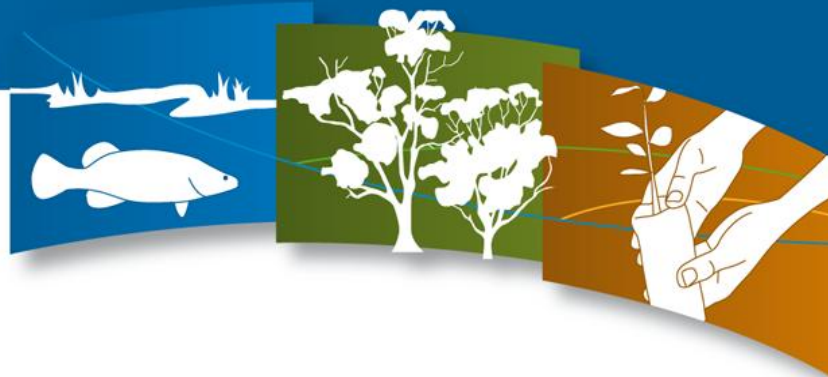


Flood Recovery Works Update

North Central CMA Region



NORTH CENTRAL
Catchment Management Authority
Connecting Rivers, Landscapes, People



June 2013

This update summarises the flood recovery and related projects undertaken by the North Central CMA since the 2010-11 flood events.

Flood Management Plans

- The Castlemaine, Campbells Creek and Chewton Flood Management Plan is progressing to schedule with hydraulic modelling results due in early August. Potential mitigation options will then be assessed.
- The development of the Dunolly Flood Study is well underway. The next stage of the study is to display the information compiled to date and to gather any additional information from the community on Wednesday 26 June.
- The Carisbrook Flood and Drainage Management Plan is now complete. Central Goldfields Shire Council has applied for \$410,000 of funding under the Natural Disaster Resilience Grants Scheme (NDRGS) for vegetation thinning works, project management and detailed design of flood mitigation options.
- The Rochester Flood Management Plan is now complete. Campaspe Shire has sought funding under NDRGS to implement the flood warning recommendations, undertake detailed planning and levee design to replace a channel due to be decommissioned, as well as further assessment and design of the recommended structural mitigation options. This will provide Council and the community with sufficient information to make further decisions about this option.
- The Charlton Flood Management Plan is now complete. Funding has been sought by the Buloke Shire Council under NDRGS to undertake the detailed design of levees to protect the town against a repeat of the January 2011 flood event. Funding is also being sought to remove culverts under the Charlton–St Arnaud Road. The Council and community will not be making a final decision to proceed with the construction of flood protection levees until detailed design and costing is complete.

- The Donald Flood Management Plan is now complete. Funding has been sought by Buloke Shire Council to construct two flood protection levees to protect against a repeat of the January 2011 flood event. As there is a high level of community support and no properties are adversely affected by the works, funding for both design and construction of the works is able to be sought.

Fencing repairs

- Over the past 18 months, the North Central CMA has worked with 166 landholders across the region to repair or replace previously funded, flood damaged fencing along waterways.
- \$1.6M of Natural Disaster Relief funding enabled 176km of fencing to be repaired and 89km to be completely replaced due to the damage caused by floodwater and associated debris.
- Reinstating stock-proof fencing along waterways will continue to protect the banks, riparian vegetation and water quality from the impacts of stock.

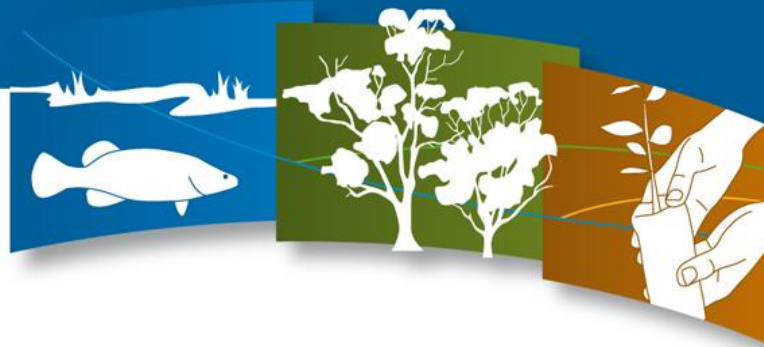


Figure 1: Repaired waterway protection fencing along Tullaroop Creek, Carisbrook.

Connecting Rivers, Landscapes, People



NORTH CENTRAL
Catchment Management Authority
Connecting Rivers, Landscapes, People



Erosion control repairs

- To date, over \$3M of Natural Disaster Relief funding has seen the completion of 116 repairs to previously installed erosion control structures on 59 properties.
- The remaining 25% of repairs will be completed in coming months pending suitable weather conditions.
- To see time-lapse footage of the replacement of a failed erosion control structure in the upper Avon-Richardson catchment go to <https://www.youtube.com/watch?v=WPRiAQUzMBI>



Figure 2: A repaired erosion control structure near Tarnagulla performing its role of reducing the in-stream gradient and preventing further streambed incision, June 2013.

- To improve their long-term resilience, a total of 12 km of fencing and revegetation of 80,000 plants along with 33 kg of broadcasted native grass seed will be completed around each repaired structure by October 2013.
- Managing stock access with fencing allows planted and naturally regenerating vegetation to establish, and eliminates the direct impacts of livestock destabilising the stream bed and banks.

- Vegetation establishment provides the long-term stability that rock structures provide in the shorter-term. The roots of vegetation act to reduce the risk of soil movement, while water use minimises soil saturation which can contribute to bank failure. Vegetation increases landscape roughness, thus reducing the flow velocity and potential for erosion to occur.
- Prior to works commencing in the Toolleen area, cultural heritage assessment of the site revealed a stone artefact scatter. Another assessment near St Arnaud revealed a buried cooking hearth. Measures were taken to minimise harm to these sites during construction.



Figure 3: In April 2013 Victorian Minister for Water, Peter Walsh MP, visited a repaired pile field at Newstead with North Central CMA's Damian Wells (CEO), Christine Brooke (Deputy Board Chair) and Angela Gladman (Project Manager).

Revegetation replacement

- Replacement of approximately 200,000 seedlings was completed on 56 properties during spring 2012. These plants replaced previous North Central CMA plantings destroyed by floodwaters along waterways throughout the region.
- In spring 2013 the North Central CMA will coordinate the planting of an additional 80,000 plants around the repaired erosion control structures on 38 landholder properties.



NORTH CENTRAL
Catchment Management Authority
Connecting Rivers, Landscapes, People



Connecting Rivers, Landscapes, People



Figure 4: Replacement of flood damaged revegetation in October 2012 along the Campaspe River, Woodend.

Drainage system repairs

- In February 2013 the North Central CMA began to remove silt and repair damaged culverts where required along 329 km of regional surface water drains damaged by flood across the seven waterways that make up the Bullock Creek Improvement Trust drainage system.
- Utilising \$430,000 of Natural Disaster Relief funding, the project has completed detailed surveys to define the areas and quantities of silt for removal to enable the drains to function effectively.
- The drainage repair funding does not extend to 669 km of privately owned and operated community surface water drains, nor those drains owned and operated by Goulburn-Murray Water.
- Repair works involving 19 landholders have been completed along Seven Months Creek and the Western Depression Drain, with some minor delays due to wet conditions. Works will continue systematically across sections of Bullock, Welshes, Calivil, Nine Mile and Pennyroyal creeks over coming months.



Figure 5: Desilting a section of Seven Months Creek near Pyramid Hill, February 2013.

Quambatook Weir replacement

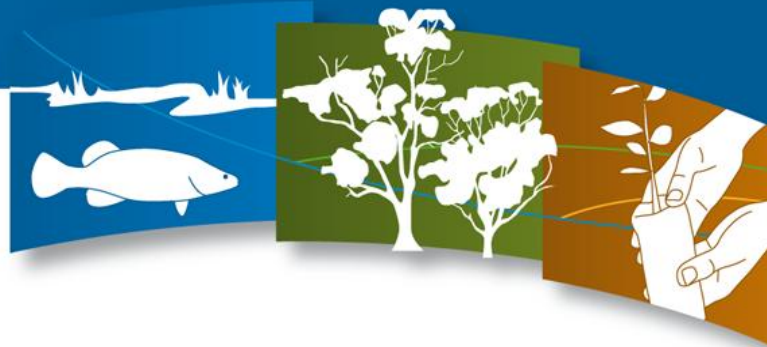
- Natural Disaster Relief funding was secured to replace the flood damaged Quambatook Weir on the Avoca River.
- The North Central CMA contracted Gannawarra Shire Council to build a replacement structure by 31 August 2013 at which time ownership of the asset will transfer to the Council.
- The repairs, which commenced in late May 2013, will see an operable structure rebuilt at the same full supply level as the flood damaged weir.



Figure 6: Concrete reinforcement of the Quambatook Weir commenced in May with the gate fitted in June 2013 (Photo: Gannawarra Shire Council)



NORTH CENTRAL
 Catchment Management Authority
Connecting Rivers, Landscapes, People



Pental Island levee realignment

- A 3.3 km section of the Pental Island levee (a North Central CMA asset) will be realigned with the Natural Disaster Relief funding.
- The aim of the project is to:
 - realign the levee to a standard and location consistent with the existing Pental Island levee system
 - maintain the protection of all life and property on Pental Island as far as possible from flooding
 - minimise harm to sites of cultural heritage significance
 - minimise the environmental impact of works.
- To date, a feature survey and a flora, fauna and net gain assessment, finalisation of the alignment and an arborist assessment on impacted trees have been completed. Discussions are currently underway with the Department of Environment and Primary Industries (DEPI) regarding the native vegetation offsets required.
- Pending approvals, construction is planned for summer 2013-14.



Figure 7: Surveyors marking trees within the construction zone along the Pental Island levee realignment, February 2013.

Stream gauge repairs

- Repairs to 13 water quality stream gauges along key waterways were completed with \$93,000 of Natural Disaster Relief funding over the past two years.



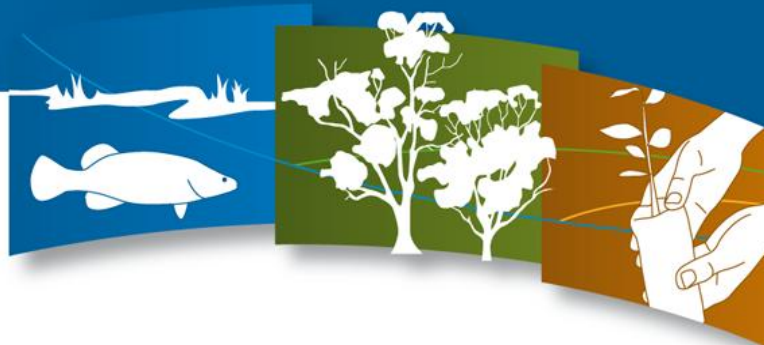
Figure 8: Flood debris removed at a Campaspe River stream gauge, Eppalock (Photo: Thiess Services)

Levee breach repairs

- As a result of the 2010-11 floods in Victoria, a number of levees in north central Victoria were breached or otherwise damaged. A number of these levees, which are located both on Crown and privately-owned land, are of unknown origin and ownership; however they contribute to the protection of public assets.
- On behalf of the Victorian Government the North Central CMA undertook 202 emergency and strategic levee repairs on the Loddon floodplain over a two-year period since the January 2011 flood event at a cost of \$1.05M.
- Each levee repair was inspected by engineering consultants and a brief report provided on the integrity of the repair works.



NORTH CENTRAL
Catchment Management Authority
Connecting Rivers, Landscapes, People



Connecting Rivers, Landscapes, People



Figure 9: An emergency levee repair, January 2011

Levee assessment project

- A Victorian Government funded project to survey and assess the condition of over 250 km of strategic levees along the Murray and Loddon rivers from Echuca to Tyntynder was completed in May 2013.
- The project involved detailed field surveys (July-December 2012) to plot long- and cross-sections of levees, capture geo-referenced photos and identify points of weakness and height.



Figure 10: A section of the Murray Murrabit levee surveyed in November 2012 (Photo: Water Technology)

- Twenty-six kilometres of levee (10%) was found to have a crest height below the standard level of protection (100 year ARI).
- Points of weakness (discrete locations along a levee that do not offer the same level of protection) were also identified, e.g. infrastructure such as tracks and pipes traversing the levee; or biological impacts such as saplings, rabbit burrows and wear by cattle or horses.
- Of the more than 7,000 points of weakness identified, 257 sites and approximately 1.5 km of linear features were ranked as extreme or high risk.
- An indicative capital cost of \$11M has been calculated for the identified works addressing the priority points of weakness and sections of levees below the standard level of protection. An annual maintenance allowance of \$180,000 is estimated.
- The outcomes of the assessment project will enable the North Central CMA to provide Vic SES and the community with better information during a flood and will assist the DEPI in the decision making process about long-term management of levees.