

Corangamite Catchment Management Authority

FLOODPLAIN MANAGEMENT STRATEGY

Update

December 2013



Jan 2011 Barwon River flood at Moorabool Street Bridge Geelong

Corangamite Catchment Management Authority
Floodplain Management Strategy
Original approved by Board 12 April 2002
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Compiled by Floodplain Statutory Team
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Strategy Update Summary

Background

This review and update of the 2002 Floodplain Strategy has been undertaken as an interim measure until the new State Floodplain Strategy is released later in 2014. All of the 2002 strategy programs have been reviewed and new actions proposed to the end of June 2015.

A summary of recent floods in the Region and their impact is included as well as recent priority for large development areas are highlighted.

Review of 2002 Programs

The review of the 2002 Strategy showed that 60% of the proposed actions have been completed with another 11% will be completed this year. The attached Table U3 shows the status of each of the proposed actions in the 2002 Strategy programs. A summary of the proposed program status is shown below grouped by priority (High, Moderate and Low).

Program	Completed			In progress			Not commenced		
	H	M	L	H	M	L	H	M	L
Asset Management	5	1	0	1	1	0	0	1	1
Local Flood Studies and Flood Mapping	1	11	0	0	1	0	0	0	0
Flood Warning and Flood Preparedness	4	0	0	0	1	0	1	2	0
Statutory Land use Planning	4	6	0	1	1	0	1	6	0
Development and Research	2	0	0	0	0	0	3	1	0
Totals	16	18	0	2	4	0	5	10	1
	34			6			16		

Outstanding Actions

The highest outstanding actions relate to the introduction of flood overlays in the City of Ballarat planning scheme. There was agreement in principle in 2002 for the overlays to be introduced with council, but progress has been slow.

No Floodplain Development Plans or flood preparedness plans have been commenced due to available resources in both councils and the CMA. The Victorian SES has commenced a program in 2013 to write flood preparedness plans with help from the CMA and council and 4 have been completed.

No floodplains have been declared by the authority or any work on a property flood database due to available resources and some of the allocated priorities in 2002 have less priority now.

The floodplain team first priority over the last 10 years is to deal with the increasing referrals from councils and the general public. The number of referrals completed since July 2005 is shown in table below and shows the increasing work load just for this activity.

Year	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13
No. completed	337	359	518	630	685	703	732	855

Flood Events since 2002

Two large flood events have occurred since 2002 as shown in the table below.

Month/Year	River	Towns Affected	Comment
Aug 2010	Curdies	Curdie, Peterborough	60-80 yr ARI
	Gellibrand	Princetown	80-100yr ARI
Jan 2011	Leigh	Shellford Inverleigh	50 yr ARI
	Lower Barwon	Geelong	5-8 yr ARI
	Woody Yallok	Cressy	100 yr ARI

Two flood event occurred in 2010 with wide spread rainfall over our region in August and early September. In August major rainfall fell in the previous 24 hours with 136mm at Weeaprounah in the Otways.

Curdies River, Scotts Creek, Gellibrand River, Barham River and Tributaries.

- Lost/Damaged crossings, fishway damage, erosion control works damage, damaged riparian fencing, damaged off stream water infrastructure, young riparian planting damage. Extensive low lying rural land inundated along rivers and creeks.
- Crossing replacements, minor repairs to structures, some replanting and fence repair required. Repairs were delayed until late November due to difficult access caused by waterlogged paddocks;
- Corangamite Shire has a number of road crossings damaged requiring repair work. No details or costs are known.



Curdies River at the Trestle Bridge, Curdie. Highest level reached on record at this site.

Widespread rainfall falling on the northern tributaries of the Barwon River catchment during Friday 14 January 2011 averaging 50 to 70 mm's, the Barwon River at Geelong flooded to 3.78m on the 16 Jan 2011. The previous days had been wet with significant rainfall of 20-40mm falling on Tuesday and Wednesday creating a wet catchment.

The resulting impact of the flood is shown in the table below.

River	Location	Impact
Leigh River	Above Shelford	Widespread low lying rural lands inundated along river.
	Shelford	3 homes flooded over floor, 3 further homes threatened, 1 defended by sandbags. 6 people self evacuated. Bannonsburn-Shelford Road closed. Inverleigh-Shelford Road closed due to flooding.
	Inverleigh	1 home flooded over floor, 2 others threatened. Water entered backyards along northern edge of town. Hamilton Hwy closed west of Inverleigh Saturday morning.
Moorabool River	Above Batesford	Minor low lying rural lands inundated along river.
	Batesford	Flooding below Minor Level. Low lying rural land flooded close to River Street. Level reached slightly less than Feb 2005 Flood.
Barwon River	Above Inverleigh	Minor low lying rural lands inundated along river.
	Geelong	Golf course at Queens Park Majority of walking paths along both sides of river inundated. Riverdale Road Newtown closed along Balyang Golf course Barrabool Road closed under Sewer Bridge 5 rowing sheds and Blue room flooded over ground floors Inner track flooded at Landy Field Flooding along Steel and Woods Street up to Barwon Terrace. Parts of Gravel Pits Road closed. Breakwater Road closed. Ovals flooded off Breakwater Road and Barwon Heads Road. Belmont Common flooded (Golf Course) Half of Barwon Heads Rd along Belmont Kmart Centre and new criterion bicycle track flooded. The photograph on the front of this report shows resulting flooding around Moorabool Street bridge Geelong.
	Below Geelong	Parts of rural land along river inundated. Water ponded within Sparrowvale Levees from local runoff. Not flooding problems at Lake Connewarre/Barwon Heads.

Recent development areas in the Region

In recent years four new urban growth areas had been proposed requiring significant floodplain and drainage planning work with council staff and consultants in developing planning scheme urban growth and structure plans. The four main areas are:

- Armstrong Creek
- Lara (West and North)
- Ballarat West
- Canadian Creek Tributaries (SpecimenVale, Pennywright and Lal Lal creeks)

Residential development has now commenced in all four areas requiring continuing work on submitted subdivision plans, proposed waterway works and applicable flood extent and levels.

New Actions 2013-15

New actions proposed for the next 2 years until June 2015 are shown in Table U2. This program has priorities, indicative costs and proposed funding arrangements. The total cost of implementing this program over 2 years is \$232K with an annual cost to the CCMA of \$32K for 2013-14 and \$60K for 2014-15. It is proposed that 60% of the total program funds required will be obtained via grants and partnerships with stakeholders.

Attached Tables

- U1 New Actions commenced since 2002
- U2 Proposed Actions July 2013 to June 2015
- U3 Review of 2002 Strategy Actions

Appendix

- A Floodplain Management Strategy April 2002

Table U1 – New Actions commenced since 2002

Priority	Action	Responsibility	Performance Target	Funding Share	Indicative Cost
H	Bellarine/ Corio LCHA Study – impact of climate change on sea level rise (3 rd pass)	DEPI/ CoGG/ BoQ/ CCMA	Completed by Mar 2014	\$10K ccma	\$300K
H	Ballarat Urban Creeks – Review of 2008 Flood Study Report including detail modelling of the lower Gnar Creek and Mall area.	CoB/ CCMA	Completed Feb 2013	\$ 10K ccma	\$20K
H	Ballarat Tribs Floodplain mapping – Specimenvale, Pennywight and Lal Lal Creeks.	CoB/ CCMA/ DEPI	Completed by Apr 2014	\$ 30 K ccma	\$120 K
H	Woody Yaloak Diversion Scheme – revised strategy including the impact from climate change. Western Region Sustainable Water Strategy	DEPI/ CCMA	Completed Nov 2011		?
H	North Curdare Barrage culvert replacement	DEPI/ CCMA	Design completed by Dec 2013. Constructed by Apr 2014	State funding	\$30K \$200K
H	Increased demand for Floodplain Advice due to increased development in the Region and from Insurance costs increases. Use of contractors to reduce backlog.	CCMA	Ongoing		\$30K
H	Armstrong Creek Urban Growth Framework Plans C138 & C170 (Nov 2008), C206 & C207 (May 2010)	CoGG/ CCMA	Completed May 2010	\$3K ccma	?
H	Planning structure plans for Lara development areas. Tribs of Hovells Creek. Lara West C246 (May 2013), Manzeena Ave C285 (ongoing)	CoGG/ CCMA	Ongoing		?
H	Renewal of CCMA Works on Waterway Authority	DEPI	Completed by June 2014		
H	Maintenance of flood information on GIS system including mapping completed by councils.	CCMA	Completed by Mar 2014		\$6K
M	Planning structure plan for Ballarat West development area	CoB/ CCMA	Completed March 2009		?
M	Lough Culvert Drainage Scheme – revised strategy with Climate change	CCMA	Completed by June 2014		\$20K
M	Revised flood overlays for Corangamite Shire Planning Scheme	CS/ CCMA	Completed by June 2014		?

M	Revised flood overlays for Surfcoast Shire Planning Scheme	SCS/ CCMA	Completed by May 2014	\$3 K ccma	\$20K
M	Golden Plain Shire flood study	DEPI	Completed by June 2014		\$100K
M	Painkalac Creek Flood Study (in house)	CCMA	Completed Aug 2013		\$3K
M	Anglesea River Flood Study (in house)	CCMA	Completed Aug 2013		\$3K
M	Thompson Creek Flood Study (in house)	CCMA	Completed Aug 2013		\$3K
M	Moorabool River Flood Study (in house)	CCMA	Completed by Mar 2014		\$3K
M	Leigh River Flood Study (in house)	CCMA	Completed by Apr 2014		\$3K
M	Mid Barwon River Flood Study (in house)	CCMA	Completed by May 2014		\$3K
M	Lower Barwon River Flood Study (in house)	CCMA	Completed by June 2014		\$3K

Table U2 - Proposed Actions 2013- 2015

Priority	Action	Responsibility	Performance Target	Funding Share	Indicative Cost
H	2D cells model of Morrabool River at Batesford	CCMA	Completed by June 2014	\$20K ccma	\$50K
M	2D cells model of Barwon River through Geelong	CCMA	Completed by June 2015	\$20K ccma	\$80K
M	2D cells model of Leigh River at Shellford	CCMA	Completed by June 2015	\$20K ccma	\$50K
M	Revised flood overlays for Golden Plains Shire	GPS/ CCMA	Completed by June 2015	\$5K ccma	
M	Revised flood overlays for Moorabool Shire	MS/ CCMA	Completed by June 2015	\$5K ccma	
M	Revised flood overlays for City of Greater Geelong	CoGG/ CCMA	Completed by June 2015	\$5K ccma	
M	Revised flood overlays for Borough of Queenscliffe	BoQ/ CCMA	Completed by June 2015	\$5K ccma	
M	Renewal of Barwon River flood network MoU	Members	Completed by Mar 2014		
M	Woody Yallock catchment Flood Study (in house)	CCMA	Completed by June 2014	\$4K	\$4K
M	Gellibrand River catchment Flood Study (in house)	CCMA	Completed by June 2014	\$4K	\$4K
M	Curdies River catchment Flood Study (in house)	CCMA	Completed by June 2014	\$4K	\$4K

Table U3 – Review of 2002 Strategy Actions**Asset Management**

Priority	Action	Responsibility	Performance Target	Funding Share	Indicative Cost	Completed?	Comments
H	Kinnersly Ave Retarding Basin-Canadian Creek, Ballarat Stage 1	CoB	Works proposed to start Jan 2002	1/3 Federal, State, Local	\$700K	completed	Works built as part of subdivision.
H	Kinnersly Ave Retarding Basin – Canadian Creek, Ballarat Stage 2	CoB	Works proposed in 2003/04	“	\$350K	completed	Works built as part of subdivision.
	(extension of basin area to the south)						
H	Coordinate maintenance of Barwon River flood warning system	CCMA	Ongoing \$ 30,000 per year	5 Councils and CCMA	\$150K	completed	MOU needs to be renewed with partners
H	Operation and Maintenance of the Drainage Schemes (LC & WY)	CCMA	Ongoing \$160,000 per year	CCMA	\$800K	completed	
H	Audit reports on significant flood assets every 3 years	Asset owner/CCMA	All CCMA assets inspected every 3 years	CCMA	\$10K	completed	Drainage scheme assets inspected. Lower break and fish structures ?
H	Review operating guidelines for Lough Calvert and Woody Yaloak drainage schemes	CCMA	Complete catchment model by Sept 2002. Completed review by end of June 2003	\$172K NAP Funding,	\$206K	underway	WYDS nearly completed. LCDS underway.
				\$34K CCMA			
M	Gnarr Creek improvements through CBD of Ballarat	CoB/CCMA	Finalise design options by July 2002.	1/3 Federal, State, Local	\$1.2M	completed	Completed by City of Ballarat
M	Replace culvert crossings with bridges, Lough Calvert main channel	CCMA	Replace one crossing a year with a bridge structure.	“	\$500K	not started	No money allocated.
M	Implement Lough Calvert and Woody Yaloak Scheme options following operating rules review	CCMA	Begin agreed options by Dec 2003 following NAP Study.	“	\$750K	underway	Cundare barrage culverts being designed and constructed summer 2013-14.
L	South Geelong Industrial levee Option A	CoGG/CCMA		“	\$3.3M	abandoned	Adopted option by CoGG to allow filling of allotments for new developments.

Local Flood Studies and Flood Mapping

Priority	Action	Responsibility	Performance Target	Funding Share	Indicative Cost	Completed?	Comments
H	Flood Mapping – Canadian Creek, Gnarr Creek and Yarrowee River	CCMA & CoB	Govt funding 2002/03	1/3 GOVT, CCMA & SHIRE	\$105K	completed	
M	Flood Mapping – Leigh River at Inverleigh	CCMA & GPS	Govt funding 2002/03	“	\$42K	completed	
M	Flood Mapping – Ballarat urban drains (Redan Creek/Winter Creek)	CCMA & CoB	Govt funding 2003/04	“	\$25K	completed	
M	Flood Mapping – Geelong urban creeks (Cowies Creek)	CCMA & CoGG	Govt funding 2003/04	“	\$80K	not started	A flood review of Cowies Creek completed indicating low flood risk.
M	Flood Mapping – Geelong urban creeks (Waurm Ponds Creek)	CCMA & CoGG	Govt funding 2004/05	“	\$70K	completed	
M	Flood Mapping – Moorabool River at Batesford	CCMA	Govt funding 2003/04	“	\$50K	completed	Internal study by CCMA. Full 2D model study proposed 2013-14.
M	Flood Mapping – Barongarook Creek at Colac	CCMA & COS	Govt funding 2004/05	“	\$50K	completed	
M	Flood Mapping – Wye and Kennett Rivers	CCMA & COS	Govt funding 2005/06	“	\$80K	completed	Internal study by CCMA based on historic flood event.
M	Flood Mapping – Hovells Creek at Lara	CCMA & CoGG	CCMA funding 2001/02	CoGG & CCMA	\$80K	completed	Completed by CoGG
M	Flood Mapping – Smythesdale (Woody Yaloak River)	CCMA & MS	Govt funding 2004/05	1/3 GOVT, CCMA & SHIRE	\$40K	underway	Partially completed. Needs 2D modelling to complete. Low priority.
M	Flood Mapping – Barwon River at Winchelsea and Birregurra	CCMA & Shires	Govt funding 2005/06	“	\$60K	completed	Winchelsea completed. Preliminary extent for Birregurra completed.
M	1% Tide level Study from Barwon Heads to Peterborough	CCMA	Govt funding 2005/06	“	\$20K	completed	CSIRO report Dec 2009.
M	Flood Mapping – Leigh River at Shelford	CCMA & GPS	Govt funding 2006/07	“	\$30K	completed	Internal study by CCMA based on historic flood event.

Local Flood Studies and Flood Mapping (continued)

Priority	Action	Responsibility	Performance Target	Funding Share	Indicative Cost	Completed?	Comments
M	Flood Mapping – Native Hut Creek at Teesdale	CCMA & GPS	Govt funding 2006/07	“	\$30K	completed	Internal study by CCMA based on RORB and hecRas models.

Flood Warning and Flood Preparedness

Priority	Action	Responsibility	Performance Target	Funding Share	Indicative Cost	Completed?	Comments
H	Flood Preparedness Plan for Barwon River in Geelong	CCMA & CoGG	Govt funding 2002/03	1/3 GOVT, CCMA & SHIRE	\$25K	completed	Completed by CoGG.
H	Flood Preparedness Plan for Canadian, Gnarr, Redan Creeks and Yarrowee River, Ballarat	CCMA & CoB	Govt funding 2003/04	“	\$25K	unknown	Some work done by City and VSES
H	Flood Preparedness Plan for Leigh River, Shelford to Inverleigh	CCMA & GPS	Govt funding 2003/04	“	\$20K	completed	Completed by VSES
H	Flood Preparedness Plan for Moorabool River in Batesford	CCMA & CoGG	Govt funding 2003/04	“	\$20K	completed	Completed by CoGG.
M	Flood Preparedness Plan for coastal towns in Colac Otway Shire	CCMA & Shires	Govt funding 2004/05	“	\$30K	unknown	
M	Study the viability of flood warning for Ballarat floodplains	CCMA & CoB	Govt funding 2004/05	“	\$10K	abandoned	Flood warning is not viable at this stage.
M	Publish Flood Preparedness brochure for region	CCMA	By June 2002	“	\$10K	underway	Work being completed by VSES.
H	Flood monitoring and reporting (significant floods only)	CCMA	Report within 4 weeks after flood event.	CCMA	\$10K	completed	All flood reports completed by CCMA.

Statutory Land Use Planning

Priority	Action	Responsibility	Performance Target	Funding Share	Indicative Cost	Completed?	Comments
H	In principle agreement that all appropriate flooding overlays be placed on municipal planning schemes based on the best available data set	CCMA	Process accepted by municipalities by June 2002;	CCMA	\$45K	underway	Only City of Ballarat to be implemented. Agreement by City to introduce flood overlays.
H	Prepare local floodplain development plan for CoGG	CCMA/CoGG	Both by Jan 2003	½ share each	\$40K	completed	Just completed with help from Melb Water.
	Incorporate flood overlays into scheme					completed	
H	Prepare local floodplain development plan for Ballarat	CCMA/CoB	Both by Jan 2004	“	\$60K	unknown	
	Incorporate flood overlays into scheme					underway	
H	Reply to referrals by prescribed date	CCMA	90% of referrals replied within 14 days of receipt.	CCMA	\$300K	completed	Ongoing
				(\$60K yr)			
M	Provide technical advice on floodplain issues	CCMA	90% within 28 days	CCMA	\$50K	completed	Ongoing
				(\$10K yr)			
M	Prepare local floodplain development plan for Golden Plains Shire	CCMA & GPS	Both by July 2003	½ share each	\$20K	unknown	
	Incorporate flood overlays into scheme					completed	Overlays in Scheme.
M	Prepare local floodplain development plan for Colac Otway Shire	CCMA & COS	Both by Jan 2005	“	\$20K	unknown	
	Incorporate flood overlays into scheme					completed	Overlays in Scheme.

Statutory Land Use Planning (continued)

Priority	Action	Responsibility	Performance Target	Funding Share	Indicative Cost	Completed?	Comments
M	Prepare local floodplain development plan for Corangamite Shire	CCMA/Corang	Both by Jan 2005	“	\$30K	unknown	
	Incorporate flood overlays into scheme					completed	Review of current overlays proposed.
M	Prepare local floodplain development plan for Moyne Shire	CCMA/Moyne	Both by Jan 2006	“	\$20K	unknown	
	Incorporate flood overlays into scheme					completed	Overlays in Scheme.
M	Prepare local floodplain development plan for Queenscliffe Borough	CCMA/QCB	Both by Jan 2006	“	\$20K	not started	
	Incorporate flood overlays into scheme					underway	Flooding from tidal surge events and part of 3rd pass work pilot underway.
M	Prepare local floodplain development plan for Moorabool Shire	CCMA/MS	Both by Jan 2006	“	\$20K	unknown	
	Incorporate flood overlays into scheme					completed	Overlays in Scheme. Need to be reviewed but low risk.

Development and Research

Priority	Action	Responsibility	Performance Target	Funding Share	Indicative Cost	Completed?	Comments
H	Declare existing Canadian Creek/Yarrowee River flood levels	CCMA	Declare by June 2003	CCMA	\$30K	not started	
M	Declare all flood levels resulting from flood studies by CCMA or council including Lake Victoria and Rippleside Drain	CCMA	Declare by Dec 2002	CCMA	\$20K	not started	
H	Develop and maintain a property GIS database of all flood prone properties resulting from flood studies.	CCMA	Complete database by June 2002	CCMA	\$30K	not started	
H	Floodplain 'best practice' – training with each municipality	CCMA	Run workshops for all municipalities by Dec 2002	CCMA	\$10K	completed	Regular meeting with Council staff undertaken each year.
H	Keep flood plans for the region up to date.	CCMA	Update changes and distribute to stakeholders four times per annum	CCMA	\$50K	not started	Updates now done through VFU ?
H	Develop a referral decision process policy	CCMA	Complete by May 2002	CCMA	\$10K	completed	Updated recently.

APPENDIX

A Floodplain Management Strategy April 2002