Government of Western Australia
Department of Water
Australian Government

Water notes

WN38 February 2009

Water notes for river management

Advisory notes for land managers on river and wetland restoration

Management of sediment in pools of the Avon River system

This Water note provides information on the problem of sedimentation of the deep pools of the Avon River system in the Wheatbelt region of Western Australia. It explains why deep pools are important to stream ecosystems, why the problem has occurred and the management practices that are used to reverse it and help prevent it from recurring.

Two case studies are described. These are the pool restoration projects for One Mile Pool and for Boyagarra Pool.

While this Water note specifically covers sediment management in the Avon catchment, many of the techniques are applicable to the rest of the Wheatbelt region. For background information on the process of sedimentation in streams please refer to *Water note 17: Sediment in streams.*

Kokeby Pool – Avon River (photo courtesy of Charissa Marwick)

Sedimentation of the Avon River pools

There are three main causes of the changes that have occurred in the biology and physical condition of the Avon River since the Avon River basin was settled. These are widespread catchment clearing, urban development and the River Training Scheme. 'River training' works were undertaken from 1956 to 1972 to reduce the risk of flooding. They involved the ripping and bulldozing of the riverbed and removing debris from the river channel. The form of the river channel was dramatically changed, from braided – where river flow passes through a network of small interlaced channels that reduce flow velocity and trap sediment – to a straightened single channel that increases flow velocity and erosive power (Harris 1996). The idea was to contain flood flows within the river channel and so avoid flood damage. However, the works resulted in extensive erosion and redistribution of sediment that was being held in place by fringing and channel vegetation and by natural bed controls such as logs, rock riffles and stable, vegetated sediment bars. As a result, many of the deep, permanent river pools of the Avon River are now either completely filled with sediment or are in the process of filling.

Figure 1 shows which pools are completely filled with sediment, those more than 80 per cent filled, those filled to less than 80 per cent and those that have previously had sediment extracted from them. Of the 26 major pools between Beverley and Toodyay, six are completely full and another four are more than 80 per cent full of sediment (Advanced Choice Economics and Viv Read & Associates 2007, and B Kelly and T Brooks (Department of Water) 2008, pers. comm., December). It is estimated that there are almost 2 million m^3 (3.2 million tonnes) of sediment in these river pools (Advanced Choice Economics and Viv Read & Associates 2007).

For the river itself to be able to scour sediment from the pools, flows that are greater than a 30-year-flood event are needed (Southwell, 1990). In other words, in theory the river is likely to clean out the sediment naturally only once in every thirty years. However, with the drying climatic conditions and below average rainfall in the region, no major flood events capable of naturally scouring sediment from river pools have occurred in the Avon River catchment since the River Training Scheme was undertaken. Consequently, there have been serious losses to the environmental, social and cultural values of the pools with serious consequences for the stream ecosystem.

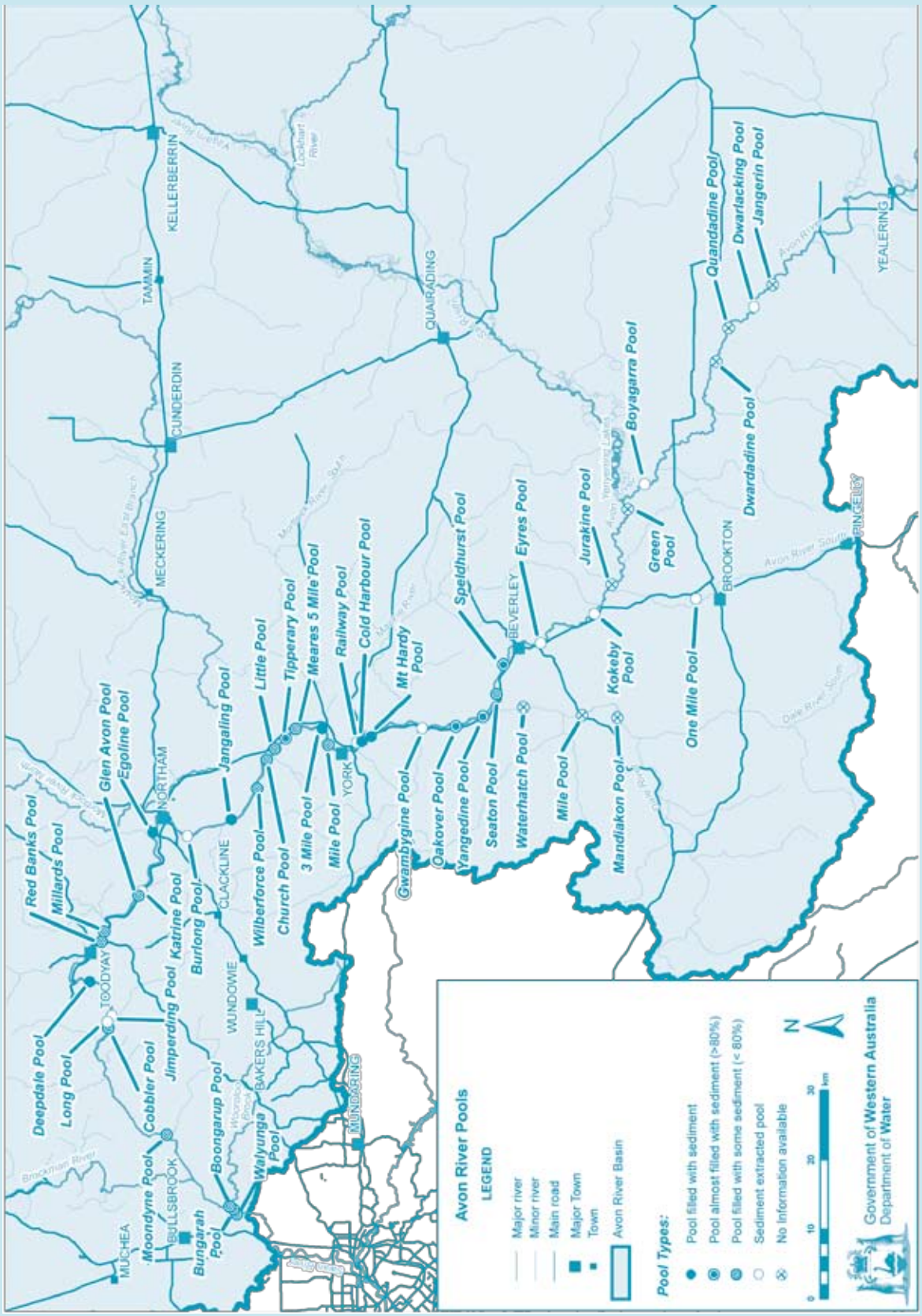

Figure 1 *Major pools of the Avon River in the wheatbelt region of Western Australia*

The damage caused by sedimentation of pools

Sediment that is suspended in the water has a direct effect on plants and animals and on microbial processes (Wood and Armitage 1997). It reduces light penetration which in turn affects the growth and diversity of plants and algae which form an important part of the stream ecosystem Suspended sediment can also be abrasive and can cause damage to the gills of fish (Pen 1999).

Aquatic macroinvertebrates, such as crustaceans, are vulnerable to deposited sediment because the particulate composition of the stream bed is a major factor in the formation of their microhabitats.

Large sediment accumulations can retard streamflow and cause upstream flooding, or deflect the flow into the adjacent stream bank or even onto adjacent land, causing further erosion.

When the rest of the river is dry, the remaining deep pools of the Avon River form some of the river's most valuable habitats by providing the only permanent summer refuge and breeding area for waterfowl and other aquatic fauna. Waterways, and in particular deep pools, are places of special significance for Aboriginal people. These deeper pools also have high aesthetic, nature conservation and recreational values.

Preventing soil erosion in the catchment

As well as sediment being eroded from the channel bed and banks and transported downstream, largely as a result of the River Training Scheme, sediment also enters the river from soil erosion occurring on the floodplain and agricultural areas. Because of this, we need to consider what is happening in the entire catchment.

Agriculture is the primary land use in the Avon River catchment and this has resulted in extensive clearing of native vegetation. This has increased surface runoff and hence, erosion which contributes to the influx of sediment to the river.

To prevent surface soil erosion the rate at which runoff from rain moves across the landscape and into streams must be controlled. In undeveloped catchments, only a small portion of rainfall (around 10 to 15 per cent) becomes direct surface runoff. The majority of the rainfall is intercepted by vegetation, infiltrates into the soil or is lost through evapotranspiration. Runoff only occurs once the catchment is saturated or in rare, heavy storm events. In natural catchments, this runoff moves slowly across the land, being filtered by vegetation. Additionally, the root network of the plants holds the soil in place, preventing erosion. Once rain water begins to stream across the land in cleared catchments, soil erosion can occur as soil particles and nutrients are lifted and transported, potentially washing into rivers and wetlands.

Methods to reduce soil erosion in agricultural areas involve retaining runoff from rain water and slowing the rate at which runoff flows across the land. Where site

conditions are suitable contour banks can be built to intercept runoff, thus allowing it to infiltrate into the soil. Runoff can also be retained in vegetated depressions or in basins, tanks or farm dams. These methods aim to replicate the 'slow' hydrology of a natural catchment.

Vegetation has an enormous ability to decrease soil erosion and is the preferred technique for managing floodplain erosion and sedimentation. In agricultural or pastoral areas, clearing needs to be kept to a minimum and revegetating of areas will be needed in places. Revegetating recharge areas (areas where runoff percolates down into the groundwater) also helps to reduce catchment runoff. In many cases it may not be necessary to revegetate an entire floodplain to prevent excessive erosion.

There are some farming practices which help to reduce soil erosion. By cultivating along contours rather than perpendicular to them and constructing slightly raised banks along the contours, runoff can be intercepted which can significantly reduce soil and nutrient loss (SCEP 1992).

Soil disturbance and exposure of bare soil to rain can be minimised by drilling rather than ploughing, retaining stubble from the previous season's crop and by careful grazing management.

Further information on reducing soil erosion can be found on the Department of Agriculture website <www.agric.wa.gov.au>.

Techniques for controlling sedimentation of river pools

The recovery process aims to restore pools to as near their natural state as possible, typically providing aquatic habitat during summer and improving the aesthetics.

To restore the pools and to reduce the sediment load that the Avon River system has to cope with, the Department of Water, with the involvement of other government agencies, landholders and community groups, is undertaking pool restoration projects. These involve extensive revegetation of the riparian zone (the corridor of land in which the stream 'lives'), restricting stock access by constructing fencing, using various engineered management techniques and removing sediment from some river pools that have been assessed as being a high priority. The department has also supported fencing, revegetation and other bed and bank stabilisation works along tributaries to reduce the sediment load entering the Avon from the wider catchment. Some tributaries, although not directly affected by the River Training Scheme, have been recognised as contributing to the sediment entering the Avon system and so it is important that these are also managed and restored.

Revegetation of the riparian zone

Revegetation of the riparian zone with native plants is an essential part of waterway and pool restoration. It restores biodiversity and reduces erosion by stabilising the river bed and banks. Strips of vegetation along the foreshore slow runoff and trap suspended sediment and nutrients before they get into the river. As the native vegetation becomes established the habitat for native fauna also improves.

Further information on revegetating the riparian zone can be found in *Water note 24: Riparian zone revegetation in the Avon catchment, Water note 29: Long-term management of riparian vegetation, Water note 31: Revegetating with native grasses in the Avon catchment and Water note 32: Establishing samphires in the Avon catchment.*

Fencing of the riparian zone

Fencing riparian zones to restrict stock access helps to protect river banks from physical disturbance and hence preserves riparian vegetation, minimises soil erosion and provides long-term channel stability.

Whilst funds are available, the Department of Water will continue to manage a fencing program in the Avon region whereby fencing materials are supplied to landowners, on the understanding that the landowner will construct fencing along the riparian zone and manage stocking rates within the fenced area. Fences should be located away from the floodway of the river where they will not be damaged by high velocity flows.

Further information on fencing of the riparian zone is given in *Water note 18: Livestock management – fence location and grazing control and Water note 19: Flood proofing fencing for waterways.* Department of Water offices can also provide information.

Watering points and crossings

Providing off-stream watering points and avoiding river crossings are preferable to having livestock walking within river channels. In situations where this cannot occur, properly designed and constructed river watering or crossing points are necessary. Straight sections of the river, where stream power is low, or where the river bed is hard are most suitable for livestock crossings. Watering points are best located on the inside of meander bends where water velocity is low.

Further information on the design and construction of livestock crossings on fenced waterways can be found in *Water note 6: Livestock management – construction of livestock crossings* and in the department's publication *Crossing Creeks - stream crossings on farms.* Additional information on livestock watering points in-stream and alternative watering options off-stream can be found in *Water note 7: Livestock management – watering points and pumps.* For further advice, contact your local Department of Water office.

Engineered sediment management techniques

When river banks are too unstable to support vegetation, there are a number of engineered management techniques available to help secure and protect them. These are carried out in conjunction with revegetation and fencing. They include positioning large, woody debris in the stream in a way that deflects the flow away from the

banks, protecting the toe (base) of the bank with rocks (riprap) or logs, and applying brushing or matting to stabilise and protect the banks until vegetation establishes.

A riffle is a high point in the stream bed that may consist of a rocky rapid, log bar or the natural accumulation of debris or course bed material. Water flow is typically relatively shallow, fast and rough over the riffles causing the 'bubbling' noise of a stream. The stream forms a pool upstream of the riffle, which helps to slow flow, trap sediment and control erosion. Pool-riffle sequences can be artificially constructed to stabilise the river bed itself until longer-term improvements in the catchment take effect (Figure 2).

For more information on engineered techniques for managing sedimentation please refer to the department's *River restoration manual No 10 (Stream Stabilisation)* and contact your nearest Department of Water office to find out what management procedures might be appropriate for your reach of the river.

Figure 2 *Rock riffle sequence at Spencer Brook, a tributary of the Avon River, when dry (A) and when flowing (B)*

Sediment extraction

Machinery may be used to remove sediment and restore the volume of a river pool. However, simply removing sediment without carrying out other river restoration measures in the area will almost certainly result in the pool filling in again over time.

It is important to properly assess the site and carefully plan the pool restoration project. Excavation should not extend below the original bed of the river and only additional deposited sediment should be removed. Excavating too much sediment or excavating in the wrong location can actually initiate channel erosion, as the unstable bed head cuts back up the catchment. The bed and banks of the excavated pool should be graded to a stable slope. Channel stabilisation techniques, such as the construction of rock riffles, may also be needed.

Sediment removal is planned taking into account the effects on pool ecology and disturbance to the sensitive riparian vegetation surrounding the pools. Access for machinery and the logistics of transporting the sediment off-site need to be considered. The choice of machinery (dredges or long-reach excavators for example) will depend on the individual characteristics of the pools (Figure 3).

Coarse sand sediments from river pools may have commercial value and may be suitable for applications such as manufacturing concrete and bricks, installation of septic tanks, construction of housing pads and supplies for nurseries. For example, in the past, sediment removed from Katrine Pool has been used for the construction of the Great Eastern Highway by-pass, near Northam. Local government authorities, such as shires, may also find uses for river sands for general purposes.

Based on the department's sediment removal projects in 2007 and 2008, the approximate cost of sediment removal from Avon River pools is approximately $17 per tonne (with disposal of sediment on-site) while the sale price of sediment (in 2007) was estimated to be between $12 and 32 per tonne, depending on the transport distance (Advanced Choice Economics and Viv Read & Associates, 2007).

Prior to sediment extraction, a pool management plan is required. Licences and permits also need to be obtained from the appropriate local and/or state government agency. It may be necessary to obtain an extractive industries licence from local government authorities, and under the *Rights in Water and Irrigation Act 1914* (WA), the Department of Water may require a permit to disturb the bed and banks of a waterway. A very important step that must occur prior to any excavation is the testing of sediments for high levels of nutrients, potential acid sulfate soils or other contaminants that may require special handling and disposal precautions. You will also need to formulate clear safety procedures that must be strictly adhered to. Please contact your local Department of Water office when considering a pool restoration project in your area.

Figure 3 *Depending on the site, a dredge (A) or a long-reach excavator (B) may be more suitable for extracting sediment*

Aboriginal heritage and native title

Activities affecting rivers and tributaries are likely to be of concern to Aboriginal people. Aboriginal sites are protected under the *Aboriginal Heritage Act 1972 (WA)* and the *Commonwealth's Native Title Act 1993* and should not be disturbed without consent from the Western Australian Department of Indigenous Affairs and Western Australian Office of Native Title. When planning a pool restoration project, groups need to check whether native title applies to the location of the proposed works and identify whether the site is of cultural value and registered as a significant site under the *Aboriginal Heritage Act 1972*. Please contact your local Department of Water office for more information about the correct procedure to follow when applying for approval of the proposed works.

Apart from the legal and statutory requirements to ensure that all aspects of a project are investigated, there is a social and moral obligation to ensure Aboriginal heritage is not detrimentally affected by any proposed works in an area. The Department of Indigenous Affairs can assist in advising which Aboriginal communities and individuals should be consulted or notified in instances where an Aboriginal site may be at risk of being disturbed. Prior to restoration works, all efforts must be made to consult with the appropriate Aboriginal communities.

For further information on the importance of waterways and wetlands to Aboriginal people, see *Water note 30: Safeguarding Aboriginal heritage.*

Monitoring, maintenance and evaluation

Monitoring is important so that the success or otherwise of the pool restoration project can be evaluated. If sediment is removed from a pool surveys should be conducted (for example, cross-sectional surveys of pools) before and after excavation to determine the volume of sediment extracted. These surveys also provide baseline levels for future monitoring of sedimentation rates. Monitoring may also include ecological factors such as the water quality of the pool, conducting flora and fauna surveys to identify changes over time and checking the success rate of revegetation plantings.

Maintenance may include weed control, repairing constructed riffles or extracting more sediment to retain the depth of the pool.

Water note 28: Monitoring and evaluating river restoration works provides further information.

Case study: One Mile Pool

One Mile Pool is located approximately 1.5 km north of Brookton along the Avon River South Branch. Before it filled with sediment, One Mile Pool was valued by the local community for recreation (Figure 4), as well as being a drought refuge for fauna in summer. The pool also held great significance for the local Aboriginal community.

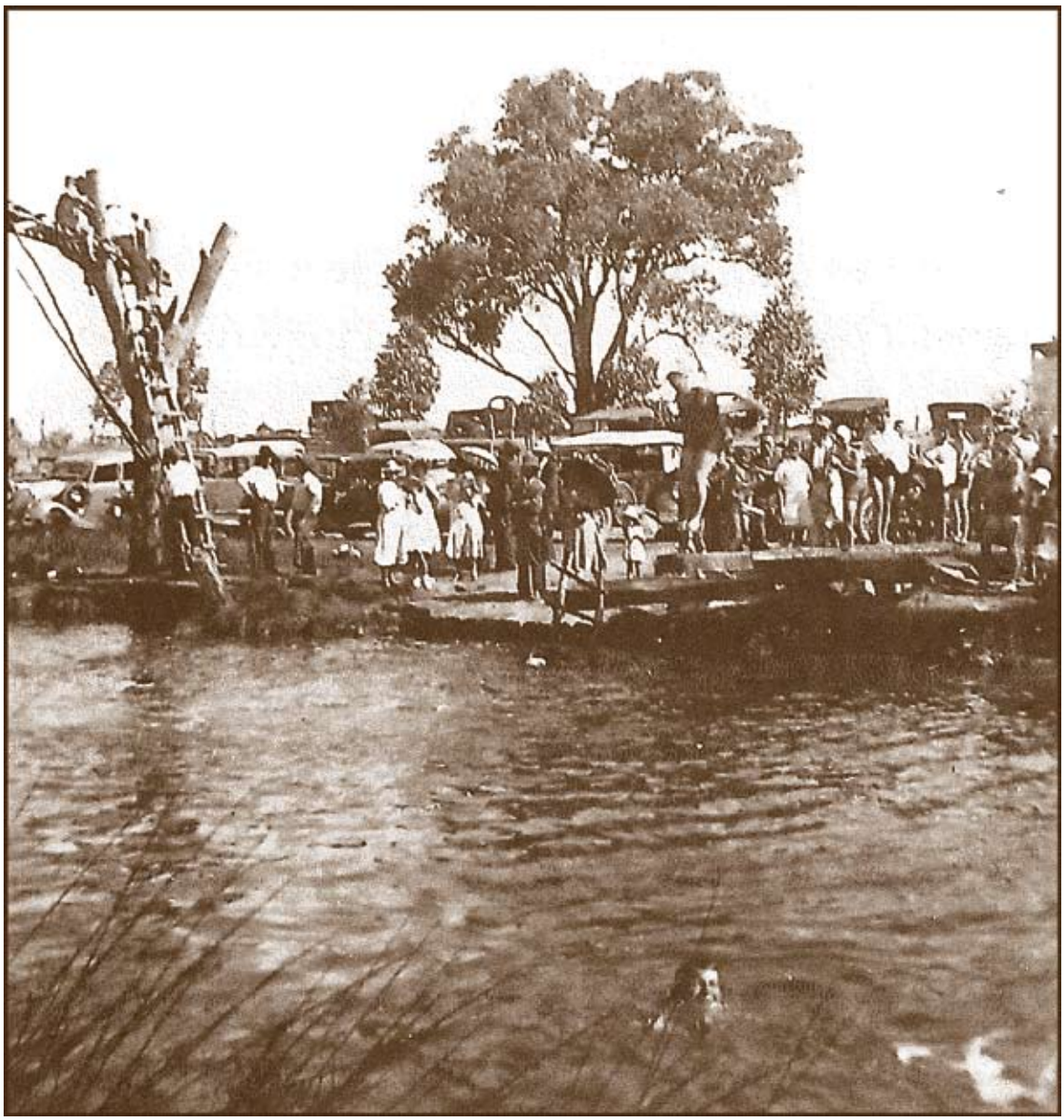

Figure 4 *One Mile Pool was once used widely for recreation by the local community (photo courtesy of Judy Williams)*

In May 2007, approximately 3000 m^3 of coarse sediment was removed from the pool using a long-reach excavator, increasing the pool depth from 0.5 m to 2.5 m. An extensive re-vegetation program was conducted in August 2007 and July 2008, after weed control and ripping of the area surrounding the pool had been completed, and fencing was constructed along the riparian zone to keep cattle out (Figure 5).

Monitoring has shown that the plantings were successful and that the pool has maintained its depth. The results of this pool restoration project mean that local communities that once enjoyed the natural beauty of this ecosystem can do so once more (Figure 6).

Figure 5 *Fencing and revegetation of the riparian zone were important parts of the pool restoration project at One Mile Pool on the Avon River South, near Brookton*

Figure 6 *One Mile Pool before (A) and after (B) sediment extraction*

Case study: Boyagarra Pool

Boyagarra Pool is a 600 m stretch of the Avon River located 19 km north-east of Brookton (Figure 7). In 1999, a management plan was developed by the Water and Rivers Commission and the University of Western Australia's Centre for Water Research, based on the ideas of the Friends of Boyagarra Pool (consisting of adjoining landholders and members of the Brookton community). A restoration project has been under way since February 2000 to carry out the recommendations made in the management plan. This has included revegetating the riparian zone, excavating to remove excess sediment from the pool and fencing a section of the pool. From 2000 to 2002, a mixture of trees, groundcovers, shrubs, sedges, rushes and native grasses were planted at several areas across the site. The denuded banks caused by sediment extraction works, the surrounding floodplain and the floodway upstream of the pool were all revegetated to stabilise the mobile sediment that would otherwise refill the pool.

Excavation of the pool was undertaken in two parts. In April 2001, when the pool was relatively dry, the top half of the pool was excavated to a depth of 2 m and then in April 2002 the downstream half of the pool was excavated. A total of 6000 m^3 of sediment was removed.

Over the summer of 2000–01 the downstream section of the pool was fenced to exclude stock while the upstream section has regenerated naturally after being fenced by the landholders in the 1970s.

Monitoring of the vegetation and sediment movement has been continuing throughout the project. Sediment is most likely to move during large flood events and the low rainfall since the dredging has meant there have only been low to medium flows in this reach of the river. Sediment movement into the pool is being monitored by surveying the pool bottom profile twice each year. The reaches immediately upstream of the pool have been returning to their naturally braided state which is helping to trap the sediment and prevent its transport into the pool. To date, very little sediment has moved back into the pool.

The fencing to exclude stock has allowed many of the native plants to recover or germinate by themselves and native fauna have started nesting in the ground vegetation under newly planted trees due to a denser understorey that allows for the nest to remain hidden.

Figure 7 *A successful pool restoration project at Boyagarra Pool on the Avon River*

For further information regarding the management of sedimentation in the pools of the Avon River or for advice on how to commence a pool restoration project, please contact your local Department of Water office.

References and further reading

Available from Department of Water

Water and Rivers Commission 2001, *Stream Stabilisation*, River Restoration Report No. 10, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2002, *Stream channel and floodplain erosion*, River Restoration Manual No. 18, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2000, *Livestock management: construction of livestock crossings*, Water note No. 6, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2000, *Livestock management – watering points and pumps*, Water note No. 7, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2000, *The value of large woody debris (snags)*, Water note No. 9, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2000, *The values of the riparian zone*, Water note No. 12, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2000, *The management and replacement of large woody debris in waterways*, Water note No. 13, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2000, *Sediment in Streams*, Water note No. 17, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2000, *Livestock management – fence location and grazing control*, Water note No. 18, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2000, *Flood proofing fencing for waterways*, Water note No. 19, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2000, *Importance of large woody debris in sandy bed streams*, Water note No. 21, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2001, *Riparian zone revegetation in the Avon catchment*, Water note No. 24, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2002, *Demonstration sites of waterways restoration in Western Australia*, Water note No. 27, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2002, *Monitoring and evaluating river restoration works*, Water note No. 28, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2002, *Long-term management of riparian vegetation*, Water note No. 29, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2002, *Safeguarding Aboriginal heritage*, Water note 30, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2003, *Revegetating with native grasses in the Avon catchment*, Water note No. 31, Water and Rivers Commission, Western Australia.

Water and Rivers Commission 2003, *Establishing samphires in the Avon catchment*, Water note No. 32, Water and Rivers Commission, Western Australia.

Department of Water 2008, *Assessment of the status of river pools in the Avon catchment*, Water resource management series, Report No. 47, Department of Water, Western Australia.

Department of Water 2008, *Managing waterways in the Avon Wheatbelt – field guide*. Perth, Australia.

Viv Read & Associates 2001, *Avon River Management Authority: Gwambygine Pool management plan*, Water resource management series, Report No. 27, Water and Rivers Commission, Perth and Avon River Management Authority, Northam, Western Australia.

Available from other sources

Advanced Choice Economics & Viv Read & Associates 2007, *Review of the economic viability of sediment extraction from the Avon River pools*, Advanced Choice Economics, Perth and Viv Read & Associates, Perth.

Harris, T F W 1996, *The Avon: an Introduction*, Avon River Management Authority, Water and Rivers Commission and Alcoa Australia, Western Australia.

JDA Consultant Hydrologists 2008, *Avon River pools sedimentation survey*, JDA Consultant Hydrologists, Perth, Australia.

Land and Water Australia 2006, *Case Study 19: Managing Riparian lands, National Riparian Lands Research and Development Program*, Canberra, Australia.

Lovett, S, Price, P and Cork, S 2004, *Riparian ecosystem services*, Fact Sheet 12, Land & Water Australia, Canberra, Australia.

Lovett, S and Price, P (eds.) 1999, *Riparian land management technical guidelines*, Volumes 1–2, Land and Water Resources Research and Development Corporation, Canberra, Australia.

Pen, L 1999, *Managing our rivers: a guide to the nature and management of the streams of south-west Western Australia*, Water and Rivers Commission, Perth, Australia.

SCEP 1992, *Reducing the nutrient load from rural sources to Albany's harbours.* South Coast Estuaries Project Group, Western Australian Department of Agriculture, Western Australia.

Southwell, C E 1990, *The bedload regime response to the clearing of channel vegetation in the Avon River, Western Australia*, Department of Geology, University of Western Australia, Perth.

Toodyay Friends of the River 2006, *Sedimentation in the Avon Valley: a major threat to the Swan River and park and Avon Valley and Walyunga national parks*, Toodyay Friends of the River, Toodyay, Western Australia.

Wood, P J and Armitage, P D 1997, Biological effects of fine sediment in the lotic environment, *Environmental Management*, Vol. 21(2): 203 –17.

Acknowledgements

The production of this Water note is part of Strategic Reserve Project 063058 – Statewide Waterways and Wetlands Frameworks, Coordination and Support, which is funded by the National Action Plan for Salinity and Water Quality, the Natural Heritage Trust and the National Landcare Program.

Many thanks to all of the staff at Department of Water who contributed to and provided comment on this Water note, with a special mention to Bernard Kelly, Kate Gole, Terry Brooks and Martin Revell at the Northam office. Thanks also to Jesse Steele and Clare Taylor.

Mapping Datum

The following information applies to all maps included in this document.

Sources

The Department of Water acknowledges the following datasets and their custodians in the production of the included maps:

Dataset Name	Custodian	Metadata date
Western Australian Towns	Department of Land Information	August 2004
Road centrelines	Department of Land Information	May 2004
Hydrology, linear (hierarchy)	Department of Water	November 2007
Hydrographic Catchments	Department of Water	June 2007
WA coastline	Department of Water	July 2006

The source of information for the pool categories was a combination of personal communication with Bernard Kelly and Terry Brooks of the Department of Water, and the report produced by Advanced Choice Economics & Viv Read & Associates (2007).

Datum and projection information

Vertical Datum	Australian Height Datum
Horizontal Datum	Geodetic Datum of Australia 1995
Projection	MGA 94 Zone 50

Disclaimer

The map is a product of the Department of Water, Water Resource Management Branch and was printed in November 2008. The map was produced with the intent that it be used at the scale of 1:655000 when printed at A4.

While the Department of Water has made all reasonable efforts to ensure the accuracy of this data, the department accepts no responsibility for any inaccuracies and persons relying on this data do so at their own risk.

File location of map: J:\gisprojects\Project\B_Series\B4193\0001_Wheatbelt_Water_Notes\mxd\avon_river_pools.mxd

For more information and technical assistance please contact the Department of Water:

168 St Georges Terrace,
Perth Western Australia 6000
Telephone: 08 6364 7600
Facsimile: 08 6364 7601
Website: www.water.wa.gov.au

Printed on recycled paper February 2009
ISSN 1832–6897 (print)
ISSN 1835–8861 (online)

This water note is intended to be a general guide only and is not a comprehensive document. For further information contact the Department of Water regional office in Northam or the Drainage and Waterways Branch in Perth.

Notes

Notes

Notes

Did you find the information in this Water note helpful?

We would really appreciate your feedback. Please fill in the form below and either post it to:

Waterways Section, Drainage and Waterways Branch
Department of Water
168 St Georges Tce
Perth WA 6000

or, scan and email your response to **waterways@water.wa.gov.au**, fax it to 6364 6516 or call 6364 7600 and ask for the Waterways Section to provide your feedback.

What is your current occupation?

❑ student ❑ natural resource management practitioner

❑ teacher ❑ community group volunteer

❑ other, please state _____

How helpful was the information provided in this Water note?

❑ not helpful ❑ helpful ❑ extremely helpful

What did you think about the level of technical content in this Water note?

❑ too low ❑ appropriate ❑ too high

What did you think about the readability of the Water Note?

❑ difficult to read ❑ reasonable to read ❑ easy to read

Have you read any other Water notes or Water facts? ..... ❑ yes ❑ no

If so, did you find them helpful? ..... ❑ yes ❑ no

Please provide names/issue numbers of those that you have read and provide any related comments._____

_____

If you use Water notes and Water facts, please describe what you use them for._____

_____

_____

Did you know that all Water notes and facts are available on the internet? ❑ yes ❑ no
(http://portal.water.wa.gov.au/portal/page/portal/WaterManagement/Waterways)

Would you like to see more Water notes/Water facts published? ..... ❑ yes ❑ no

If so, are there any topics that you would like to see published in the future?_____

_____

_____

Do you have any suggestions on how to improve these Water notes?_____

_____

_____

Any other comments?_____

_____

_____

Name (optional):_____ **Email (optional):**_____

Address (optional): _____

_____

Thank you very much for your feedback.

printed on recycled paper

Government of **Western Australia**
Department of **Water**