

Kadaltilla / Park Lands Authority

Torrens River / Karrawirra Pari Restoration Proposal

Thursday, 28 April 2022
Board Meeting

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Public

Purpose

The purpose of this report is to provide an update on the Karrawirra Pari River Restoration project. The proposal involves the construction of one or two wetlands within the existing river alignment adjacent to Pinky Flat and / or Piltawodli (on the northern riverbank between the City Weir and Morphett Street bridge).

The report outlines the context and background to the proposal and the current phase of investigations and design work being undertaken.

Recommendation

That Kadaltilla / Park Lands Authority:

1. Notes that a report will be presented to Kadaltilla / Park Lands Authority and Council detailing the outcomes of the scoping study and presenting options and recommendations on concept designs.
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Implications

<p>Adelaide Park Lands Management Strategy 2015-2025</p>	<p>Adelaide Park Lands Management Strategy 2015-2025</p> <p>The proposal aligns with the following strategy and actions within the APLMS 2015-2025:</p> <p>Strategy 4.2 Enhance the ecological health of Park Lands water course</p> <p>4.2.2. Minimise the impact of stormwater runoff on Park Lands watercourses while reducing flood risk.</p> <p>4.2.3. Improve the ecological condition of all Park Lands watercourses.</p> <p>4.2.5. Re-establish self-sustaining, healthy aquatic ecosystems through revegetation with native aquatic plants and riparian revegetation in all Park Lands watercourses.</p> <p>4.2.6. Re-imagine watercourses and wetlands in the Park Lands to enhance their value to biodiversity protection and informal recreation and provide interpretation to raise public awareness of their importance to sustaining the City environment.</p> <p>4.2.7. Continue to work with the State Government and other Councils to reduce stormwater and other pollutants entering into the Torrens River catchment.</p>
<p>APLA 2020-2025 Strategic Plan</p>	<p>Adelaide Park Lands Authority 2020-2025 Strategic Plan</p> <p>Strategic Plan Alignment – Environment</p> <p>Improve community connection with the natural and cultural landscape of the Park Lands.</p>
<p>Policy</p>	<p>Water Sensitive City Action Plan 2020-25</p> <p>Action 3.1:</p> <p>Establish partnerships to deliver wetlands within the River Torrens riparian zone to improve water quality and restore aquatic biodiversity in the City.</p>
<p>Consultation</p>	<p>Kaurna representatives have been engaged to provide input into the project. Key river users, such as Popeye and rowing clubs, are also being consulted.</p>
<p>Resource</p>	<p>Not as a result of this report</p>
<p>Risk / Legal / Legislative</p>	<p>Not as a result of this report</p>
<p>Opportunities</p>	<p>Opportunities include:</p> <ol style="list-style-type: none"> 1. Improvements to river water quality, ecological function and biodiversity. 2. Creation of a high-quality community space of Kaurna significance that enhances recreational and tourism opportunities. 3. Significant improvements to aesthetic and design outcomes.
<p>City of Adelaide Budget Allocation</p>	<p>Budget allocation for the 2021/22 financial year is \$250,000.</p>
<p>Life of Project, Service, Initiative or (Expectancy of) Asset</p>	<p>Asset life to be determined as part of the scoping study and concept design report.</p>
<p>Ongoing Costs (eg maintenance cost)</p>	<p>Estimates of maintenance and operational costs will be developed as part of the scoping study and concept design report.</p>
<p>Other Funding Sources</p>	<p>Green Adelaide has announced a \$5 million project for Transforming the Torrens over a period of two, up to four, financial years subject to future negotiation that could leverage this project.</p>

Discussion

Background to the governance and management of Karrawirra Pari and Torrens Lake

1. Karrawirra Pari, and particularly the Torrens Lake, is a highly modified and engineered river system typified by the Torrens Weir and establishment of the Lake.
2. Urban waterways and rivers typically exhibit poor water quality and ecological health due to a range of causes including stormwater pollution, altered flow regimes, erosion, removal of remnant vegetation and introduced pest flora and fauna species.
3. Poor water quality and ecological health is evident throughout Karrawirra Pari as with other urban river systems.
4. Torrens Lake blue green algae (BGA) outbreaks began occurring from around 1998. In addition to the links between BGA outbreaks and poor catchment stormwater water quality, large-scale dredging of sediments prior to 1998 are understood to be a key contributor to BGA outbreaks due to the removal of macrophytes and release of nutrients from sediments.
5. The BGA outbreaks, and consequent Lake closures, were the catalyst for the establishment of the Torrens Taskforce in 2006.
6. The Torrens Taskforce was responsible for implementing strategies and actions to improve water quality in the Torrens Lake and reduce BGA blooms. Strategies and actions ranged from broad catchment wide initiatives to localised responses within the Torrens Lake.
7. The Torrens Taskforce is no longer operational. A review of the implementation of Torrens Taskforce initiatives conducted by Urban Regional Planning Solutions (URPS) in 2017, outlined that, while some measures implemented contributed to improving river health and water quality, the management and governance of the Karrawirra Pari remained uncoordinated and required a renewal of efforts to improve strategic planning and management.
8. There are currently no clear governance arrangements in place for coordinated catchment wide management of Karrawirra Pari.
9. The River Torrens Water Quality Improvement Project was established subsequent to the Torrens Taskforce and is an informal group of stakeholders established to manage water quality within the Torrens Lake. Members of the group include the City of Adelaide, Green Adelaide, Environmental Protection Authority (EPA), SA Water and the City of Charles Sturt.
10. The primary function of the River Torrens Water Quality Improvement Project group is to coordinate dilution flow releases. It also coordinates communication activities associated with Torrens Lake water quality issues.
11. Green Adelaide is the primary State Government body responsible for urban waterways in accordance with the Landscape South Australia Act 2019.. Green Adelaide's Regional Landscape Plan 2021-2026 outlines a 'key focus area' to "protect, enhance, and restore water resources and water-dependent ecosystems through partnerships and on-ground delivery".
12. Strategies implemented by the City of Adelaide (CoA) and the River Torrens Water Quality Improvement Project in the Torrens Lake and adjacent catchments to improve water quality and river health include:
 - 12.1. Water sensitive urban design – installation of gross pollutant traps and other street scale stormwater management measures.
 - 12.2. Carp management – periodic carp monitoring and removal using electro-fishing.
 - 12.3. Weed management – removal of woody weeds along the banks of the river.
 - 12.4. Litter removal.
 - 12.5. Water quality monitoring – the CoA coordinates the collection of water quality data within the Torrens Lake. The primary use of the data is the monitoring of BGA counts.
 - 12.6. Dilution flows – Green Adelaide (and its predecessor the Adelaide and Mount Lofty Natural Resource Management Board) in conjunction with SA Water coordinate the release of flows from Kangaroo Creek Reservoir to flush the river when BGA counts reach a certain level deemed at risk of causing a BGA outbreak. Facilitating flow releases are a requirement of SA Water under the direction of the Minister for Environment and Water and the *Public Corporations Act 1993* and are considered the most effective current tool to reactively manage BGA outbreaks in the Lake.
 - 12.7. Aeration / destratification pumps – previously installed for the purpose of temperature destratification. The pumps were removed in 2019 as they were deemed to be ineffective and costly to run and maintain.

- 12.8. Macrophyte planting trials – small macrophyte planting trials were implemented between 2013 and 2018. The trials, aimed at establishing sections of submerged aquatic plants at various locations in the Lake, were largely unsuccessful due to uprooting from high flow events, sedimentation, poor light penetration and consumption by waterbirds.
13. Removal of sediment build up has been undertaken periodically by the City of Adelaide to improve amenity and navigation.

Strategic context for recent investigations to improve water quality and ecological function of Torrens Lake

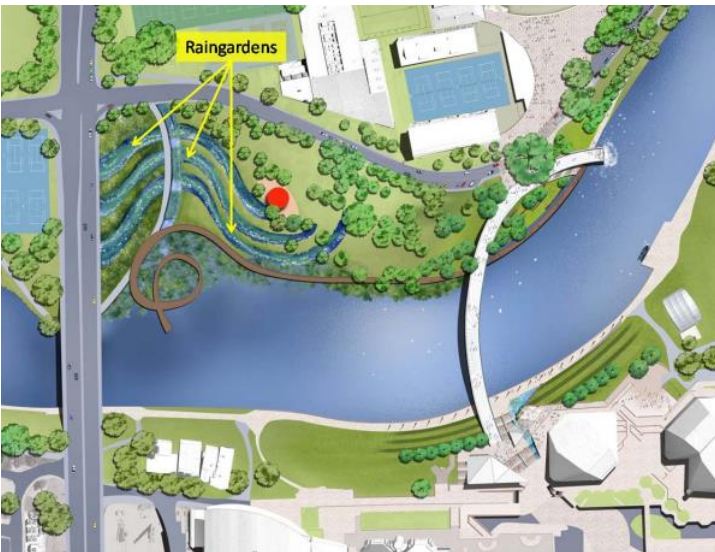
14. The previous City of Adelaide Strategic Plan 2016-2020 objective “by 2020, Aquatic Native Plants on the Torrens Lake Floor will have increased from almost zero to 7,500 square metres” provided the strategic basis for investigations into large scale restoration of aquatic vegetation within Torrens Lake.
15. The construction of wetlands and other localised treatment systems have also previously been investigated and proposed by the State Government and were included in the previous Greater Riverbank Implementation Plan 2013 (See Figure 1).

Figure 1: Representation of wetlands concept from the Greater Riverbank Implementation Plan (2013).



16. In 2013 an alternative proposal was developed by Design Flow for Renewal SA (Figure 2). This proposal was presented to Council, although no further action was undertaken regarding this proposal.

Figure 2: Renewal SA proposal (prepared by Design Flow) for Pinky Flat stormwater treatment system (2013).



Torrens Lake Rehabilitation Assessment report

17. In 2018, consultancy Water Technology was engaged by the CoA to complete a Torrens Lake Rehabilitation Assessment report ([insert link here](#)). The objective of the assessment was based on the Strategic Plan 2016-2020 objectives to increase aquatic plants in the Torrens Lake.

18. The Torrens Lake Rehabilitation Assessment report outlined approaches and options for increasing submerged aquatic vegetation in the Torrens Lake to contribute to improved water quality, river health and biodiversity outcomes.
19. The Torrens Lake Rehabilitation Assessment report outlined two main options for increasing macrophyte coverage in the Torrens Lake:
 - 19.1. Option 1 – Shallowing the entire lake floor. This was not considered feasible due to the impacts on Lake users (eg rowing activities and the Popeye) and also the technical difficulties with retaining filled sediment and macrophytes during high flow events.
 - 19.2. Option 2 – A series of wetlands (in-channel and side-channel) with a maintained flow path through the Lake. This was considered feasible and further modelling work was undertaken.
20. The report identified 6 potential locations for the wetlands (Figure 3). Locations identified were in shallower areas of the river outside the main flow path with lower water velocities.

Figure 3: Proposed locations for wetlands (prepared by Water Technology) (2018)



21. The potential benefits of the implementation of the wetlands identified in the report include:
 - 21.1. Improve water quality by reducing sediment and nutrient loads from organic pollutants, reducing turbidity and providing habitat for beneficial aquatic organisms.
 - 21.2. Balance the phytoplankton dominated environment which perpetuates algae growth by re-establishing macrophytes that 'out compete' blue-green algae and act as a natural 'cleaning' process.
 - 21.3. Providing shallower water levels and improved light penetration to support plant growth as well as reducing flow velocities for plant stability.
 - 21.4. Reduce the total Lake water volume and establish a designated channel which allows depths to cater for boat movement and flood conveyance.
 - 21.5. Provide habitat for native species of water birds, frogs and native fish species and reducing grazing pressure from carp and birds.
 - 21.6. Create a unique visitor experience showcasing South Australian native wetland environments, plant communities and species and provide outdoor recreation activities (boardwalks and viewing areas) in the heart of the City.
22. The outcomes and recommendations of the Torrens Lake Rehabilitation Assessment report were presented to a Council workshop on 17 September 2019.
23. The presentation was in response to a Council resolution at the meeting on 27 August 2019 to "request Administration provide an update on what the City of Adelaide has done to improve the water quality of the River Torrens and provide information on opportunities to work more collaboratively with State Government or other partners to ensure water quality issues in Torrens Lake are addressed to enhance the long-term sustainability of the River Torrens".
24. The current project team includes representation from Green Adelaide and additional engagement has occurred with Renewal SA.

25. Council allocated \$250,000 in the 2021/2022 Business Plan and Budget following investigations commenced in 2020/2021.
26. A review of the locations identified in the Torrens Lake Rehabilitation Assessment report was conducted with the aim of prioritising 1 to 2 locations to undertake further detailed feasibility investigations and progress to concept and detailed designs. Incremental water quality improvement would be anticipated as additional wetland locations were established.
27. Based on considerations such as available wetland area, adjacent land uses, adjacent river uses, existing infrastructure, operational considerations and recreation and tourism opportunities; Pinky Flat and Piltawodli wetland sites (shown as Pinky Flat wetland and City West Wetland respectively), in Figure 3 were deemed suitable for further investigation with a view to developing concept designs.
28. Construction of 1 to 2 wetlands will contribute to water quality improvement and provide 'proof of concept' but will not resolve all water quality issues. The potential for BGA outbreaks will remain. Complimentary measures, such as dilution flows (with possibly reduced volumes and frequency), will also likely be required.
29. Initial contact with Kurna on the wetlands river restoration concept was undertaken by consultants. Integrated Heritage Services were engaged to facilitate this engagement and Kurna representatives gave in-principle support to the wetlands proposals at the Pinky Flat and Piltawodli locations pending ongoing engagement and consultation through subsequent stages of the project development.
30. Green Adelaide announced the \$5 million 'Transforming the Torrens' program in November 2021. CoA are currently in discussions with Green Adelaide in relation to the terms and conditions of the \$5 million funding allocation towards the Karrawirra Pari River Restoration Project.

Scoping Study and Concept Design project

31. In 2021, Taylor Cullity Lethlean (TCL) landscape architecture consultancy completed a Scoping Study and Concept Designs for the Karrawirra Pari River Restoration project focused on the Pinky Flat and Piltawodli (City Weir wetland) locations.
32. The scoping study and concept design project is based on the broad concept and wetland footprints outlined in the Torrens Lake Rehabilitation Assessment report for the proposed locations.
33. The project team contains representation from Green Adelaide and is consulting broadly across the CoA administration.
34. Kurna engagement on the project is being facilitated through the Kurna Yerta Aboriginal Corporation (KYAC).
35. Initial targeted consultation with key Torrens Lake users, such as rowing clubs and the Popeye is also being facilitated.
36. The objective of the scoping study and concept design project is to facilitate the implementation of river restoration at Pinky Flat and Piltawodli (City Weir) through detailed feasibility and technical assessment and the development of concept designs that comprehensively considers the ecological, social, regulatory and technical requirements of the project.
37. The design objectives of the scoping study and concept design report are:
 - 37.1. To improve water quality, increase biodiversity and provide habitat through the reintroduction of aquatic vegetation, appropriate plant selection and innovative wetland/waterway design.
 - 37.2. To create a high-quality community space of Kurna significance that enhances recreational and tourism opportunities through the interaction of people, nature, the river, and culture.
 - 37.3. Demonstrate innovative approaches to managing water quality and urban waterway renewal.
38. To date key items under consideration as part of the scoping study have included:
 - 38.1. Review of adjacent landscape and infrastructure and impacts on design and functionality.
 - 38.2. Functional design considerations, such as pumping and wetland flow regime to facilitate wetland function and water quality improvement.
 - 38.3. Edge design and construction methodology to maximise wetland area and provide for the most cost-effective construction approach.
 - 38.4. Transport and movement options through and around the sites.

Next steps

39. The outcomes of the scoping study will inform the development of site-specific concept designs as part of the current TCL engagement.

40. A report and presentation will be brought to Kadaltilla / Park Lands Authority and Council by July 2022 outlining the findings of the scoping study and recommending a preferred concept design.
41. CoA will continue to work with Green Adelaide to finalise the terms and conditions of the proposed \$5 million funding announcement and opportunities arising from this project.
42. Subject to Kadaltilla / Park Lands Authority and Council approval, and negotiation of funding arrangements, detailed design could commence in 2022/2023.

Attachments

Nil