Restoration and Rehabilitation in the Canning
A State, Local and Community Partnership That Works.

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Abstract
In the face of increasing degradation of the Canning River, and as part of Gosnells Town Centre Revitalisation Scheme, the City of Gosnells initiated a unique partnership between the WA State Government and the community to restore and rehabilitate a one km reach of the Canning River at Gosnells, Western Australia. This restoration project, which encompasses weed control, revegetation, stormwater management and construction of instream structures, has demonstrated great improvements in ecological health in the study reach, as well as providing more efficient utilisation of environmental flow releases to the River. The cautious planned approach undertaken in this project has become recognised as a model for river restoration on the Perth Coastal Plain.

Keywords
Restoration, partnership, consultation, ecological, environmental flow

The Canning River, one of the main tributaries of the Swan estuary at Perth, Western Australia, is typical of most waterways in urbanised areas of Australia – being in a degraded state due to the effects of urbanisation and inappropriate historical management practices.

The City of Gosnells is situated in the South East Corridor of Perth WA, located 18 kilometres from Perth CBD. The City comprises 127 square kilometres of diverse landscape ranging from mostly State Forest and Regional Park on the Darling Scarp to the east through a mostly urbanised core and on to the south west where rural land use is fast giving way to urban development.

Although broader, more strategic catchment-based programmes are addressing many of the causes of decline (Swan River Trust, 1999; Ryan, 2002) there was a need for a more coordinated local approach to reversing the physical and ecological manifestations of decline. The City of Gosnells initiated a working partnership with the Western Australian State Government, the Armadale-Gosnells Landcare Group and its community to design and implement the Canning River Ecological Recovery Plan to provide local ecological benefits, but also to provide a model River Rehabilitation and Restoration project.

The project site is a one-kilometre reach of the Canning River located in Pioneer Park, Gosnells. This site was reviewed by the Water and Rivers Commission (WRC, 1999) which reported very poor river health.

With the implementation of the Ecological Recovery Plan (ERP), an amazing transformation has taken place through focused actions in vegetative rehabilitation of the floodplain wetland and the riparian zone. More remarkable results were evident within days of the completion of in-stream and bank stabilisation and protection works where previously unobserved aquatic species had emerged to take advantage of the diversity of ecological opportunities provided.

THE DEVELOPMENT OF THE ECOLOGICAL RECOVERY PLAN

The City of Gosnells is unique on the Perth coastal plain in that the Canning River runs through its Town Centre. The Canning provided not only the means for early transport to the rich alluvial banks, but also the means to support a thriving orchard industry. As Gosnells town centre grew on the banks of the Canning, it turned its back on the River to focus development towards new transport links by road and rail.. The Town Centre ignored the river, and its decline went mostly unnoticed.

The river had long been neglected, with dams in the upper catchment controlling as much as 95 % of its flow; Incision and sedimentation were inevitable with the diminished flow regime and inappropriate land use practice and development within the catchment. Grazing and clearing removed almost all under and mid storey vegetation, and weeds became the norm. Woody debris from fallen trees was quickly removed under the prevalent river management paradigm of snag removal. Under this not-so-great scenario for riparian habitat, aquatic and terrestrial species diversity and abundance took a dive. The Canning River, by the 1990s was an all too familiar scene. It exhibited little geomorphic diversity, it responded far too rapidly to small rain events, it was being strangled by the dams on it, smothered in the sediments that entered it, and infested with weeds in the riparian zone. The river, and this section in particular, was, to all intents and purposes, on its last ecological legs.

In 1994, in response to numerous algal blooms and fish kills in the Swan-Canning estuary, the State Government developed the Swan Canning Clean Up Program (SCCP), designed to initiate action and investigation into measures to improve the rivers' health. SCCP, in adopting a whole of catchment approach, served as the catalyst for the City of Gosnells' river restoration program, developed as part of the Revitalisation of Gosnells Town Centre scheme.

The City of Gosnells, in 1997, initiated an holistic scheme to address serious economic and social decline in Gosnells Town Centre. The scheme addressed three major elements:

- the built environment of the commercial and proposed residential area;
- the passive recreational environment of Pioneer Park; and
- the natural environment of the Canning River passing through Pioneer Park.

The built environment has been designed to connect with the river. The new Town Square provides a visual link through to the river, the new Knowledge Centre and Library overlook the river and Pioneer Park on the floodplain, and proposed further commercial and residential development will front the parkland.

Major development work in Pioneer Park, programmed to commence in November 2005, will provide a unique passive recreation environment, with the river as its focus. Boardwalk access paths and interpretive signage will guide and inform park visitors through the treetops, restored riparian zones and floodplain wetland.

The City investigated, in partnership with the Armadale Gosnells Landcare Group (AGLG), means by which the one-kilometre stretch of the Canning River in Pioneer Park could be restored to health. Working with the Water and Rivers Commission, who had developed a scientific approach to in-stream River Restoration, the City and the AGLG agreed to initiate a unique project in the Perth Metropolitan Area.

A Memorandum of Understanding (MOU) was signed in 2001 between the City of Gosnells and the WA Water and Rivers Commission (WRC) for the development and implementation of the Ecological Recovery Plan (ERP) as the third element of the Revitalisation of Gosnells Town Centre scheme. The MOU acknowledges the complementary nature of the partnership, with WRC providing technical advice, direction, and support with regard to River Restoration design and works. The City, for its part, agreed to provide financial and staff resources towards the ERP's implementation. The City also sought to maximise community involvement and participation, one of the few real opportunities for community participation in the Revitalisation scheme.. The AGLG, as the peak regional community landcare group, has assisted, and continues to assist, with advice and resources. Most importantly, though, the Group's assistance in garnering community support for the rehabilitation works has been invaluable.

The City engaged consultants Bowman Bishaw Gorham (BBG) in 2001 to prepare a report providing:

- an environmental resource inventory;
- advice on relevant environmental policies;
- an analysis of constraints and opportunities; and
- an outline Ecological Recovery Plan.

A variety of actions was prescribed to restore the river environment within the study area. These recommendations included generic standard practices (remove weeds and rubbish, preserve native vegetation etc) which apply to the whole reach, and location-specific actions for key sites along the river. The techniques incorporated into the ERP included:

- removal of weeds
- preservation of existing native vegetation
- removal of "rubbish" from stream channel
- replanting of the riparian zone to optimal average 15 m width (Storey, 1998)
- removal of the existing fencing
- removal of specific introduced trees
- adding woody debris to stream bed and banks
- relocating existing woody debris

- removal of sediment slugs
- stabilising riverbanks
- repairing existing eroded areas
- installing and maintaining erosion control structures
- retrofitting of existing stormwater outfalls with management proposed to improve water quality
- identifying priority areas for revegetation
- construction of riffles
- taking action to reconnect the floodplain wetland to the river's flooding events – historical alterations to topography had effectively isolated the wetland from providing fish breeding habitat

Extensive community engagement was a hallmark of the Revitalisation of Gosnells Town Centre scheme. A range of ideas for Pioneer Park and the Canning River were recommended by the community and, where possible included in the ERP and further planning for Pioneer park.

The Canning River has significant cultural and economic importance to the general community, but has an especially important spiritual significance to the Nyungah Aboriginals who were the original inhabitants of the south west of Western Australia.

The City had a statutory obligation under the Aboriginal Heritage Act (1972) to undertake an assessment in the proposed project area. The City chose to go beyond its statutory requirements to engage the local Aboriginal community as partners in the project, assisting with implementation of the ERP, as well as interpretation materials and artwork throughout the Park.

PUTTING THE PLAN INTO ACTION

AGLG commenced basic ecological quality monitoring in 2000, with ongoing macroinvertebrate monitoring being continued as part of a trend monitoring process, and also an opportunity to involve local schools in the river's rehabilitation.

Preliminary works on the rehabilitation of the Canning River were initiated with funding from the Federal Government's Natural Heritage Trust in 2001. Site preparation involved deep ripping of the heavy clay/loam soils, and was supervised by two representatives of the local Aboriginal community. The City, mindful of the significance of the River to the Nyungah people, had committed to this engagement to ensure that works were carried out in an appropriately sensitive manner, and that any Aboriginal artefacts uncovered during the earthworks were to be appropriately handled and managed. No artefacts were found.

In 2002, the first year of the ERP implementation, some 7200 endemic plants were planted on the first community volunteer day in selected riparian areas of the study site. Preparatory weed control was funded by the City, but coordinated by the AGLG. This community day provided the first practical opportunity to show, and talk to the community about, the final plans for the overall implementation of the ERP. There was a

tangible buzz of excitement on that day, as community volunteers worked with an understanding of the big picture, and how their work contributed to the whole.

Subsequent to the initial plantings in the study area, in-stream works were initiated in the early 2003 when water levels were at their lowest. Placement of in-stream structures such as riffles and woody debris was undertaken by contractors using heavy machinery under the direction of City staff and AGLG with the assistance of WRC specialists. Costs on a project of this type are difficult to nail down, and any savings are very important. Woody debris and coffee rock of sufficient size, and otherwise not available for this project, was obtained by the AGLG at the cost of cartage only from nearby highway construction works. Similarly, large trees removed by City operations were stockpiled for use on the project.

Literally within days of the installation of in-stream structures, the rehabilitated environment was showing signs of improved health. Fresh water mussels (*Westralunio carteri*) had migrated into a deposition zone downstream of one of the constructed riffles, within 24 hours of its construction, and Western Minnows (*Galaxias occidentalis*) were observed swimming in the high velocity flow regions adjacent to one of the newly constructed riffles. To say that the exploitation of these niches gave the team satisfaction is an understatement.

2003 also saw extensive works undertaken by a Green Corps Team on the rehabilitation of a wetland area on the flood plain adjacent to the Canning River. This team undertook extensive weed control and removal, following up with replanting of native species that are representative of the area's original flora. This wetland becomes inundated during flow events that exceed bankfull, providing breeding sites for a range of species including invertebrates, fish, and frogs.

Additional plantings were installed by community volunteers within the wetland and riparian zone on National Tree Day 2003 with funding derived from Envirofund grants. The sighting of a Water Rat (*Hydromys chrysogaster*) on that day gave more reason to believe that the project was achieving results. It also provided an opportunity for practical knowledge transfer to community volunteers. .

National Tree Day has become an important date in the City of Gosnells' environmental calendar. Over the past 3 years, around 400 community members have planted some 12000 trees and shrubs into the riparian zone of the Canning River in Pioneer Park. The valuable sponsorship and support of the local Toyota dealership, Prosser Toyota, is acknowledged in this respect. The National Tree Day events have lead to the initial steps towards the formation of a Friends of Pioneer Park group.

The headwaters of the Canning River are almost all diverted to the Canning Dam, with over 90 % of the flows being retained by the dam. As a result, summertime flows for abstraction purposes are provided by releases of treated scheme water from six riparian release points along the river. One such release point is located above the Pioneer Park

project site. When operational, each release point provides flows of up to 1.6 ML per day over the release period (which is typically February to May).

Due to the diminished flows in the river, flood events in winter are much reduced in size as well as duration. Whereas flooding in pre-dam times would inundate the flood plain for days at considerable depth, the modern River has significantly reduced volumes that rise and fall rapidly.

The WA State Government has initiated research towards the provision of dedicated environmental releases for the Canning. Under the guidance of the Canning Environmental Flows Steering Committee, whose membership includes relevant State Government agencies, Water Corporation, City of Gosnells and community, research has determined Environmental Water Requirements (EWR) for the river. The process is now investigating Environmental Water Provisions (EWP) – how much water can realistically be provided within the constraints of current resources (WA dams are currently at 34% capacity, and water restrictions have been in place for a number of years), existing infrastructure and community expectations.

It is acknowledged that “roughened” rivers with riffles, staged heights and still reaches provide a more efficient use of environmental releases. The Department of Environment has recently installed flow monitoring equipment at the Pioneer Park site to assist in determining the effectiveness of the increased "roughness" of the main channel. The results of the environmental flow trials are far from complete, but anecdotal evidence suggests that the inclusion of woody debris and riffles in the stream provide an increased level of resistance to the flows released into the river, and hence provide more “bang for the buck” with regard to the release of precious scheme water.

The 2005/06 year of the Ecological Recovery Plan’s implementation will see works on the floodplain to finalise restoration of the riparian zone and floodplain wetland, as well as improving community amenities and managing access. Interpretation of the riverine environment is a crucial element of this stage, with a particular emphasis on Aboriginal spiritual and cultural aspects. Works currently planned include the development of a bush tucker garden, raised timber boardwalks and treetop walk. This final phase of ERP construction will also include an interpretive walk train and passive recreational facilities in the park such as barbeques, picnic tables, and play equipment.

WHAT WE HAVE LEARNED

The development and implementation of the ERP has catalysed a profoundly positive change in the Canning's role as a landscape, recreational, cultural and environmental asset in the heart of the Gosnells Town Centre. It is also growing in stature as place to "go and see what they've done and how they did it". It has also set a new direction and standard for Local Government and others in the management of Perth's rivers.

Planning has been a vital component of the success of the ERP implementation and is a must for any group considering projects of similar scale. By adopting a cautious but

structured approach, the City of Gosnells ERP implementation has been able to achieve results that have made it a model for River Restoration projects across the Swan Coastal Plain.

The benefits of the river restoration project have been numerous, including the obvious increase in measurable indices of river health, increases in the level of community involvement in the Integrated Catchment Management process and collection and collation of useful data in the development of ecological flow requirements for the Swan-Canning estuary system.

The City of Gosnells has a project to be proud of, at the heart of its revitalised Town Centre, and at the heart of its community. The City is committed to growing this important asset, and to growing the community's ownership and protection of their hard work.

In May 2005, the Bright Future festival was held in the City of Gosnells, celebrating a number of major milestones in the TCRS project. This event provided the City with the opportunity to gauge the public reaction to the works that have been undertaken in the Canning, as well as their expectations and thoughts on the final stages of the project. It was reassuring to experience first-hand the excitement and overwhelmingly positive response and support for the Canning River and the ERP project. The Canning River is once again in the community's field of view, being recognised for its true worth as an important part of the natural, cultural, social and recreational environment of Gosnells, as part of its history, and as part of its bright future.

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