Recovering Toolibin Lake

Summary of a Community Recovery Plan

Contents

Department of Conservation and Land Management

Recovery Plan Objective

The plan's objective is to ensure:

> **that Toolibin Lake and its surrounding nature reserves are maintained on a long-term basis as a healthy and resilient freshwater ecosystem, suitable for continued use by waterbirds at current high levels.**

Toolibin Lake is listed under the Ramsar Convention as a wetland of international importance. Signatories to the Convention have agreed to ensure the conservation of such wetlands and their flora and fauna, and the wise use of wetlands generally.

Recovery Actions

By the end of 1995, we plan to:

- expand groundwater pumping to a total of 10 bores;
- complete the major components of the surface drainage of the flats in the Toolibin West Catchment;
- establish the first trial plots of a major revegetation research trial, the 'Toolibin Alley Trial';
- extend plantings of oil mallee hedges;
- establish outlet control and protect the lake from some saline inflows;
- complete a revegetation strategy for the Toolibin Catchment, managed by the Toolibin Catchment Group with funds from the National Landcare Program;
- expand revegetation (other than for the oil mallee project) and implement other works which decrease the waterlogging of agricultural lands (undertaken by local landholders).

The recovery plan covers a 10-year period and will cost an estimated $4.47 million.

See also page 3 (**Actions Needed**) and page 7 (**Implementation Schedule**).

The Problem

The major threat to Toolibin Lake is salinisation, associated with rising saline groundwaters and increasingly saline inflows of surface water. An increase in salinity is inevitable unless remedial action is taken urgently.

The decline of our wetlands was the first sign of trouble facing our agricultural lands and remnant vegetation. While some wetlands were always saline, many originally were fresh, and all were surrounded by healthy bush. In sixty years or less, many of our wetlands have ceased to be the healthy, biologically diverse and pleasant places they once were, and have become less inviting areas. They still support an interesting wildlife, but it is much less varied.

Unfortunately, the wheatbelt landscape will continue to degrade. Urgent action is required to conserve our remaining flora and fauna, and to develop agricultural practices which are sustainable and profitable in the long term. Rural land managers

face a number of land conservation problems with many causes; however, of primary concern is the imbalance in our water cycle. The effects of this are aggravated by the very high levels of salt stored in our soils and groundwater.

Why Recover Toolibin Lake?

Toolibin Lake is one of the last remaining inland freshwater lakes in the south-west of Australia. It is the only remaining wetland in south-western Australia with extensive woodlands of living swamp sheoak and melaleuca across the lake floor. Additionally, the lake and its environs provide breeding habitat for up to 24 species of water birds, including rare species such as the freckled duck. It has recorded the highest species-richness of water birds, and supports more breeding species, than any other inland wetland in south-west Western Australia

Our wetlands are crucial for nature conservation and a sensitive measure of the sustainability of our farming practices. If our wetlands are lost, our children will never fully understand our land, its history, and the lessons that we have learned from our mistakes. Restoration of our wetlands will be an early sign that we are achieving both sustainable land use and a landscape that we can be proud to leave to our descendants.

There is much more at stake. If we don't restore the processes of our land, there will be significant productivity losses in our valley agricultural systems and in parts of upper catchments. This will take only a little longer than the loss of our wetlands.

The Toolibin Opportunity

Presently there is concern amongst land managers that the problems they face are beyond their personal control. Toolibin Lake presents an excellent opportunity to show them what can be done.

Catchment landholders are aware that they must be involved in the solutions for their areas, and more catchment groups are being formed. We now have an important opportunity to develop long-term solutions based on our inventiveness and ability to work hard together, as communities do when faced by a crisis. Toolibin provides an important opportunity to show that a rural community, including its government agency members, can overcome major land degradation problems on a catchment basis.

Effective group action at Toolibin will not only protect an important wetland. It will also create options for increasing farm productivity, and it will provide a case study for action elsewhere in Australia.

In the case of Toolibin and its catchment there are five 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 (more than 100 years); reduces the current area of degraded land; and 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 solutions.

Toolibin Lake is a vital community asset. Its conservation as a functioning remnant of a natural ecosystem benefits the community by protecting an important example of our flora and fauna for present and future generations, providing opportunities for recreation and important learning experiences, and contributing to the healthy functioning of a broad system of land uses.

Actions Needed

The Recovery Plan involves an integrated program of short-term and ongoing measures at a local and catchment scale. The principal elements of the Recovery Plan are as follows:

1. Establishment of a Recovery Team and a Technical Advisory Group to ensure efficient and flexible implementation of the Recovery Plan.
2. Watertable control by staged groundwater pumping to ensure the drawdown of the saline water table beneath the lake and reserves in the short term.
3. Surface water drainage of the Toolibin Flats to reduce waterlogging of agricultural lands, thus increasing their protection against salinisation.
4. Lake outlet control to improve flushing efficiency.
5. Enhancement of vegetation in the lake and its adjoining reserves through grazing control, planting, and fire management, to improve regeneration and maintain waterbird habitats.
6. Revegetation in the catchment to establish and maintain a more favourable hydrological equilibrium for the Toolibin Lake catchment in the long term. This will be achieved though land management planning, the promotion of high water-use crops, the revegetation of salt-affected land, and the targeted but broadscale revegetation of groundwater recharge and discharge areas.
7. Agronomic manipulation to maximise soil water use.
8. The development of a decision support system to enable the Toolibin Lake Recovery Team to consider all available information during the implementation and on-going management of the Recovery Plan.
9. Monitoring and reporting to provide input to the decision support system, to determine the effectiveness of the recovery actions, and to facilitate ongoing flexible management.

Actions have been funded in the past by state and federal government as well as private landholders, Greening Australia, and Alcoa. All these bodies will continue their support in protecting Toolibin Lake and its catchment.

For details of timetable and costs, see **Implementation Schedule** on page 7.

Recovery Strategies

The catchment of Toolibin must be restored to a hydrological condition which conserves the Lake and its environs. Establishing sustainable, high water-use agriculture within the catchment is crucial to this. Therefore, strategies for recovery of Toolibin Lake require the integration of active management and rehabilitation of the lake, associated reserves, and nearby agricultural lands. Recovery 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.

While all the strategies listed are important, the first four are crucial and therefore have the highest priority.

1. to control groundwater levels beneath Toolibin and ensure that they do not threaten the freshwater status of the Lake or its environs;
2. to control surface water inflows to Toolibin and ensure that they do not threaten the freshwater status of the Lake;
3. to maintain or enhance the natural vegetation in and around the Lake;
4. to achieve sustainable agriculture and increased water use on agricultural lands in the catchment by:
   a.) developing and implementing commercial revegetation schemes based on woody, native vegetation;
   b.) 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;
   c.) 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);
5. to develop consultative mechanisms, models and decision-making systems with the community to ensure that land conservation issues, such as drainage and disposal of effluent from groundwater pumping, can be effectively resolved;
6. 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.

Evaluating Success

Recovery will be achieved when the following criteria are met:

Biological Criteria

1. No further deterioration should be observable in the health of the vegetation of the lake or the reserves.
2. Successful tree and shrub regeneration in the lake and reserves should be established in ail vegetation associations.
3. Based upon available data, the lake should support sufficient species richness and numbers of invertebrates to assure waterbird food resources.
4. The numbers and species of waterbird visitation (41 species) and breeding success (24 species) that currently occurs should be maintained or improved.

Physical Criteria

1. The minimum depth to the water table beneath Toolibin Lake and Toolibin Flats in spring, when the lake is dry, should be 1.5 m.
2. The maximum water salinity when the lake is full should be 1 000 mg/l Total Dissolved Salts (TDS).
3. The maximum salinity of inflow to the lake, measured at the Water Authority gauging station 609 009 on the Northern Arthur River, should be 1 000 mg/l TDS during the winter when the lake is full.
4. The lake bed should dry periodically, by evaporation, on average once every three years.
5. The levels of nutrients within Toolibin Lake should not cause excessive growths of algae or other aquatic plants, or cause deleterious reductions in dissolved oxygen concentrations in the water. Total phosphorus levels in the water should not exceed 100 mg/1 unless long-term monitoring indicates that this criterion can be modified.

Implementing the Recovery Plan

The biological, physical and social issues affecting the Lake are complex. Research has greatly increased our knowledge, but many important issues are not well understood. Consequently, implementation of the Recovery Plan will be flexible, so that rapid and effective responses may be made to new information, unpredictable changes in resource availability, and changes in environmental factors.

To ensure adequate consultation with stakeholders, implementation of the Plan is under the immediate control of a Recovery Team which includes representatives of appropriate agencies and the local community. Because of the complexity of the technical issues surrounding Toolibin Lake, a Technical Advisory Group has also been established. The roles of these groups are outlined below.

Recovery Team

Blyth, J. *Department of Conservation and Land Management*
Davenport, G. *Landholder, Toolibin Catchment*
Dexter, E. *Australian Nature Conservation Agency*
Helsby, P. *Water Authority of Western Australia*
Lane, J. *Department of Conservation and Land Management*
McDougall, G. *Landholder, Toolibin Catchment*
Rowley, E. *Department of Agriculture, Western Australia*
Wallace, K. (Chairperson) *Department of Conservation and Land Management*

The functions of the Recovery Team include:

- implementing the Recovery Plan, including decisions on priority actions and supervision of applications for external funding.
- reviewing and re-ranking Recovery Plan priorities.
- reporting progress annually to the Director of Nature Conservation, CALM.

The Recovery Team is responsible through the Director of Nature Conservation to CALM's Corporate Executive. CALM's Wheatbelt Regional Manager will chair the Recovery Team. When necessary, the Director of Nature Conservation will take issues to the NPNCA for approval.

Technical Advisory Group

Bicknell, D. *Department of Agriculture, Western Australia*
Froend, R. *Water Authority of Western Australia*
George, R. *Department of Agriculture, Western Australia*
Halse, S. *Department of Conservation and Land Management*
Wallace, K. (Chairperson) *Department of Conservation and Land Management*

The functions of the Technical Advisory Group include:

- supervising research and monitoring.
- supervising the collation and analysis of technical information concerning the Lake and catchment.
- advising the Recovery Team on technical matters.

The Technical Advisory Group will be chaired by CALM's Wheatbelt Regional Manager and is responsible to the Recovery Team.

Further Information

The full recovery plan is called *Toolibin Lake Recovery Plan*. For information, contact:

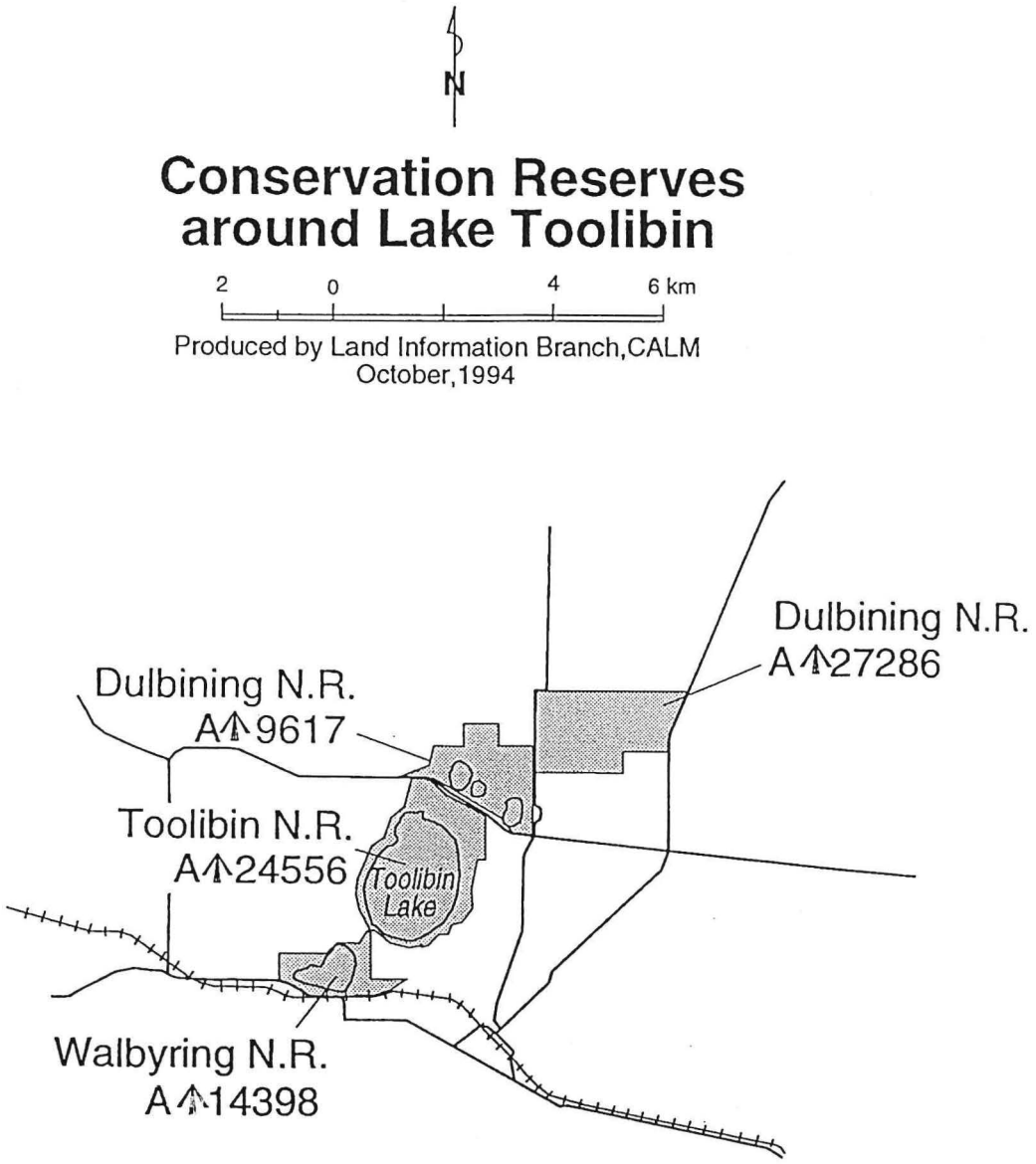
Ken Wallace
Manager, CALM Wheatbelt Region
7 Wald Street
NARROGIN 6312
Telephone (098) 81 1444

Implementation Schedule

TASK	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	TOTAL
1. Groundwater Pumping											
1.1 Groundwater Pumping - Stage 1		263	21	21	21	21	21	21	21	21	431
1.2 Groundwater Pumping - Stage 2			266	25	25	25	25	25	25	25	441
1.3 Groundwater Pumping under reserves	15	237	27	27	27	27	27	27	27	27	468
2 Surface Water Control											
2.1 Surface Water Feasibility Study	50										50
2.2 Surface Water Design	50										50
2.3 Surface Water Implantation	100	100	100	42	42	42	42	42	42	42	594
3 Lake Outlet Control											
3.1 Feasibility Study	30										30
3.2 Lake Outlet Control Works	100	5	5	5	5	5	5	5	5	5	145
4 Lake and Reserve Revegetation											
4.1 Protection from grazing				8.5	0.2	0.2	0.2	0.2	0.2	0.2	9.7
4.2 Trial gilgai mounds Stage 1					3						3
4.3 Trial gilgai mounds Stage 2								3			3
4.4 Fire management				3	3	3	3	3	3	3	21
5 Catchment Revegetation											
5.1 Land Management Planning											
5.2 Revegetation of Deep Sands	37.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	195
5.3 Revegetation of salt affected land	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	195
5.4 EM survey of salt affected land	37.5	56									93.5
5.5 Alley style revegetation, Toolibin Flats	80	80	80	80	80	80	80	80	80	80	800
5.6 Break of slope revegetation	10	10	10	10	10	10	10	10	10	10	100
6 Agronomic Manipulation											
6.1 Waterlogging control of uplands	20	20	20	20	20	20	20	20	20	20	200
6.2 Improved soil structure, Toolibin Flats		10									10
7 Decision Support System	30										30
8 Monitoring and Reporting											
8.1 Ground water Monitoring	5	30	30	30	30	30	30	30	30	30	275
8.2 Surface Water Monitoring	10	10	30	30	30	30	30	30	30	30	260
8.3 Vegetation		6	6	6	6	6	6	6	6	6	54
8.4 Invertebrates	3					3				3	9
8.5 Waterbird Counts	3					3				3	9
TOTAL	600.5	864	632	344.5	339.2	342.2	336.2	339.2	336.2	342.2	4476.2

MAP (See next page)
Toolibin Lake is approximately 200 km south-east of Perth at the head of the Northern Arthur River drainage system of the Blackwood River catchment, and is the first of a series of nine lakes. It is the only major lake in the chain that has not yet become badly affected by salinity. The lake lies within a system of Class 'A' nature reserves that are vested in the National Parks and Nature Conservation Authority (NPNCA) and managed by the Department of Conservation and Land Management (CALM). The total area of these reserves is 1230 hectares.

Most of the catchment has been cleared for mixed grazing and cereal cropping. Only small stands of natural vegetation remain, and are limited to the more gravelly ridges or in the wetter parts of the valleys. The remnant vegetation surrounding the lake, and within the reserves to its north-east, is particularly important to the survival of the lake and its valuable wildlife habitat.


N
Conservation Reserves
around Lake Toolibin
2 0 4 6 km
Produced by Land Information Branch,CALM
October,1994
Dulbining N.R.
A 27286
Dulbining N.R.
A 9617
Toolibin N.R.
A 24556
Toolibin Lake
Walbyring N.R.
A 14398
WESTERN AUSTRALIA
Kalgoorlie
PERTH
Narrogin
Toolibin Lake
Bunbury
Albany
LOCALITY
INSET