

Chowilla Creek Environmental Regulator Frequently Asked Questions

Maximising ecological benefits on the Chowilla Floodplain by managing environmental water



The Chowilla Floodplain is one of the last parts of the lower Murray that has kept much of its natural character.

It contains the largest remaining natural river red gum forest in the lower River Murray and a range of aquatic habitats, including fast and slow flowing creeks, backwaters, wetlands and lakes.

Chowilla is:

- an area of high environmental and cultural importance
- part of the Riverland Ramsar wetland of international importance
- part of one of the six The Living Murray (TLM) Icon Sites in the Murray-Darling Basin.

Development in the Murray-Darling system over the past 100 years has greatly reduced the frequency, extent and duration of floods. Chowilla has experienced severe ecological decline due to lack of flooding over long periods. This decline accelerated during the extreme drought of 2006-10, resulting in the widespread loss of mature river red gum and black box trees.

What has been constructed at Chowilla?

A number of important environmental works have been undertaken on the Chowilla floodplain (see map) to enable the effective use of environmental water to improve the health of the floodplain. The works include:

- construction of an environmental regulator on Chowilla Creek incorporating fishways
- construction of ancillary structures to be operated in conjunction with the Chowilla regulator including:
 - Woolshed Creek South regulator
 - Woolshed Creek East regulator
 - Chowilla Island Loop channel and channel regulator
 - Chowilla Island Loop regulator
- the upgrade of existing weirs on Pipeclay and Slaney Creeks (major inlet creeks from the River Murray into the Chowilla anabranch) to provide for more flexible operations for environmental management and incorporating fish passage
- replacement of Bank E with a rock ramp fishway and replacement of Boat Creek Bridge to remove flow restriction, improve fish passage and improve access.

These works have been constructed through The Living Murray (TLM) Environmental Works and Measures Program. This program funded works for ecological restoration activities at TLM Icon Sites.

What is the Chowilla Creek environmental regulator and how does it work?

The environmental regulator is a weir-like structure built across Chowilla Creek downstream of Monoman Island. The structure is designed to raise water levels to enable inundation of large areas of the floodplain and wetlands.

The regulator consists of a series of concrete piers and a deck. When the regulator is being operated, removable concrete stop logs (similar to those in existing River Murray weirs) will be inserted between the piers to raise the water level in Chowilla Creek by up to 3.5 metres. During operation, continuous flow

will always be maintained over the structure and downstream water levels will remain as normal. When the stop logs are removed, the supporting piers allow uninterrupted flow with no impact on water levels in Chowilla Creek.

Fish passage is not hindered when the regulator's stop logs are removed. When the regulator is in operation, fish will be able to move past the regulator through two fish-ways. These have been specifically designed to enable fish passage for large, medium and small-bodied native fish.

The regulator can be used in a variety of ways:

- **Low level operation;** to raise and vary the water levels within the channels of the anabranches and creeks.
- **Medium level operations;** to raise water levels to a height where water flows out into wetlands and starts to spill out onto the broader floodplain.

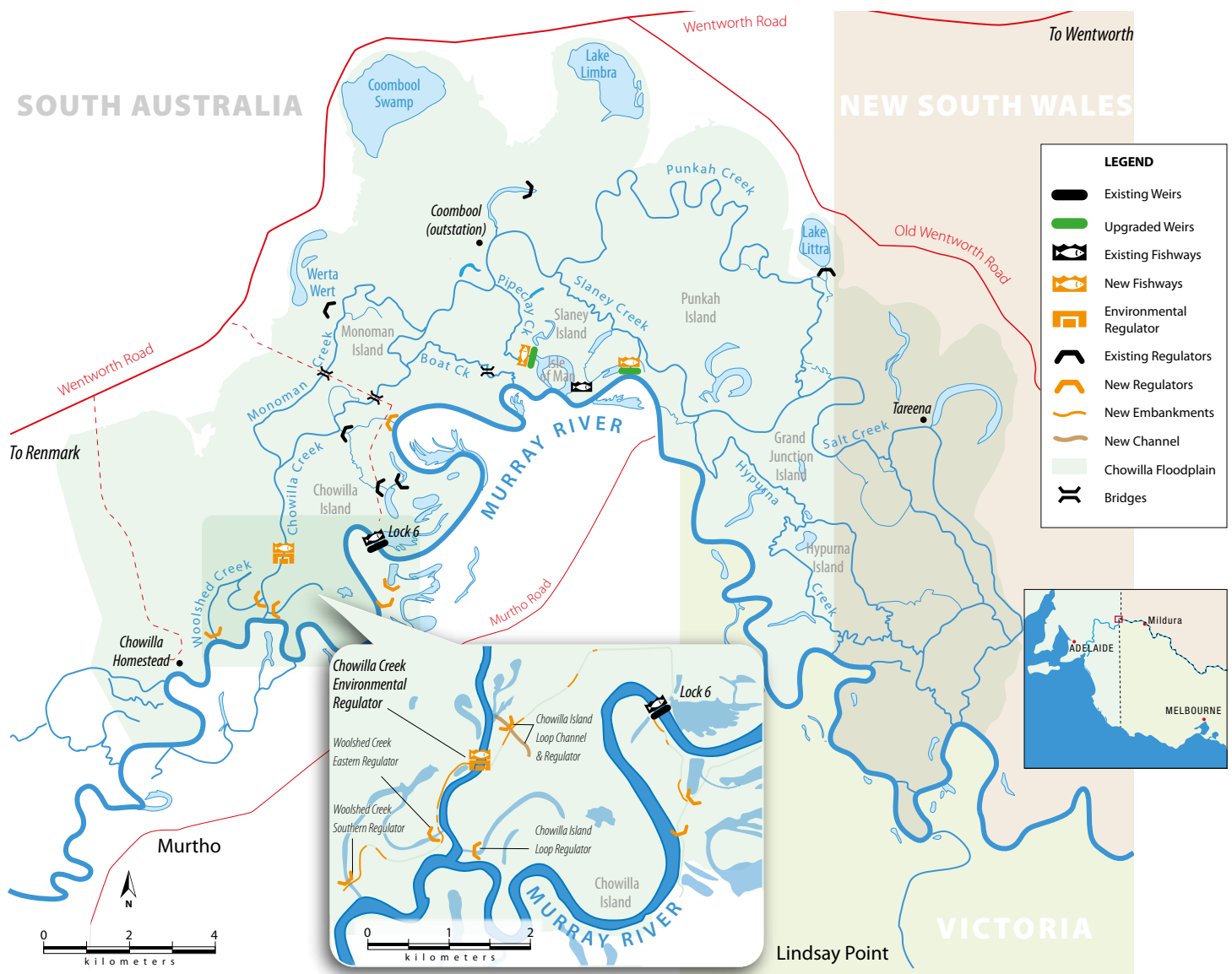




Photo: Todd Wallace

The Chowilla Regulator

- **High level operation;** where the regulator is operated to its full extent to generate broad scale inundation of wetlands and the floodplain.
- **Following a natural flood;** to extend inundation to allow breeding events to be completed if required.

It is intended to operate the environmental regulator in conjunction with the other structures on the floodplain and Lock 6 to maximise ecological benefits. Lock 6 water levels will be raised in conjunction with the operation of the environmental regulator to maintain flows through the Chowilla system. At the same time, Pipeclay and Slaney Creek weirs will also be operated to pulse flows through the Chowilla system.

Decisions will be made about the timing, duration and levels of flow based on consideration of factors including the:

- health of the floodplain and wetlands
- availability of environmental water
- flow in the river
- requirements of floodplain flora and fauna
- water quality
- results of native fish population monitoring.

Why do we need an environmental regulator?

The health of the Chowilla floodplain has declined, as a result of river regulation, over extraction and the recent extreme drought. The lack of water has resulted in a decrease in the number of high flow events and so a significant reduction in floodplain inundation events, loss of habitat for flora and fauna, and an increase in salinity levels across the Chowilla floodplain.

Well known native species such as river red gums and black box trees are dead and dying, and the health of wetlands has been

adversely impacted. Not only is the vegetation affected, but so is the wildlife that relies on healthy vegetation to survive.

Studies indicate that the outlook for this special place is bleak, unless more frequent and extensive floodplain inundation can occur. The environmental regulator will enable provision of much needed water to large areas of the floodplain, bringing substantial benefits for the plants and animals.

A program of pumping water onto a number of important wetland sites has occurred since 2004 as part of The Living Murray Initiative. This watering has been particularly important in maintaining refuge areas for plants and animals through the recent drought. While the response at these watering sites has been positive, this work has benefited less than ten percent of the floodplain.

Significant investigations undertaken over a number of years lead to the conclusion that in the absence of increased natural flooding that construction of an environmental regulator on Chowilla Creek was the best option to provide water more frequently to large areas of Chowilla. The environmental regulator will enable the benefits of environmental watering to be spread further over the floodplain, connecting it with wetlands, creeks and with the river.

Small-scale watering (pumping of water to wetlands and areas of the floodplain) may still be required during periods of extended low flows in the River Murray.

What will the benefits be?

These new and upgraded works will enable large areas of Chowilla Floodplain to be inundated when the flows in the River Murray would otherwise be insufficient to do so. The long-term aim is to restore the floodplain to a healthy condition so it is able to withstand the pressures of future droughts.



Before environmental watering



After environmental watering

A number of regulators on key wetlands provide further important opportunities for retaining inundation. Used in combination with landscape-scale River Murray flow releases and other site management activities, this will allow us to achieve the ecological objectives for the Chowilla Floodplain Icon Site.

During future full height operation, the environmental regulator will enable the inundation of up to approximately 50 percent of the floodplain, depending on the prevailing River Murray flow. Research and experience tells us that plants respond rapidly to watering. Floodplains and wetlands that are inundated on a more frequent basis thrive, enabling the cycling of carbon and nutrients and providing a flush of growth that supports a wide range of aquatic and terrestrial species and providing resources for food webs back to the river. Regular inundation flushes salt from the floodplain soils, making sure the majestic old trees are maintained and ensuring regeneration of new plants for the future.

Who authorises these operations?

Decisions about when the regulator will be used will rest with the SA Government through the Minister for Water and the River Murray on advice from the Department of Environment, Water and Natural Resources working in conjunction with the MDBA and SA Water. An Operations Plan has been developed to guide all aspects of the regulator's potential operation and which will be further developed as new knowledge becomes available. The Operations Plan and supporting documents describe how the regulator can be operated for maximum environmental benefit and minimal risks.

During operation, scientific experts, river operators and engineers will meet frequently to review monitoring data and to provide detailed advice to guide the operations.

Who operates the regulator?

The regulator and the associated structures will be operated and maintained by SA Water, on behalf of the Murray Darling Basin Authority.

What is being monitored?

A comprehensive surface water monitoring network has been established which provides real-time information regarding river flows and levels, salinity, temperature and dissolved oxygen in the River Murray and throughout the Chowilla anabranch. Data from this network will be reviewed throughout operation to inform on-going management. Sampling will also be undertaken to build our understanding of ecological responses in the river and the anabranch during operation of the new infrastructure.

Equipment has been installed to monitor the movement of native fish through the anabranch system and the fishway during the operation of the regulator.

Extensive ecological monitoring of vegetation, birds, fish and frogs at Chowilla has been undertaken for nearly a decade. Other monitoring of groundwater and soils is also undertaken the monitoring has informed the development of the Operations Plan and will provide important data to enable ongoing improvement of the planning over time.

The monitoring provides information that enables us to track the condition of the floodplain to determine the need for environmental watering and to support our proposals to gain environmental water allocations from environmental water holders such as The Living Murray and the Commonwealth Environmental Water Holder.



Can I still visit the Game Reserve?

The Game Reserve will remain open for the public to enjoy. Some short-term restrictions in access to parts of the Reserve will occur during the medium and higher level operations as low lying parts of the floodplain are inundated.

When the regulator is in operation, and during periods when there are significant increases in river flow levels, passage through the regulator itself will not be possible. However, boating above and below the structure will be unrestricted. The creeks and waterways above the regulator will not be closed to the boating, canoeing or walking public during an inundation event and information will be provided through the SA MDB Natural Resources Centre Berri and on the DEWNR website to guide Reserve users.

When the regulator is not operating, visitors will be able to access the floodplain and creeks as usual to enjoy the natural beauty of Chowilla. When not operating, small boats will be able to pass between the piers of the regulator with upstream and downstream passage clearly marked with buoys; however larger houseboat-sized vessels will be unable to navigate past the structure. During higher flows in the river, from 30,000 to 40,000 ML/day and above, small boats will not be able to pass under the regulator.

While there will be short-term restrictions in access around the Chowilla Game Reserve during operational periods as occurs during natural flood events, the overall benefits of operating the environmental regulator will ensure visitors can enjoy this unique environment into the future.

Will salinity increase in the river?

The Chowilla floodplain, like most floodplains of the River Murray in South Australia, is underlain by saline groundwater, which is known to enter the River Murray following floods. Operation of the regulator will increase salt loads to the Murray, much the same as a natural flood does.

Modelling indicates that operation of the regulator may result in a short term increase in salinity of up to approximately 100 EC immediately downstream of the regulator. However this estimate assumes that the operation is occurring at a low river level and so is considered to be a worst case scenario. There are many ways to reduce the magnitude of potential salt spikes which could be implemented during and following the operation of the regulator, including:

- ensuring operation only when there is sufficient river flows to enable dilution of any salinity
- slower drawdown of the pool-level behind the regulator
- reduced operating height and/or duration if there are salinity concerns.

Salinity in the River Murray and in the Chowilla anabranch will be closely monitored and the operations managed adaptively to ensure salinity thresholds are not exceeded.

Repeated operation of the regulator to enable floodplain inundation will, over time, reduce the build-up of salinity in the soil profile and freshen areas of groundwater, potentially reducing future post flood salt loads.

Will the operation impact on water available for irrigation?

The regulator operations will make no difference to water allocations for irrigation. This is because specific environmental water allocations will be made available through The Living Murray initiative to operate the regulator, or operation will occur during periods of unregulated flows.

The regulator will be operated in a way that ensures the risk of potential water quality concerns such as algal blooms or black water events are mitigated. Flow and water levels downstream of the Chowilla anabranch system will not change noticeably due to operation of the regulator.

Will operation create a black water event?

Operations will be managed to avoid creation of a significant blackwater event by ensuring there is sufficient flow through the system and by altering operations in response to water quality monitoring. The surface water monitoring network includes systems to inform operators about water quality and temperatures. This information will be accessed in real-time to enable rapid changes in operations to avoid or manage any reduction in dissolved oxygen levels that could potentially result in a blackwater event.

How often will the environmental regulator be used and when will it operate?

The use of the regulator will not follow a set pattern. Decisions about using the regulator will be made based on assessments of the condition of the floodplain (in particular vegetation health) and whether it is improving, staying the same or declining. Other key factors that will influence regulator operations include the level of flow in the River Murray; availability of environmental water; and the water quality (salinity and dissolved oxygen levels) in the incoming water. In some years, due to water availability or other factors, only a low-level, shorter operation may be undertaken. If the health of the floodplain is declining and there is enough flow in the River Murray then a large scale event may be undertaken. It is likely that there will be more frequent operations in the first years in an effort to reinstate the health and resilience of the floodplain so that it can better withstand future droughts.



How will operating the regulator affect fish and fish habitat?

The Chowilla anabranch is recognised for its high value native fish habitat, particularly fast flowing habitat favourable for fish such as Murray cod. Operation of the regulator has the potential to temporarily slow the water velocity in some parts of the anabranch. Water velocity can influence the abundance of food for fish larvae, influence fish spawning behaviour and can impact on the survival of juvenile fish. The impacts vary for each species of fish.

Scientists have also indicated that operation of the regulator is likely to create significant habitat for small and medium size native fish.

Operation of the regulator is likely to result in the breeding of carp (in similar ways that carp breed in response to natural floods) and reductions in water velocity might have a negative impact on some native species such as Murray cod and positive impact on smaller native fish such as Smelt and gudgeons. The advice to operators is to focus on providing conditions that benefit native species to ensure that they can compete with pest species. Other measures may be implemented to exclude carp from key wetlands where particularly strong breeding responses have been recorded.

The Operations Plan for the Chowilla Creek Regulator aims to ensure flow velocities are maintained during the operation of the regulator.

The potential negative impacts will be managed by:

- providing fishways at the Chowilla Creek regulator and at Pipeclay and Slaney Creeks weirs
- ensuring fluctuations in water levels,

- ensuring operations occur during periods of adequate River Murray flows that support native fish breeding responses
- ensuring that significant areas of faster flowing habitat is maintained in the creek system during the operation of the regulator (the Operations Plan is based on the principle of ensuring that such flows can be maintained).
- improving the health of the creek system, floodplain and wetlands.

The upgraded Pipeclay Creek and Slaney Creek weirs will also play an important role. Both weirs now have a much greater flow capacity, and the incorporation of fishways in these structures has enabled the passage of fish between these creeks and the river under all flow conditions for the first time in 80 years.

Who is funding the project?

Funds for the construction of the Chowilla works were provided through The Living Murray (TLM) program of the Murray–Darling Basin Authority, which was established in response to evidence showing the declining health of the River Murray system. The Living Murray is a joint initiative funded by the South Australian, New South Wales, Victorian, Australian Capital Territory and Commonwealth governments, and is coordinated by the Murray Darling Basin Authority.

The combined Chowilla Floodplain and Lindsay and Wallpolla Islands in Victoria make-up one of the six Living Murray Icon Sites along the River Murray. Works have been undertaken at



a number of icon sites to maximise the environmental benefits from the cooperative use of environmental water provided through The Living Murray program, and from other sources.

More information

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Further information is also available at these websites:

Department of Environment, Water and Natural Resources (SA)

www.environment.sa.gov.au/chowilla-floodplain

Chowilla Game Reserve

www.environment.sa.gov.au/parks

Natural Resources South Australian Murray Darling Basin

www.naturalresources.sa.gov.au/samurraydarlingbasin

The Living Murray

www.mdba.gov.au

Commonwealth Environmental Water Holder

www.environment.gov.au/ewater



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