Chowilla Floodplain

Environmental water delivery and ecological responses to the 2022-23 River Murray flood

Government of South Australia
Department for Environment and Water

Operation of the Chowilla Creek environmental regulator (Chowilla regulator) was undertaken between late July and early October 2022, prior to the 2022-23 River Murray flood event in late October. This environmental water operation raised the water level in Chowilla Creek 3.25 metres above the normal level, with the peak operation height of 19.55 metres Australian Height Datum (mAHD) reached in mid-September. Lock 6 weir pool was also raised by 45cm in conjunction with the Chowilla regulator operation.

The Chowilla regulator operation was undertaken when River Murray flows were between 45,000 megalitres per day (ML/day) and 50,000 ML/day and resulted in inundation of approximately 6,230 hectares of floodplain and wetlands (image 1 and 3). Under the same river flow conditions, if operation of the Chowilla regulator and Lock 6 had not occurred, only 1,720 hectares of floodplain and wetlands would have received water.

Once River Murray flows exceeded 50,000 ML/day, the environmental water operation concluded, with the Chowilla regulator stoplogs removed and Lock 6 also prepared for removal. Following this, the continuing rise in water level across the floodplain was due to the increasing River Murray flows.

The subsequent natural flood event peaked at 185,650 ML/day on 22 December 2022, causing significant inundation across the floodplain (images 2 and 4), filling all of Chowilla's large lakes and wetlands, and watering extensive areas of black box woodland that had not been inundated since 1956. Water level at Lock 6 at this time reached 21.32 mAHD.

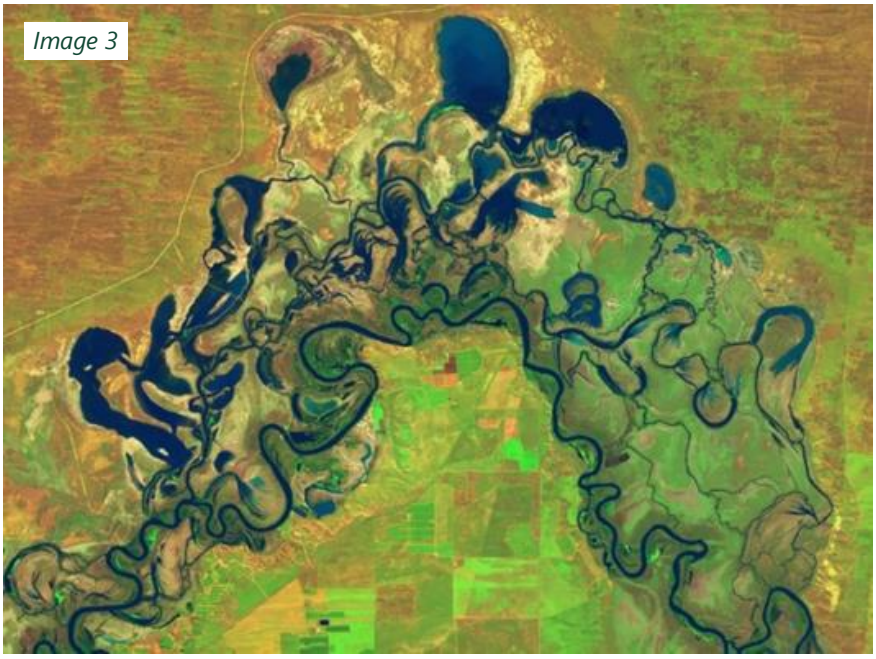
Image 1: Werta Wert Lagoon during the regulator operation in September 2022.

Image 2: Werta Wert Lagoon during the peak of the flood in December 2022.

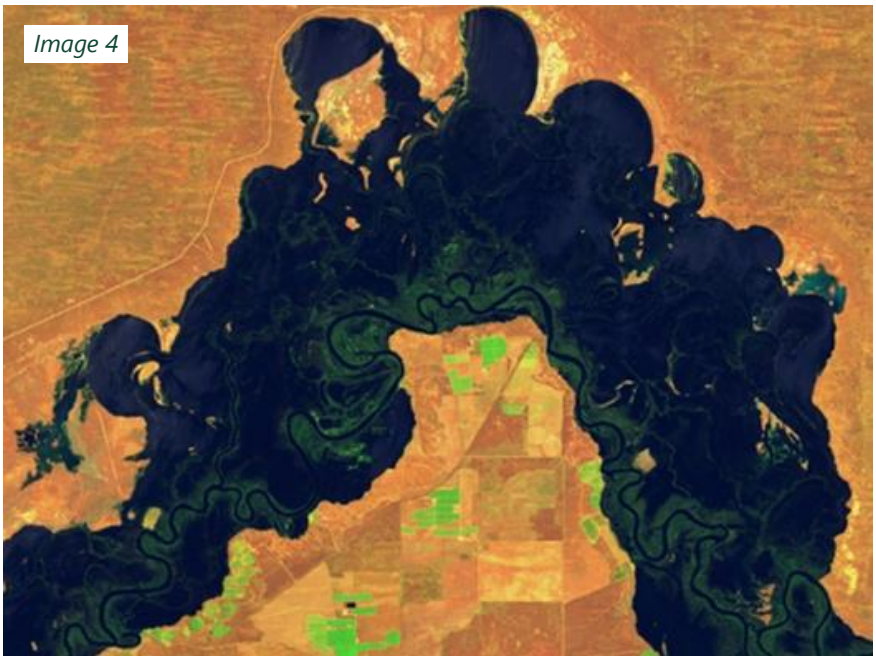
Rare tufted burr-daisy. Photo: Grace Hodder.

Chowilla floodplain sentinel satellite images

The below images show the contrast between floodplain inundation that occurred at the peak of the Chowilla regulator operation in September 2022, and the inundation received during the 2022-23 River Murray flood event.



15 September 2022
During the peak of the operation. High flows at this time were approximately 49,000 megalitres per day (ML/day) at the border,



27 December 2022
High flows at this time were approximately 178,000 megalitres per day (ML/day) at the border, causing significant inundation of the floodplain.

Image source: Sentinel, https://apps.sentinel-hub.com/sentinel-playground

Ecological response

Vegetation

Chowilla Floodplain experienced a relatively high rainfall year throughout 2022, which helped to maintain the floodplain's vegetation. The 2022 environmental water operation continued these beneficial conditions by freshening soil and improving its moisture conditions on creek banks, wetlands and floodplains. This supported established trees and understorey plants, as well as encouraging new growth of terrestrial and aquatic vegetation.

Early post-flood event observations from tree condition monitoring indicated that the natural flood continued the benefits delivered by the operation, and the majority of low to mid-elevation monitoring sites where environmental water was delivered, had achieved the ecological tree condition target. Monitoring also found widespread fresh leaf tip growth, and increased flowering and seed production amongst the black box, river red gum and cooba trees.

Monitoring results showed widespread, but low-density eucalypt germination, with denser germination along flooding strandlines. At some locations, saplings that were produced during earlier inundations but appeared to have died due to the 2022-23 River Murray flood event, had re-sprouted at the base, indicating that the population was thinned but not lost.

Monitoring also observed shrubs and understorey vegetation, with lignum (*Duma florulenta*), flowering profusely across the floodplain and appearing to be in better condition than recent years. Understorey plants, including carpets of flowering herbs, such as *Calotis* daisies (image 5) and *Sporobolu*s grasslands were widespread and large areas of black box woodlands, where understorey vegetation was previously dominated by salt tolerant species, had converted to lush green joyweed (*Alternanthera nodiflora)* (image 6).

Image 5: *purple burr-daisy (Calotis cuneifolia). Photo Helga Kieskamp.*

Image 6: a carpet of common joyweed (Alternanthera nodiflora) in the black box woodlands.

Birds

Wetland birds were sparse during the height of the flood event but post-flood, ecologists have recorded approximately 3,500 wetland birds moving between sites as water levels decrease, exposing mud flats suitable for foraging.

Ducks in their thousands were seen on the lakes including grey teal, pink-eared duck, as well as Australasian shovelers and musk duck (both Rare in SA). Hundreds of red-necked avocets, white-headed stilts, ibis (all 3 species), spoonbills (both royal and yellow-billed) were recorded. Migratory species recorded included marsh sandpiper, red-necked stint, banded stilt, white-necked heron, and sharp-tailed and curlew sandpipers (presumably on their migration north).

The combination of good rainfall, the early Chowilla environmental water operation and the natural flood event also benefitted woodland species by supporting healthy flowering trees, emergent vegetation and abundant insect life which provided a variety of feeding opportunities.

Parrots in particular, were very responsive to the flood, with red-rumped parrots (image 7) and bluebonnets recorded in flocks of nearly 100 at a time. Three rare pink cockatoos were also observed on the floodplain near Werta Wert.

Some unusual species that were attracted by the flood conditions included white-backed swallows, black-eared cuckoos, the usually shy buff-banded rail, and

Horsfield's bronze-cuckoos remained on the floodplain longer than usual, delaying their summer migration.

The flood conditions proved to be optimal for some species' with multiple breeding cycles occurring between spring 2022 and autumn 2023. Pied butcherbirds, grey shrike-thrushs, rufous whistlers, woodswallows, grey teals, Pacific black ducks, black swans, and Nankeen night-herons all had groups of young or signs of recent breeding. Emus in particular, appeared to be thriving with many juveniles recorded.

Image 7 Red-rumped parrots. Photo Helga Kieskamp.

Frogs

Frog-call surveys and tadpole monitoring were undertaken throughout both the environmental water operation and the flood event. Frogs started calling in August 2022, and all 8 species of frog expected at Chowilla were recorded. These were the vulnerable southern bell frog (image 8), Murray Valley froglet, banjo frog, spotted marsh frog, long-thumbed frog, Peron's tree frog, Sudell's burrowing frog and the painted burrowing frog.

Breeding was recorded among at 7 of the 8 species and indicates a positive frog response to the floodplain inundations.

Image 8: southern bell frogs, late-stage development (left) and metamorph (right). Photo Grace Hodder.

Fish and invertebrates

Fyke net surveys during the peak of the environmental water operation revealed a diverse presence of native fish species in the inundated lakes.

Native carp gudgeons appeared to be thriving with hundreds captured at Lake Limbra, Werta Wert and Lock 6 sampling sites. Smaller numbers of other native fish such as flat-headed gudgeons, rainbow fish, Australian smelt, callop and bony bream were also recorded at these sites.

Young European Carp were also recorded, indicating an early breeding event, although overall numbers recorded at the time of this survey were lower than previous years. Macroinvertebrates were seen in abundance, including brine shrimp, freshwater shrimp and mussel larvae, indicating a highly productive system. Freshwater yabbies (image 9) were recorded at various sites across the floodplain.

Large-bodied fish surveys were undertaken in January 2023 to assess the population in temporary lakes during the flood recession. Bony bream and European carp were the most abundant species, with small numbers of callop also recorded. A large catfish measuring 390 mm was recorded at Werta Wert Wetland.

Image 9: freshwater yabbie

More information

For further information about Chowilla Floodplain, please use the following:

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environment.sa.gov.au/chowilla-floodplain

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