School students planting trees, Nurkurak Creek, Goulburn Broken Catchment

Goulburn Broken Catchment, Victoria, Australia

The Goulburn Broken Catchment in northern Victoria contributes 11% of the water resource of the Murray Darling Basin (Australia's largest river basin) and generates 18% of the water supply for the State of Victoria. In 1997 there was serious degradation of its rivers, water quality, native vegetation and biodiversity, as well as dry-land and irrigated salinity issues.

The Goulburn Broken Catchment Management Authority (GBCMA) was established by the Victorian State Government as a community-based, not-for-profit statutory authority, and the peak natural resource management body in the watershed.

Given the range of management issues facing them, the GBCMA undertook planning at a range of scales. The Authority produces regional catchment strategies, sub-strategies, local waterway health plans through to site assessments and project plans. Each level of planning is important as the values, threats and potential actions at each scale inform the specific actions required to manage or restore the river system.

GBCMA has developed several regional strategies to guide the long-term management of the river system. The Regional Catchment Strategy also envisages a 30-year timeframe for improving river health, water quality, environmental flows and management of environmental water reserves. The current Regional River Health Strategy (2005-2015) sets out clear implementation targets and interim resource condition targets for management of the river system over ten years, with scope for a mid-term review in 2009.

GBCMA oversees the implementation of regional strategies, sub strategies, local waterway health plans and project plans to deliver environmental outcomes through a range of programs integrating river health, biodiversity and floodplain management. The programs are undertaken in partnership with landholders, Landcare groups, the wider community and research organisations and projects, as well as the Victorian and Australian Governments and their agencies, which provide considerable funding towards the organisation's management and restoration projects.

The implementation of the Regional Catchment and River Health Strategies has achieved significant improvements in water quality and river health. Nutrient and salt export from the catchment into the broader Murray-Darling system has reduced significantly, and measures established to control salinity are achieving significant irrigation water use efficiencies. Further, primary surface water management schemes and installation of water reuse systems have increased.

River System	Goulburn Broken Catchment, Victoria, Australia
Length	Goulburn River 570 km Major and minor tributaries (including Broken Basin) 10,000 km
Area	24,000 km^2 (10.5% of the State of Victoria)
Origin, Tributaries etc	The Goulburn river flows North-West from the Great Dividing Range to the Murray River at Echuca
Population	189,500
Role of River System	• Tourism & recreation • Irrigation, stock, domestic and urban water supply • Native fish communities • Cultural attachment and aesthetics
River*prize*	2001 National Thiess River*prize* Winner

Lessons learnt

Planning, monitoring and evaluation programs in the Goulburn Broken Catchment were particularly successful tools for informing and reviewing programs at several scales, yet the GBCMA advises that a number of other elements are crucial to these successes.

Community participation
Community engagement and participation in restoration and management activities leads to community ownership and therefore sustained support for the planning processes. 'The community needs to be involved otherwise nothing will change. Management of our rivers is still reliant on private land managers' stewardship of land and involvement in the decision-making process. That's still fundamental to the success of our program', said Bill O'Kane, CEO, GBCMA.

Watershed strategy
Have a regional strategy for the watershed and establish a vision of where you are going. Articulate the vision and strategy to the community, partners and stakeholders, and involve the community in commenting on the long-term direction of the watershed restoration and management.

Continuous learning
Learn from science and monitoring data collected through–out the project. Focus on understanding the river system as a whole and develop ecological models/predictive theory to assist with understanding, planning and evaluation phases – an adaptive management approach may assist with this. Understanding the complexities within the environment is necessary to making good decisions. Link outputs (what action is taken) with outcomes (what is achieved).

'Invest in knowledge and learn about what you don't know.'

Wayne Tennant
MANAGER STRATEGIC RIVER HEALTH, GBCMA

Partnerships
The success of the Authority and the river health program relies on community and partner agency participation. There is strong collaboration with other organisations that are clever and forward thinking. According to Wayne Tennant partnerships with knowledgeable organisations are critical.

The Future

Winning the inaugural National Thiess River*prize* in 2001 raised not only the profile of the Authority and its joint partnerships but also the profile of river health in the Goulburn Broken Catchment. The award gave the GBCMA an opportunity to build relationships with national and international visitors, for example a World Bank Tour group from India, and to pass on lessons learnt.

Investment of the Thiess River*prize* has enabled the GBCMA to invest in the future of river and watershed management in the region through supporting educational initiatives such as the Youth River Health and International River Health Conferences. As Bill O'Kane explained, GBCMA 'is in the process of investing the River*prize* funds in our youth'.

The GBCMA continues its work to effectively restore and manage the natural resources within the watershed. Bill O'Kane explained that with regards to the 30-year outlook, the projects are 'on track' and that the GBCMA is very good at water use efficiency, water quality and river health. However, GBCMA finds it more difficult to address salinity and soil acidity issues, and 'is perhaps too aspirational with regards to vegetation types targeted for particular areas'.

Managing water reserves by balancing socio-economic values with environmental values is recognised by the GBCMA as increasingly difficult, particularly in light of the drought and predicted climate changes. Research is being undertaken to examine the potential social, economic and environmental impacts of climate change on the watershed, both from water and river health perspectives.

'Working with rivers, not against them is the answer – patience, passion and working together.'

Wayne Tennant
MANAGER STRATEGIC RIVER HEALTH, GBCMA

Changes to reporting have improved measurement of the linkage between outputs and outcomes, by thinking of outcomes (goals) as a product of outputs (actions) multiplied by assumptions (a formula articulated by Bill O'Kane). 'If we consider water quality monitoring, for example: We know (and can assume) that we can reduce soil erosion and phosphorous loads if we engage in certain outputs (bed stabilisation and fencing off the stock), and that this will improve outcomes (water quality, biodiversity and stream habitat).'

'Outcomes (goals) = Outputs (actions) multiplied by Assumptions'

Bill O'Kane
CEO OF GBCMA

Changes in legislation and structure of natural resource management in New South Wales means that GBCMA is 'now formally recognised in State government jurisdiction as the caretaker of the river health, and manager of the Environmental Water Reserve'. Community involvement in GBCMA projects has continued despite the drought, aided by a drought employment program that employs drought affected farmers, farm-hands and workers to work on environmental programs. The program is designed to maintain community capacity in the region and encourage ongoing community involvement in watershed and natural resource projects into the future. To date the 70 farmers in the program have achieved significant progress in fencing and river protection initiatives.

www.gbcma.vic.gov.au

Mekong River, a major means of transportation

Mekong River, South-East Asia

Planning and management in the Mekong River system is extremely complex. The Mekong River runs through six countries: China, Myanmar, Thailand, Lao PDR, Cambodia and Vietnam, and supports 70 different ethnic minorities whose food, water, incomes and livelihoods are dependent upon it. Within the river basin there is a diverse range of languages and cultures, government systems, economies and industries.

The Mekong River Commission (MRC) was established in 1995 to provide an avenue for member states (Cambodia, Lao PDR, Thailand and Vietnam) to cooperate in the management and development of the water and related resources of the basin. This includes cooperation in all fields of sustainable development, utilisation and management of water and related resources within the Lower Mekong Basin and involves areas including navigation, flood management, fisheries, agriculture, hydropower and environmental monitoring. China and Myanmar are not members of the MRC but are dialogue partners.

Work in these fields involves communities, local and national governments and deals with complex trans-boundary issues. Joint planning, decision making and trade-off assessments are made in consultation with local community and national government representatives, with the assistance of GIS and hydrological data and sophisticated computer-based planning tools. Policies are developed to facilitate agreements between member countries on issues such as water quality and quantity, notification of developments and sharing data, while governance work engages decision makers at the highest ministerial level.

Dr Olivier Cogels, CEO of the MRC Secretariat, explained that whilst 'the planning of the management and development of the water resources of the Mekong is based on the 1995 agreement', the interests and priorities of the MRC member states drive the formulation of the Basin Development Plan. To date they have created a framework and processes for participatory planning, and have developed a knowledge base and tools for water resources planning.

The Basin Development Plan was recognised for its imaginative approach to managing such a large and complex system. The approach includes:

1. *An integrated water resources management (IWRM) based development strategy*, to provide the broad context and principal guidelines for basin management and development, including project selection and prioritisation.

2. *Development scenarios*, designed to assess the basin's sensitivity to realistic levels of national and joint water resources development.

3. A *Common Project Portfolio* of large-scale and significant structural projects and supporting non-structural projects, to assist in equitably utilising the common Mekong water resources to achieve socio-economic benefits for poverty reduction in all countries.

The MRC is responsible for facilitating, coordinating and supporting the Basin Development Plan, but implementation of the plan is the domain of member states. The plan is designed for periodic updating and improvement as a result of ongoing dialogue between various stakeholder groups within the basin. Importantly, this helps to address potentially 'adverse trans-boundary effects in some parts of the basin' and identifies the

Lessons learnt

The large and complex scale of issues in the Lower Mekong Basin system has highlighted the critical importance of maintaining a shared and cooperative atmosphere among participating governments and stakeholders in order for planning programs to succeed. Facilitating this sense of a shared resource led to the following key lessons:

Knowledge sharing

It is essential to 'translate' knowledge into information that usefully informs various stakeholder groups involved in planning processes. This improves the effectiveness of ongoing dialogue and management of water resources and facilitates the achievement of sustainable, basin-wide socioeconomic benefits.

The importance of dialogue

Dialogue with national agencies, private project developers, and development banks is required to improve the relevance and quality of the regional basin plans, to address any overlaps of planned water resources management activities, and to ensure that a level of equitability is included in the future development of resources within the river system.

Trans-boundary needs

All states must be engaged in and experience the benefits of effective management of the river system. Capacity building for integrated water resource management needs to consider the needs and aspirations of each of the countries, cultures and economies. This extends to their needs in improving national policy, legal and institutional arrangements.

Modelling

Accurate and reliable river system simulation models and impact assessment tools together with experts knowledgeable in the use of such models and tools are extremely important in the informing of water policies and projects.

River System	Mekong River Basin, South-East Asia
Length	4,800 km
Area	795,000 km^2
Origin, Tributaries etc	Flows through 6 states in SE Asia, discharging into the South China Sea
Population	60,000,000 Relied upon by 70 different ethnic minorities
Role of River System	• Delivers food source (the entire Mekong basin contains 19% of global inland fish catch) • Supports rice production (enough to feed 300 million people a year) • Sustains tropical rainforest
River*prize*	2002 International Thiess River*prize* Winner

benefits according to Cogels. Indeed, the MRC Basin Development Plan places a heavy emphasis on public participation, and has established partnership agreements with community representatives and international non-government organisations (NGOs), who attend MRC meetings. Education and planning programs and innovative research are consistent with the MRC's holistic watershed management approach.

Regional cooperation is central to the work of the MRC, as strengthening the bonds between neighbouring countries is essential to promote basin development. Regional cooperation is improving, and as GDP, health and lifestyle standards have risen in the region, so has the economy of the Lower Mekong Basin. The MRC is well placed to continue its work which will assist poverty reduction and economic development in the basin through effective joint regional management of shared water resources.

The Future

Since the Mekong River Commission was awarded the International Thiess River*prize* in 2002, many of the original objectives set out in the 1995 Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin have been achieved. As the needs of the Lower Mekong Basin continue to grow and change, the MRC expands its programs and tailors them accordingly.

The MRC is fortunate to have a strong donor base and continuing interest in established programs. The MRC operates programs concerned with environment, flood, fisheries, navigation, agriculture, irrigation and forestry, basin planning, information and knowledge management and capacity building, and funds are being sought for planned drought and hydropower programs.

Whilst the MRC fosters a spirit of cooperation, there are inevitably challenges to cooperation among so many different countries, cultures and economic needs. The range of tools developed to deal with these diverse needs and trans-boundary issues will be transferable to planning programs in other regions of the world.

www.mrcmekong.org

North Dara wetland,
Wallis Creek Catchment

Wallis Lake, New South Wales, Australia

Wallis Lake in northern New South Wales (NSW), Australia, suffered a serious Hepatitis A contamination event during late 1996/1997, threatening the AU $125 million per year tourism and AU $10 million per year oyster farming industries and the second most productive estuarine fishery in NSW. This event illustrated the real value of a healthy lake and watershed to the regional community and economy, and provided the motivation to establish an outcome-driven, integrated watershed management and restoration program for the Wallis Lake system.

The Wallis Lake Catchment Management Plan established a set of major restoration programs, all within a comprehensive plan and management framework that achieved integration across environmental, health, economic and social planning agencies. Gerard Tuckerman, Manager Natural Systems for the Great Lakes Council, said that 'comprehensive planning has allowed us to move forward with the implementation phase … and to achieve substantial on-ground results earlier than if we had used a traditional approach'. The Wallis Lake experience in planning was outstanding because it comprised a very carefully identified set of initiatives which were made to work in synergy.

Representatives from relevant state and local government agencies, industry groups and the local community contributed to the plan, which made use of comprehensive field research and reflected a science-based approach as well as social and economic goals and community concerns. In doing so, the plan facilitated inter-agency involvement and engaged and empowered both the rural and urban community. Gerard Tuckerman explained that not only is planning fundamental to the restoration process, but is 'the most important step to ensure the community and stakeholders are confident with the process and support the goals and actions [set out in the plan]'.

In response to the concerns about the health of Wallis Lake, restoration and management actions identified in the plan were implemented immediately, supported by funding sourced externally and internally. An advisory body of agency and community representatives was assisted by an Executive Group and a Technical Assessment Panel. The process of identifying, developing and assessing natural resource project applications from landholders was streamlined with an emphasis on landholder empowerment and technical consultation.

Implementation of priority actions of the Wallis Lake Catchment Management Plan in accordance with an adaptive management approach across urban and rural communities has not only contributed to the effective natural resource management of the watershed, but has enhanced water quality, repaired acid soil landscapes, and improved fish migration and educational outcomes. Further, a framework of baseline data collation, monitoring and review has been developed to track the successes and shortcomings of the program and allow for feedback and revision. Community reference groups that were set up within the catchment assessment program report back and get feedback, enabling the catchment planner and steering committee to further refine solutions across the catchment.

This monitoring process, apart from confirming when improvements have occurred, gives more credibility to the project and support to the planning phase. Evaluation processes are ongoing in various forms. Gerard explained that evaluation allows programs to 'adapt and maintain relevancy to the community', and thus sustain community momentum necessary to the success of restoration and ongoing management of river systems.

'Planning, evaluation and monitoring processes are the essence of our program. These are very resource dependent but the results demonstrate the effectiveness of the processes.'

Gerard Tuckerman
MANAGER NATURAL SYSTEMS, GREAT LAKES COUNCIL

River System	Wallis Lake, New South Wales, Australia
Area	1,300 km^2
Population	25,000
Role of River System	• Tourism and recreational purposes • Commercial fishing and production of Sydney Rock Oysters (largest area in NSW) • Important ecological system, recognised as a wetland of national significance
River*prize*	2004 National Thiess River*prize* Winner

Lessons learnt

Community engagement
Commitment to associated education and awareness throughout the process helps to enhance results and capitalise on successes. Community involvement was crucial to the Wallis Lake Catchment and Estuary Management Plans, from their inception to public launch, promotion and implementation. This level of engagement was achieved via strong strategic partnerships with agencies, community and industry. 'Meaningful engagement and gaining the confidence and respect of the community was critical to the catchment planning phase and now the implementation. The engagement process is really critical – sharing and involving is the most important. It is essential to be good communicators and engage the community in solutions', said Gerard Tuckerman.

Interdisciplinary collaboration
It is important to recognise the need for different skills in restoration and management of river systems, and to involve stakeholders and professionals from different disciplines where necessary. The development of effective partnerships with the neighbouring Council, the water authority, catchment authority and State and Commonwealth agencies has been critical to achieving on-ground results. The project would not happen without a collaborative approach. The Council does not have the funds to undertake the program alone but provides the commitment, leadership and facilitation to make it happen.

Natural resource managers are facilitators, not necessarily experts. If you need an expert you get them involved, you don't exclude science.'

Gerard Tuckerman
MANAGER NATURAL SYSTEMS, GREAT LAKES COUNCIL

Planning and implementation overlap
Planning processes allow the community and stakeholders to contribute to the restoration and management of river systems, and ensure that they support the goals and actions planned. The planning phase overlaps with the implementation phase, and at Wallis Lake, the strong community motivation and momentum for action could not be held back until the completion of planning.

The Future

According to Gerard Tuckerman, winning the National Thiess River*prize* in 2004 created a clear acceptance of the programs and processes that were being used to manage and restore the watershed. Unfortunately, ongoing works are dependent on funding and staff resources to support the 'case management approach' that has demonstrated such effectiveness. As Gerard explained, it is about 'building relationships with groups and individuals so that they are empowered to do things on their properties … and you don't get that by sticking a brochure in someone's letterbox. You actually have to knock on doors and talk to people about the issues and that takes time. To achieve really good river management it requires a lot of resources'.

Winning the Prize was also an important factor in helping the Great Lakes Council to secure a AU $1.8 million Federal Government funding package under the Coastal Management Initiative (CCI) to continue work on Wallis Lake and extend works to Smiths and Myall Lakes.

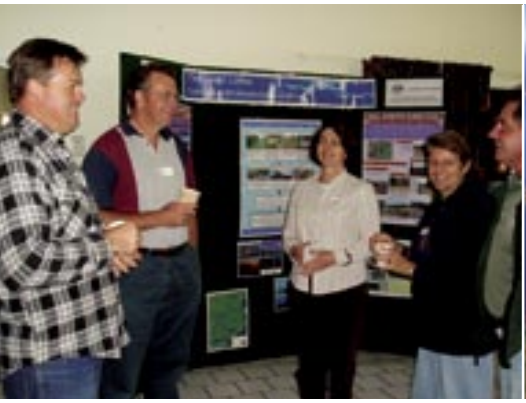
Through an evaluation of progress at Wallis Lake, the CCI currently being developed will take planning a step further with the development of decision support systems and will incorporate innovative policy and knowledge regarding best management practices for agriculture and urban management. For example, they are now examining water sensitive urban design, nitrogen (pollution) offset schemes, and higher standards for water quality in the urban area.

Gerard Tuckerman at Great Lakes Council noted that engaging with the community and landholders to produce water treatment and watershed management plans generates a lot of 'interest, momentum and capacity for implementation', but he warned that unless funding is secured to support implementation projects, a great deal of momentum and goodwill in the community could be lost. 'When you get people's commitment, and you are unable to deliver on it you tend to go backwards', he said.

Wallis Lake watershed is also presently undergoing a review process to reflect upon what elements of the management and restoration have been most effective, and how these can be improved. This process will incorporate feedback from landholders and community members involved in the restoration works, and will focus on adapting practices to suit the needs of the community.

'You can't just think what you've done in the past is necessarily going to work in the future. We're getting to the next level where it's about environmental management systems, adapting to climate change on properties. We're always trying to keep on top of new issues.'

Gerard Tuckerman
MANAGER NATURAL SYSTEMS, GREAT LAKES COUNCIL



www.greatlakes.local-e.nsw.gov.au/environment.html