posed by storm tides and increases in mean sea level, the assessment technique needs to be able to resolve the hydrodynamic processes controlling the propagation of storm tides over land.

The use of unsteady, two dimensional hydrodynamic models to assess the coastal inundation risks due to extreme storm tides, including mean sea level increases, is demonstrated at a number of locations along the Victorian coast. The coastal inundation risks determined from the application of these models is compared and contrasted to the inundation risks determined via the static interpretation of peak coastal storm tide levels. The comparisons are considered to demonstrate the significant limitations inherent in this simplified method of assessing coastal inundation risks along the Victorian coastline.

Authors: Tim Womersley, Water Technology, tjw@watech.com.au; Warwick Bishop, Water Technology, wab@watech.com.au; and Annabel Sandery, Water Technology, ass@watech.com.au

Notes:

EMERGENCY MANAGEMENT OF FLASH FLOODING

12.00-12.20pm **ANDREW GISSING**, Victoria SES & **STEVE OPEER**, New South Wales SES

Abstract: Flash flood environments are notoriously difficult to manage from a public safety perspective. Flash flood environments are among the most dangerous flood risk areas and are characterised by little or no warning lead time in the traditional flood prediction context, by rapid rates of rise in flood level and by dangerously high velocity flow of water.

Flash flood environments are often heavily disguised by urban development and the community may have little or no comprehension of the fact that they live or work in a flash flood risk area. Taking into account all of these factors it is not surprising that flash flooding is a significant challenge for incident controllers in flood emergency response organisations such as the SES.

Since 2007 the NSW SES and VICSES in consultation with other SES's around Australia, have been conducting a research and development project targeting flash flood risk. One of the intended outcomes of this work is the development of a guideline to assist planners and incident controllers to make appropriate planning and operational decisions for flash flood environments.

This paper discusses recent collaboration between State Emergency Service's and members of the National Flood Risk Advisory Group (NFRAG) to produce such a guideline. Once finalised it is proposed that the guideline will be promoted nationally through NFRAG which is a sub-group of the National Emergency Management Committee (NEMC).

Authors: Andrew Gissing - Director Emergency Management and Communication – VICSES; and Steve Opeer - Director Community Safety - NSW SES

Notes:



CONCURRENT SESSION 7

BRUSHY CREEK FLOOD MITIGATION AND WATERWAY IMPROVEMENT PROJECT

11.00-11.20am **PAUL RASMUSSEN**, Melbourne Water

Abstract: Melbourne Water is responsible for providing a safe level of flood protection for communities and for protecting and enhancing the health of the region's rivers, creeks and wetlands.

The Brushy Creek project is an example of floodplain and waterway management in an urban setting. Properties in the vicinity of Lee Ann Crescent, Croydon have been prone to regular flooding since the 1960s when the area was subdivided for residential development. Prior to Melbourne Water assuming responsibility in 1984, levee banks were constructed by the former City of Croydon along Brushy Creek to prevent flows in the creek from spreading out onto the floodplain. The creek has overtopped the levee banks several times and properties in the area were flooded as recently as February 2005.

In response, Melbourne Water undertook site inspection, survey and flood modelling to ascertain the effect of a 100 year flood event in the area. In summary, 5 properties in the Lee Ann Crescent vicinity have floor levels below the 100 year flood event. 28 additional properties would be inundated in a 100 year ARI flood event, several low garages and large sheds (used for home businesses) are well below the 100 year flood level and 236 properties not within the floodplain would not have access in or out of the area affected as access is via the floodplain. In 2006, Melbourne Water undertook interim levee bank works to provide 20 year flood protection with a view to delivering a higher level of flood protection in future. Many elements needed to be considered in providing a long term solution to flooding for local residents. Thorough analysis, planning, communications and local meetings are essential key deliverables.

In September 2008, Melbourne Water in cooperation with the SES and Maroondah City Council trialled the Flash Flood Warning System (FFWS) with five households from Lee Ann Crescent, known as the Lee Ann Crescent Pilot Group. With the successful testing of the system and acceptance by the pilot, two additional pilots are being developed for flood prone areas in Blackburn and for a project on the Gardiners Creek.

The works to provide higher level flood protection was undertaken in two stages. Works included the creation of a parallel floodway, increasing the size of an existing sediment pond, creating online pools, removing an underground pipe to re-establishing a section of natural waterway, undertaking weed control and revegetation of the site. In November 2009, Stage 1 of project was successfully completed, providing 50 year flood protection. Stage 2 is in now progress and will increase flood protection to 100 year flood ARI. The many elements of this project were successfully planned, agreed and implemented by input from many agencies and the community to deliver a unique solution. The process used in this project could be repeated and applied in many similar projects.

Authors: Paul Rasmussen and Lee Quach, Melbourne Water

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Connecting Rivers, Floodplains, People

AN UPDATE ON FLOOD WARNING SERVICES IN VICTORIA

11.20-11.40am **ELMA KAZCIC**, Bureau of Meteorology

Abstract: The purpose of this paper is to present an update on recent developments in flood forecasting and warning services in Victoria. These include some of the significant improvements in the data collection and management network in the last 4 years funded through the Modernisation and Extension of Hydrological Monitoring in Australia program. This Australian Government initiative, administered by the Bureau of Meteorology provides \$80 million over the 5 years to modernise and extend hydrometric data collection networks (DCNs) and data management systems. The primary program objective is to make better water information available to the community online.

Victorian water data collectors named in the Water Regulations 2008 have received a total of \$8.3 million over 4 years to upgrade data management systems and DCNs for monitoring sites, including flood warning stations. The paper will describe the range of projects involved including field instrumentation upgrades and improvements in data management systems.

Another recent development is coming about through the work of the Victorian Flood Warning Consultative Committee (VFWCC) on the development of state-wide flood warning service level agreements (SLA). A sub-committee to the VFWCC was formed to develop a framework to define the flood warning service requirements which will be incorporated into the Victorian State Flood Response Plan (SFRP). An initial analysis basin-by-basin will be used to identify service gaps and where there is lack of clarity on matters such as flood class levels and warning requirements so that development effort can be appropriately targeted. The aim is to ensure that this is fully coordinated with the operation of the emergency flood response (or charters) as developed at the local levels through Victoria SES, Local Councils, Catchment Management Authorities and others.

Finally the paper will discuss plans and progress toward the extension of the Bureau's current river (flood) forecasting activities and extending the current flood-only service to one which will involve the preparation of river forecasts for lead times of 7 to 10 days on a continuous basis.

This service is targeted especially at water managers and will be provided in coordination with the other Bureau services to deliver a more comprehensive river forecasting service for a wider range of clients.

Authors: Elma Kazazic, Jim Elliott and Robert Smalley

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IS THIS A FLOOD PROTECTION LEVEE?

11.40am-12.00pm **DANIEL MANOLOCHE**, FM Global

Abstract: This question is repeatedly raised when evaluating the flood risk to property. Available flood maps typically credit existing levees and railway/road embankments as flood mitigation structures and these flood maps may not be conveying the true flood risk.

Levees may reduce the likelihood of a flood, but not the consequences. Areas protected by levee systems are not always apparent and many levees now form a familiar part of our landscape. In areas where flooding has not occurred recently, there may be limited awareness and knowledge of the system.

This paper will examine the key components of a desired audit system to help ensure a flood mitigation system (levee) operates effectively up to the designed height. It is of paramount importance to understand the design criteria of the levee in terms of return period (e.g. 1% AEP), including how the freeboard height was determined, the standard of construction, and the importance of having comprehensive operation, maintenance and emergency works procedures in place. Communities also need to understand that there will always be a residual risk associated with any flood mitigation structure and its reliability is highly dependent on the maintenance regime.

Availability and the cost of property insurance are related to the adequacy and reliability of levees to protect against floods with a 1% and sometimes 0.2% Annual Exceedance Probabilities (AEP). To assist in building up the needed confidence level in flood protection levees, transparent certification and auditing processes are necessary.

Authors: Daniel Manolache, FM Global

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GETTING MORE FROM YOUR FLOOD MODEL: INTEGRATING EVACUATION PLANNING

12.00-12.20pm **SHARON WALLACE**, BMT WBM

Abstract: Estimating the ability for a community to evacuate during a flood event can be an extremely challenging task for emergency personnel. During an evacuation many tasks such as prediction, warning and evacuation must be performed; some sequentially, others concurrently. Planning for an evacuation can be difficult, especially for floodplains with multiple population centres and complex networks of evacuation routes. A sound understanding of these tasks and their relationship to dynamic flood behaviour ensures that emergency personnel can plan their resources more efficiently and assist the community most effectively during a flood event.

Most evacuation capability assessments use manual calculations and consider each evacuation route in isolation. As a result, these assessments are unable to capture a high degree of spatial and temporal complexity in the evacuation operations. To assist the planning process, a GIS-based evacuation planning model was developed which dynamically links:

- Design flood behaviour;
- Evacuation route information; and
- Demographic data.

Importantly, the model can assess complex, interacting populations and routes in a way that is systematic and directly utilises information from a hydraulic flood model. The model can be used to inform evacuation planning by identifying key constraints such as insufficient warning time, limited road capacity or early route closure. The effect of potential scenarios can also be easily assessed, for example different warning dissemination methods, traffic contra-flow, increased floodplain development, or a range of climate scenarios.

The key benefits of the tool are that it enables more efficient evacuation planning, makes better use of existing flood model output, and provides more user-friendly GIS output for a wide range of users, including floodplain managers, emergency managers and planners.

Authors: S. Wallace, BMT WBM, Brisbane, QLD, sharon.wallace@bmtwbm.com.au; C. Dearnley, BMT WBM, Brisbane, QLD, carrie.dearnley@bmtwbm.com.au; and C. Huxley, BMT WBM, Brisbane, QLD, chris.huxley@bmtwbm.com.au

Notes:



Conference Day 3: Thursday 11 November

“PEOPLE”

KEYNOTE SESSION

COMMUNICATING TO PEOPLE IN EMERGENCY SITUATIONS

9.00-9.30am **BRUCE ESPLIN**, Emergency Services Commissioner, Victoria

Notes:

FLOODS AND MEMORIES

9.30-10.00am **JOHN RIDDIFORD**, North East CMA

Abstract: This presentation will cover key learnings from the 1998 and 2010 floods experienced in the North East region of Victoria. It will also cover emergency response activities that emanated from these two events as well as the emergency response to the three mega fires that has occurred in the region during this time period. Parallels will be drawn for emergency response for fire and flood, as well as hydrological responses to the two types of events. Flood preparedness in times of extreme dry periods will also be a key topic.

Author: John Riddiford, Chief Executive Officer, North East CMA, John.riddiford@necma.vic.gov.au

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Connecting Rivers, Floodplains, People

A NEW APPROACH TO COMMUNITY FLOOD EDUCATION

10.00-10.30am **NEIL DUFTY**, Mollino Stewart

Abstract: Although of increasing importance in a future of climate change, community flood education programs have generally been poorly designed and delivered in a relatively ineffective, 'top-down' manner.

A new approach to flood education is promoted that broadens its focus from increasing awareness and preparedness levels to building flood resilient communities.

Four functions of flood education are identified to help communities learn to build their resilience. Other features of the new approach are increased community participation in the design, implementation and evaluation of programs and effective ongoing education provision through local flood education plans.

Author: Neil Dufty

Notes:

THE FUTURE OF FLOOD WARNING EMERGENCY MANAGEMENT IN VICTORIA

11.00-11.20am **ANDREW GISSING**, Victoria SES

Abstract: Increasing the resilience of communities and individuals against natural and other hazards is the primary goal of emergency management. In Victoria, flooding constitutes a major threat to communities, and the start of the 21st century has seen VICSES developing its flood emergency management capabilities in increasingly challenging and uncertain circumstances. This paper discusses key trends and challenges facing VICSES in seeking to increase resilience against the flood threat and proposes some potential advances in flood emergency management. In addition, the paper explores the importance of relationships between emergency management, flood warning and floodplain management agencies in managing future trends and challenges.

Authors: A. Gissing, Director Emergency Management and Communication, Victoria State Emergency Service, Southbank, Victoria, andrew.gissing@ses.vic.gov.au; T. White, Director Operations, Victoria State Emergency Service, Southbank, Victoria, trevor.white@ses.vic.gov.au; and C. Harrop, Emergency Management Planning and Advice Officer, Victoria State Emergency Service, Southbank, Victoria, cherry.harrop@ses.vic.gov.au

Notes:



INSURANCE RISKS IN A CHANGING CLIMATE

11:20-11:40am **SAMANTHA ZIMMERMAN**, Victorian Managed Insurance Authority

Abstract: Scientific evidence supports there will be an increased frequency of extreme weather events. The impacts of extreme weather events will be influenced by changes in climate, resilience of ecosystems, infrastructure suitability and society's capacity to respond and recover.

With increased uncertainty comes increased vulnerability, which is often shaped by many factors and variables that are interconnected and difficult to model.

The influence of population growth, disaster preparedness, economic viability and society's capacity to respond are significant contributing factors to the climate change conundrum. In addition, what guides us will be our short and long term actions to mitigate or adapt to risk. Adopting a short term view can lead to increased vulnerability in the longer term and potentially create even greater extremes. In a flood context, this may occur where populations feel protected by levies and increase local development, only to suffer greater impacts if an extreme event occurs and the levies fail.

As extreme events such as major floods occur, insurance will play a critical role in the mitigation and response phase. Insurers will need to drive improved risk management to protect balance sheets and smooth losses. There is now growing pressure on insurers to rethink traditional risk management methods and critically analyse current products and services. This presents an opportunity for insurers because of their unique capacity to use aggregated data and lessons learned from claims to enhance products and services.

Traditional insurance relationships are already evolving with an increased focus on risk management, particularly for potential large loss events. This is necessary to maintain insurance and reinsurance markets, which will only survive if they remain profitable.

Author: Samantha Zimmerman Risk Management Advisor, Victorian Managed Insurance Authority

Notes:

TAKING A WIDER VIEW – LOCAL AND REGIONAL FLOOD STUDIES

11.40am-12.00pm **STEVE MUNCASTER**, Water Technology

Abstract: Traditionally flood studies have focused on a local study area e.g. township. With the availability and use of broad scale ALS topographic data, the study areas for flood studies have increased to a regional/reach scale. In some cases, the regional scale flood studies have covered locations with recent local flood studies.

This paper discusses the possible inconsistencies arising between the outcomes of local and regional flood studies. In particular, the consistency of design flood estimates along a reach, and the presence of additional overland flow-paths entering local study areas, are considered. The paper draws on a number of case studies including the Goulburn River Environmental Hydraulics Study, and Wimmera River-Yarriambiack Creek Flow Modelling Project.

A range of possible approaches for floodplain management authorities to reconcile the potential inconsistencies are proposed.

Authors: Steve Muncaster, Associate, Team Leader - Floodplain Management and Mapping. Water Technology Pty Ltd, Unit 15 Business Park Drive, Notting Hill VIC 3168, www.watech.com.au, steve.muncaster@watech.com.au; and Guy Tierney, Manager Floodplain Management and Statutory Planning, Goulburn Broken Catchment Management Authority, www.gbcma.vic.gov.au, guyt@gbcma.vic.gov.au

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Thank You

Thank you for your attendance at the **7th Biennial Victorian Flood Conference**, held in the beautiful city of Bendigo. We hope you gained a lot from participating in this important event, especially given the recent climatic events in North Central Victoria and across Australia, and look forward to receiving your conference feedback form, as contained in your conference delegate packs. Safe travels upon your departure.

Conference Steering Committee, North Central CMA



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