



Foreshore vegetation,
Cockle Creek, Lake Macquarie

3 | Holistic Approaches

Management of rivers using a holistic approach means regarding river systems as interrelated environmental, social and economic systems. It recognises that these components are also influenced by other external forces, and that the interconnectedness of natural and human elements in the system occurs to varying degrees and in a myriad of ways. A first step in this approach is to cease regarding the natural system as separate from human and economic systems, and to apply the principle that social and economic circumstances within the watershed have immediate effects on the health of the river system. The holistic approach plans and defines outcomes that include social and economic as well as ecological health values.

Stakeholders involved in this approach tend to work together more closely, sharing their diverse knowledge and resources to identify the benefits of the river system, the problems, the opportunities and the solutions in terms of an integrated ecological, social and economic system. Practically, the holistic approach requires several disciplines of knowledge and expertise and an understanding of how diverse influences operate within the river basin. Holistic thinking programs do not necessarily require sophisticated science, but they often do adopt scientific rigour.

Ecosystem-based management (EBM) and integrated NRM include varying degrees of holistic approaches. It is only natural that every river will adopt an approach that is appropriate to its specific social, economic and natural components and relationships or ecological character.

Lake Macquarie in New South Wales, Australia, the Alexander River in Israel and the Sha River in China, have shown in different ways how a holistic approach has been effective for them – either to better prioritise their efforts, to educate a wide set of target groups, or to attract the right stakeholders and resources. On the border of Israel and Palestine, the Alexander River Restoration Authority (ARRA) recognised that the social issues of Israeli-Palestinian relationships along the river were historically significant and of paramount importance to the future of their restoration initiative, but also saw how the environmental project could be designed to lessen several social and economic problems. At Lake Macquarie, community and corporate stakeholders came to understand and support a broad suite of restoration initiatives because the managers acknowledged and welcomed their economic imperatives and social needs. The Chengdu Sha River Restoration Project Incorporation undertook to include the local and regional economy, society and environment, before designing its restoration program, and attracted far more resources as a result.



Constructed wetland, Booragul, Lake Macquarie

Lake Macquarie, New South Wales, Australia

Lake Macquarie on the eastern coast of Australia experienced rapid urban expansion, population growth and development in the 1960s and 1970s, contributing to a very unhealthy lake with poor water quality, crashes in fisheries production and health risks to swimmers. Wide spread community concerns began in the 1980s and eventually led to a State Task Force response, resulting in an improvement plan involving the establishment of the Office of the Lake Macquarie and Catchment Coordinator.

The priority plan for restoration and sustainable management of Lake Macquarie was to include a whole-of-government approach, strong community involvement, an emphasis on restoring natural systems and recognition of the inter-relationship between the economy, environment, and society. This integrated plan was to involve ‘almost everyone’.

The office encouraged and assisted the business sector to identify the commercial merits and business opportunities that arise through a healthier waterway (e.g. increased tourism), to implement Environmental Management Systems (EMS) and to help educate the community on the benefits of a healthy lake. The message put forward by the office was ‘effective environmental policies foster economic development’.

As a result of the intentional acknowledgement of business, social and environmental interests, local businesses took up the challenge, and the restoration works were backed up with a well supported and strong community education program, demonstration sites and field days, and a surge in community Landcare groups (growing from 22 to 250 catchment-wide). This breadth of support eventually enabled restoration of the littoral and riparian foreshore zones, storm water treatment devices and rehabilitation of natural wetlands.

Since work began in 1999, the improvements in water quality, return of seagrass meadows, reductions in algal blooms, and recovery of marine life, was much more than anyone anticipated, including the Catchment Coordinator Jeff Jansson, who ‘didn’t think that we would achieve the water quality improvement that we have achieved over that time.’ The results of this successful environmental stewardship are an increasingly healthy catchment, improved urban amenities and lifestyles, increased tourist numbers, higher property values and a very environmentally conscious urban community.



‘We are impressed by what the office is achieving and we hope the project will continue into the future. If the lake is clean and healthy it attracts people and this is good for business.’

Paul Kolatchew

LAKE MACQUARIE COMBINED CHAMBERS CHAIRMAN

River System	Lake Macquarie, New South Wales, Australia
Length	24 km
Area	640 km ²
Origin, Tributaries etc	Large barrier lagoon that is connected to the ocean by a lengthy constricted channel that limits tidal ventilation
Population	190,000
Role of River System	<ul style="list-style-type: none"> • Important water source for electricity generation • Recreational resource
Riverprize	2006 National and International Thies Riverprize Finalist 2007 National Thies Riverprize Finalist

Lessons learnt

Greg Piper, Lake Macquarie Mayor and Chairman of the Lake Macquarie Project Management Committee, said the Lake Macquarie project owes its success to the effective balance of economic viability, environmental stewardship and social needs. Even so, there were several lessons learnt about taking an intentionally holistic approach and its practical application:

Ensure the target audience is given recognition, a voice and a valid role

Support from the community and business sector was much easier to attract when waterway issues and restoration targets were presented and discussed around the integration of environmental, social and economic perspectives, and involved clear acknowledgement of the needs of business and community.

Communicate with the community

Keeping the whole community aware of the restoration and management initiatives happening in the catchment is important to maintaining community support. Regular newsletters, media releases and speaking with community groups are effective ways of communicating with the community.

Educate the community

Education was essential to encourage community support for restoration works and bring about change. Explaining how natural systems work and the inter-relationships between the catchment and water quality through media advertising, community groups, schools and field days are highly effective in raising community understanding and involvement.

Persevere to get results

Persisting with on-ground restoration works, despite initial community skepticism about repair of natural systems (particularly with constructed wetlands), resulted in improved water clarity, which prompted the community to eventually give full support to the ongoing program.

Review and adapt

Consistently review action plans (the ISO 14000 Environmental Systems Program may assist with this). Ask what is working and what is not, what projects can be improved and how – ‘We adapt and change as new information, experiences, monitoring comes to light.’

Integrating knowledge, resources and skills

Physical works combining the skills of community representatives, Landcare groups, and multi-disciplinary teams of consultants ecologists, environmental planners, engineers ensured a holistic approach on the ground and ‘moves away from a hard engineering solution’.

Strong community support

One of the project’s biggest success has been the increase in Landcare groups working for Lake Macquarie who engage in physical works such as weeding and planting on public land.

Jeff Jansson explained that such strong community involvement is changing the social norms, or the unwritten, accepted behaviour within the Lake Macquarie community. ‘What we’re seeing is a massive change. You’ve got so many people now changing behaviour and doing environmental improvement works – and it’s not like a government influence, it’s more like that “my neighbours are out there and I better accept it and respect it”.

Inclusion of respected citizenry

Respected community representatives and individuals who support and assist when needed, brings healthy credibility and wide acceptance from stakeholders, making some potentially difficult watershed issues easier to progress on.

The Future

For the Lake Macquarie Improvement Project, being a finalist of both the National and International Thiers Riverprize categories came at a good time during negotiations for funding with a new state government Cabinet, and for its third and final phase of restoration work under its current structure. The Lake Macquarie Project Management Committee knows that while there is improving community optimism with the environment, that with increasing populations sediment and nutrient loads will increase and further wetland and riparian habitat is at risk. Some sectors of the community still need to become attuned to the benefits that a healthy watershed brings to economies, living conditions and social integrity.



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Alexander River

Alexander River, Israel

The fresh water in the Alexander River was severely polluted by sewage, effluent, industrial waste and waste products from olive oil manufacturing, mostly from the Nablus Stream flowing from the Palestinian city of Nablus into the Alexander River. The high concentrations of organic matter in the river, especially during the olive harvest, led to severe fish mortality and coloured the water black. Further, stone grindings caused sediments to sink along the entire river and colored the water grey-white almost year-round.

The Alexander River Restoration Administration (ARRA) was founded in 1995 and now consists of local, regional and national level public agencies, including a unique and effective partnership with Palestinian neighbours from the district and town of Tul Karem.

Ensuring equitable and sustainable freshwater resources is difficult. 'However, the challenges can be even greater when managing shared waters: unwise water consumption, water pollution, or the discharge of waste waters that flow into other countries provide a basis for potential conflict' (Illueca & Rast, 1996).

Fortunately for the Alexander River, formal agreements signed by the Palestinian Governor of the District of Tul Karem and the Israeli Mayor of the Emek Hefer Regional Council formed the basis for cooperation. Under the agreement, Palestinian and Israeli experts conduct joint planning and collaborative projects to address pollution and sewage problems across the whole drainage basin. Ecology, which knows no political borders, has become a unique bridge between people from both sides of the security wall.

The group believed that addressing the health of the river system could also be used to improve the social and economic future of Palestinians and Israelis living along the river. Their approach to comprehensively address ecological, hydrological, economic and social issues was perhaps the reason that ARRA was able to attract partners from government, industry and communities from both Palestine and Israel. The concept of a joint sewage project with ecological, social and economic objectives attracted international collaboration and financing by the German Government, to boost installation of water filtration infrastructure on the Palestinian side, as well as financing by the Israeli Government on the Israeli side of the border.



River System	Alexander River, Israel
Length	32 km
Area	550 km ²
Origin, Tributaries etc	Alexander River crosses borders, flowing from the Palestinian city of Nablus in the Samarian Hills up to the estuary of the Mediterranean Sea in Israel. The Nablus Stream flows directly into the Alexander River.
Population	450,000
Role of River System	<ul style="list-style-type: none"> Habitat for endangered species, e.g. Nile soft-shell turtles Recreation Industrial and domestic wastewater disposal
Riverprize	2003 International Thiess Riverprize Winner

This environment project has been a uniquely successful social project. Community is involved in the restoration works through public hearings, meetings with community representatives, community volunteer groups (Riverwatch), a regional annual river festival and school education programs which involve planting riparian vegetation and releasing marine species in the river. Eight park and leisure facilities along the river have also facilitated cooperative initiatives between Israeli and Palestinian communities and attract huge crowds at weekends on the Israeli side. The Alexander League Peace Players is a basketball tournament held between Israeli and Palestinian children, and Friends of the Earth Middle East run river craft workshops in the facilities, bringing together Palestinian and Israeli children.

The involved partners took a creative and courageous step to ensure that restoration projects provide preferential employment of Palestinians to enhance their economic opportunities through the program. Sewage treatment facilities funded by German partners were contracted to Palestinian companies to ensure that they received direct revenue from the project, and maintenance of the facilities is contracted to Palestinian companies. Incorporating these socio-economic initiatives into river restoration works has greatly increased community support and momentum for ongoing restoration.

Lessons learnt

One of the most enlightening lessons from the holistic approach in the Alexander River was that incorporating social and economic solutions into the environment program created far more leverage for the project than was imagined by the planners. These socio-economic environment projects led to immense ongoing support from traditionally polarised social groups and attracted additional finance, planning skills and construction capacity from government and international arenas.

River restoration projects:

Benefits can be several-fold if it is ensured that project planning and implementation consider carefully every aspect of the river and its surroundings, especially the interconnected social and economic issues.

Cooperation

A river restoration project provides an opportunity to bring together stakeholders and people from different regions and backgrounds. Collaboration between these groups to achieve mutually beneficial outcomes 'can be a bridge to overcome conflicts'.

Think long-term

When planning for restoration projects, a long-term approach with agreement among partners helps to create long-lasting outcomes and continuity of resources beyond the completion of individual projects.

The Future

Since ARRA received the International Thiess Riverprize in 2003, it has partly met most of the original objectives set when it was established. Support for the project has grown and new partners have joined, but full restoration of the Alexander River could be a very long-term process. Much has yet to be done. For example, while most of the major pollutants have been removed and water quality has improved, the river is yet to reach the standards set by the Ministry for the Environment.

A series of three pilot wetlands have been constructed alongside the Alexander River, and these are being carefully monitored and evaluated to determine which model provides the best natural filtration of sewage released from purification plants. As an outcome of the pilot wetland study a larger scale wetland is to be constructed. Large-scale upgrading of a sewage treatment facility is planned, and the construction of a further sewage treatment facility is scheduled for 2008. The ARRA, with German and South African support, have developed a concept for the establishment of a Peace Park along the river on both sides of the border.

Large-scale plans must be implemented in the coming years in order to meet the vision of a restored Alexander River.



www.restorationplanning.com.au/alex.html



A landscaped park along the Sha River

Sha River, China

The Sha River is part of the Minjiang Tributary system, a primary catchment for the western reaches of the Yangtze River, which eventually discharges into the East China Sea. The river plays a major role in the flood management control for Chengdu City and provides 90% of the city's industrial and human consumption water needs.

The Sha River has experienced many modifications and uses of its watercourse in accordance with the needs and environmental philosophies of various eras. Years of rapid population growth and industrial development have seen the river suffer from the combined impacts of city waste, raw sewage, deforestation, coal silt and rural garbage, with waste loadings well above the capacity of sewage treatment systems. By 1999, scientists rated the river as virtually 'dead'. Most species of fish, shrimp and wildlife had almost entirely vanished from the river, and it became a severe public health hazard, seriously affecting everyday life for people in Chengdu and for communities downstream. Water quality problems also impacted on industrial production, and combined with the degradation of transport infrastructure around the river, the river in its degraded state became a significant obstruction to industrial and economic growth. Further, recreational facilities and scenic amenities associated with the river declined as a result of the concurrent neglect of river banks and surrounds.

The Chengdu Sha River Restoration Project Incorporation was co-founded by a large number of government organisations and investment agencies in the Sha River watershed, with a determination to improve water quality, flood control, riparian management, waste disposal, and public use of the Sha River and its surrounds. The scope of the project necessitated the involvement of the community and a large number of different

stakeholder groups. Multilateral cooperation of stakeholder groups including government committees, banks, various international design institutes, engineering firms, environmental organisations and local community representatives was considered essential to the success of the project, and was designed into the restoration process. Partnerships with media also facilitated this cooperation and collaboration.



Throughout the restoration project, effective collaboration was underpinned by the recognition that ecological improvement of the Sha River would be accompanied by economic and social benefits. Liu Qunfang, President of the Board of Supervisors for the Chengdu Sha River Restoration Project Inc., explained that the project recognised foremost that environmental protection and sustainable development needed to be achieved within the context of the contemporary enterprise system.

River System	Sha River, China
Length	22 km
Area	12,390 km ²
Origin, Tributaries etc	Major component of the Minjiang Tributary, the longest tributary of the Yangtze River, which eventually discharges into the East China Sea at Shanghai (1,770 km to the East).
Population	10,597,000
Role of River System	<ul style="list-style-type: none"> Irrigation (3,000 ha of farming in the lower reaches) Industrial and domestic water (provides 90% of water for Chengdu City) Flood management control for Chengdu City
Riverprize	2006 International Thiess Riverprize Winner

Water recycling infrastructure was developed and wastewater treatment systems enhanced to create a sustainable source of potable water for human and industrial use. Large-scale reforestation and river bank control measures, including the re-location of housing development projects and major industrial facilities away from the river, were carried out. Planning for potential flood control, constructing new bridges, roads and access areas assisted in the restoration of the river course. Municipal and rural waste as well as silt accumulations within the river system were targeted through a large-scale clean-up project and public education campaign designed to prevent future misuse of the river. Historical and cultural sites surrounding the river were enhanced for public recreational use.

The project has helped to stabilise water flows, improve water quality, and establish a green belt within the city. Further, aquatic and terrestrial biodiversity has improved dramatically as a result of the restoration activities. Ecosystem restoration has been accompanied by improved community attitudes towards the river, and the project has provided a sound foundation for the future development of Chengdu in terms of human welfare, industrial and economic development and ecological sustainability. The massive scope of the Chengdu Sha River Restoration Project and wide range of achievements are largely due to the input and collaboration of a diverse range of stakeholder groups.

Lessons learnt

With the multi-faceted goals to address social, environmental and economic needs, the project set out to understand the requirements of different stakeholders. This approach dictated a multi-disciplinary and diverse set of working partnerships. It led to much larger scale projects and achievements that were more significant than could have been achieved through single independent projects. In the process, the group noted some other advantages:

Multilateral cooperation

Cooperation and collaboration from many sectors of the community, combined with highly efficient coordination and project management, had a strong and lasting impact on working relationships and benefits across several government, business and community sectors.

Advanced technology

Technology used in restoration efforts was absolutely necessary and indispensable for this program to be successful, and the technology was found only because of the wider networks that were used.

The Future

'For the Chengdu Sha River Restoration Corporation, receiving the International Thiers Riverprize in 2006 has spurred them to further build on their focus of environment protection and ecological recovery within the contemporary enterprise system', noted Liu Qunfang.

The project is in the final stages of constructing amenities for the community around the restored waterways, and strengthening the management structure for the watershed. The corporation realises the range of improved living conditions and economic opportunities that come with a healthy river system and want a program that will prevent any repeat instances of degradation as populations, tourism and industry develop further.

