

# Environmental watering of the Pike Floodplain

## Frequently Asked Questions



*Pike Floodplain landscape with vegetation communities such as black box*

*Image: Taken by Sam Walters DEW*

### Background on Pike Floodplain

The Pike Floodplain is situated near Renmark between Paringa and Lyrup and covers more than 6,700 hectares of woodlands, shrublands and herblands. It is known for its ecological and cultural heritage treasures, including a range of floodplain and aquatic habitats for threatened species. It is a site that is rich in Aboriginal and European heritage and history with middens and mounds that were formed tens of thousands of years of permanent occupation.

The ecological health of the Pike Floodplain has been declining due to obstructions to water flow and fish passage, and changes in the volume and frequency of water inundating the landscape. This increases the problems associated with the naturally salty groundwater and in-stream salinity, and further impacts the habitat values of the floodplain, making it susceptible to pest plants and animals.

### What has been constructed at Pike?

As a result of the continuing decline of the health of the floodplain and the vegetation, environmental watering will allow for the plants and trees to improve in condition over time. An engineering solution was adopted to help improve the ongoing management of the floodplain ecosystem. This approach will help provide water to the environment more often than flooding occurs through managed floodplain watering events.

The following infrastructure works have been done to help manage the floodplain to achieve environmental and social outcomes:

Removal of barriers and banks to improve fish passage and flow, including Col Col bank which was established in the 1890s.

Construction of the blocking alignment to enable managed floodplain inundations of the upstream side of the floodplain.

Construction of two large environmental regulators and fishways at Pike River and Tanyaca Creek to manage the water levels.

Construction of five smaller regulators to enable tiered watering of the floodplain and connectivity during natural floods.

These works have been constructed through the Riverine Recovery Project (RRP) and South Australian Riverland Floodplains Integrated Infrastructure Program (SARFIIP) these programs funded works to improve the health and resilience of the floodplain

### Why do we need infrastructure for environmental benefits?

The health of the Pike Floodplain has been declining as a result of river regulation, over extraction and the recent extreme dry conditions. The lack of water availability has resulted in a decrease in the number of natural high flow events across the floodplain, which has led to a decline in extent and condition of native plants, a loss of habitat for wildlife, and increase in salinity levels across the landscape.

Key native vegetation communities such as river red gums, river cooba, black box, lignum and shrublands are currently in decline. The health of wetlands has been

impacted and the wildlife relies on healthy vegetation to survive. To restore this landscape the environmental infrastructure will be able to provide much needed water to a significant area of the Pike Floodplain. The infrastructure can be managed to mimic what would have happened under natural conditions with wetting and drying cycles which is good for the environment.

### How does the infrastructure support floodplain inundation?

There are various types of infrastructure within Pike that will enable a floodplain watering, such as environmental regulators and blocking banks.

An environmental regulator is designed to be opened and closed like a gate and can be used to raise and lower water levels by closing off water access or allowing more water to pass through. Each regulator or structure is operated differently depending on the landscape, design and purpose. Some of these structures for example have been designed to enable fish passage for large, medium and small-bodied native fish.

The blocking bank has been designed to enable the water for the environment to reach the long lived vegetation and to contain the water on the floodplain for longer. The alignment of the bank extends from Pike River regulator to Mundic North ancillary, a total length of 10 km with 7.3 km of elevated bank to retain the water on the floodplain.

Floodplain inundation can be completed in a variety of ways depending on the ecological targets:

- **Low operation:** to raise and vary the water levels within the channels of the anabranches and creeks
- **Medium operation:** to raise water levels to a height where water flows out into wetlands and starts to spill out onto the broader floodplain
- **High operation:** where the regulators are operated to their full extent to generate broad scale inundation of wetlands and the floodplain
- **Helping a natural flood:** to extend inundation and to allow breeding events to be completed if required

It is intended to operate the infrastructure in conjunction with raising water levels in Lock 5 to maximise ecological benefits. Higher water levels in the Lock 5 reach together with the operation of the primary environmental regulators will increase flows through the inlets Margaret Dowling Creek and Deep Creek.

### What are the expected benefits?

The long-term aim is to improve the floodplain to a healthy condition and to create a long living landscape for all to enjoy. There will be an improvement in connectivity between riverine and floodplain habitats, freshening of groundwater systems, improvements in soil condition and enhanced biodiversity. The floodplain inundation will achieve the following ecological benefits:

- Native vegetation that lives on the floodplain such as river red gums, black box and lignum will be watered more often.
- As the flooding mobilises salt, the soil conditions will freshen and improve which will benefit the grasses and ground cover plants.
- Circulation of leaf litter and nutrients will support a wide range of bugs which in turn provide food for fish, frogs, bats and reptiles.
- The bugs, fish and frogs help support populations of water birds, turtles and yabbies.
- The newly watered parts of the floodplain are likely to develop new saplings which will help ensure that the tree community is sustained in the future.

### How will floodplain watering events be managed?

Monitoring stations located throughout the Pike anabranch system provide real-time water information, enabling ongoing risk assessments, consistent with the Operations Plan for the infrastructure. Automated alarms will trigger if salinity or dissolved oxygen levels fall outside the established parameters. This provides an opportunity to respond to known or likely risks and ensure that established water quality thresholds are not exceeded.

When the regulators are in the process of a managed floodplain watering, the operation of the structures can be altered based on real time conditions and understanding through the monitoring and observations of how the event is progressing. Post event the Department for Environment and Water will summarise what did and did not work, to assist with accuracy of forward planning and aim to purpose larger operations into the future.

Management options include:

- Slower drawdown of the pool levels.
- Changing the amount of water passing through different structures.
- Reduced operating height and/or duration.

Prior to, and throughout, each inundation event there will be clear communication provided to key stakeholders and the community on how the event will be managed. Water information is available on the Water Connect website which is accessible to anyone and provides real time water information.

## What is being monitored?

Surface water monitoring has been established to provide real time information regarding river flows and levels, salinity, temperature and dissolved oxygen in the River Murray and throughout the Pike anabranches and creeks during a managed event. This will be reviewed throughout all operations to adapt to situations and facilitate ongoing management. Sampling will be completed to build knowledge and understanding of ecological responses in the river and the anabranch during and after operations of the new infrastructure.

The Floodplain team has developed Operations and Monitoring Plans which outline the required monitoring program, and how it relates to site ecological objectives and targets. There is an extensive ecological monitoring program which includes vegetation, birds, fish, and frogs. Other monitoring of groundwater and soils is also undertaken and has helped with the development of the Operations Plan for Pike as it provides important data to enable improvement of the inundation plans into the future.

The monitoring program allows us to track the condition of the floodplain to determine the need for water for the environment and to support our proposals to gain environmental water allocations for the landscape

## How often will the environmental regulators be used and when will they operate?

The use of the regulators will not follow a set pattern. A Pike Operations Plan has been developed, used to inform decisions about how inundation using the environmental regulators can be undertaken. Decisions about undertaking a floodplain watering are made in accordance with the Operations Plan and based on assessments of the condition of the floodplain (in particular vegetation health) and whether it is improving, stable or declining. Other key factors that will influence regulator operations include the 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 high level operation may be undertaken. It is likely that there will be low level operations in the first few years in an effort to reinstate the health and resilience of the floodplain so that it can better withstand future droughts.

All environmental regulators and supporting structures will be maintained and operated by SA Water, on behalf of the Department for Environment and Water.

## Will operations impact on water availability and quality 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 Environmental Watering bidding process, or operation will occur during periods of unregulated flows.

## Can I still visit Pike?

The majority of the Pike Floodplain is Crown Land and some parts of the landscape are protected under the reserve system. Vehicle access is not permitted on the floodplain, however the site can be accessed by walking, mountain biking and kayaking. Some short term restrictions in access to parts of the landscape will occur during the medium and higher level operations as low lying parts of the floodplain are inundated. When the primary regulators are 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. Access through the creeks and waterways above the regulator will be considered and dependent on the water levels and flow rates. Information will be provided through the National Parks and DEW website to guide the general public.

When the regulator is not operating, visitors will be able to access the floodplain and creeks to enjoy the ecological character and attributes Pike has to offer. While there will be short-term restrictions in access around Pike during operational periods as occurs during natural flood events, the overall benefits of operating the environmental regulators will ensure visitors can enjoy this unique environment into the future.



Pike River and Floodplain Image: Dan Haines SA Water





Pike River regulator and Fishway Image: Dan Haines SA Water

### Will the salinity increase in the river?

The Pike Floodplain, like most floodplains of the River Murray in South Australia, has salty groundwater located just under the surface. The lack of natural flooding has caused this groundwater to become highly saline because it continues to accumulate and is not flushed away frequently. This saline groundwater is known to enter the River Murray following natural floods.

To assist management of salinity, works have been completed to reduce up to 80 tonnes of salt from entering the Pike Floodplain each day. This has involved installation of bores, pumps and underground pipelines to move the highly saline water away from the Pike floodplain, to a disposal basin. Over time we expect to see water quality improve in the Pike River and Mundic Creek waterways due to these works.

Any watering event, whether natural or managed, comes with the risk of changes in water quality. Modelling indicates that managed floodplain inundations will result in a temporary increase in salinity both during and after an event. The potential magnitude of any salinity spike will be determined and communicated to stakeholders prior to any inundation. Adaptive management will reduce the magnitude and/or duration of salinity spikes during an event.

Irrigators are encouraged to review their irrigation practices prior to, and during, an event and make any changes necessary to avoid potential impacts to water quality which may affect crops. These changes may also help avoid salinity spikes during a natural flood. Repeated operation of the regulator to enable floodplain inundation will, over time, reduce the build-up of salt in the soil profile and freshen areas

### How will dissolved oxygen (DO) water quality risks be managed?

DO refers to the level of oxygen available in the column for use by plants and animals. Oxygen naturally enters water through plants, as a by-product of photosynthesis, air, wind, running water or groundwater discharge. Aquatic life including fish, frogs, invertebrates and bacteria all need DO to survive.

Vegetation type, historic grazing and fewer smaller floods have resulted in an accumulation of organic material on the Pike Floodplain. Natural and managed inundation events wash this organic material into the water, which will consume DO as it decomposes. This process will be carefully monitored in a managed inundation to maintain adequate DO levels for aquatic life. Heat and still water increase the rate at which DO is consumed. High air and water temperatures will be avoided by conducting inundations between winter and spring. DO levels will also be managed by raising Lock 5 to optimise the dilution flow.

Under certain conditions, depleted DO levels could result in a hypoxic blackwater event, during which fish, tadpoles and invertebrates would become stressed and or die. Native fish are especially vulnerable and would be impacted if unable to find refuge. Blackwater events do occur naturally, however close monitoring of, and responding to, DO levels will help prevent hypoxic blackwater during managed inundations.

## More information

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*The South Australian Riverland Floodplains Integrated Infrastructure Program is a \$155 million investment program funded by the Australian Government and implemented by the South Australian Government to improve the watering and management of River Murray floodplains in South Australia's Riverland*