

Watershed Torbay: Restoring Torbay Catchment

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Watershed Torbay is a new project to restore the waterways of the Torbay Catchment. It is an Australian first, with the project aiming to restore a whole catchment, not simply a river reach. This national demonstration catchment project runs for four years and is jointly funded by the National Rivers Consortium and the Water and Rivers Commission (WRC, Western Australia). The State of Western Australia's Department of Agriculture, Water Corporation and the Torbay Catchment Group Inc. are the other major partnership organisations. The project aims to achieve whole catchment outcomes through a combination of good science and knowledge, strong community partnerships, planning, community visioning and change processes, action learning, and adaptive management. Issues being addressed through the project include managing toxic algal blooms in receiving water bodies, protecting a future public drinking water supply, managing a deep drainage area including stakeholder conflicts over flooding and environmental impacts, changing land use, and environmental flows for river, wetlands and estuaries. Torbay Catchment also provides ecosystem services, including potable water supplies and wastewater disposal, which benefit communities far beyond the catchment. The project aims to integrate river management with positive social and economic benefits for the entire catchment community. This paper reports on all aspects of project progress to date, including the principles and philosophy of approach, the project process, outcomes, research and community linkages.

Key Words: River Restoration; Whole of Catchment; Partnerships; Community Change;

Ecological Condition; Ecological Services.

The Watershed Torbay whole of catchment river restoration project is an Australian first, aiming to achieve whole catchment river restoration outcomes through a combination of good science and knowledge, strong community partnerships, prioritised planning, community visioning and change processes, and adaptive management. The four-year project aims to show the benefits of stream restoration at the catchment scale rather than for discrete river reaches, with a research component included in project activities. It aims to demonstrate community participation as an essential project component; to incorporate

monitoring and evaluation to allow ongoing adaptive management; and to achieve an action oriented learning environment through the collective work of researchers, agencies and community groups (Land and Water Resources Research and Development Corporation 2000).

Torbay Catchment Issues

The Torbay catchment has complex management issues and at times, conflicting land uses. It is widely accepted that farming (including beef cattle production, intensive horticulture and dairying) will remain a major land use, vital for the local economy.

However, farming practices will need to change to meet community expectations regarding the protection of environmental values. To date there has been a very low adoption of on-ground Natural Resource Management activities in the catchment, with historical and current land uses leading to nutrient hot spots. A deep drainage system throughout the lower catchment floodplain, constructed in the 1950s for flood control has many significant management problems. The drainage system links Torbay Inlet, Lake Powell and Manarup Lagoon, which are some of the most severely degraded water bodies in the state, with the exception of the Vasse-Wonnerup system in the South West of Western Australia. Toxic blue green algal blooms in Lake Powell and Torbay Inlet impact on biodiversity, community health and recreational activities. The catchment provides ecosystem services for the Albany urban community in the form of wastewater disposal and a future drinking water source area. The growth of Albany is putting further pressure on the demands of all suitable potable water sources within the catchment, the Marbelup Brook Water Reserve and Albany Groundwater Area. Very careful planning and education of all stakeholders, government agencies, landholders and residents, is essential for the long-term prosperity of the district and environment.

Principles and Philosophy of Approach

This project provides the project managers with the challenge of achieving whole of landscape and sectoral change, when a "single" issue program funds the project. The Water and Rivers Commission (WRC) is the project manager of Watershed Torbay, with the core business of this organisation being water resources management. However, WRC's intention is to broaden the scope to ensure the project integrates river management with positive social and economic benefits for the entire catchment

community, beyond the scope of river restoration. This starts with the collective visioning carried out with all stakeholders and is followed through with planning and activities in the catchment. Within the program, WRC provides an issue-raising forum and acts as an information recipient, however, non-core issues are referred to the relevant group or organisation. The project team has identified the links this catchment project could have with all stakeholders including individuals, local community groups and organisations, state organisations and federal programs, and ensures that local representatives are present at catchment and project events. Barriers that exist across some agencies need to be overcome. Integration across different management issues is therefore a key feature of the plan.

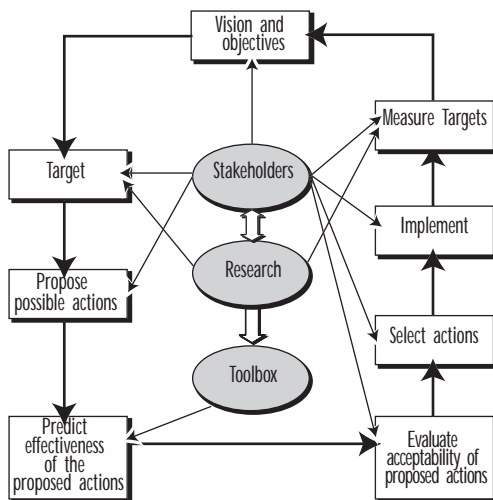
Project Management

Three committees have been set up to further the project. The Project Support Team is the core project management team that ensures that project milestones, research, planning, communications, and coordination are on track. The Technical Advisory Group brings together all researchers involved with the project, meeting six times per year to collaborate and report on the progress of Watershed Torbay's five principal research components. The Community Steering Committee has nine community members with industry and community expertise who provide strong support and commitment from within the catchment community to the Watershed Torbay project. The Steering Committee meets eight times per year, and provides valuable local knowledge and advice on the practical applicability of research to achieving outcomes and on-ground work in the catchment. Specific project committees made up of community and technical members are formed at critical points, for example the Drainage Committee which will provide local knowledge and technical expertise to develop the drainage district water balance model.

The Planning Approach

The Watershed Torbay project framework, shown below, is an adaptation of the model provided in Land and Water Australia's *River Restoration Framework* (2001). This model emphasises two main roles in selecting actions – whether they will work technically, and how practical they are to adopt. The Technical Advisory Group and the Community Steering Committee both have a key role in helping to develop the actions. The Watershed Torbay River Restoration Plan will be produced in a number of versions, with each version better informed from the research outcomes, and more challenging for the community in terms of adoption.

Figure 1: Watershed Torbay Project Framework



Issues, Vision and Objectives

The community and agencies have worked together to establish a common vision for the catchment. Community workshops, the Torbay Catchment Group, and landholder surveys have identified the critical issues now being addressed by the project. These are algal blooms, the function of the lower drainage system, catchment nutrient sources, environmental water requirements,

and catchment social and economic issues.

Project objectives developed to address these issues include: minimising conditions which encourage algal blooms; ensuring that water quality, flows, and the ecological and recreational values of waterways are maintained; managing the drainage district to best meet the needs of current and future land uses, and the environment; encouraging biodiversity through the management of remnant vegetation, in-stream habitat, weeds and pests; assisting in ways that aid the viability of farming and result in better environmental outcomes; increasing the awareness of appropriate land use planning; and education and communication objectives

The collective visioning carried out means that those issues not covered within the river restoration project could be referred to other agencies, providing seamless support across all sectors. A key objective of the project will be to engage the community to negotiate and agree on management objectives for its waterways that best meet environmental, social and economic outcomes. The communication and participation activities have involved a process that engages the whole community, and aims to achieve community consensus on setting project objectives.

Selecting Targets, Actions and Implementing the River Restoration Plan

The Community Steering Group and Project Support Team are working on target setting and action planning. Research projects have been identified which will fill the knowledge gaps in those issues targeted by the project. Restoration activities are now being implemented based on current "best bet" practices, as prioritised by the research and targets set by the community in the river restoration plan, and based on their effectiveness and practicality of the proposed actions. The effectiveness of various actions has been predicted using aids provided by researchers, for example, mathematical

models and flow dynamics, or assessment based on previous studies or experience. The extent to which the proposed actions are acceptable will be gauged by which actions are practical in terms of how acceptable they are to the community and how much they will cost to implement.

The Torbay Catchment Group (TCG) has received Federal Government Envirofund grants to commence on-ground works in the catchment in 2003, valued at \$31,000. This is in addition to total grants of \$21,000 provided by the Water and Rivers Commission from 1999-2002 for on-ground waterways rehabilitation works following Best Management Practices, on those properties in Torbay Catchment target for restoration works by waterways foreshore condition surveys. The TCG has also been successful in applying for the allocation of a federally funded Green Corp team to work in Torbay Catchment for six months during 2003, carrying out the work funded by the Envirofund Grants. This work will include 30 km of waterways fencing, 15 hectares of riparian revegetation; installation of five stock crossings, weed control (arum lily, taylorina, sydney golden wattle, watsonia), bird hide construction at the nationally significant wetland Lake Powell, and maintenance work on three community halls in the catchment.

Channel stabilisation and revegetation implementation will be according to current best practices as in Land and Water Australia's Riparian Land Management Technical Guidelines (1999) and the National River Consortium's Rehabilitation Manual for Australian Streams (2000). Funds will be sought from other federal, state and local government programs where outcomes match, for example for salt management, development of potable water supplies, or biodiversity conservation. It is unlikely that one source of funds will be available to implement all aspects of the River Restoration Management Plan immediately, but the catchment community believes that by developing the Plan, they

will be in a much stronger position to bid for any funds that are available.

The implementation of restoration activities will take into account the social and economic constraints (and opportunities) in the catchment.

Research Program

At the same time that the restoration plan is being developed (Vision, Issues, Objectives, Targets and Action), scientific and technical work has begun on issues already identified over many years by the community as critical to the health of Torbay's waterways. In this way, the community can be assured that the project is not just another planning exercise, but will lead to tangible outcomes. This is essential for active community involvement in the project.

The research projects that are now in progress will assist with assessment of the characteristics and driving processes of the Torbay system, and will define management issues and potential solutions. It is essential that good science underpins the river restoration action plan and that the research can define management issues and practical solutions for the community. One of the challenges this project faces is the integration of science across disciplines. All researchers are required to do a communications plan for the project, and to involve the community wherever possible in the research. Watershed Torbay provides many opportunities for linkages across disciplines, for example, water quality, environmental flows, in-stream habitat, and nutrient and pesticide levels. These links have been identified, and partnership projects and funding are now being co-ordinated. This approach also avoids duplication across agencies. For example, two West Australian organisations, the Department of Agriculture and the Water Corporation are now working on a project looking at the sub-surface flow of nutrients and pesticides to Marbelup Brook, sharing project infrastructure costs and sampling

equipment. The Water Corporation is funding a PhD student to carry out the pesticide research. The results will be used by the Watershed Torbay project, and in Water Corp's feasibility study of Marbelup Brook as a public drinking water source.

This example is part of a detailed research and investigation plan developed by the Technical Advisory Group, with many projects well underway. The five research themes are as follows:

- **Environmental water requirements**
What water quality and quantity do the rivers, wetlands and estuary require to maintain their environmental values and prevent issues such as algal blooms? This includes a PhD developing environmental water requirement methodologies for south coast estuaries using Torbay Inlet as a case study.
- **Wetland and estuarine algal blooms**
What are the key drivers of the algal blooms that occur in the catchment's receiving waterbodies? What roles do a range of environmental parameters play, including nutrient availability and salt water input through bar openings?
- **Catchment nutrient sources**
What are the main sources of nutrients in the catchment and the pathways through which they reach the receiving water bodies? Where can we most cost-effectively implement on-ground works to limit nutrient discharges? How much does groundwater account for the input of nutrients to the receiving lakes and estuary?
- **Drainage management**
How can we better manage the lower drainage district to meet stakeholder and environmental

requirements? A complicated drainage system operates on three levels with a complex system of weirs, floodgates and stop boards. Research includes development of a water balance model through which drain management scenarios can be developed and evaluated.

- **Barriers to change**

This suite of projects will look at the social issues involved in managing the catchment waterways. What economic or social issues are preventing the implementation of on-ground works in the catchment? What economic incentives do we need to encourage uptake? How do we encourage recognition of, and foster a "user pay" ethos for the important ecosystem services that Torbay Catchment provides for the nearby City of Albany (potable water source and liquid waste management sites)?

Community Involvement

Watershed Torbay is involving the community in some traditional as well as new and exciting ways.

Local ownership

It is essential that Watershed Torbay has strong community participation and ownership. Local community people are involved in all aspects of the project. Local halls are used for meetings, with local businesses and Progress Associations catering for project events. The Watershed Torbay project launch was held at Woodbury Boston Environmental School with sweeping views of the Torbay Coastline.

Guidance

The Community Steering Committee meets monthly to guide the project and a small support team which includes the community

chairman and project staff meets fortnightly to progress issues.

Links to science

A number of initiatives are underway to link scientists represented on the Technical Advisory Group with the broader community. Joint meetings and briefings are held regularly, and all scientists have been asked to develop a community involvement plan as part of their research proposal. Opportunities for community involvement include using community members to support fieldwork and monitoring.

Web Page and newsletters

The Watershed Torbay web page (www.torbay.scric.org) and quarterly newsletter of the same name is produced for all catchment residents and stakeholders.

Celebrations and activities

Community celebrations are an important project component. The project launch April 2002 was attended by over 150 community members, with local produce displays and project information a feature. A photographic exhibition in July 2002 attracted many entries depicting the many different features of the catchment landscape, celebrated with a prize giving and afternoon tea. Woodbury Boston Environmental School, located within the catchment, is using the project to guide a range of curriculum activities over the next few years, including photography, building a catchment water model and capturing the oral histories of seniors living in the catchment.

Community catchment health indicators

The development of community catchment health indicators underpins the community involvement for this project. While we will have a range of scientifically based indicators and targets, the community's perceptions of what will make this project a success are important. Community visioning

workshops have been held to identify the future vision for the catchment and the issues that need to be resolved. Information from the workshops will form the basis for the development of community indicators, to be reported back to the community on an annual basis. These indicators will be the true measures of success of the project.

Capturing local knowledge

People living in the catchment have an enormous wealth of catchment knowledge. The project teams are currently investigating ways of using Geographic Information Systems (GIS) and web-based technology to capture community information on a range of matters, in particular on historical and current land uses.

Best practice community change

Adoption is always a challenge with any planning and implementation project and is an issue in this catchment for a range of reasons. To support the above community initiatives, the project's Communications Coordinator is also undertaking her Masters degree in Best Practice Community Change. From a worldwide review of literature and case studies, the project will provide a best practice community process for this project.

Community skills audit

A skills audit carried out at one of the first Community Steering Group meetings identified a broad range of expertise within the community. The project now has access to a resource base of people with a wide range of skills including graphic design, web site production, accountancy, primary production, tourism, amateur biologists, historians, photographers, teachers and project managers.

Project Communications

A communications strategy has been initiated early on in the project to identify the appropriate ways of communicating the

results of the project within and beyond the catchment. The strategy has also been developed to ensure that the best practice approaches are demonstrated and incorporated as criteria into funding schemes for the implementation of on-ground works.

Effective communication is a critical element of the project, ensuring that the restoration plan is developed in partnership with the community and reflects stakeholder issues and priorities. With extensive community participation factored into the project's communication plan, community motivation to implement the restoration plan is ensured. The communications plan also ensures that knowledge from the project process is communicated to other catchments, and that an action learning approach is used. A high communications profile is being maintained for the project, not only within the region, but also across the southwest, as a "living" example of what a whole of catchment approach can deliver for improved waterways management.

Project Monitoring and Evaluation

Annual evaluation of project progress, research and on-ground activities will be carried out to ensure that community objectives are being met, and to support a longer-term, adaptive management approach to continued improvement in waterway condition. Documentation of the critical success and failure points is obviously another focus so that the knowledge developed from this project can be transferred to other catchments and communities throughout Australia and beyond.

The communication and monitoring and evaluation strategies being developed as part of the project will include indicators and targets for the project. These will be measured and reported on an annual basis. Techniques being used to measure the success or otherwise of the communication and adoption outcomes from this project

include: questionnaires for forum attendees; a periodic survey of landholder attitudes, and the number of landholders actively involved in on-ground activities including areas fenced and replanted; expenditure on on-ground projects; the extent of achievement of on-ground targets; and measurable improvement in waterway condition.

Project Outcomes

Community ownership and participation are essential ingredients to the success of Watershed Torbay. The project will help the community identify a future vision for the catchment and will facilitate the development of management objectives for the catchment and receiving water bodies that are agreed on by all stakeholders. Project research will result in an improved understanding about the state of the catchment, the sources of nutrients, and how to manage the wetlands that are receiving water from the catchment. At the end of the second year of the project, an improved drainage management plan for the floodplain Drainage District will be completed. Iterative development of a restoration plan for all waterways in the catchment will take place throughout the life of the four-year project as new research and best management practice becomes available. Cost benefit analysis and implementation of restoration activities across the catchment to improve the waterways will show the benefits of stream restoration at the catchment scale backed by research.

Incorporation of monitoring and evaluation of restoration activities will allow changes to implementation as we go.

Conclusion

The chief outcome of the program will be a major improvement in the water quality and ecosystem health of the Torbay catchment stream system and associated wetlands and estuary. However, the project will lead to

environmental improvement only as the catchment is highly modified and degraded by land use and drainage. The impacts of any specific works will be assessed for potential environmental degradation on a case-by-case basis. There are six major areas of benefit from the project: improved drinking water quality; reduction in algal

blooms; improved property values; improved environmental values; improved social values; and improved primary production and income. Many of these are hard to value, but a conservative estimate for the first three areas is in excess of AU\$7 million dollars.

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Endnote

1. An earlier version of this paper was presented at the Indopacific Ecosystem Health Conference in Perth, Western Australia in November 2002.

References

- Koehn, J.D., Brierley, G.J., Cant, B.L. & Lucas, A.M. 2001, *River Restoration Framework*, Land & Water Australia Occasional Paper 01/01, PLACE?.
- Land & Water Resources Research & Development Corporation 2000, *National Rivers Consortium: Large-scale River Restoration and Management Demonstration Projects*, Land & Water Resources Research & Development Corporation, Canberra.
- Lovett, S. & Price, P. eds 1999, *Riparian Land Management Technical Guidelines, Volume One: Principles of Sound Management*, Land & Water Resources Research and Development Corporation, Canberra.
- Price, P. & Lovett, S. eds 1999, *Riparian Land Management Technical Guidelines, Volume Two: On-Ground Management Tools and Techniques*. Land & Water Resources Research and Development Corporation, Canberra.
- Rutherford, I.D., Jerie, K. & Marsh, N. 2000, *A Rehabilitation Manual for Australian Streams, Volume 1*, Land & Water Resources Research & Development Corporation, Canberra, ACT and the Cooperative Research Centre for Catchment Hydrology, Victoria.
- Rutherford, I.D., Jerie, K. & Marsh, N. 2000, *A Rehabilitation Manual for Australian Streams, Volume 2*, Land & Water Resources Research & Development Corporation, Canberra, ACT and the Cooperative Research Centre for Catchment Hydrology, Victoria.

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