TOOLIBIN LAKE RECOVERY TEAM

2004 ANNUAL REPORT

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for the
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1. INTRODUCTION

This report summarises activities carried out under the Toolibin Lake Recovery Plan (Toolibin Lake Recovery Team, 1994) during 2004.

Toolibin Lake Recovery Plan, 1994

Toolibin Lake is a wooded, seasonal wetland situated southeast of Wickepin in the Western Australian wheatbelt. The lake is a feature of the Toolibin Lake Nature Reserve which is managed by the Department of Conservation and Land Management. Toolibin Lake is recognised as a conservation area of international significance for migratory waterbirds under the Ramsar Convention.

The Toolibin Lake Recovery Catchment Plan (Toolibin Lake Recovery Team, 1994) was prepared in response to a continued decline in vegetation health at Toolibin Lake in an increasingly saline environment. The plan was endorsed in September 1994. The following information has been reproduced from the Recovery Plan:

Recovery Plan 5 principal goals

- to conserve Toolibin Lake and its associated wildlife as a freshwater habitat.

- to improve land use decision making and practice within the Toolibin Catchment so that land management:
  * is sustainable, productive and profitable in the long term (over 100 years);
  * reduces the current area of degraded land;
  * favours conservation of local wildlife.

- to demonstrate that, within a large catchment, it is possible to stabilise hydrological trends which if unchecked threaten land, water and biodiversity resources.

- to demonstrate to other land managers in Australia methods of protecting their biodiversity, land, and water resources.

- to develop mechanisms which lead to community ownership of Western Australia's natural resources including management problems and their solution.

Recovery Objective

The objective of the Recovery Plan is to ensure the long-term maintenance of Toolibin Lake and its environs as a healthy and resilient freshwater ecosystem suitable for the continued visitation and breeding success by the presently high numbers and species of waterbirds.

Recovery Approach

To achieve this objective it will be necessary to restore the catchment of Toolibin to a hydrological condition, which conserves the Lake and its environs. Establishing sustainable, high water-use agriculture within the catchment is crucial to attain this goal.

Therefore strategies for recovery of Toolibin Lake require the integration of active management and rehabilitation of the lake, associated reserves, and nearby agricultural lands. The major cause of deterioration of the Lake is salinisation and waterlogging associated with a rising saline groundwater table. To enable the lake to survive and recover requires this process to be reversed to return the system to one that is a closer reflection of the historical hydrological regime. This can only be achieved through appropriate action at the level of the whole Toolibin Catchment.

While a solution at the catchment level is essential, emergency action, such as groundwater pumping, is required in the short term to maintain and improve Toolibin Lake until longer term strategies begin to take effect.

Recovery Strategies

While all the strategies listed are important, the first four are crucial and therefore have the highest priority. The strategies for achieving the Recovery Objective are:

- to control groundwater levels beneath Toolibin and ensure that they do not threaten the freshwater status of the Lake or its environs.

- to control surface water inflows to Toolibin and ensure that they do not threaten the freshwater status of the Lake.

- to maintain or enhance the natural vegetation in and around the Lake.

- to achieve sustainable agriculture and increased water use on agricultural lands in the catchment by:

    * developing and implementing commercial revegetation schemes based on woody, native vegetation.

    * developing and implementing revegetation which improves current agricultural production (cereal and stock). For example, by effective implementation of alley farming, shelterbelts, and rehabilitation and pastoral use of areas with surface salinity.

    * encouraging changes in farm practice which better utilise water "where it falls". This may include improving soil structure to enhance plant growth (and thus water use).

- to develop consultative mechanisms, models and decision-making systems with the community to ensure that potentially divisive land conservation issues, such as drainage and disposal of effluent from groundwater pumping, can be effectively resolved.

- to implement monitoring and research which allows the achievement of strategies to be evaluated.

Given that the Australian community contributes to the recovery of the Lake, it is recognised that the following strategies must also be pursued although they do not directly relate to the recovery objective:

- to improve knowledge of hydrological, farming and natural systems so that information generated through the Toolibin Catchment can be successfully applied elsewhere.

- to educate the local, State, and National communities concerning the recovery outcomes so that people are better informed concerning land use and land conservation.

- to extend the information and lessons from Toolibin to other land managers.

2. RECOVERY TEAM

RECOVERY TEAM

The 2004 Recovery Team membership is as follows:

Mrs Roz Thomson (Farmer, member of the Lake Toolibin Catchment Group)
Mrs Audrey Bird (Farmer, Chair of the Lake Toolibin Catchment Group)
Mr John Blyth (Acting Manager, WATSCU)
Mr Jim Lane (Principal Research Scientist, CALM)
Mr Richard Pickett (Senior Resources Officer, Water and Rivers Commission)
Mr Bruce Bone (Wheatbelt Regional Manager, CALM)
Mr Greg Durell (District Manager, CALM, Chair).

TECHNICAL ADVISORY GROUP

The 2004 TAG membership is:

Mr David Bicknell (Senior Revegetation Development Officer, Dept of Ag WA)
Dr Richard George (Senior Research Scientist, Dept of Ag WA)
Dr Stuart Halse (Senior Principal Research Scientist, CALM)
Dr Peter Muirden (Surface Water Hydrologist, Water and Rivers Commission)
Dr Shawan Dogramaci (Hydrogeologist, Water and Rivers Commission)
Mr Bruce Bone (Wheatbelt Regional Manager, CALM)
Mr Greg Durell (District Manager, CALM, Chair).

DEPARTMENTAL TOOLIBIN LAKE RECOVERY CATCHMENT STAFF

Peter Lacey (Toolibin Lake Recovery Catchment Officer)
Peter Wnuk (Toolibin Lake Recovery Catchment Technical Officer)

3. RECOVERY PLAN STATUS AND FUNDING

PLAN STATUS

The Recovery Plan continues to guide recovery actions until the new Recovery Plan currently being developed is completed.

PLAN FUNDING

Funds have been provided through the State Salinity Strategy and Australian Government Department of Environment and Heritage to implement works during 2004.

4. RECOVERY PLAN ACTIONS

Recovery actions undertaken in 2004 are detailed below.

GROUNDWATER PUMPING

Recovery Action 3.2

Pump Performance

Approximately 232 ML of groundwater has been extracted from beneath Toolibin Lake between the period of the 1st January 2004 to the 31th December 2004. On average, 637 KL of water has been extracted daily, with an average 74% of this water produced from the electric submersible bores and 26% from the air displacement pumps.

During the same period, there were 295 lost pump days due to pump faults or breakdowns (approximately 7% of production time). The majority of these were related to either iron bacteria, power surges, power failures, pump failures or other equipment breakdowns.

Iron Biofouling

Both pump P7 and P10 still had some problems at the beginning of the year, but it appears that the Pumpmate chemical dosing system is now working effectively and controlling the iron bacterial build up.

SURFACE WATER CONTROL

Recovery Action 3.3

Flow

Rainfall and stream flow data from the WRC gauging station 512045 indicates that total rainfall from 1st January 2004 to 31st December 2004 at Toolibin was 306mm, with 44% of this falling during the winter months of June, July and August.

There was no flow in the North Arthur River in 2004.

Catchment Surface Water Management Plan

The Department of Agriculture has completed a comprehensive surface hydrology assessment to define surface water movement across the catchment and to consolidate

information generated from past surface water and groundwater investigations. This information will be used to review the performance of surface water management strategies and also recommend additional solutions to address the threats of waterlogging and salinity in the Toolibin Lake catchment.

LAKE AND RESERVE REVEGETATION

Recovery Action 3.5

Toolibin Lake and Dulbinning Nature Reserves Revegetation

The biannual vegetation monitoring of Toolibin Lake and Reserves has been completed and the results show a slight positive response in the vegetation.

There has still been no germination of *Banksia prionotes in* either the ashbed that was seeded or the unseeded ashbed that were burnt in 2003.

Protection of Toolibin Lake seedlings

Several areas of *Casuarina obesa* regeneration on the southern edge of the lake floor that were fenced to prevent further kangaroo grazing have continued to grow well and have new seedlings germinating.

Chadwick's Block

The review by Gavan Mullan of the current revegetation plan is almost complete. The current review of the Recovery Plan looks at the recommendations made in the original revegetation plan (Arboressence 2001) to ascertain its current relevance and make new recommendations where appropriate.

Until the review is completed progress continues on implementing the Chadwick's Block Revegetation Plan (Arboressence 2001). Approximately 12 hectares were revegetated at Chadwick's Block during 2004. All seedlings were grown from seed that had been collected by CALM staff from the Toolibin Lake catchment.

The revegetation plots include seed production areas for a range of species.

Extensive damage from kangaroo grazing of *Casuarina obesa* has occurred at Chadwick's Block. Kangaroo numbers have been monitored on the lake and reserves but were not considered significantly high enough to warrant culling. Numbers did increase significantly for a short period after a large wildfire occurred between Harrismith and Kukerin in early December 2004 (Kukerin fire).
A number of techniques were trialled to prevent damage to *Casuarina obesa* seedlings. These included fencing and tree guards; the fencing worked well, however the tree guards failed because the trees were not able to support themselves when the tree guards were removed and the kangaroos stripped the bark from a number of trees. Other damage included spray drift from a neighbouring property effecting 2 hectares of *Allocasurina huegeliana;* this did not kill the trees but set them back considerably and made their form unsuitable for timber production. Also between the 17th and 22nd of December 2004 the *Casuarina obesa* plantation suffered significant parrot damage. Approximately 50% of trees sustained damage and losses are expected to be high, although it is still too early to determine just how severe it will be. We believe that the damage was caused by a flock of Galahs and all occurred in one day. A few other sheoaks were damaged on the property at the same time.

First year weed control was carried out on plots planted in 2003. Spring and summer weed control was also necessary for plots planted in 2004. The rainfall pattern in 2004 made weed control difficult. Even though there were few large rainfall events over the 2004 growing season, the number of days where rainfall occurred was high. Wet and windy days limited the available opportunities for spraying to take place. Difficulty in weed control allowed germination to continue throughout the 2004-growing season.

CATCHMENT REVEGETATION

Recovery Action 3.6

Biodiversity Revegetation Programme

14.5 hectares of privately owned, agricultural land was revegetated with approximately 18300 seedlings through cost sharing arrangements with the Department. Approximately 76% of the seedlings went to new sites to be revegetated, while 24% were used to infill 2003 planting sites. Six landholders participated in the revegetation programme during 2003.

Revegetation can play an important role in conserving the biodiversity of the catchment. However, the scale of the current revegetation programme very much restricts its impact on the hydrology of the Toolibin Lake catchment.

Oil Mallees

In 2004 the Department returned to its previous subsidy rate of $0.40 per oil mallee seedling to landholders. This subsidy was conditional on an agreement to comply with specified planting standards, and proposed sites. Sites also had to be located in the designated target zone.

6 landholders through the subsidy scheme planted a total of 130257 oil mallees. The oil mallees have been planted in alley formation over approximately 325ha of agricultural land.

AGRONOMIC MANIPULATION

Recovery Action 3.7

These works are primarily under the jurisdiction of the Lake Toolibin Catchment Group (LTCG). The LTCG offers a subsidy to its members for the use of high water use pastures. The Department has no documentation of these activities.

DECISION SUPPORT SYSTEM

Recovery Action 3.8

Revegetation Database

A database to assist with the establishment and administration of Recovery Catchment revegetation schemes is in the final stages of production. It is anticipated that the database will also provide a skeleton structure for recording other recovery activities such as earthworks.

MONITORING AND REPORTING

Recovery Action 3.9

Groundwater Bore Monitoring

Department staff continue to conduct comprehensive groundwater monitoring of around 250 bores across the Toolibin catchment. All data has been entered into the COMBORES database.

Data from the Toolibin Lake bores was analysed using the HARTT software package. This software package allows the effects of treatments (such as pumping) on groundwater levels to be separated from the effects of seasonality.

The results from this analysis (Wyland, 2004) show that there has been groundwater drawdown in many of the bores across Toolibin Lake since the commencement of the pumping programme. The HARTT analysis suggests that groundwater pumping has significantly ($P < 0.05$) contributed to this drawdown in the many of the bores.

The relationship between groundwater pumping and drawdown is most apparent in the deeper bores. However, a number of the shallower bores, particularly on the western side of the lake, also demonstrate a significant relationship between groundwater pumping and drawdown.

Groundwater levels monitored on the lake floor during 2004 showed water tables have continued to reduce since 2003 and were more than 2m below the lake floor in October 2004.

Recovery Plan Review

The Toolibin Lake Recovery Catchment Plan was endorsed in September 1994 and its ten-year term has expired. The Recovery Team and Technical Advisory Group recommended that the Recovery Plan be reviewed prior to the preparation of a new Recovery Plan. The review process began in November 2003. Development of a new recovery plan is under way and will incorporate the review of the previous recovery plan.

The main objective will be to comprehensively review all major components of the recovery plan to facilitate the development of a new management plan for Toolibin Lake. The review will examine what has been achieved by the project, what still needs to be achieved and what, if anything, needs changing to meet the objectives and criteria of the Recovery Plan.

OTHER

Interpretation & Recreation

Toolibin Lake continues to be a point of interest for a wide variety of groups. More than 300 people attended organised tours at Toolibin Lake during 2004. The Toolibin Lake Recovery Catchment Officer conducted the majority of these tours.

Approximately 425 vehicles (CALM management excluded) visited the reserve during 2004.

Landholder survey

Jenny Monro from Murdoch University carried out a survey of landholders in the Toolibin Lake catchment.

The survey examined landholder activities and how they where influenced by the actions undertaken by the Toolibin Lake Recovery Plan. It also examined landholder attitudes relating to CALM and its activities directed towards the recovery of the lake, along with landcare in general.

77% of landholders agreed to take part in the survey and results showed that the Toolibin Lake Recovery Plan and associated activities had a significant positive impact on farming practices and landholder attitudes. It also showed that most landholders believed that the activities undertaken by CALM in the Toolibin catchment were beneficial with a positive impact.

The results of the survey were presented as an article for the journal of Ecological Management and Restoration.

5. REFERENCES

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