

Chowilla Floodplain Icon Site

Summary of 2016 Environmental Water Operations and High Flows

Chowilla Environmental Regulator Operation

Successful high level testing of the Chowilla regulator and ancillary structures was undertaken between August and November 2016. The operation resulted in the managed inundation of approximately 7,650 hectares of floodplain and wetlands (Fig 1), providing significant benefit to floodplain vegetation and fauna including many species of frogs, birds, fish and invertebrates.

The testing of the Chowilla regulator reached a target operating height of 19.75 m AHD (3.45m above normal level) in late September 2016. At the western end of the floodplain this height is equivalent to the water levels in Chowilla Creek that would occur during natural flows of around 80,000 - 90,000 ML/day flow in the River Murray. The inundation filled all of the major high elevation wetlands including Coombool Swamp, Lake Littra, Werta Wert and Gum Flat and large areas of river red gum and black box woodland and shrubland vegetation.

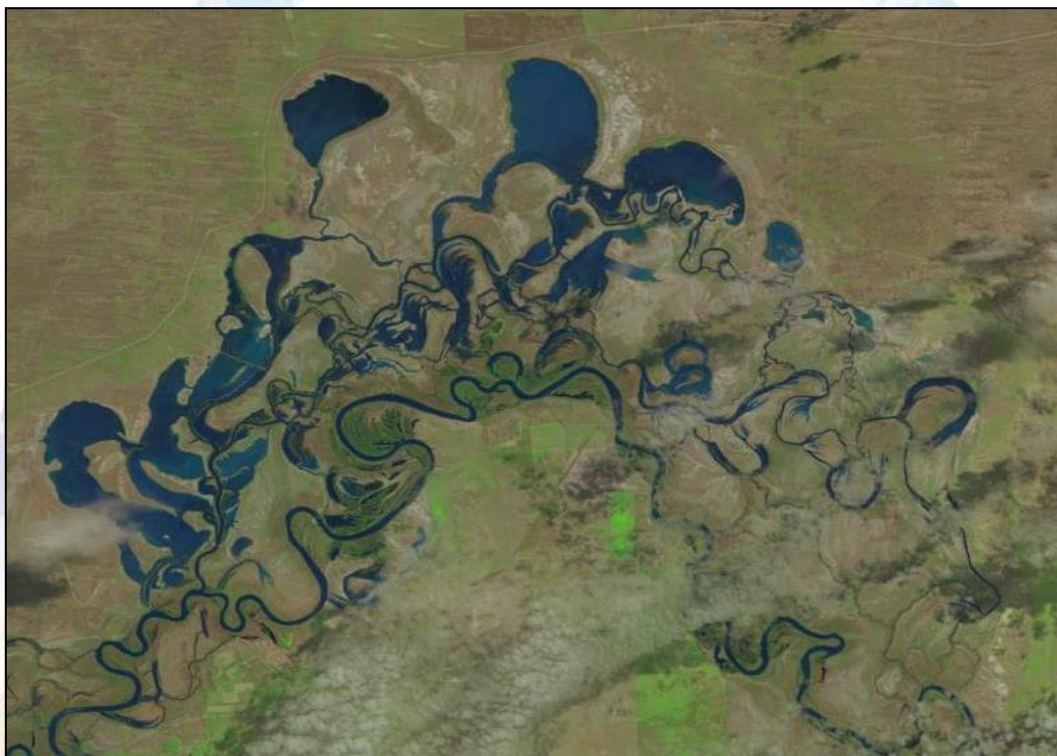


Fig 1. Landsat 8 image captured 28/09/16 showing 7,650 ha inundated during the testing event





Fig 2. Floodplain Inundation around Chowilla Creek Bridge and Lock 6 road 27 Sept. Photo: SA Water

Monitoring during the operation

The area inundated during the testing event included significant areas that had not been flooded since the natural high flow event in 2010/11. Large areas of black box and river red gum woodlands received a much needed watering. The widespread floodplain inundation also mobilised organic matter, with carbon and nutrients from the floodplain transported to the river channel. This provides the critical building blocks for food webs within the anabranch and the River Murray ecosystem.



Fig 3. Inundation extending into areas of black box and lignum on the floodplain Photo: C Nickolai (DEWNR)



Fish surveys on the floodplain and wetlands revealed seven species of native fish and four introduced species. Encouragingly, there were large numbers of small bodied native fish and several adult golden perch (callop) detected during monitoring in the floodplain wetlands. Native fish species recorded included: golden perch, bony bream, carp gudgeon, un-specked hardyhead, rainbow fish, Australian smelt, flat-headed gudgeon. Non-native species included; common carp, oriental weatherloach, goldfish and gambusia. There was also an abundance of invertebrates collected during sampling.



Fig 4. Brine shrimp, muscle larvae, and shield shrimp provide important food resources for fish and birds. Photo: S Brown DEWNR

The testing event was coordinated by the Department of Environment Water and Natural Resources working closely with SA Water who undertake the physical operation and maintenance of the infrastructure. SA Water's high level of skill at implementing the complex operations in conjunction with their operation of the River Murray Locks and Weirs was again apparent. The further testing of the new infrastructure was a success with the regulator and ancillary structures performing according to plan. The event was undertaken with a combination of The Living Murray environmental water and unregulated flow and was closely monitored to manage risks and to document the benefits of operation.



Fig 5. Coppermine Waterhole. Photo: A. Stokes DEWNR



River Murray high flows

The arrival of high River Murray flows in late 2016 coincided with the start of the managed draw-down of the Chowilla regulator. With the floodplain already wet and major lakes and swamps full, the additional rise in water levels caused by the natural high flows pushed water further out onto the floodplain and extended the length of time the floodplain was watered – further consolidating the benefits from the regulator event (Fig 6).

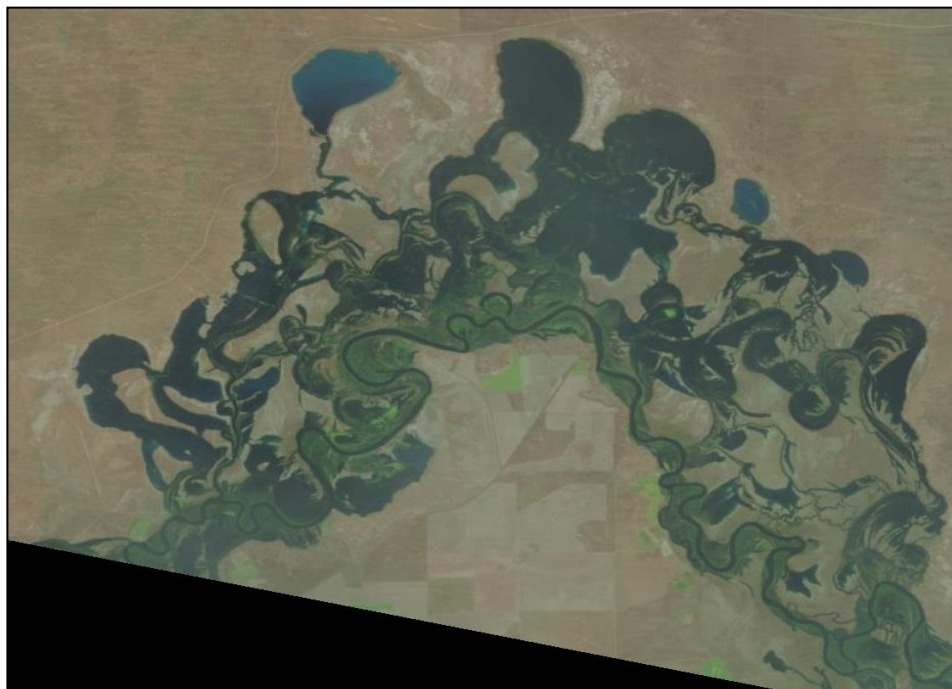


Fig 6. Landsat 8 image captured 01/12/16 at peak of the high flows showing the increased inundation

River Murray flows to SA peaked at the border on Wednesday 30th November at 94,565 megalitres/day. The natural flooding raised water levels across the Chowilla floodplain with water extending to a large area beyond the influence of the managed inundation. This was particularly noticeable across the eastern sections of the floodplain. (Fig 6). This provided the floodplain vegetation with an extended watering and pushed water into additional areas of black box woodland.

Blackwater

The heavy rainfall and flooding in spring 2016 in the upper catchments in NSW and Victoria inundated extensive areas of floodplain forests, many for the first time since the early 1990's. This resulted in a large scale blackwater event with dissolved oxygen levels in some areas dropping as low as zero. The managed inundation on Chowilla did not contribute to this blackwater event. The dissolved oxygen (DO) levels in the Chowilla anabranch remained higher than the levels in the adjacent river channel and remained above 4 mg/l throughout the managed operation. DO levels within the Chowilla anabranch dropped as low as 1.49 mg/l during the high flows (after completion of the managed inundation) as the low dissolved oxygen water from upstream moved downstream through the lower Murray system. River Murray channel dissolved oxygen levels recorded immediately downstream of Chowilla Creek remained higher than those recorded at the monitoring site immediately upstream which did reach zero for a period in late November nearing the peak of the high flows. There were some fish kills observed during the high flow period within SA but only limited numbers within the Chowilla region. Encouragingly the majority of radio tracked Murray Cod in Chowilla appear to have survived the event.





Fig 7. Chowilla floodplain during peak of the natural flooding December 2016 Photo: H Smith (DEWNR)

Monitoring during the natural high flows

Monitoring undertaken during the managed inundation was extended to include the peak of the natural flooding at Chowilla. Monitoring included fish, waterbirds and frog surveys in a number of wetland and floodplain sites.



Fig 8. DEWNR Ecologist Nathan Creeper undertaking fish survey. Photo: C Nickolai (DEWNR).

Field observations indicated a good abundance of native fish species, with native species being more abundant than non-natives at a number of sites during the November 2016 survey. Native fish species recorded included: golden perch, bony bream, carp gudgeon, un-specked hardyhead, Australian smelt, flat-headed gudgeon. Non-native species included; common carp, oriental weatherloach, goldfish and gambusia.



During any managed or natural large scale floodplain inundation event a large carp breeding event is anticipated and subsequent observations indicate that this did indeed occur. However the high River Murray flows experienced during the regulator testing and subsequently, provided good conditions for native fish. Aligning Chowilla operations with good River Murray flow conditions is an important way of ensuring benefits for native fish.

Other field observations of interest included;

- Juvenile golden perch were observed at a number of sites indicating successful recruitment.
- Tadpoles, metamorphs and frogs of several species including, Spotted Grass frog, Eastern Banjo frog and Peron's Tree frog and the vulnerable species - Southern Bell frog were recorded, indicating successful breeding.
- Eastern Longneck and Broad Shelled turtles were recorded at four sites.



Fig 9. Golden perch, broad shell turtle; frog metamorph - *Limnodynastes* species. Photos: C Nickolai (DEWNR).

The floodplain responded well to the extended period of inundation, made possible by the managed operation of the Chowilla regulator followed by the flooding from the natural high flows. Long lived species such as red gum, river cooba and black box, as well as a range of understory and aquatic vegetation have responded well.



Fig 10. Vegetation at Gum Flat following the environmental watering and natural flooding Photo: A. Stokes (DEWNR).



Bird activity on the floodplain following the watering was high with some sightings of interest including:

- An abundance of wading birds on Gum Flat with about 500 birds recorded in just one area including 100 Red-necked Avocets, 300 ducks (mostly Pink-eared), 37 White-faced Herons, and 1 White-necked Heron. The shallow water across Gum Flat was just perfect for feeding.
- 40 Red-necked Stints on the water's edge at Coombool Swamp. Despite their small size they manage to make an annual journey north to breed, which is a distance of approximately 12,000 km one way. They breed in eastern Siberia and western Alaska and visit Australia only in summer.
- Over 250 pelicans sited at Coombool Swamp which retains water for many months following flooding.
- 150 Freckled ducks (listed as vulnerable species in South Australia) at Werta Wert wetland as well as large numbers of Spiny-cheeked Honeyeaters feeding in the heavily flowering Black Box nearby.
- Approximately 1000 Woodswallows, mostly White-browed and some Masked were seen flocking over Chowilla Island. While this behaviour is common just before they depart for their migration they have not been recorded in these high numbers at Chowilla in recent surveys.
- A flock of 12 Regent Parrots and 2 Major Mitchell's Cockatoos near Coppermine Waterhole.
- Beautiful Rainbow bee-eaters were observed flying around in groups of up to 10 birds, getting ready to migrate.
- The shy Australian Spotted Crakes were feeding in the mud in between the lignum at Lake Littra.
- Two freshly made Wedge-tailed Eagle nests were seen, one with 2 birds present in the same tree, one with the eagle flying nearby.
- Owlet-nightjars were heard calling at Werta Wert Wetland and Lake Littra and one was sighted at near Coppermine Waterhole enjoying a bit of early morning sun. They are nocturnal so not seen very often.



Fig 11. Red-necked Stint (left) and Regent Parrot (right). Photos: H Kieskamp





Fig 12. White-browed and Masked Woodswallows. Photos: H Kieskamp

FOR MORE INFORMATION

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Further information is also available at these websites:

Department of Environment Water and Natural Resources (SA)

<http://www.environment.sa.gov.au/chowilla-floodplain>

Chowilla Game Reserve

<http://www.environment.sa.gov.au/parks/>

Natural Resources South Australian Murray Darling Basin

<http://www.naturalresources.sa.gov.au/samurraydarlingbasin/home>

The Living Murray

<http://www.mdba.gov.au/>

Commonwealth Environmental Water Holder

<http://www.environment.gov.au/ewater/>

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