succession ecology

Burra Creek Management Plan

Prepared for the Regional Council of Goyder

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DOCUMENT SPECIFICATION

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LIMITATION

This report has been completed in accordance with the relevant federal, state and local legislation and current industry best practice. It has been prepared on behalf of and for the exclusive use of Succession Ecology's client and is subject to and issued in connection with the provisions of the agreement between Succession Ecology and its client. Succession Ecology accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

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1.0 INTRODUCTION

1.1 General

This document has been prepared for the Regional Council of Goyder to advise on the management of reed clearance from the Burra Creek within the township of Burra. The council wishes to clear Bulrushes (*Typha* ssp.) that have colonised the Burra Creek adjacent to the playground and within the Burra Creek Park (Figure 1).

1.2 General Site & Project Information

1.2.1 General Description

Burra Township is located 162 km north from the Adelaide CBD and is a well-known for its pastoral and historical mining past. The town itself is located on Burra Creek amongst the Bald Hill Ranges with adjacent hill slopes surrounding Burra. The creek runs through the Burra township from north to south.

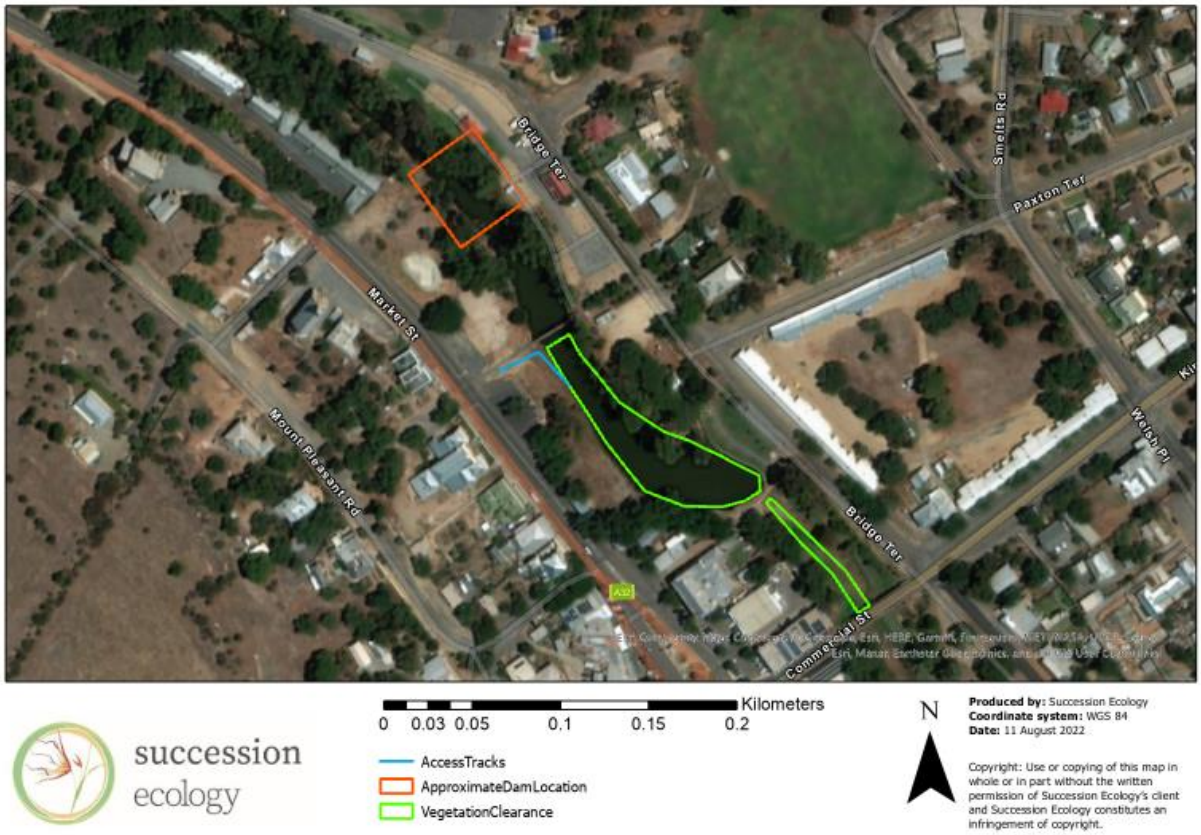

Figure 1: Area of Burra Creek where the Bulrush clearance will occur.

1.2.2 Surrounding Land Uses

The surrounding land uses include recreation and rural residential blocks. The majority of surrounding land use outside of the town is grazing and cropping paddocks.

2.0 HYDROLOGY

Historically the Burra Creek was an ephemeral creek possibly fed from a spring. During the operation of the Burra Mine, the township relied on the water pumped from the mine that kept the Burra Creek flowing (1884-early 1900s). Currently creek and water pumping are managed by the Regional Council of Goyder who pump ~850,000 L of water a day into the creek from the local water table.

The water flows less than 150 m downstream from the pump before soaking into the creek bed, the water also pools up to 250 m upstream from the pumping station (Figure 2). If water is not continually pumped into the area, the water in the creek line soaks in and dries out in under a week. The existing stormwater network within Burra is largely limited to overland flow through open channels or roadside drainage. Underground drainage is limited to short sections of pipe and under road culverts. Flow is largely conveyed via channels which discharge directly to Burra Creek (Water Technology 2020). Overall, there appears to be a low level of water flow along the creek and a high permeability of the creek bed, this allows for increased sedimentation and growth of *Typha* spp.

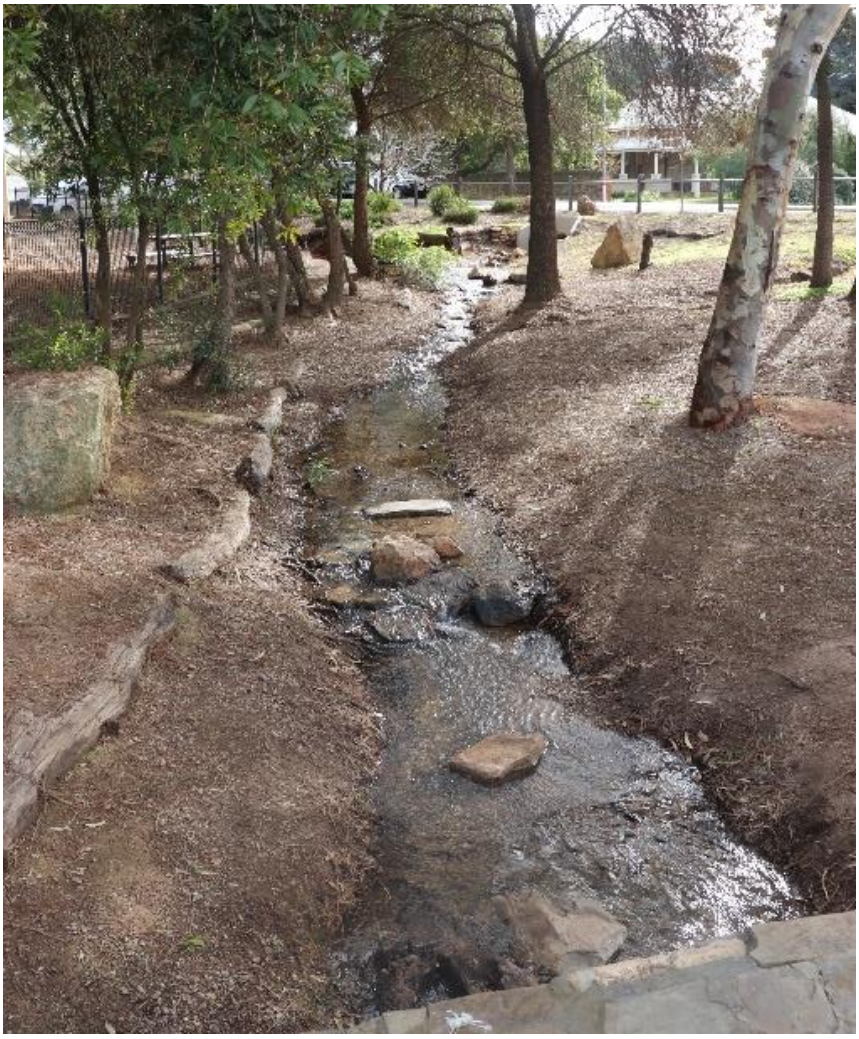

Figure 2: Entrance flow of water pumped into Burra Creek from a bore.

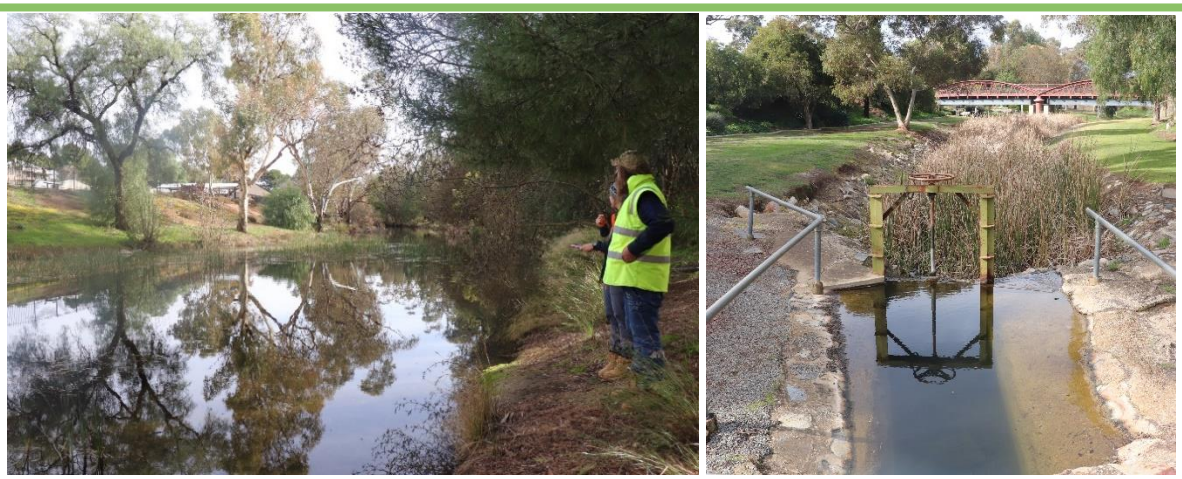

Figure 3: Standing water looking north from the footbridge (left) and surface water flowing down the creek towards the Commercial Street bridge.

Figure 4: Leaf litter and plant material accumulate in the bottom of the creek reducing water depth and increasing nutrient levels.

3.0 FLORA MANAGEMENT

The terrestrial part of the creek line surveyed is dominated by exotic species on the north-eastern side of the creek. The south-eastern side has been planted with native tree and shrubs. The aquatic vegetation is dominated by *Typha* species, with smaller reeds and sedges around the edges of the creek line (Table 1).

Table 1: Key flora species within the Burra Creek area.

Native Species		Environmental Weeds	
Species Name	**Common Name**	**Species Name**	**Common Name**
Typha ssp.	Bulrush	*Schinus molle**	Pepper Tree
Eucalyptus camaldulensis	River Red Gum		
Cyperus gymnocaulos	Spiny sedge		

**Recruitment can occur by seed dispersal and via suckering, control of this species is recommended.*

3.1 Information on Typha

As Typha are native plant species, it is subject to the *Native Vegetation Act 1991* (See Legislation section). Typha prefer slow moving fresh or brackish water up to 2 m in depth. Bulrushes grow only where the soil is inundated or permanently damp and they have little tolerance for drought. The current conditions make an ideal habitat for the growth of this species.

Typha spp. produce tens of thousands of seeds. Most seeds fall close to the parent plant, but they can be blown several kilometres by the wind. Seeds are also spread by moving water or in mud that sticks to animals, particularly waterfowl, or machinery. Their size and their ability to cover large areas causes concern for land managers and these species have developed a reputation for being weeds. Further, overgrowth of reed species can indicate an increase of nutrients in slow moving waterbodies. They provide habitat and refuge areas for native fauna including birds, turtles, frogs, and fish.

3.2 Methodology

Works are proposed to clear the vegetation growing in Burra Creek. Prior to conducting these works, a temporary clay dam wall will be constructed to the north (upstream) of the clearance area, to contain enough water as refugia for local turtle and duck populations. Once the dam is installed pumping water into the Burra Creek will temporarily cease and the area to the south of the dam will be allowed to dry out. As this area dries it is expected that any wildlife will move upstream to where the water is pooled behind the temporary dam.

Clearance of the rushes will involve machinery accessing the site using an existing track to the west of the Burra Creek, just south of the footbridge. A bulldozer and excavator will be used to clear the *Typha* ssp. from the creek line. Reeds will be stockpiled and allowed to drain back into the creek line before removal off site (as per BPOP for Removal or destruction of vegetation (Section 104(4)(g))). To maintain the operation of the weir the excavator will be used to remove sediment within a 10-15 m radius of the weir, to a depth up to but no deeper than the base of the riverbed.

Once the clearance is complete, a hole will be made in the dam wall to allow water to flow back into the creek line and pumping of water will be resumed. Once wildlife has had an opportunity to passively return to the south of the dam the dam wall will then be removed.

Consideration of other management options has been made, but the proposed methodology above has been deemed as the most appropriate method. See the Table 2 below for other potential management options that have been considered.

Table 2. Potential future management options post-clearance.

Option	Pros	Cons
Mechanical clearance of waterway	Requires infrequent maintenance	Difficult access Costly Requires removal of biological material and sediment.
Installation of solid bottom	Decreased ability for unwanted plants to attach. Potentially easier to clean	Further alteration of the waterway. Cost and time to install
Intermittent drying of creek bed	Waterways become less favourable habitat for *Typha* spp.	Potential disruption of habitat for frogs, turtles and fish. Potential smell due to high levels of organic matter being exposed
Slashing and removal of plant matter	Reduce biomass	Requires more frequent maintenance. To prevent water nutrification, cut material needs to be taken away.

Option	Pros	Cons
Herbicide **Requires herbicide appropriate for waterbodies*	Reduce biomass	Requires more frequent maintenance.
Increasing water flow	Waterways become less favourable habitat for *Typha* spp.	Requiring greater volumes of water being pumped through the system.
No management	Reeds will not need to be removed	Aesthetics of the area will change with the increase of reeds and the loss of open water.

There is also the potential to manage the creek line towards more a more natural habitat, especially further down the creek to the south of commercial road See www.water.wa.gov.au/__data/assets/pdf_file/0003/5484/9762.pdf for potential ideas.

4.0 FAUNA MANAGEMENT

Local community members have an interest in the welfare of the animals that currently reside within the creek line. Care and consideration must be taken to all animals during any management works.

Table 3: Fauna species observed or identified in Biological Database of South Australia searches that may occur within the Burra Creek area.

Locally Native Species		Not Locally Native	
Species Name	**Common Name**	**Species Name**	**Common Name**
Anas gracilis gracilis	Grey Teal	*Anas* spp.	Ducks (Muscovy, Indian Runner, mixed breeds)
Anas superciliosa	Pacific Black Duck	*Chelodina longicolis*	Eastern long-neck turtle
Crinia sp.	Froglet	*Emydura macquarii*	Murray short-neck turtle
Fulica atra australis	Eurasian Coot	*Gambusia holbrooki*	Eastern Gambusia (Mosquitofish)
Limnodynastes tasmaniensis	Spotted Grass Frog	*Perca fluviatilis*	Red fin/European Perch
Malacorhynchus membranaceus	Pink-eared Duck		
Poliocephalus poliocephalus	Hoary-headed Grebe		
Tachybaptus novaehollandiae novaehollandiae	Australasian Grebe		

The Burra community enjoys and is invested in the park along Burra Creek. The Burra Management committee is a body that represents the views of local community members and people have expressed concern around the wellbeing of the animals within the creek line while the clearance is taking place. This is based on observations at times when remedial vegetation clearance has occurred, or the pumps have failed, and the creek has dried out past. Some of the species that should be considered include, Fish, frogs, turtles and water birds.

4.1 Fish and Frogs

While native frogs in the area have the potential to be disturbed by the maintenance of Burra Creek, impacts are expected to be minimal due to the timing of the works. The Spotted Grass Frog spawns from spring to autumn, therefore any populations present at the time of works will be adults and therefore able to disperse on their own. Froglet species have a higher risk of being impacted as they breed all year long and will lay a mass of eggs on plant material in water. It is recommended that if frog eggs are found that they are relocated to above the dam, this will require a Wildlife Permit.

Mosquitofish and Redfin Perch may also inhabit Burra Creek and are declared noxious under the *Fisheries Management Act 2007.* Declared noxious species are prohibited to be released or permitted to escape into any waters under this act, and therefore do not require any management actions. Department of Primary Industries and Regions (PIRSA) recommends that noxious fish may be euthanised by a sharp blow to the head.

Native fish are protected under the *Fisheries Management Act 2007.* While native fish are not commonly known to occur in Burra Creek, if it is suspected that native fish will be impacted by the works, it is recommended that advice is sought directly from PIRSA fisheries on how to proceed.

4.2 Turtles

Although native to South Australia, the Murray short-neck and Eastern long-neck turtles are not native to the Burra region. It is most likely that they have been released into the creek line. See Key to South Australian fresh-water turtles https://docs.samuseum.sa.gov.au/9kmwrfeiu

Turtles are dependent on water to survive, with Murray short -neck turtles spending most of the time in the water. The Murray short neck turtles are rarely seen out of the water, however they will bask on logs in the water on warm days. Both the Murray short-neck and Eastern long-neck can also disperse across land to find sources of water to live in.

During the winter both turtle species will brumate (the reptile equivalent of hibernation). Turtle's brumate either on land or in water, burying themselves in dirt and foliage or mud and sediment respectively. These two turtle species will breed around about the first heavy rains in spring, which is usually around November. The female turtles will leave the water to build a nest between 30 and 150 m from the water's edge.

4.2.1 Turtle management

Proposed works are to be undertaken in summer, when turtles are active and brumation should not be an issue. Previously when pumping of water ceased in 2020, turtles wandered through town searching for water. To reduce the potential of this happening water will be retained in the upstream section of the creek so that the turtles can travel a short distance to access it. This pool will also be suitable to provide a temporary refuge for the local frog population while the works are being undertaken.

The Burra Creek Turtle Rescue Group, a subgroup of the Burra Management Committee have wildlife rescue and animal handling skills and can assist as required. This group should be engaged to move turtles should the turtles move into the town, or to assist with moving animals from the clearance area to the temporary refuge area if necessary.

4.3 Water Bird species

Several different species of birds use the reeds as a place to nest and a shelter for young chicks. Some of the water birds such as the Dusky Moorhen will be in the end phase of their breeding time at the time of clearance (August to January).

4.3.1 Water Bird Management

Prior to any management actions, it is recommended that a walking survey around the site is undertaken to look for any active nests within the reeds or young chicks. If either are found, then it is suggested that some reeds are left as shelter until the chicks fledge. Care must be taken when conducting clearance of reeds as birds may become stuck as they try to escape. If birds are unable to escape on their own, a qualified animal handler may need to be brought in to help remove wildlife.

5.0 TIMING OF WORKS

At present the initial works are planned to take place in January or February 2023. As the slow-moving shallow water of the creek provides ideal conditions for Typha to growth, it is likely that there will be future need for maintenance within the next five years or possibly sooner. It is recommended that maintenance works continue to be conducted in late summer when the water levels are already naturally low, breeding season for birds is likely ending and the turtles are active enough to move away from clearance.

6.0 LEGISLATION

6.1 Legislation

Legislation and regulations relevant to the clearance of Typha in and maintenance of the site includes:

- *Animal Welfare Act 1985*
- *Landscape South Australia Act 2019*
- *National Parks and Wildlife Act 1972*
- *Native Vegetation Act 1991*

  As the site has been managed in the same way previously the Native Vegetation Council does not require notification.
- *Fisheries Management Act 2007*

Phragmites australis and *Typha domingensis* may be cleared subject to the *Native Vegetation Regulations, 2017: Schedule 1, Part 1, Division 1 - Regulation 8(9) – Regrowth, and 8(16) – Native vegetation causing natural resource management problems*. This allows clearance where the of regrowth or colonising growth at:

- existing boat ramps, pumping sites or other existing lawfully established sites where access to open water is essential for the functioning of those sites;
- artificial channels lawfully established for water diversion or flood mitigation purposes where the clearance is necessary to maintain the design function of the channel; and
- constructed farm dams where reed or rush species have become established over time.

The method of clearance must be chosen to have minimum impact on the site and on adjoining native vegetation.

6.2 Approvals, Permits and Licences

The following approvals permits, and licenses are applicable to the project in relation to fauna and flora management operations. These are described in Table 4.

Table 4: Permits applicable to the project.

Best practice operating procedures for water affecting activities (Landscape SA Act 2019)	The Regional Council of Goyder has produced a Best Practice Operating Procedure (BPOP) for water affecting activities, in partnership with the Northern and Yorke Landscape Board. This document outlines board-approved water affecting activities, and allows Council to undertake works in a watercourse without applying for a Water Affecting Activities permit.	Works must follow the processes outlined in the BPOP.
Ministerial Permit (Fisheries Management Act 2007)	Native fish are protected by the *Fisheries Management Act* 2007. If fish need to be removed or are found during the drainage of the area below the temporary dam, a permit may be required to move, handle and release them elsewhere.	Seek advice from PIRSA on appropriate permit for moving of fish.
Native Vegetation Act 1991	Due to the nature of the vegetation requiring removal, clearance is permitted without notification to the Native Vegetation Council. Should vegetation outside of the initial scope of works be impacted, approvals may be required. Clearance of *Typha* spp. within the Burra Creek area falls under Schedule 1, Part 1, Division 1, Regulation 8(9) of the *Native Vegetation Regulations 2017.*	No approval is required (given that the clearance is of regenerating *Typha* species) Notification was given to Native Vegetation Council in August 2022, no follow-up notifications are required.
National Parks and Wildlife (Wildlife) Regulations 2019	Permits are required to take (hunt, catch, restrain, kill or injure, and any act of attempting or assisting to hunt, catch, restrain, kill or injure), release, and disturb protected native wildlife.	Application must be made to DEW SA.

7.0 COMMUNITY ENGAGEMENT

The community has previously expressed concerns around the welfare of the turtles in Burra Creek. When there was a breakdown of the water pump in 2020 turtles roamed the streets in Burra searching for alternative water. Since then, the Burra Creek Turtle Rescue Group has been formed. Concerns around the welfare of turtles could be allayed by providing several levels of community engagement. Including, consulting with the Burra Creek Turtle Rescue Group, providing information to the Community meetings and appropriate signage.

Key messaging around the project could include:

- The provisions being made for the turtles during the project. i.e., not all the water will be drained from Burra Creek during the clearance of the reeds.
- Watch out for turtles - During the project place signage around roadways alerting people to beware of turtles and who to contact if they encounter them in the streets.
- Any other considerations to local wildlife (e.g., walking surveys for breeding bird species prior to management actions)

8.0 REFERENCES

Animal Welfare Act 1985 (SA).

Fisheries Management Act 2007. (SA).

Hutchinson M. (2021). Freshwater turtles of South Australia. South Australian Museum. https://www.samuseum.sa.gov.au/reptile-keys

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