Mid Georges River
Sustainability Initiative

2006/USM/0003

Final Project Report

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1. Summary

The Mid Georges River Sustainability Initiative (MGRSI) was a partnership between Bankstown City Council, Sutherland Shire Council, NSW National Parks and Wildlife Service (NPWS) and the Georges River Combined Councils Committee (GRCCC). Focusing on the Yeramba Lagoon and Mill Creek sub-catchments, the ultimate objective of the project was to move towards a healthy, balanced ecosystem by engaging all stakeholders in long-term sustainable management of the mid Georges River.

Masterplans were developed to guide future activities within the two sub-catchments, identifying priority on-ground works, planning controls, and educational activities to achieve sustainability objectives. Many of the actions that were funded through the MGRSI will continue to be implemented by partner agencies beyond the life of the grant project.

Environmental restoration works, including weed removal, bushland regeneration, riparian rehabilitation, native species plantings and erosion control, have been undertaken at over 25 sites throughout the catchments.

An integrated education program has helped to build connection, ownership and pride among the mid Georges River, while encouraging changes in negative behaviours affecting the catchments.

The MGRSI worked with the other Georges River Sustainability Initiatives to promote sustainable water management throughout the entire catchment. A number of learning opportunities have been provided for Bankstown and Sutherland staff, and both organisations participated in capacity building workshops to complete rapid assessments and Water Sensitive Urban Design (WSUD) Action Plans.

The program was delivered over three years from 2008 to 2011. Challenges to implementation of the Masterplans, meeting community expectations and also gaining budget approval for works were ongoing. In hindsight it was unrealistic to presume that expectations of the all stakeholders could be satisfied. Indeed even with persistent encouragement not all of the high priority stakeholders could be engaged. Ultimately not all of the funds were able to be used to support priorities identified through the Masterplans. Additionally challenges with employing a project manager and retaining staff near the completion of the project caused disruptions to the planned activities and works.

2. Background to and objectives of the project

The Georges River is about 100 km long and has a total catchment area of 960 square kilometres. Home to over one million people, it is one of the most populated catchments within the Sydney Basin and Australia. Consequently, urban stormwater, flooding influences and development pressures within the catchment have significantly impacted on the river and its tributary creeks.

The project sites, Mill Creek and Yeramba Lagoon, represent two very different eco-regions of the mid Georges River catchment, managed and utilised by a diverse array of stakeholders. Competing demands for urban development and recreation have caused significant environmental damage and degradation in both sub-catchments. Yeramba Lagoon receives polluted stormwater runoff and sewer overflows, and consequently suffers from weed invasion and poor water quality. The Mill Creek area has issues with illegal land use, specifically four wheel drives and trail bikes, resulting in sedimentation of the creek and destruction of wetland habitat.

A shared vision for the Georges River with cooperation of all stakeholders in its ongoing management is required to alleviate these impacts and ensure the sustainability of the catchments.

The major project objectives of the MGRSI were as follows:

Multi-disciplinary information exchange and decision-making

- Attain a balanced ecosystem with a healthy foreshore through initiatives established via mutually beneficial partnerships between stakeholders
- Enhance and build on existing communication networks and create meaningful regional relationships

Urban water management

- Improve understanding and implementation of urban water management
- Ensure the longevity of waterways as areas of recreation and ecological amenity requiring minimal maintenance in the long-term
- Improve stormwater management and urban run-off leading to improved water quality, nutrient levels and biodiversity

Improve the health of the Georges River, it's tributaries and the quality of the urban environment

- Demonstrate a method for improving the health of other areas along the Georges River
- Improve bushland habitat with particular focus on Endangered Ecological Communities and threatened flora and fauna.
- Improve outcomes of restoration and rehabilitation initiatives

Community Ownership and Empowerment

- Increase community education and encourage greater public responsibility for the health of the catchment
- Promote community capacity building in decision-making and stakeholder involvement

Long-term sustainable management

- Create a cost-effective low maintenance environment

3. Project Activities Undertaken

MGRSI activities are outlined below and listed in the detailed project schedule - see Appendix 1.

Stakeholder engagement

Stakeholder involvement in the MGRSI was established in the first year.

The Steering Committee, which guided the strategic direction of the project, was formed with representatives of the project partners (Bankstown City Council, Sutherland Shire Council, NPWS and GRCCC) and other major stakeholder agencies (Sydney Metro Catchment Management Authority, Land and Property Management Authority and NSW Maritime).

Gandangara Local Aboriginal Land Council, who are the landholders of a large portion of the Mill Creek catchment, declined invitations to sit on the Steering Committee. Instead they nominated a contact person and agreed to be consulted throughout the process, however this proved increasingly difficult throughout the length of the project.

Major stakeholders attended site visits to Yeramba Lagoon and Mill Creek to identify and discuss current issues within the two catchment areas. The Project Manager undertook subsequent visits to each site with respective Project Team members.

A comprehensive list of stakeholders was identified during the preparation of the Masterplans, including community organisations, environmental groups, state government agencies and regional environmental organisations. All stakeholders were contacted to provide them with information about the project and to seek their involvement in the planning process.

Community consultation days were held during development of the Education Strategy and sub-catchment Masterplans to allow individual community members to provide input into the project's direction.

For further details of this activity see Section 4 - Partner/stakeholder communication and Section 5 - Stakeholder engagement/participation.

Website

The Georges River website (www.georgesriver.org.au) acts as a port-of-call for various user groups looking for information about the river and offers a medium for stakeholders to disseminate information to target groups. It contains media releases and promotion for current events, and provides access to publications such as reports and management plans.

As the MGRSI, Upper Georges River Sustainability Initiative (UGRSI) and the GRCCC were each planning a website at the same time, the MGRSI and UGRSI agreed to share the cost of creating one website to represent the entire Georges River and all its stakeholders. A facilitated planning workshop was held with stakeholders to develop the website brief.

Officers from each Council have been trained to edit and upload information to the website, to allow greater ownership amongst the Georges River Councils and ensure the website remains relevant to the entire length of the river. Administrator training was also provided to the GRCCC Executive Officer and a staff member from the GRCCC host Council (Hurstville).

A casual officer was employed through the GRCCC in late 2009 to add content to the website. The initial cost was shared between the MGRSI and UGRSI, and additional hours were funded through the Lower Georges River Sustainability Initiative (LGRSI). The MGRSI has provided funds for the website to be hosted and maintained by the developers for four years, which will be renewed by the GRCCC in the future.

The website was launched in October 2009. For details on website usage statistics see Section 6 - Monitoring.

Development and implementation of Masterplans and education strategy

Individual Masterplans were developed to guide the long-term sustainable management of each sub-catchment, incorporating the actions and objectives of existing plans and strategies, and linking to the respective Education Plans.

The Environmental Education Strategy for the Mid Georges River Catchment was created as an umbrella document comprised of two independent Education Plans. A casual Education Officer was employed in 2010 to implement both plans.

Yeramba Lagoon Catchment

Masterplan and on-ground works

The Yeramba Lagoon Catchment Masterplan identified catchment-wide and location specific actions to enhance habitat and biodiversity, reduce residential pollution sources, and control aquatic and terrestrial weeds. A major recommendation of the plan was to re-open the lagoon to tidal flows and re-establish the lower part of the lagoon as an estuarine ecosystem.
NPWS and BCC will be responsible for implementation of the Masterplan over the next three to ten years. The following activities have been undertaken by the MGRSI:

Replace grass verge at the front of residential properties with vegetated swale or filter strip
The grassy area at Amberdale Reserve was identified as a suitable location to install a vegetated swale. Funds were transferred to BCC to complete the designs in-house and manage construction. The ~39m^2 swale will filter residential stormwater before it enters the natural drainage line.

Install no dumping signs in areas of frequent dumping
This action was completed under the Education Plan - see *Education Plan.*

Install directional signage for main walking tracks
A new track head sign and directional totems were installed along the Loop Track that circles Yeramba Lagoon. This will improve recreation opportunities in the area and encourage more people to connect with the lagoon and bushland.

Close and revegetate/rehabilitate unwanted tracks and adjacent areas, giving priority to closing areas of sensitive habitat AND Weed control and bush regeneration in Kennedy St drainage line to allow native canopy trees and understorey to regenerate; revegetate areas that have been cleared of heavy weed infestation
Bush regeneration activities are being undertaken by works crews sourced from the Department of Corrective Services Periodic Detention Program. This was

coordinated by the GRCCC Riverkeeper Program, which has implemented similar projects along the Georges River foreshore since 2003. The MGRSI contributed funds for supervision, administration and materials. As there is no labour cost for the detainees this program offers a significant cost saving compared to engaging professional contractors, and facilitates strong and worthwhile partnerships between Councils, state agencies, regional organisations and the community. A team of detainees has been working at Kennedy St drainage line and the cleared area near the substation, treating and pulling a variety of weeds and spreading native seeds from on site. The team will also close off trail bike tracks and promote rehabilitation by ripping the tracks and spreading leaf litter.

Weed control on margin of the Asset Protection Zone and bushland (with local Bushcare groups)

The Yeramblers Bushcare group carries out weeding and maintenance on the bushland interface at Amberdale Reserve. This program was set up through the education strategy and will continue after the MGRSI finishes - see *Education Plan.*

Bush regeneration in Amberdale Avenue drainage line in accordance with a detailed Vegetation Management Plan

An ecological restoration company was contracted to undertake primary weed treatment and follow-up maintenance along the Amberdale drainage line to allow Alluvial Woodland vegetation to regenerate. The Yeramblers will continue these activities as part of their 2011 work plan.

Monitor sea wall along Georges River (e.g. erosion, structural integrity) and restore degraded sea walls in accordance with DECC's *Environmentally Friendly Seawalls* guide

NPWS has been progressively repairing and replacing hazardous sections of the sea wall, which is collapsing and releasing large amounts of sediment into the waterway. MGRSI allocated funds to install a new length of environmentally friendly sandstone sea wall at a popular fishing spot in Fitzpatrick Park, opposite the lagoon. Construction is underway.

Initial harvest of aquatic weeds (mainly *Salvinia molesta* and *Nymphaea mexicana*) in the lagoon while longer term management measures are being developed

In late 2010, a specialist aquatic weed removal company was contracted to harvest Salvinia and Mexican Water Lily from the lagoon, as well as Alligator Weed, Water Hyacinth and Ludwigia. Around 250 tonnes of weed was removed. To maintain the Salvinia at a reduced level, the MGRSI has commenced a biological control trial. The Salvinia Weevil *Cyrtobagous salviniae* was released in September 2010, in partnership with NSW Industry and Investment. Monitoring will be ongoing, though in

temperate conditions it may take 3 years before results are evident. A second release of weevils will occur in spring 2011 if necessary.

Education Plan

The Yeramba Lagoon Education Plan was aimed at building knowledge, ownership and pride among the community, and promoting behavioural change to reduce the impacts of residential runoff on catchment health. The plan contains a list of 12 integrated activities, predominately targeting residents of the Yeramba catchment, with smaller components targeting visitors to Yeramba Lagoon and the broader Bankstown community. It was designed to be run as a six month program that can be re-delivered and built upon as a four month program in the future. The program was branded with the tagline 'It's our Yeramba!'.

Re-establish the Friends of Yeramba Lagoon group

All residents in the catchment were invited to join a local environmental group that focused on improving the lagoon. A special event was held to launch the group and sign up members, attracting 60 people. Due to issues with using 'Friends of Yeramba', the group was given a fresh name by popular vote - The Yeramblers.

Support during the establishment phase of the Friends of Yeramba group

A mailing list was created to keep Yeramblers informed of project activities. Members were surveyed about the types of things they would like to do to participate, so that the programs could be tailored to the interests of the group. The majority were keen to volunteer for Bushcare once a month. Members were also interested in attending workshops, talking to neighbours, reporting illegal dumping and trail bike use, helping at events and with letter box drops, and participating in water quality monitoring and flora/fauna surveys.

Provision of resources to Friends of Yeramba to carry the program forward

- The Yeramblers Bushcare group received induction and training, and were provided with uniforms, tools and other equipment. A work plan was developed to guide their activities, and a qualified bush regenerator was engaged to supervise the group for the first few months. The Yeramblers are now fully incorporated into Bankstown Council's Bushcare program.
- To help Yeramblers to raise awareness about stormwater pollution among their peers, the Education Officer developed a 'We're protecting Yeramba Lagoon' garden sign program. Residents were given a choice of five key actions that could be written on a picket sign for their front garden: 'We don't sweep garden waste down the drain'; 'We pick up our dog's poo'; 'We don't fertilise before rain'; 'We wash our car on the grass'; 'We don't dump garden waste in the bush'. Seventeen households participated.
- A 2011 wall calendar was created so that local residents and users of the catchment could share what they love about the lagoon and encourage others to

be environmentally responsible. The calendar features quotes and photographs taken of local residents, Bushcare volunteers, school students, environmentalists and recreational groups. It was distributed to 2000 every household in the catchment, plus schools and all other interested people, to promote connection and appreciation of the Lagoon.

- A stormwater education workshop was planned for Yeramblers but was cancelled due to low numbers.

Schools program

The MGRSI partnered with the Georges River Environmental Education Centre to deliver classroom lessons on stormwater for Year One students from Panania Public and Year 10/11 students from Picnic Point High. As a result, Panania PS produced a booklet on stormwater pollution and both schools have stencilled drains around their play grounds. The Project Manager was invited to talk to Year 1 and 2 students from Picnic Point PS about the problems at Yeramba Lagoon and what people can do to help.

Ongoing community education about the works program

See Section 4 - Partner/stakeholder communication.

Signage at the GPTs, along the escarpment above the lagoon and around the lagoon

Interpretive signage has been designed for Amberdale Reserve to provide information about the existing gross pollutant trap and the new grass swale, how to help prevent stormwater pollution, and joining the Yeramblers Bushcare group.

Residents that back on to bushland at the top of the hill

New drain stencils were created for the catchment, including the messages 'Don't litter - drains to river and Drains to Yeramba Lagoon' with shapes of a turtle, heron, frog and fish. These were painted onto kerbs next to approximately 60 stormwater pits throughout Picnic Point to act as a persistent visual reminder of the consequences of pollution.

Bushwalkers and birdwatchers

Markers were installed along the Yeramba Lagoon Loop track - see *Masterplan and on-ground works*. A new brochure was made to promote the walk and highlight features of the natural environment within and around the lagoon. It is available to download from the NPWS, Georges River and BCC websites and in hardcopy from BCC.

Guided Yeramba Lagoon bush walks

A 'Birds and Brunch' guided nature walk around the lagoon was organised in three consecutive years. The first in December 2008 was held in conjunction with Bankstown Council's 'Sport-a-month' program, and in following years was run as part

of Biodiversity Month activities. The first two events had strong participation however the 2010 walk had to be cancelled due to a low number of bookings.

Compliance and enforcement

NPWS identified problem locations where new compliance signage was required. Seven 'Dob in a Dumper' signs were installed along Henry Lawson Drive from Padstow Heights to Milperra, while four old signs were removed to ensure consistency. A sign promoting the responsible disposal of fishing lines, hooks and tackle was produced for the fishing spot opposite Yeramba Lagoon.

River Health

Four River Health sampling events (Spring 2009, Autumn 2010, Spring 2010, Autumn 2011) have been held at seven sites in the mid Georges River catchment, four of which were coordinated by the MGRSI. One monitoring site was located in Yeramba lagoon, while Picnic Point High School also used the River Health methodology to monitor water quality at their school.

Media generated about Yeramba

See Section 4 - Partner/stakeholder communication.

Mill Creek catchment

Masterplan and on-ground works

The Mill Creek Catchment Strategic Management Plan recommends actions to enhance vegetation and habitat, improve water quality, and reduce impacts from recreation. It identifies foundation actions that can be implemented independently by the MGRSI, Council, and other public agencies without being completely reliant on private or commercial enterprises, as well as actions that require the co-operation and active participation of the catchment's major land owners and mangers.

Once all projects had been agreed to and planned, Sutherland Shire Council completed project proposals developed by the Project Manager and were transferred funding to contract and manage the following actions:

Regeneration of degraded Endangered Ecological Communities and bushland on Council-managed Crown Lands at Little Forest

Contractors were engaged to rehabilitate disturbed areas and reconnect fragmented native vegetation of Little Forest on Crown Lands and in Lucas Heights Conservation Area. Cleared sections have been fenced off and revegetated with indigenous species, using direct seeding and brush matting techniques. Weeds, mostly restricted to Boneseed, Lantana and Pampas Grass, were treated with several applications of herbicide.

Undertake weed control measures along the upstream sections of Bardens Creek AND Continue targeted weed control measures to known priority locations/ infestations within the catchment AND Council to offer on-ground land management service/support to ANSTO for conservation and recreation management requirements within that part of the Buffer Zone within the catchment.

Vegetation has been improved through bush regeneration and weed control, revegetation and mitigation of stormwater impacts at eighteen degraded sites throughout the catchment - see Appendix 12.

Works that have been undertaken along the eastern tributary creeks includes treatment and removal of weeds within riparian zones, beside roads and trails, in adjacent bushland and at stormwater discharge points; removal of dumped rubbish; native species plantings; bank stabilisation using Ecologs and Jute matting; and maintenance of silt and sediment traps.

Council contractors have undertaken weeding on ANSTO lands in upper Barden Creek, strengthening the partnership between the two agencies. A high diversity and density of native species have already begun to regenerate.

As described above, the MGRSI worked with DCS and GRCCC to establish a supervised periodic detainee crew to work in the Sandy Point section of the National Park. The team spent 176 hours on weeding, planting and erosion control (filling in holes with rocks, logs and soil).

Reinforce vegetated corridor/link to Hall Drive Bushland Reserve AND Promote establishment of Bushcare groups in residential areas along the catchment's eastern ridge

Hall Drive Reserve and Bradman Road community Bushcare Groups have been active for over a decade. The project aimed to support the volunteers by undertaking work using contractors that was beyond the scope of the group. At Hall Drive weed control was coordinated with a prescribed hazard reduction burn in February 2011. Stacked weed material and herbicide treated weeds were burnt reducing the need for removal of weeds off site. At Bradman Reserve contractors were able to undertake follow up weeding and extend the length of the creekline being treated into areas inaccessible to volunteers.

Include the Mill Creek Catchment in Council's Strategic Water Monitoring program

Six new sites in the Mill Creek catchment have been included in Sutherland's water quality monitoring program - see Appendix 5.

Upgrade the construction standards, security and strategic siting of gates at entry points to the fire trail and management access network AND Exclude unauthorised vehicle access/use from the fire trail and management access network of the north-eastern hillslopes of Mill Creek, north from Treolar Place AND Prevent unauthorised east-west vehicle access across Mill Creek headwater

Sites identified for controlling unauthorised access into bushland were investigated. At three locations boom gates are being installed with 50m of steel barrier railing to restrict illegal off-road vehicles into sensitive areas. A hundred metres of temporary fencing has been installed in remote locations in the upper catchment to protect new revegetation from trail bikes. See table below and Appendix 6.

Site	Description	Gate	Fencing
Gould Place Menai	Unused fire trail with poor access control. Dumping of building and garden waste common. 4WD & trail bike access point.	Heavy duty NPWS style boomgate.	20m of steel Armco railing.
Treloar Place Menai	Main access point for illegal 4WDs into Mill Ck catchment.	Heavy duty NPWS style boomgate.	25m of steel Armco railing.
McKenzie Place Menai	Access point for illegal 4WDs into Mill Ck catchment via firetrail. Regular dumping site.	Heavy duty NPWS style boomgate.	20m timber bollards.
Site 16 Little Forest – Lucas Height Conservation Area	1 hectare of revegetation. Fence to keep out trail bikes & wallabies.	Temporary wired gate to allow access for revegetation.	500m of heavy duty 1.7m tall mesh and star posts
Site 17 Little Forest- Crown land	1 hectare of revegetation. Fence to keep out trail bikes & wallabies.	Temporary wired gate to allow access for revegetation.	500m of heavy duty 1.7m tall mesh and star posts

Access restriction to manage the impacts of unauthorised vehicles was listed as key activity in the project schedule. In 2010 funding was allocated to NPWS to install two sections of fencing (200m and 400m) along the boundary of the Georges River National Park - see Appendix 6. This was an extension of fencing undertaken by NPWS in 2008. The MGRSI originally identified the need for fencing along Heathcote Rd but GLALC were opposed to this - see Section 9 - Delays/ difficulties encountered and Section 10 - Modifications.

Other on-ground works undertaken in the Mill Creek catchment by the MGRSI included:

Encourage/ assist the Gandangara LALC to stabilise and remediate erosion and sedimentation areas associated with vehicle tracks along the margin of the western escarpment of the Mill Creek valley and around Barden Trig, and install suitable preventative measures

The MGRSI allocated funds to SMCMA to continue their Land Alive program and maintain an Indigenous land management team in Mill Creek. The team received accredited training to attain a Certificate II in Conservation and Land Management. Under the supervision of qualified professionals they are gaining practical experience undertaking weeding, erosion control and bush regeneration on GLALC lands.

Undertake and promote continued community engagement and education regarding the catchment, its values and management

See *Education Plan.*

Encourage continuation of periodic macro-invertebrate sampling in Mill Creek

The GRCCC River Health monitoring program conducts macro-invertebrate sampling twice a year and includes three sites in the Mill Creek catchment. The program commenced in 2009 with support from the MGRSI, SSC and BCC, and will continue until at least 2013.

Develop a medium standard foreshore walking track link east from Sandy Point into Georges River National Park

Local stakeholder Menai Wildflower Group was engaged to scope and map a new walking route and identify where track improvements and slashing would be required. A series of numbered and directional totems were installed along the route and detailed track notes were created using text and images provided by the MWG. The track notes will be available to download from the Council and NPWS websites - see Appendix 7.

Education Plan

The Mill Creek Education Plan focuses on growing a positive connection to the area and using integrated enforcement and deterrence techniques to reduce inappropriate use of catchment sites. The plan is split into two parts, with 13 activities targeting people who are wilfully impacting on the sites (mostly non-residents) and 7 activities targeting people who are carelessly impacting on the site (mostly residents). Part 1 contains a six week context phase and a six week deterrent phase, with part 2 run concurrently over 16 weeks. An enforcement phase was also developed under part 1 but due to the circumstances at the time was not included as part of the strategy. However it could potentially be implemented in the future when the program is

repeated to reinforce its outcomes. The program was branded with the tagline 'Mill Creek - Tread Lightly'.

Establish or insert specific information on a page on the most appropriate website that allows for relevant messages and materials about this program

The Georges River website, partly funded by the MGRSI, contains a page specific to the project where any relevant material can be uploaded.

Engage the community in a Mill Creek Art Photo Competition

The 'Mill Creek - Tread Lightly' nature photography competition helped to raise awareness and appreciation of the natural environment in the sub-catchment. With youth and open categories and offering a total prize pool of $1000, the competition received 52 entries from 23 people throughout the Sutherland Shire and surrounding suburbs. An awards night was held for participants and winners were selected by three invited judges - Councillor Lorraine Kelly (SSC), Carl Bento (Australian Museum) and John Veage (*The Leader* newspaper). Alison Megarrity was also present at the ceremony and gave a speech on the importance of the Georges River and community involvement and the actions being undertaken by Local Councils. An entrants poll revealed that only 53.3% had visited the Mill Creek area before the competition, but 100% said they would visit again.

Photography Exhibition Event

An exhibition was set up at Menai Marketplace, showcasing the images submitted to the photography competition, and information displays on the Mill Creek catchment and its Aboriginal heritage, flora and fauna. During the week long exhibition 229 people voted in a 'People's Choice' award category, indicating a high level of interest

Undertake a letter box drop

A 'Stormwater and our bushland' education flyer was produced and mailed to residents along with a works notification letter.

Guided Mill Creek Walks

Leading up to the photography competition, the MGRSI organised three guided photo walks along the Menai Fire Trail. The walks were lead by a senior member of the Menai Wildflower Group, who provided information on flora and fauna, and an expert photographer was on hand to offer tips and answer questions. All available places were filled, with 35 participants booked in, but one walk was cancelled due to rain.

Signage on the eastern side of Mill Creek

New regulatory signs warning people about illegal use of bushland have been installed at eleven locations in Menai and Alford's Point along the residential interface - see Appendix 8.

Local stories

Images from the photography competition were compiled in a 2011 wall calendar distributed to 2500 households in the Mill Creek catchment. Each photo was accompanied by a caption from the contributor about their subject matter to inspire others to appreciate and protect the natural value of Mill Creek.

Four wheel drive and trail bike education

A non-profit educational organisation specialising in environmentally responsible outdoor recreation was engaged to implement a media campaign targeting four wheel drivers and trail bike riders. This included the development of brochures explaining how people can reduce the impacts of four wheel driving and trail bike riding, and the distribution and promotion of these information materials through existing and newly established networks. See Appendix 10.

Media

See Section 4 - Partner/ stakeholder communication.

Council Sustainable Urban Water Management

Towards the end of 2009, the MGRSI began working with Bankstown's Stormwater Levy Coordinator to develop an activity plan aimed at increasing WSUD knowledge, skills and projects within BCC. In February 2010, a seminar on sustainable urban water management was arranged for all BCC staff with presentations by two leading water academics. The MGRSI also funded placements at MUSIC training for a BCC staff member, and a Raingardens Essentials course for a staff member each from BCC and SSC.

The MGRSI linked with the LGRSI to provide facilitated institutional capacity building workshops for BCC and SSC. These assisted staff to undertake rapid assessment of WSUD capacity and development of a Sustainable Water Management Action Plan. Sutherland staff have since finalised their Action Plan, and are awaiting Council endorsement. Bankstown Council has completed a draft action plan, which for now will remain as an informal document to help staff identify new opportunities.

The Project Manager worked closely with BCC engineers to investigate potential WSUD options at Amberdale Reserve. Detailed deigns for the swale were completed in-house, which was important to building capacity among staff. Both Councils have implemented a range of other WSUD-related projects over the last three years.

The three Georges River Urban Sustainability Projects collaborated to host a WSUD conference in the form of a dinner cruise along the Georges River, aimed at engaging Councillors and Executive staff. The event was attended by over 60 people from 27 organisations. Experts from Monash University and University of Western

Sydney spoke about the past, present and future of urban water management. Guests were given a folio that showcased WSUD projects already commissioned by Councils and highlighted achievements of the existing initiatives. The majority of feedback forms rated the information and atmosphere as above average or excellent and many commented that they would be able to use what they had learned at their organisations.

4. Partner/stakeholder communication

Steering Committee and project partners

The Steering Committee met quarterly over the project's duration, a total of ten times, with the first in June 2008 and the final meeting in November 2010. Minutes of all meetings have been included in previous Progress Reports to the Trust. The Project Manager also sent interim progress updates to the Steering Committee via email.

Various site meetings, discussions and written correspondence, were held between the Project Manager and relevant BCC, SSC and NPWS staff and project team members to plan and coordinate on-ground works.

At the GRCCC meeting in August 2008, the Project Manager gave a presentation about the objectives and expected outputs of the MGRSI. The Project Manager continued to attend bi-monthly GRCCC meetings, and an update on the MGRSI was included as a standing item on the agenda and in annual reports. The Project Manager also attended River Ecosystem program cluster meetings and workshops.

The Project Manager participated in four meetings of the Botany Bay Catchment Coordination Group, which consists of all state and federally funded projects within the Botany Bay catchment.

Over the course of the project the Project Manager and members of the Steering Committee communicated with GLALC to seek their involvement. Between April and September 2008, the Project Manager sent three formal Steering Committee invitation letters to GLALC and two meetings were held with GLALC representatives. During preparation of the Masterplan the consultants made repeated attempts to contact GLALC by phone. The draft Masterplan was sent to GLALC and they responded via email with comments. The SMCMA Indigenous Officer and Place Manager arranged two meetings with GLALC in late 2009 to discuss objections to the Masterplan and options for fencing and other works, and to attempt to get them involved in future activities and planning of the MGRSI.

The Steering Committee attended a site visit to Yeramba Lagoon in November 2008 and a planning workshop in December 2008 to identify key issues and management strategies for the catchment Masterplan.

Yeramba Lagoon

Consultations

Invitations to the key stakeholder workshop in December 2008 were extended to staff and agencies outside the Steering Committee including: NSW Roads and Traffic Authority, Sydney Water, GLALC, NSW Department of Primary Industries (Fisheries), DECCW Rivers and Wetlands Unit, SMCMA Botany Bay Coastal Catchments Initiative, SMCMA Waterways Health Strategy and OceanWatch Australia .

A community consultation workshop for the Masterplan was held in February 2009. Letters were sent to all households and interest groups in the Yeramba Lagoon catchment, and ads were placed in *The Torch* newspaper and *Bankstown Naturally* environmental newsletter. Councillors from BCC were also invited. Display material contained information about issues, objectives and solutions. Verbal and written comments from community members were collected.

A consultation day for the Yeramba education plan occurred in May 2009. Invitation letters were sent to households and an advertisement was placed in *The Torch*. At the consultation over 50 conversations were held with community members and 25 written feedback forms were submitted.

Events and media

Articles about the MGRSI have regularly featured in BCC publications (website, *Community Link* and *SustainABLE Bankstown*) and local newspapers (*The Torch* and *The Express*) over the years. This has included general information on project objectives and on-ground works, details of events and activities, and education about environmental issues and how people can reduce their impacts.

All residents of the Yeramba Lagoon catchment received an expression of interest survey regarding the Yeramblers environmental group. A launch and sign up day was held in May 2010 with a free BBQ and wildlife show. The group was advertised via flyers, a media release on the BCC website, ads in *The Express* and *The Torch*, an article in the National Parks Association newsletter and in BCC community publications. A newsletter was also sent to the group once it was established.

Other events held included a 'Birds and Brunch' guided walks at Yeramba Lagoon in 2008 and 2009; and presentations and stormwater lessons to school/s.

Mill Creek

Consultations

Masterplan consultants individually contacted all landholders in Mill Creek and relevant government agencies via phone interview to discuss management of the catchment.

An 'issues and ideas' session was held in June 2009, as an integrated community consultation for the Masterplan and education plan. An information letter was sent to 2500 residents in the catchment and ads were placed in *The Leader* newspaper and posted on SSC website. A follow-up letter with a feedback form was mailed to all participants, another 200 randomly selected households, 21 public schools, 14 scouts/cubs/guide groups, and 25 people encountered during fieldwork. Fifteen forms were returned. Community and interest groups were contacted individually by phone or email and supplementary meetings were arranged where requested.

Events and media

The Project Manager gave a presentation on the Mill Creek Masterplan to the Sutherland Bushwalking Club at their request. The Sandy Point Progress Association also asked for a presentation but the Project Manager was unable to attend.

A letter was sent to relevant residents in Mill Creek in early 2010 advising them of the environmental restoration works taking place along drainage lines. An education flyer on the impacts and prevention of stormwater pollution was included with the mail out.

The Mill Creek photo competition was held in mid 2010, advertised in *The Leader* and through posters and flyers. As part of this activity the MGRSI also organised three guided nature walks. An awards night was held in July at the Sutherland Entertainment Centre and the photos were shown in an exhibition at Menai Marketplace for one week.

General events and media

An official website launch was held during National Water Week in October 2009 at the Georges River Environmental Education Centre. The event included website demonstrations, a commemorative tree planting and River Health macroinvertebrate sampling. Information about the MGRSI was also displayed. The website itself features a page on the MGRSI, containing an overview of the project and its objectives, along with access to Masterplans, reports and event details. Over the past 10 months the MGRSI page has received 569 visits.

The Project Manager was invited to present a case study at the 'Talking up biodiversity' environmental education workshop hosted by the SMCMA and the Sydney Environmental Educators Network. The presentation focused on activities and outcomes of the Yeramblers community program.

The MGRSI ran a stall at the Georges River Cross Currents Festival held at Garrison Point during National Water Week in October 2010. It had information on the MGRSI, stormwater pollution, the Georges River Health Program, and other information about the River as well as an interactive macroinvertebrate display.

Four River Health sampling events (Spring 2009, Autumn 2010, Spring 2010, Autumn 2011) have been held at seven sites in the mid Georges River catchment, four of which were coordinated by the MGRSI.

The MGRSI coordinated Schools Tree Day twice in the Georges River National Park. De la Salle College and Padstow Heights PS participated in 2009, and St Christopher's, St Luke's and East Hills PS participated in 2010.

Council Sustainable Urban Water Management

Events and training included:

- MUSIC modelling training; eWater CRC; December 2009
- SUWM seminars; Dr Peter Morison, Monash University; Dr Ian Wright, University of Western Sydney; February 2010
- Institutional capacity building workshops; Andre Taylor Consulting; March 2010
- Raingardens Essentials; WSUD.org; Clearwater; May 2010
- Georges River Cruise conference; Dr Ian Wright, UWS; Prof Tony Wong, Centre for Water Sensitive Cities, Monash University; February 2011. A general press release about the conference was issued after the event - see Appendix 9.

5. Stakeholder engagement/participation

Steering Committee and project partners

The National Parks and Wildlife Service, Sutherland Shire Council, Bankstown City Council and the Georges River Combined Councils Committee were all involved in planning and inception of the project, and attended the majority of Steering Committee meetings, allowing them to actively contribute to decision-making.

The MGRSI has worked closely with SSC, BCC and NPWS in the development and coordination on-ground works throughout the two catchments. The Project Manager was physically based at BCC offices, making it easier to collaborate with BCC staff.

SSC and NPWS had direct input into proposal of on-ground works, and the MGRSI was able to transfer funding and management responsibility to these agencies for a number of projects.

The GRCCC assisted with implementation of various project activities and on-ground works, and created links to the MGRSI through the Riverkeeper, River Health and River Ecosystems Programs. The GRCCC also provided a mechanism for reaching a wider pool of stakeholders and interested parties throughout the life of the MGRSI (membership includes Council staff, Councillors, state government agency staff, Gandangara Local Aboriginal Land Council and environmental community groups).

The Sydney Metro CMA had ongoing input into the project through Steering Committee meetings and updates. Partnership with the SMCMA Indigenous Officer was critical to engaging GLALC in the project and negotiating works on GLALC land. The MGRSI also linked to the Waterways Health Strategy and the Botany Bay Coastal Catchments Initiative.

The above organisations all participated in key consultations for the two Masterplans and provided comments on the briefs and drafts.

NSW Maritime was not able to attend Steering Committee meetings but was contacted during development of the two Masterplans, and was involved in the project team through the Georges Riverkeeper. Land and Property Management Authority (formerly Crown Lands) was only able to attend a few Steering Committee meetings, but had significant input into the Mill Creek Masterplan.

Yeramba Lagoon

Steering Committee agencies plus DPI (fisheries), RTA, GLALC and OceanWatch Australia, had direct input into determining future management options for the catchment through participation in the key stakeholders consultation workshop.

Input and ideas gained from community consultation had significant influence on the development of the Masterplan and education plan for Yeramba. Over 50 people attended the Masterplan community consultation workshop and additional comments were received by email and telephone. Residents and groups raised a range of issues that they wanted addressed, and the actions in the Masterplan reflect these. A similar number of people attended the education consultation, and it was noted that the crowd showed a high level of interest and enthusiasm. The key findings from the consultation process formed a basis for development of the education plan.

A particular segment of the local community was very passionate about protection and improvement of the catchment. They were actively engaged in the project and

education activities with a strong turn out to the Yeramblers sign-up event and participation of over 40 people in the calendar, including residents, children, environmentalists, and recreation groups. Many community members will have ongoing involvement in the catchment through Bushcare, River Health and the garden sign program.

Local schools in the Yeramba Lagoon catchment have been keen to incorporate stormwater education and local catchment issues into classroom learning. Panania Public School and Picnic Point High School accepted an offer of tailored stormwater lessons from Georges River Environmental Education Centre, while MGRSI and students from both schools subsequently became involved in the Yeramba Lagoon Calendar, passing on what they had learned to others in the catchment. Picnic Point High School is also involved in River Health monitoring at the Morgan's Creek site. Picnic Point PS requested a presentation from the MGRSI Project Manager about Yeramba Lagoon for Year 1 and 2 students, which the teachers later followed up with interactive classroom lessons based on reducing impacts on the lagoon.

Mill Creek

Discussions were held with a number of government agencies beyond the Steering Committee to gain their input into the Masteprlan. The Rural Fire Service, Department of Commerce and TransGrid in particular made significant contributions. Major land holders ANSTO and WSN Environmental Solutions also agreed to meetings. Other agencies contacted include DPI (Conservation Management Section and Fisheries), DECCW Rivers and Wetlands Unit, Sydney Water (Stormwater Section) and Australian Federal Police.

GLALC were offered many opportunities to have their say in the project but were not able to commit to the Steering Committee and chose not to participate in the Masterplan development. Often they did not answer or return telephone calls and it was difficult to get a response to email or mail correspondence. GLALC were highly critical of the Masterplan and refused to endorse it, as they felt that it did not consider or represent their own objectives. They wanted major revisions to the final version, but these were rejected by the Steering Committee. However, they were open to discussions through the SMCMA Indigenous Officer and became involved in the identification and implementation of bush regeneration and track rehabilitation works on their lands.

The following interest, recreation, community and sporting groups were contacted about the Masterplan, with varying degrees of input and interest:
- Australian Plant Society (Menai and Sutherland)
- Georges River Environmental Education Centre
- Sutherland Shire Environment Centre

- Great Kia'mia Way Committee
- Illawong and Alford's Point Progress Association
- Menai West Barden Ridge Precinct Residents' Association
- Sandy Point Precinct Residents' Association
- National Parks Association (Southern Sydney Branch)
- Sutherland Bushwalking Club
- Sutherland Shire Canoe Club
- Georges River Bull Sharks
- Jenko Sutherland Shire Pony Club
- Metropolitan Mountain Bike Club
- Southern Off-road Cycling Club
- Sutherland Bushwalking Club

Menai Wildflower Group (Australian Plant Society) provided detailed comments in the early stages of Masterplan development, and assisted with the implementation of education plan (photo walks) and on-ground works (loop track, provision of free native plants of local provenance).
Unfortunately, the Masterplan had to proceed without any participation from four wheel drive or trail bike users or club representatives. Attempts were made to contact the NSW 4WD Association and thirteen four wheel drive or trail bike clubs but it was very difficult to engage with any of these groups. The Masterplan consultant was able to speak with some by phone, and mailed or emailed information to others where possible. However, the clubs were reluctant to be involved and no further responses were received.

Information and ideas gained from the community consultation evening, attended by over 30 residents, and feedback from the mailouts, were all incorporated into the Masterplan and education plan.

The Mill Creek photography competition generated a strong level of interest among the local and wider community, and each activity attracted a high number of participants.

Council Sustainable Urban Water Management

The project engaged all levels of Council, including officers, management and Councillors. Staff from a wide range of disciplines and divisions participated in WSUD learning through training courses, seminars and capacity building workshops organised by the MGRSI.

6. Monitoring

A table compiling project monitoring results is included in Appendix 2.

7. Evaluation

The MGRSI outcomes hierarchy is attached in Appendix 3. This has been updated to include an assessment of project progress toward each outcome.

For a list of project outputs see Appendices.

8. Embedding Sustainability

The implementation of the MGRSI has assisted with embedding sustainability into the major partner organisations, through project activities that focus on the following environmental, social and economic sustainability outcomes:

Economic Outcomes

- Greater prioritisation of issues across governments allowing the concentration of resources into identified high priority issues within each catchment
- Improved urban stormwater management that minimises stress on existing infrastructure
- Adoption of water sensitive urban design principles within Councils
- Reduced maintenance costs by avoiding the need for ongoing remediation

Environmental Outcomes

- Improved ecological values and ecosystem health (Reduced erosion, improved habitat connectivity, biodiversity, fauna protection, water quality, reduced aquatic weed infestations)
- Greater protection of Coastal Saltmarsh, Sydney Coastal Riverflat Forest and Sydney Turpentine Ironbark Forest (EEC's)
- Balance between competing recreational and environmental needs in natural areas (i.e. closure of informal/illegal tracks and access paths, formalising other tracks for recreation, and restoration of areas damaged by 4WD's)
- Implementation of WSUD principles in regional and local council planning policies
- Higher quality open space within the Georges River catchment - improved service levels and standards
- Increased community awareness about water conservation and water management through education
- Improved relationship and communication with NSW DECCW to improve management of urban bushland and waterways

- Greater public responsibility over polluted stormwater and nutrient inputs into urban waterways; less litter and polluted stormwater entering the urban waterways

Social Outcomes

- Development of land use strategies for the two sub-catchments that meet the community's expectations without compromising the natural environment
- Facilitation of foreshore recreational connectivity between State Government and Local Council foreshore reserves to make them more accessible
- Reduced impact of harmful recreational activities on the natural environment
- Hierarchical improvement in knowledge of environmental issues starting with Councillors and filtering down to the community
- Shared regional responsibility over management of the Georges River
- Increased knowledge and participation of local communities
- Better relationships with stakeholders in the catchment
- Interdisciplinary approaches to management and planning within and across Councils and State government agencies

9. Delays/ difficulties encountered

General

Administration and recruiting challenges delayed the start of the project until April 2008, and the first Steering Committee meeting was not held until June 2008. This caused subsequent delays in project spending and scheduled activities planned for the first year of the project and resulted in a 6 month extension being received by the Trust.

Development and implementation of Masterplans and education plans

Significant delays occurred in commencing sub-catchment Masterplans and the education strategy, as it took longer than anticipated to engage consultants through internal BCC procurement procedures.

<u>Yeramba Lagoon</u>

Modification of the weir is a high priority identified in the Yeramba Lagoon Masterplan and an original intent of the project partners, receiving strong support from community and stakeholders. However, allocation of MGRSI budget to fund the development of concept and detailed designs was not approved by the Trust. As reintroduction of tidal flows is considered to be the most sustainable option for the lagoon, Bankstown Council agreed to fund concept designs for the weir instead.

Construction of the grass swale at Amberdale Reserve was delayed by the discovery of asbestos and acid sulphate soils, which needed to be correctly handled and required minor design modifications. It also took time to identify and incorporate the needs of several stakeholders that would be affected by the works.

Commencement of the periodic detainee teams was delayed for several months due to internal Department of Corrective Services staff changes and restructuring of the program. There were problems sourcing enough detainees for planned workdays. Detainee teams also stopped working at Yeramba when DCS raised objections to the safety of the sites such as trip hazards and uneven surfaces.

Other on-ground works, such as construction of the Environmentally Friendly Sea Wall, experienced delays due to the weather.

Mill Creek

The Masterplan consultation process extended beyond the planned timeframe due to reluctance of some important stakeholders (e.g. GLALC, WSN, ANSTO, 4WD groups) to be engaged. This also set back completion of the Mill Creek education plan because it was important that the outcomes of the Education Strategy be consistent with that of the Masterplans. The education plan was finalised while the Masterplan was still in draft form, which was not considered ideal. The draft plan included an Enforcement Phase, but these activities had to be removed due to lack of cooperation or interest from GLALC.

The Project Manager encountered ongoing challenges in attempting to engage Gandangara LALC throughout the project - see Section 4 - Partner/stakeholder communication and Section 5 - Stakeholder engagement/participation. GLALC declined to provide a representative to sit on the Steering Committee, so the Project Manager was required to seek input into the direction of the project via other channels. Negotiation with GLALC caused significant delays to the finalisation of the Masterplan because they initially declined to participate in its preparation, and were then opposed to certain aspects of the draft. A change in focus of GLALC since the original grant application, in which GLALC were a significant participant, meant that they were no longer willing to allow fencing along Heathcote Rd to restrict illegal access to the western plateau by recreational vehicles and illegal dumpers. Restricting illegal vehicle access to GLALC land was a key objective of the MGRSI, and the difficulties experienced resulted in considerable changes to the scope of the project.

Communication and consultation with four wheel drive and trail bike groups was also very difficult. Exhaustive attempts were made to contact numerous clubs and associations about the Mill Creek Masterplan however none were interested in

discussions or comment. Unfortunately, the Masterplan had to be finalised without any input from this important stakeholder group.

The four wheel drive and trail bike education program was significantly delayed due to problems with the contracted organisation. Despite having six months to complete the project, from October 2010 to March 2011, continued issues in sourcing data meant that the media campaign could not commence until April when the information materials were eventually finalised.

Barnes Crescent, along with Sandy Point, was identified for inclusion in the periodic detainee program as a priority site for bush regeneration. However, Barnes Crescent was not approved by DCS. Barnes Crescent was considered a very important site to conduct works on so the funds for this site were instead allocated to bush regeneration contractors.

Council Sustainable Urban Water Management

Progress with Councils was slow in the first one to two years of the MGRSI as BCC and SCC both de-prioritised the urban water management improvement component of the project.

When the MGRSI commenced the Cooks River Sustainability Initiative was already working with BCC to improve sustainable water management and BCC felt that any additional push would reduce its effectiveness. Therefore, it was decided that the MGRSI delay this activity until the CRSI reached its late stages.

Though there was support from staff for adoption of WSUD action plans, BCC was reluctant to immediately incorporate stormwater into planning documents and controls.

SSC felt they had already made significant advancements in WSUD and had a greater understanding of urban water management, so did not want to pursue this project activity at a higher level. However, once the LGRSI commenced and greater pressure was applied, they became more mobilised in this area.

10. Modifications

Approval was granted in January 2009 to extend the finish date of the project until 17 April to accommodate the delayed start of the Project Manager.

Part of the budget originally set aside for the website was put toward Masterplan development following approval by the Trust, with the website being jointly funded by the UGRSI.

The initial project proposal allocated $300 000 to restrict access to Mill Creek via GLALC lands. This was redirected to erosion control works with the Indigenous Land Alive team, and fencing in other areas of the catchment.

NPWS also committed a further $500 000 from other funding sources to the MGRSI for access restriction in Mill Creek. However, due to delays in project commencement this money had to be spent before the project manager was recruited. Half was still spent on fencing the Sandy Point section of the National Park, but the other half was used on facilities upgrades within the Georges River National Park at Revesby.

To mitigate delays with the finalisation of the sub-catchment Masterplans the Project Manager worked with NPWS to commence some on-ground works while they were still in draft form.

11. Timetable

The completion dates of scheduled project activities are listed against expected timeframes in Appendix 1.

12. Permits or Approvals

Approval was granted by SSC to gain access to GIS data and layers for use by the project.

A Section 132C licence was obtained by NPWS to undertake bush regeneration in EEC's on their land under the *National Parks and Wildlife Act 1995*.

A permit for transport and disposal of notifiable weeds was obtained from Department of Industry and Investment under Section 34 of the *Noxious Weeds Act 1993*.

13. Financial Statement

A certified financial statement will be supplied in early June at the finalisation of the May monthly expenditures.

14. Visual Documentation

Images of the following events, activities and materials have been included in previous progress reports:

- Catchment maps
- Site visits to project areas

- Website planning workshop
- Kennedy St drain before, during and after regeneration works
- Community consultations for Yeramba Masterplan and education plan
- Stakeholder consultation for Yeramba Masterplan
- Yeramba Lagoon guided bird walks
- Schools Tree Day at GRNP
- Georges River Website launch
- Urban water management seminars at BCC
- WSUD capacity building workshops
- Yeramblers launch and sign-up day
- Mill Creek guided photography walks
- Stencilled drains in the Yeramba catchment
- Garden sign installed in volunteer's front yard
- Yeramblers Bushcare induction and training day
- Weed harvesting at Yeramba Lagoon
- Sculptures made for Amberdale Reserve
- MGRSI stall at the Cross Currents festival
- Amberdale before, during and after bush regeneration
- River Health Spring 2010 sampling
- Detainee team track rehabilitation works at Sandy Point
- Bush and riparian regeneration locations in Mill Creek
- Mill Creek photography competition awards night

The following images are included in Appendix 12:

- Georges River Cruise
- Detainee teams track rehabilitation work before and after
- Yeramba Lagoon catchment signage
- Mill Creek catchment signage
- Mill Creek bush regeneration and stormwater works
- New gates and fencing in Mill Creek catchment
- Construction of environmentally friendly sea wall
- *CommunityLink* March 2011 media article

16. Appendices

The following project outputs have been attached to previous progress reports:

- Steering Committee meeting minutes
- MGRSI branding/logo
- Various letters to stakeholders
- Briefs for the website, Masterplans and Education Strategy
- MGRSI brochure and posters
- Yeramba consultation findings
- WSUD workshop information

- MGRSI update reports for GRCCC
- Invitations to website launch
- Yeramba works schedule
- Mill Creek works outline and budget allocation
- Education Plans
- Yeramba Lagoon track signage
- Education program evaluation and monitoring
- Website statistics
- Work plan submission for Land Alive Traineeship Program
- Stormwater booklet made by Panania PS
- Media articles and advertisements
- 'Talking up biodiversity' case study presentation
- Invites to Georges River Cruise conference
- MGRSI on-ground works map
- Designs for Amberdale swale and sign
- Mill Creek consultation feedback form
- Yeramblers expression of interest survey
- Drain stencils
- Stormwater education flyer
- Yeramba Lagoon and Mill Creek 2011 Calendars
- Community garden sign graphics

Appendix 1 Detailed project schedule and Timetable

Activity / Milestone	Details	Estimated timeframe (revised)	Status
Engage stakeholders	Engage and inform all identified stakeholders.	May - June 2008	Completed
	Establish and meet with Steering Committee		Steering Committee defined in planning meeting 01 April 2008 Formal invitations to sit on PSC sent 22 April 2008 First meeting held on 25 June 2008
Progress report to the Trust	Include updated Business Plan	May - June 2008	Submitted 30 May 2008
	Gain approval from Project Steering Committee.		
Development of a communications and education strategy	Commence development of Draft Strategy	June 2008	Briefs commenced June 2008 Quotations received November 2008 Consultants engaged January 2009
	Identify any additional stakeholders eg. community groups, recreational groups, etc.	August 2008	Undertaken by consultants
	Engage key stakeholders to work on development of Draft	August 2008 (February - May 2009)	
	Review and consult stakeholders Draft	August - September 2008 (May - June 2009)	Finalised December 2009
Development of Masterplan for each sub catchment	Develop brief	June 2008	Briefs commenced June 2008
	Engage consultants	August 2008	YL consultants engaged October 2008 MC consultants engaged December 2008
	Review and consult stakeholders on Draft	September 2008 (March - June 2009)	YL Draft received February 2009 MC Draft received October 2009
	Adopt Final report and Masterplans	November 2008	YL Masterplan finalised August 2009 MC Masterplan finalised June 2010
Final Business Plan Due to Trust	Submit final Business Plan to the Trust. Must include Communication and Education Strategy.	October - November 2008	Submitted 27 October 2008
Progress report to the Trust	Gain approval from Project Steering Committee.	November - December 2008	Submitted 28 November 2008
Assist Council staff in improving their urban water management.	Look at both BCC and SSC existing policies and proceedures with the aim of increasing WSUD use in the LGA. Assess current knowledge and skill levels within organisations.	Commence July/August 2008 (Ongoing stages 2 and 3)	Commenced December 2009

Activity / Milestone	Details	Estimated timeframe (revised)	Status
	Establish or link in with existing working groups within each Council.	Late 2008 - Mid 2009	Throughout 2010
Implement actions identified in communications and education strategy	Website	Mid to late 2008 (Launch June 2009)	Company engaged September 2008 Launched 21 October 2009
	Community, industry and organisational education and awareness raising.	Commencing 2009 (Commencing July - August 2009)	Education programs ran from January 2010 to September 2010
Restrict access to Mill Creek area.	Details to be confirmed	Commencing early 2009 (Commencing mid 2009)	Commenced late 2010
Implement On-Ground works for Mill Creek Catchment	Identified from strategic management/action plans: 560k	Commencing early 2009 (Commencing mid 2009)	Commenced early 2010 and ongoing for remainder of project
Implement On-Ground works for Yeramba Lagoon Catchment	Identified from strategic management/action plans: 400k	Commencing Early 2009 (Commencing late 2008)	Commenced late 2009 and ongoing for remainder of project
Progress report to the Trust	Gain approval from Project Steering Committee.	May - June 2009	Submitted 01 June 2009
Continue to implement education and communication strategy	As above	Year 3	Education programs ran from January 2010 to September 2010
Progress report to the Trust	Gain approval from Project Steering Committee.	November - December 2009	Submitted 01 December 2009
Continue to implement identified actions from Masterplans	As above	Year 3	Commenced late 2009 and ongoing for remainder of project
Continue to work with councils to ensure best practice urban water management is incorporated into council operations and planning.	Coordinate training and produce materials where needed.	Year 2 - 3	Ongoing during 2010 and early 2011
Progress report to the Trust	Gain approval from Project Steering Committee.	May - June 2010	Submitted 06 July 2010
Final Report	To cover entire project duration Gain approval from Project Steering Committee.	November - December 2010 (March - April 2011)	Project extension approved by Trust - 6th progress report submitted 04 January 2010 Final report submitted May 2011

Appendix 2 Monitoring Results

Category	Performance Measure (* Trust measures)	Performance Value	Description
Ecosystem Health	Improvement in River Health score Spring 2009 to Spring 2010	C to B-	Yeramba Lagoon
		E to E+	Morgan's Creek
		C to C+	Morgan's Creek estuary
		D- to C	Salt Pan Creek
		A- to A+	Barden Creek
		A+ to A	Mill Creek
		A+ to B-	Mill Creek estuary
	Area supporting sediment and erosion controls	0.5ha	Detainee team, Sandy Point
		2ha	Land Alive team, Mill Creek
	Area regenerated * and/or weeded *	100m2	Yeramblers Bushcare (Amberdale Reserve)
		3ha	Sutherland Bushcare (Hall Drive Reserve and Bradman Rd)
		0.5ha	Detainee team Sandy Point
		1ha	Detainee team Yeramba
		2ha	Land Alive team Mill Creek
		22ha	Tributaries in east Mill Creek
		26ha	Bardens Creek and Little Forest area
		1ha	Amberdale drainage line, Yeramba
	Aquatic weed matter removed	237.92 t	Weed harvesting in Yeramba Lagoon
	Number of native species plantings	4000	Land Alive team, Mill Creek
		1800	Detainee team, Sandy Point
		5000	Amberdale drainage line, Yeramba
		14500	Tributaries in east Mill Creek
		5000	Georges River NP, Schools Tree Days
	Length of bank stabilisation *	100m	Environmentally Friendly Sea Wall
	Length of access restriction	600m	Georges River NP at Sandy Point
		100m	Temporary fencing at Little Forest
		65m	Gates and fencing in Menai
Stakeholder Engagement	Number of organisations engaged in the project *	20+	Government agencies
		15+	Community, recreation and interest groups
	Number of individuals engaged in the project *	53	Yeramba Masterplan community consultation
		40	Mill Creek Masterplan and education plan community consultation
		50	Yeramba education plan community consultation
	Number of individuals reached by communication/ dissemination strategy *	22 (13)	Participants in Mill Creek photo walk (plus those that missed out due to rain)
		23	Mill Creek photo comp entrants
		228	Mill Creek photo comp exhibition votes receives
		2500	Mill Creek calendars distributed
		~ 60	Yeramblers mailing list
		25	Yeramblers Bushcare volunteers
		2000	Yeramba calendars distributed
	Number of education materials	8	No dumping/ littering signs installed

Category	Performance Measure (* Trust measures)	Performance Value	Description
	produced	11	Bushland regulations signs installed
		60	Stormwater drains stencilled
		17	Garden signs installed
		2	Bushwalking tracks improved/ marked and visitor information brochures produced
	Number of students engaged in the project	165	Schools Tree Days
		57	GREEC classroom lessons
		60	Yeramba talk
	Number of hits on Georges River website (01May2010 - 28Feb2011)	10 895	Total visits to site
		8162	Unique visitors to site
		31 562	Total page views
		569	MGRSI page views
Urban Water Management	Number of Council WSUD projects (so far, in general)	8	Bankstown City Council
		6	Sutherland Shire Council
	Number of staff provided with training/ education	60	BCC Sustainable Water Management seminar
		1	BCC MUSIC training
		2	BCC/ SSC Raingardens Essentials course
	Number of staff involved in rapid assessment/ action plan workshops	14	Bankstown City Council
		8	Sutherland Shire Council
	Number of Councillors and executives attended Georges River Cruise	10	Councillors (from GRCCC Councils incl.1 BCC)
		6	General Managers and Directors
Aboriginal cultural areas	Number of known Aboriginal sites identified in catchment	90	Mill Creek catchment
		1	Yeramba Lagoon catchment

Appendix 3 Outcomes hierarchy

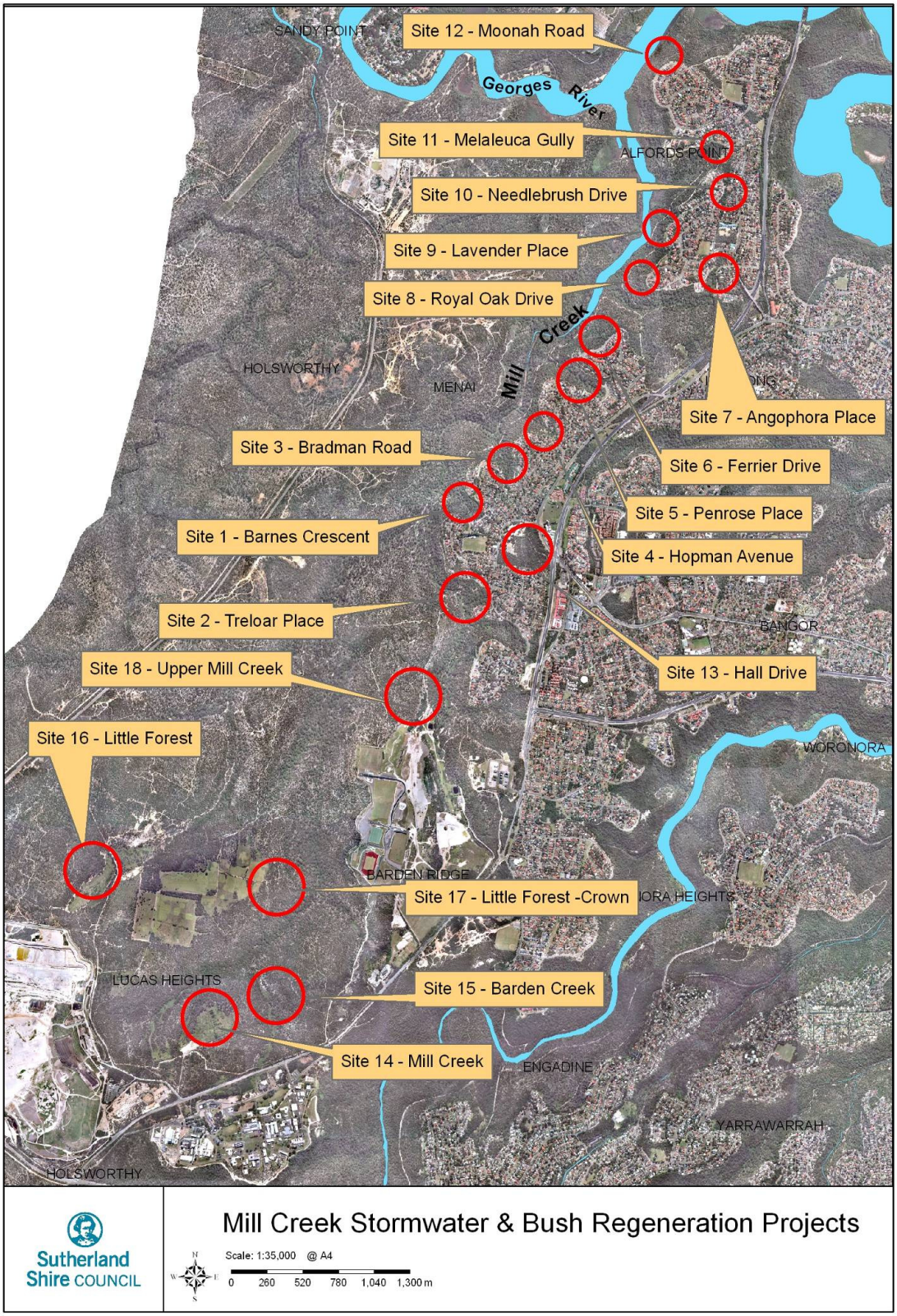
	Target Outcome	Evaluation Questions	Performance Indicator	Performance Results	Progress to date
Ultimate Outcomes	**A significant move towards a healthier, balanced river ecosystem and a shared vision for the mid Georges River by the community, stakeholders and government.**	Has ecosystem health within the mid Georges River been balanced with competing uses (social/recreational, economic and environmental)? Has a shared vision been established for the mid Georges River by all stakeholders? Have all stakeholders been engaged and consulted? Has this improved the health of the mid Georges River?	Number of opportunities for addressing environmental, recreation and economic needs of the catchment identified and/or implemented. Number of stakeholders (community, government, etc) actively involved in planning and decision-making process. WQ Monitoring results Decreased recurrence of aquatic weed infestations Visual/photographic evidence. Amount of litter, oils and sediment trapped in GPT's.	MGRSI implemented 22 actions out of 91 identified through the Masterplans Over 35 organisations/agencies/groups and over 150 individuals were actively involved in the project See River Health report card Appendix 12 Data not available Photos of consultations, events and on-ground works in appendix 13 and previous reports Data not available	The MGRSI has made significant progress towards its ultimate outcome. Masterplans were commissioned as a guide for land managers to protect and enhance environmental values while balancing competing needs and uses of the catchments. The planning process engaged a diverse range of stakeholders to consolidate common objectives for the mid Georges River. Management activities to achieve vegetation and habitat improvements have been implemented throughout the catchment in partnership with multiple stakeholders. Education programs have empowered members of the community to care for the river and help ensure its sustainable future. The MGRSI has raised awareness and support for sustainable urban water management and incorporation of WSUD principles into Council operations and planning.
Intermediate Outcomes	**Reduced erosion and increased soil stability.**	Is there a reduction of sediments in stormwater? Is this reduction a result of reduced access (4WD and trail bikes) to the site?	Visual/photographic evidence. WQ monitoring results. Amount of sediment trapped in GPT's.	Photos of track work and erosion control in appendix 13 and previous reports See River Health report card Appendix 12 Data not available	Erosion and sedimentation issues were addressed by the MGRSI through the sub-catchment Masterplans. The Land Alive team is focusing on sediment control and track rehabilitation in western Mill Creek, and riparian rehabilitation works were carried out along the eastern tributaries. Fencing has been installed to restrict illegal access to Mill Creek and reduce erosion caused by vehicles. The PDC teams have also undertaken trail rehabilitation and erosion control on both sides of the GRNP. Such efforts throughout the catchments will make significant progress towards reduced erosion and increased soil stability in the mid Georges area. These works were ongoing to the end of the project, but changes to water quality in the medium term will be measured through: River Health monitoring program, BCC water quality monitoring program (extensive baseline data from August 97 to March 09 is available from sampling site in Yeramba Lagoon), and SSC water quality monitoring program (new MGRSI-funded sampling sites in Mill Creek).
	Improved habitat connectivity and biodiversity.	Has biodiversity been improved in the catchment? Has habitat connectivity been enhanced?	Visual/photographic evidence. Areas regenerated/ revegetated.	Photos of bush regeneration in appendix and previous reports More than 55 hectares regenerated and approx 28000 plantings	The Masterplans identify a range of actions to address impacts on natural habitat and biodiversity. The MGRSI has implemented environmental restoration works across an area of more than 55ha throughout both catchments to improve vegetation and water quality. Connectivity has been directly increased at several sites through new plantings and seed spreading in cleared and disturbed areas of Mill Creek and the GRNP. A high diversity and density of native species have already begun to grow where extensive weed removal and treatment has taken place. Responses of native fauna to better habitat values will be revealed with future surveys and sighting records gathered by Councils.

Target Outcome	Evaluation Questions	Performance Indicator	Performance Results	Progress to date
Support for a shared multi-disciplinary regional approach to the management of the mid-Georges River and improved relationships between stakeholders.	Is the catchment being managed through a shared regional approach? Is there greater communication and interaction between stakeholders? Are more stakeholders now involved in the management of the catchment than before the project commenced? Do catchment managers consider multiple bottom lines when planning and managing the catchment?	Number of cross-council programs. Number of stakeholders actively involved in planning and implementation of management actions.	Over 35 organisations/agencies/groups and over 150 individuals were actively involved in the project	The MGRSI has facilitated higher frequency of communication and better relationships between major stakeholders through membership of the project steering committee. More stakeholders have indicated their support for a shared regional approach to management via participation in Masterplan development and in multi-disciplinary partnerships to implements works and activities. The three Georges River Sustainability Initiatives, representing the entire length of the Georges River, have collaborated on catchment-wide engagement projects to assist information sharing among stakeholders, such as the website and the cruise conference. Residents and community groups were given the opportunity to interact with Council and NPWS at consultation workshops. The education programs have made significant progress in raising awareness of catchment issues and empowering the community to become involved in ongoing management activities, such as Bushcare.
Reduced maintenance costs.	Have maintenance costs been reduced as a result of the Project?	Visual/photographic evidence. Reduction in budget requested for maintenance each year.	Not applicable Future maintenance requirements have not yet been determined	The Masterplans are aimed at achieving higher environmental sustainability of the catchment to reduce the costs of protecting the river in the long term. Management actions are designed to improve ecosystem health with minimal maintenance requirements. Actions successfully implemented by the MGRSI will contribute to reduced maintenance costs for land managers in the future. Riparian rehabilitation works and improved urban stormwater management by Councils will help to minimise stress on existing infrastructure. Education activities have raised awareness in the community about their impacts on the river and encouraged them to behave more sustainably. The weevil biological control trial was undertaken at Yeramba Lagoon with no direct costs and will potentially keep the salvinia infestation at a much reduced level. Weeding, mulching and planting alongside road verges provides a buffer to resist long-term spread of weeds into bushland.
Adoption of WSUD principles into Council operations/policies to reduce stress on existing stormwater infrastructure and improve water quality and quantity.	Has WSUD been incorporated into Council's policies? Has the quality of stormwater runoff been improved? Has potable water use in the catchment been reduced?	Number of Council projects/works incorporating WSUD and best practice urban water management. Incorporation of WSUD into Council reporting. Incorporation of WSUD and water quality standards into development and planning controls. WQ Monitoring results Visual/photographic evidence. Decreased recurrence of aquatic weed infestations.	Approx 15 MGRSI/Council projects incorporate WSUD Not undertaken by the MGRSI Not undertaken by the MGRSI See River Health report card Appendix 12 Not applicable Data not available	By raising awareness and understanding of sustainable urban water management amongst Council staff, Executive and Councillors the MGRSI has generated support for the incorporation of WSUD principles into operations and policies. The project has provided capacity building workshops for the two Councils, leading to the completion of WSUD action plans. Sutherland Council's DCP (2006) already includes a stormwater section and Bankstown Council will soon review its DCP.

	Target Outcome	Evaluation Questions	Performance Indicator	Performance Results	Progress to date
Immediate Outcomes	**Increased community and stakeholder awareness of the project and it's scope.**	Are the community and stakeholders more aware of the project and its scope?Have stakeholders and the community been engaged and involved in the project?	Community interest in the project.Inquiries and interest from other stakeholders.	Over 450 community members participated in education events/activities, and 569 MGRSI webpage views Over 35 organisations/agencies/groups and over 150 individuals were actively involved in the project	The MGRSI has ensured a high level of awareness about the project among stakeholders. Relevant groups and agencies were made aware of the MGRSI through the steering committee and invitations to contribute to the Masterplans. GRCCC networks have also assisted in disseminating information about the project. All residents in the two catchments received letters providing details of the project and community consultations. Display material and information presented at consultation workshops enabled stakeholders to gain a better understanding of the project. Various MGRSI events and ongoing media coverage have promoted the objectives and outputs of the project to the general community. Anyone can readily access information on the project via the Georges River Website.
	Increased awareness of how individual actions can impact the natural environment e.g. 4WD, trail bikes and littering.	Are individuals more aware of the impact of their actions on the natural environment? Has this resulted in a change of actions? Does the community retain knowledge from past education programs?	Visual/photographic evidence. WQ monitoring results. Amount of litter, oils and sediment trapped in GPT's. Community remembers information from previous stormwater education campaign.	Photos of education events and activities in previous reports See River Health report card Appendix 12 Data not available Will be measurable with implementation of future education programs	The education strategy identified and addressed target groups that were impacting on the project sites. Stencilling is now visible at drain pits throughout Picnic Point and should be seen by almost all residents of the Yeramba catchment. Knowledgeable residents have assisted peer education through the garden sign program and calendar. Stormwater lessons were incorporated into the curriculum for local school classes. The Mill Creek photography competition successfully engaged a wide audience, and the calendar contained information on how individuals can reduce threats to the catchment. There were ongoing difficulties engaging 4wd and trail bike users so progress has been slow in educating this segment of the community. Regulatory signage has been installed along the bushland interface to warn people about environmental damage caused by illegal recreation. Whether the community retains this knowledge, and if an increase in awareness leads to significant change in behaviour, will need to be evaluated with future education activities and compliance monitoring.
	Improved management of the two sub-catchments incorporating environmental, recreational, social and economic values.	Have environmental needs been addressed? Have recreational and social needs been addressed? Have long term management options been considered (reduced maintenance costs)? Were all stakeholders consulted in the development of the plans? Has the new Council reporting and planning structures assisted?	Amount of works identified to address environmental needs Amount of works identified to address recreational and social needs Amount of on-going maintenance required for identified works. Number of community consultations Number of stakeholders involved in the development of the Masterplans	At least 20 MGRSI on-ground projects address environmental needs At least 4 MGRSI projects address recreational and social needs Future maintenance requirements have not yet been determined There were 3 community consultations Over 35 organisations/agencies/groups and over 150 individuals were actively involved in the project	The MGRSI has made significant progress towards improved management of the sub-catchments in the immediate term. The has been achieved through collaboration with land managers and land users to develop and commence implementation of two Masterplans. A comprehensive array of stakeholders were involved in the Masterplanning process, ensuring that all values and needs were considered and incorporated into actions and objectives. Environmental restoration works have occurred throughout the catchment, as well as actions to enhance passive recreation opportunities. The Masterplans provide guidance for agencies and land owners to continue toward management objectives after the life of the grant project and to prioritise actions according to available resources.

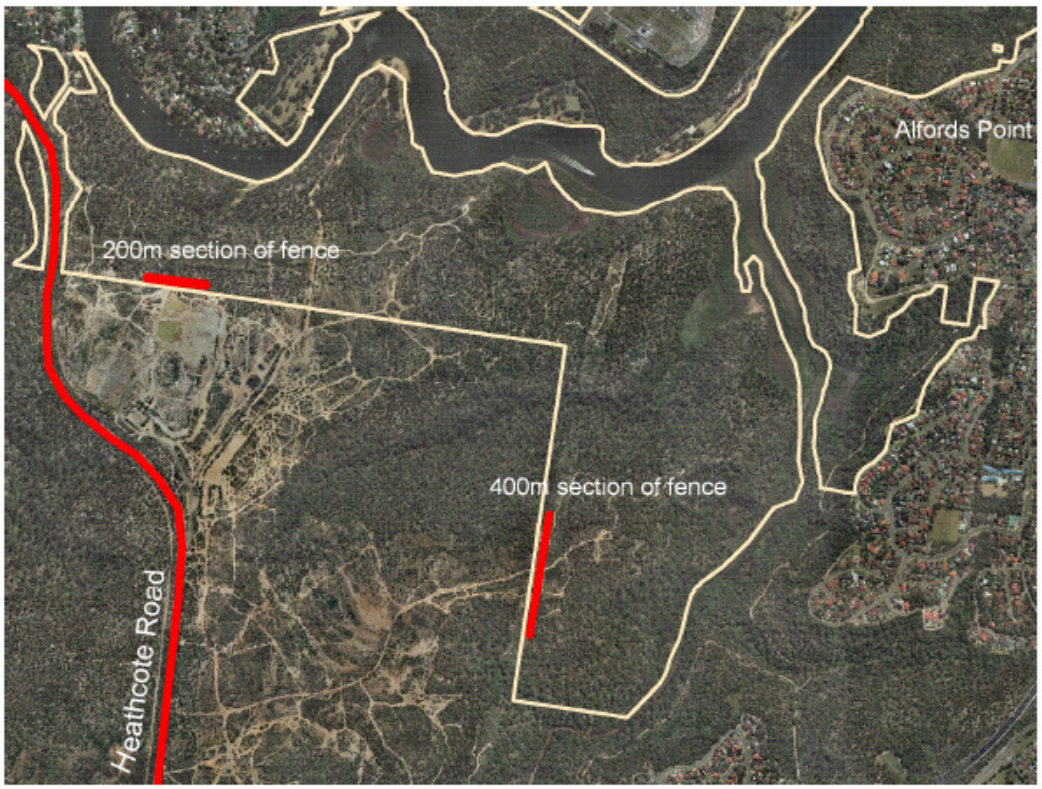
Target Outcome	Evaluation Questions	Performance Indicator	Performance Results	Progress to date
Increased community, stakeholders and council participation and multidisciplinary regional approaches to the decision-making process.	Is there greater communication and interaction between stakeholders? Are more stakeholders now involved in the decision-making process? Are multiple bottom lines being considered in the decision-making process?	Number of stakeholders actively involved in planning and decision-making process.	Over 35 organisations/agencies/groups and over 150 individuals were actively involved in the project	With establishment of the Project Steering Committee there has been much greater communication and interaction between NPWS, Councils, GRCCC and SMCMA in relation to these two project sites. Involvement of regional organisations like GRCCC and SMCMA ensured that decisions about the mid Georges were made with consideration of wider catchment-scale influences. Extensive consultations for the Masterplans and education strategy successfully engaged a diverse range of stakeholders to determine objectives and future direction of the two sub-catchments. The Masterplan brings together input from individual community members, recreation and interest groups, environmental companies, and government agencies, that otherwise may not have had the opportunity to participate.
Improved awareness of appropriate urban water management within Councils.	Has WSUD been incorporated into Council's policies? Has the quality of stormwater runoff been improved? Has potable water use in the catchment been reduced?	Number of Council projects/works incorporating WSUD and best practice urban water management. Incorporation of WSUD into Council reporting. Incorporation of WSUD and water quality standards into development and planning controls. WQ Monitoring results Visual/photographic evidence.	Approx 15 MGRSI/ Council projects incorporate WSUD Not undertaken by the MGRSI Not undertaken by the MGRSI See River Health report card Appendix 13 Photos of WSUD workshops in previous reports. Photos of Cruise conference	Awareness and understanding of sustainable water management among BCC staff has greatly improved over the last three years. Following on from CRSI, the MGRSI worked closely with other BCC programs to deliver several training and education opportunities. Completion of in-house WSUD projects has subsequently allowed more staff from across the organisation to become involved in and learn about urban water management. Sutherland Council already had a greater level of awareness of WSUD in their organisation, and have also recently implemented a number of WSUD projects. The Georges River Cruise was successful in increasing Council executive and Councillors understanding of sustainable urban water management.
Identification of areas of cultural significance (Aboriginal and other).	Are aboriginal and other cultural sites being identified and protected?	Number of sites known. Number of sites protected through appropriate measures. Visual/photographic evidence.	91 Aboriginal sites and 2 other sites are known Not specifically undertaken by the MGRSI Not applicable	The MGRSI recognised that significant Aboriginal heritage values exist in both catchments and placed great importance on engaging local Indigenous groups in management and on-grounds works to protect their lands. The AHIMS database was consulted during the development of each Masterplan, identifying one Aboriginal site in a secluded part of the Yeramba catchment and 90 sites within the Mill Creek catchment. The Mill Creek Masterplan also identifies the remains of a flour mill from the 1920s as significant to the local area, and the HIFAR on the ANSTO site is an item on the Commonwealth Heritage List.

Appendix 4 Mill Creek stormwater and bush regeneration map



Appendix 5 Mill Creek water quality monitoring sites

Appendix 6 Mill Creek access restriction locations

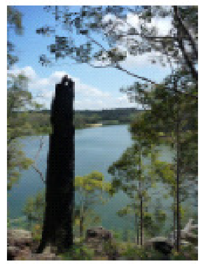

Alfords Point
200m section of fence
400m section of fence
Heathcote Road

Appendix 7 Sandy Point Loop track notes

Georges River National Park
Sandy Point to Mill Creek Loop Track

The Sandy Point to Mill Creek loop is a rough bush track of about 6.7 km. It typically takes 3hrs 30min to walk and requires a moderate level of fitness. The track descends to the river then travels eastward past a variety of ecological communities, including mangroves and endangered salt marsh. Upon reaching Mill Creek the track climbs and turns westward, returning via sandstone ridges through open forest and heathland.

The walk begins at the **Sandy Point Community Centre on St George Crescent**, Sandy Point, NSW 2171. Parking is available at the centre. Directional posts, including ten numbered markers, guide the way along the track. The first numbered marker is located behind the community centre at the Georges River National Park gates. A shorter route of 3 km turns back at Marker 4, or the walk can be lengthened to 11 km by taking the extension loop at Marker 8.



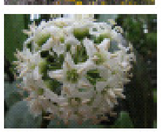
The setting for this track is the southern shore of the mid reaches of the Georges River. The geology is Hawkesbury sandstone, though there is strong clay/shale influence in places. This combines with the unusual geography to produce diverse and complex plant communities, containing species typical of both the Cumberland plain and the coastal sandstone areas.

History: This section of the Georges River National Park was originally leased to private occupiers during the early to mid 1800's. The Sanbrook Brothers, who operated paddle wheelers on the river, developed the Parkesvale Pleasure Grounds including a wharf, pavilion with dance floor, summer houses and picnic areas. Its popularity declined during the First World War and it closed in 1920. The area subsequently became part of the army buffer zone to the Holsworthy artillery range until it was handed to the NSW National Parks and Wildlife Service in 2007.

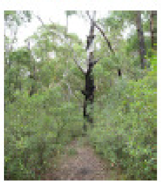

1

Marker 1 to Marker 2 An easy descent through open sclerophyll forest down a well made track. Large Blackbutt (*Eucalyptus pilularis*) and Grey Gum (*Eucalyptus punctata*) are the dominant tree species due to the enriched soils, though Narrow-leaved Apple (*Angophora bakeri*) soon takes over. The shrubs include Sickle Wattle (*Acacia falcata*), Dogwood (*Jacksonia scoparia*; picture 1) and Blackthorn (*Bursaria spinosa*), giving way to a grassy understory and almost open woodland.

At the bottom of the hill a swampy area beside the river features an extensive patch of the Common Reed (*Phragmites australis*).


2

Marker 2 Here the river is lined with two types of mangrove, which are adapted to grow well in salt water. The Grey Mangrove (*Avicennia marina*) is taller with greyish-green leaves and the River Mangrove (*Aegiceras corniculatum*; flowers shown in picture 2) is shorter with rounder leaves. Swamp Oaks (*Casuarina glauca*) sit just above the high tide mark.


3

Marker 3 Soon after the track starts to rise again, Marker 3 can be found next to the fresh green 'foliage' of a Native Cherry (*Exocarpus cupressiformis*). The track crosses the old, badly eroded Parkesvale road.

Marker 4 The track arrives at an intersection. The right hand (south-westerly) branch heading up-hill is the short route back to the community centre, cutting across to Marker 10.

Straight ahead (easterly) the main track descends through two metre high Hop Bush (*Dodonaea triquetra*), a sure sign that in the past there was a serious fire through the area, and more Blackbutts; pictured (3).

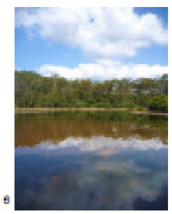
Georges River National Park Sandy Point to Mill Creek Loop Track


4

Marker 5 At the approach to Marker 5, summer-flowering paperbarks (*Melaleuca decora*) sit amongst an expanse of a low scrambling yellow-flowered Hop Goodenia (*Goodenia ovata*) on the edge of endangered saltmarsh. Marker 5 indicates a viewing area overlooking a shallow tidal pool, trapped behind mangroves and surrounded by a low spreading plant, Samphire (*Sarcocornia quinqueflora*); pictured (4). Samphire grows in areas where evaporation has increased the salt concentration to above that of sea water. Water birds are a feature of this pond, particularly Black-winged Stilts (*Himantopus himantopus*).


5

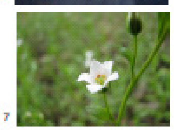
Marker 5 to Marker 6 The track climbs the side of the hill beneath an impressive sandstone escarpment, weaving through Blackbutts, Grey Gums and Narrow-leaved Apples above a dense stand of Hop Bush; pictured (5). It then skirts around a rocky point just below a substantial overhang before descending to cross a large swamp where the reeds give way to Saw Sedge (*Gahnia sieberiana*), paperbarks and eucalypts. The track follows the edge of the swamp to the saltmarsh.


6

Marker 6 Three species of Paperbarks, *Melaleuca linearifolia, M. nodosa, and M. decora* sit along with Marker 6 beside the track.

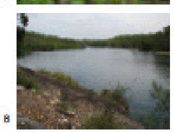
This area is typical of several wetlands in this part of the Georges River; pictured (6). It was a minor creek valley 7000+ years ago when the thawing of the last ice age flooded the river system with salt water and sediments. Assisted by mangroves, the sediment accumulated to the point that a substantial levy bank now juts out from the eastern shore, supporting large gum trees. Salt water still flows in through the mangroves at the western end, but in the areas only reached by higher tides hypersalination caused by evaporation has formed saltmarshes.

It is noticeable that the young mangroves are encroaching on new ground. Mangroves are a dynamic species, trapping sediments and creating new banks as old ones are eroded away. If the sea level does not rise any further the sediment will continue to accumulate until the tide can no longer reach them. The salt tolerant species will then be displaced by freshwater species.


7

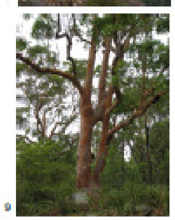
Near the land margins is the Sea Rush (*Juncus kraussii*). The small white flowers of Creeping Brookweed (*Samolus repens*, picture 7) can be seen in spring and summer.

Marker 6 to Marker 7 From the flats the track continues eastward climbing through bracken at the end of the bay. After 300 metres it comes back to the river edge beside a rock platform, pictured (8). This provides a good spot to stop for a rest while viewing the activities on the river. From here the bush is more open, and there is now an occasional Grass Tree amongst the Narrow-leaved Apples and Bloodwoods (*Corymbia gummifera*).


8

Marker 8 At the approach to Mill Creek the track splits again. The main track turns right up the hill and climbs the ridge to return to the Community Centre.

Continuing straight on there is a further loop track that visits an extensive Mill Creek wetland before returning. This will add an extra 4 kms onto the trip. **Warning****


9

Marker 8 to Marker 9 Once on the ridge there is a view of Mill Creek and the Georges River. The track heads up the spur through Grass Trees (*Xanthorrhoea arborea*) to emerge on a vehicle track continuing westward and upwards. The Smooth-barked Apple (*Angophora costata*) is a feature of Sydney's ridges. Here we can see a specimen that demonstrates this trees ability for one limb to grow into and fuse with another; pictured (9). In this case the tree has split into two trunks at the base and rejoined into one 1.7m later.

Near the top of the ridge are numerous examples of a wattle that holds its narrow leaves vertically. This is the Rush-leaf Wattle (*Acacia junciflolia*), an unusual occurrence in Sydney. There are a number of points along the climb that provide a good view of the river.

Georges River National Park Sandy Point to Mill Creek Loop Track

10

Marker 9 Cautious walkers approaching the first electricity pylon (shown in picture 10) may be able to see the Peregrine Falcon that regularly uses the structure. The reason this pylon is known as the Falcon's Table becomes evident to those who search the ground underneath.

11

Marker 9 to Marker 10 The track continues along the river side of the pylon and remains near the top of the plateau for the return trip. At first it follows the edge of the escarpment through open forest, with commanding views of the Georges River framed by large Smooth-barked Apples (*Angophora costata*) and Bloodwoods. The flora along this section is typical of sandstone, with little evidence of the clay-preferring species found lower down. A red-flowered form of the Bottlebrush (*Callistemon sp*) is common along here; pictured (11).

The track joins the electricity pylon access road near the park boundary fence. The dominance of the Smooth-barked Apples and Bloodwoods continues but the understorey becomes much more complex with many wattles, pea and spider flowers prominent. The Fine-leaved Pea (*Pultanaea stipularis*), and the Pink and Green Spider flowers (*Grevillea sericea* and *G. mucronulata*) are common, as well as the Broad-leaved Geebung (*Persoonia levis*) with its large bright green leaves and black paper-like bark that protects it from bush fires. In autumn/winter the Hairpin Banksia (*Banksia spinulosa*) is a feature; the honey-coloured flower spike can be tall and the styles may be dark-red or even black.

12

The Lookout, off to the right of the track near some pylons, is a rock promontory that offers extensive views of the river; pictured (12).

After this the open forest gives way to man-made shrub-heath beneath the pylons because the trees are routinely lopped. Though the visual human impact on this section is regrettable there are some excellent areas of heath. During spring, Honey Myrtle (*Kunzea ambigua*, picture 13) and Yellow Tea-tree (*Leptospermum polygalifolium*) flower so heavily that the air can smell richly of nectar.

13

Marker 10 This is where the short cut from Marker 4 rejoins. From here the journey is a mostly downhill 1.2kms to the Community Centre.

In this area are many examples of Dwarf Apple (*Angophora hispida*) also known as Beetle Bush. This small straggly tree with rough, heart-shaped leaves is transformed in summer when it becomes covered in red, velvety new growth and buds that open to masses of large creamy flowers, attracting all sorts of insects, particularly colourful scarab beetles.

14

The main track continues westward along the ridge top amongst the heath where the orange-red spiked Heath Banksia (*Banksia ericifolia*) lights up the winter gloom. Approaching Heathcote Rd the track turns north, then leaves the main access road to return to the start; pictured (14).

** Warning: The extension track is unmarked and so should only be undertaken by experienced bushwalkers with navigational skills. Some areas are poorly formed with steep and loose rocky sections. This track may not be negotiable following wet weather as it crosses a swamp.

Mid Georges River

Information and photographs contributed by the Menai Wildflower Group

Appendix 8 Mill Creek regulatory signage locations

Site	Location	Description	Sign Type
1	**Moonah Road** Alfords Pt. Adjacent to fire trail. Opposite No 47.	Adjacent to Georges River NP. • All prohibitions • No dogs	DECCW
2	**Brushwood Drive** Alfords Point. Roadside no fire trail. Opposite 121-119.	Adjacent to Georges Rive NP. • No harm to vegetation • No dumping • No fires • No dogs	DECCW
3	**Bottlebrush Place** Alfords Pt. Adjacent to fire trail opposite Rosegum Pl.	Adjacent to Georges River NP. • All prohibitions • No dogs	DECCW
4	**Royal Oak Drive** Alfords Pt. Opposite residential properties No 27. Private bushland. Regular dump spot.	Adjacent to Private bushland. Not a fire trail. • No harm to vegetation • No dumping	SSC
5	**Penrose Place** Menai. Next to fire trail opposite No 19.	Adjacent to fire trail and Council land • All prohibitions	SSC
6	**Rosewell Drive** Menai Opposite No 72 at end of cul-de sac	Adjacent to Crown land • All prohibitions	SSC
7	**Davidson Road** Menai	Adjacent to Crown land • No vehicles • No bikes • No dumping • No harm to vegetation	SSC
8	**McKenzie Place** Menai Next to fire trail adjacent to No 1	Adjacent fire trail and Crown land. Access for Transgrid 133Kv stanchions. • All prohibitions	SSC
9	**McKenzie Place** Menai Next to access adjacent to No 29	Adjacent fire trail and Crown land. Access for Transgrid 133Kv stanchions. • All prohibitions	SSC
10	**Treloar Place** Menai Opposite Clarke Place. Next to gate and firetrail.	Adjacent fire trail and Crown land. • All prohibitions	SSC
11	**Gould Place** Menai At end of road.	Adjacent to NSW Planning land. Fire trail not required by RFS. To be blocked. • All prohibitions.	SSC

Appendix 9 Georges River Cruise media release

24 February 2011

LGRSI Media Release
Local Government Executives converge for water management conference

Local Government councilors and executives and state and federal agency managers came together to learn about sustainable urban water management on the Georges River last Thursday evening, 17 February.

Over 60 people from varying professions and community interests joined the cruise, enjoying a unique perspective of the Georges River and its catchment – from the water.

The purpose of the boat conference was to showcase innovative urban infrastructure design which improves water quality, enhances the natural landscape, and reduces stormwater runoff. The infrastructure and planning method that incorporates these ideas is called Water Sensitive Urban Design (WSUD).

The evening included presentations from Dr Ian Wright of the University of Western Sydney who spoke about the impacts of past urban development on our waterways, and Prof Tony Wong of Monash University who spoke about the technological and engineering innovations which cities are using to improve the water quality of our rivers.

Cr Julie Bourke, chairperson of the Georges River Combined Councils' Committee (GRCCC), said that participation in the event from local government councilors and executives was vital to the adoption of WSUD in development and planning.

"It was encouraging to see so many executives at an educational forum for WSUD," said Cr Bourke. "There are advancements in WSUD all the time and Councils' strategic planning staff should ensure these sustainable stormwater methods are considered and incorporated into council's planning requirements."

The cruise was an initiative of the Improving Prospect Creek, Mid, Lower and Upper Georges River Urban Sustainability Initiatives, which are funded from the NSW Government's Environmental Trust, in association with the GRCCC.

Media enquiries: David Kuhn, LGRSI/GRCCC at 9330 6010

Appendix 10 LNT media release and four wheel drive brochure

MID GEORGES RIVER SUSTAINABILITY INITIATIVE:
LEAVE NO TRACE 4WD AND TRAIL BIKE RIDERS MATERIALS.

Wednesday 30 March 2011

Leave No Trace Australia (LNTA) have developed minimal impact education resources for 4Wheel Drive enthusiasts and Trail Bike riders in the Greater Sydney area as part of the Mid Georges River Sustainability Initiative (MGRSI).

The MGRSI, funded by the NSW Environmental Trust, is a group that includes Bankstown and Sutherland Councils, NSW National Parks and Wildlife Service and the Georges River Combined Councils Committee.

LNTA's Executive Director Cameron Crowe said motorised recreation was a popular pastime for a growing number of people and it was important that environmental and social impacts were minimised so that people were able to continue to recreate without degrading the environment or impinging on other people's enjoyment.

"A number of factors are critical issues for 4WD and Trail Bike enthusiasts to maintain access to areas they currently enjoy" he said.

"Noise is the number one issue for trail bike riders in terms of social impacts, with biosecurity, fire, erosion, and waste disposal being key environmental issues."

"Campfire escapes have resulted in major wild-fire incidents in other parts of Australia, and Phytophthora dieback spread via soil being transported in warm, wet conditions another major issue."

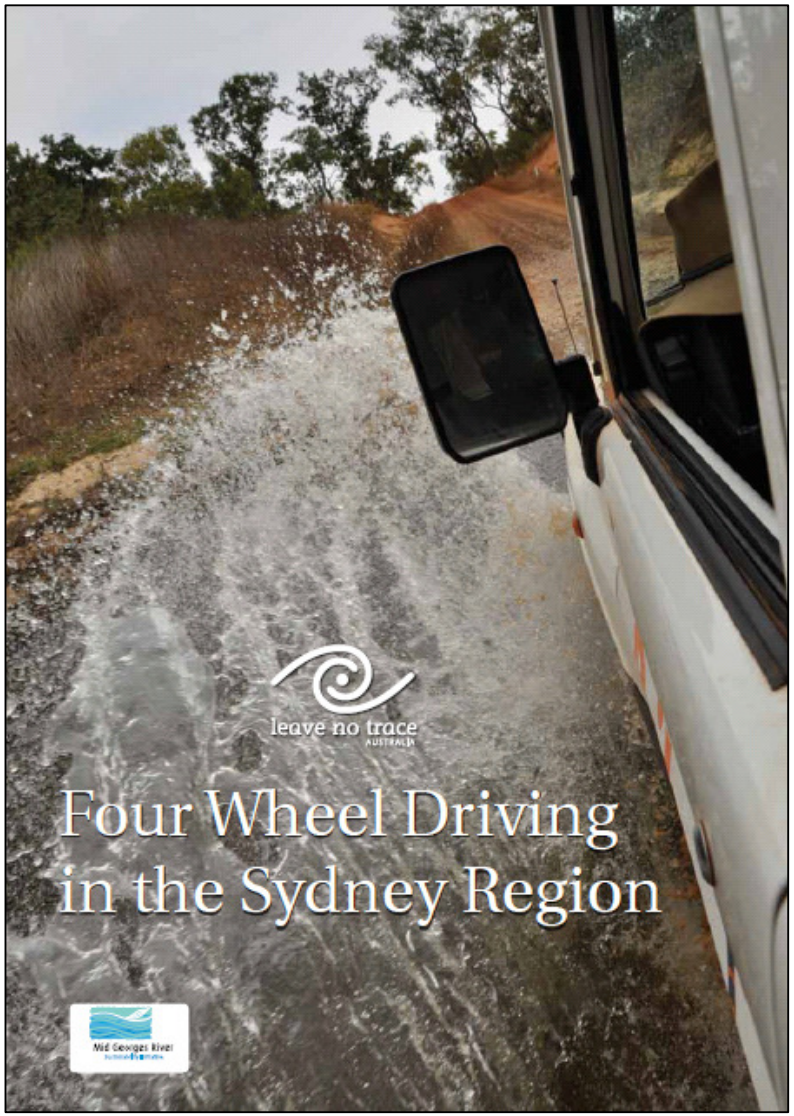
"The emergence of Myrtle Rust in 2010 in New South Wales has already impacted on access to sites for recreation with Hornsby Council temporarily closing tracks to walkers and numerous instances of spread being recorded from activity in the bush" he said.

The production of these materials will provide much needed education for people seeking to access the region for motorised recreation.

With continued population growth and a range of land management challenges to accommodate a variety of activities across the greater Sydney region, it is important that all groups and individuals continue to improve their knowledge and minimal impact skills to ensure a healthy environment available for all to use.

END

Contact:
Cameron Crowe
Executive Director
Leave No Trace Australia
0438 501112



Four Wheel Driving in the Sydney Region

Four wheel driving is a great way to see parts of Australia that many people never get the chance to experience. Unfortunately, if not done right, it also has the ability to do irreversible damage.

This brochure provides you with information about where you can go in the Greater Sydney Region to enjoy your driving. It provides you with the knowledge and skills to reduce the impact of your activities.

Leave No Trace is an educational, non-profit organisation dedicated to the responsible enjoyment and active stewardship of the outdoors by all people.

Through partnerships, LNTA works with motivated individuals, groups, non-profits, industry and governmental agencies to effectively reduce impacts on lands used by the public.

leave no trace

SYDNEY'S BUSHLAND

We live in a remarkable place. Although the Sydney Basin is the most populated and developed area in Australia, it also contains some very important and beautiful natural and cultural areas.

Many of these natural areas are threatened. Weeds, inappropriate fire regimes, 'dieback', feral and domestic animals and some recreation activities, such as four-wheel-driving, mountain biking and hiking, all impact on these places.

We can all do something when we are out and about to help protect our remaining bushland areas and ensure they are there for others to enjoy in the future.

4WD MAINTENANCE

Maintain your vehicle to ensure excellent performance – this includes cleaning the vehicle regularly.

A clean vehicle not only looks good, but also means you aren't spreading weeds or plant disease.

WEEDS

Weeds are considered one of the greatest threats to the Australian environment and cost Australia millions of dollars each year to control and manage. One of the main ways weeds spread is on our tyres – seeds and other reproductive material are carried on mud and spread quickly across the landscapes we ride.

Activities that impact on our native vegetation such as making new vehicle tracks, or eroding existing tracks, also make it easy for weeds to invade.

Please make sure you stick to existing roads and clean your vehicle thoroughly before and after heading bush.

'PHYTOPHTHORA DIEBACK'

Are you a carrier? Phytophthora *(pronounced fy-TOFF-thora)* is a type of mould that occurs in the soil and is a devastating plant killer. It is most active in warm, wet conditions and can be transported in the mud encrusted to your tires and undercarriage.

Phytophthora attacks through the roots, killing many different species of plants and is spreading across the region. Mass death of vegetation destroys the food and shelter required by many animals.

MYRTLE RUST

Myrtle Rust is a newly described fungus in Australia - detected in northern NSW in 2010. It is already widespread along the eastern coast. This rust is a serious pathogen which affects Australian native plants like bottle brushes, tea trees and eucalypts. There is evidence it can also be spread through bush by brushing on clothing, so practice good hygiene. Report it if you notice it and practice good hygiene (clean gear etc).

Report any suspected detection to the Exotic Plant Pest Hotline 1800 084 881.

www.dpi.nsw.gov.au/biosecurity/plant/myrtle-rust#What-can-I-do

EROSION

Much of the soil in the Sydney Basin is highly erodible - that means it is easily worn or washed away once the vegetation is removed.

This soil then ends up in our creeks, rivers and harbours making them dirty and brown and inhospitable to natural life. The muddier water impacts on native fish and other aquatic life that find it difficult to survive in poorer water quality. It also leads to changes in the river beds, and can impact on navigability.

FIRE

Fire can have devastating effects on life and property. Whilst it is an important part of the Australian environment, it must be carefully managed to meet social, legal and environmental requirements. Accidental lighting of bushfires must be minimised.

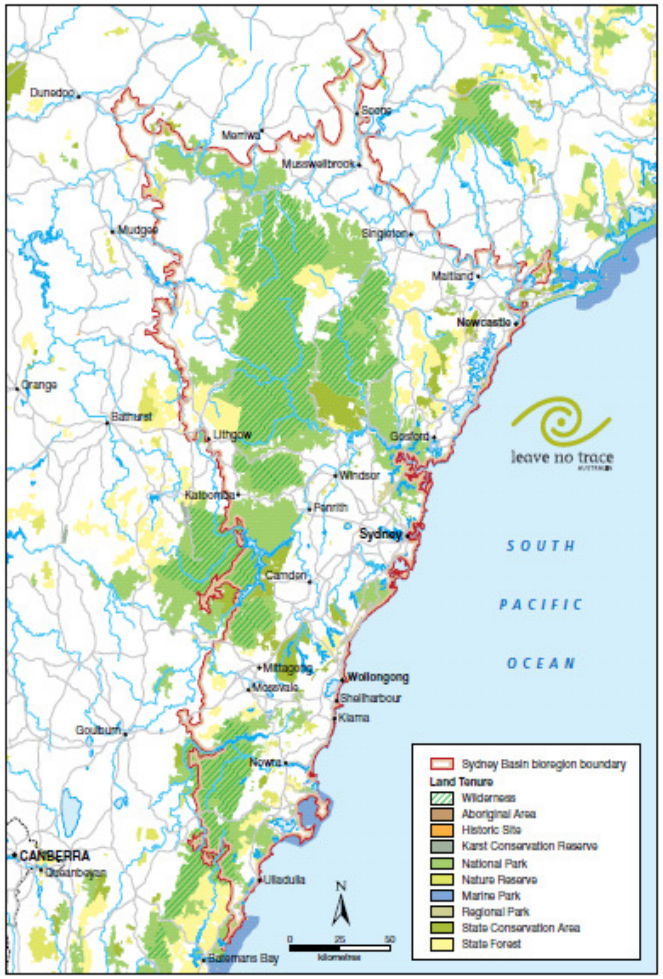
Cigarette butts are a known cause of fires in Australia – don't flick them. Make sure the cigarette is 'out' and place it in a rubbish container (e.g. a film canister).

Glass bottles littered in bushland can easily start fires - take your rubbish home with you.

If lighting a cooking fire check and **obey all fire bans and regulations** - take extreme care and make sure you completely extinguish it before you leave. You are legally responsible for the consequences of your fire.

Please follow the principles of *Leave No Trace* and:

- Keep to established tracks and don't widen them,
- Don't clear or drive over vegetation,
- Drive with the aim of minimal soil disturbance.



7 PRINCIPLES OF LEAVE NO TRACE

1. PLAN AHEAD AND PREPARE

» Before you leave home, research the area in which you wish to travel.

» Obtain permission from the landholder or the land management agency and make sure you know all local regulations.

» Take plenty of drinking water and emergency equipment (including a First Aid Kit, warm clothes and basic shelter).

» Take your recovery tools including Kangaroo Jacks and tow-ropes.

» Notify someone of your planned return time from isolated trips and in an emergency don't leave your vehicle.

» Throw a shovel in the car for bush toileting.

2. TRAVEL AND CAMP ON DURABLE SURFACES

» Do not create new tracks - stay on established ones.

» Slow down to reduce erosion of the track.

» Park your vehicle on durable ground and camp at least 100m away from water.

» Use existing campsites. Good campsites are found not made. Altering a site is not necessary.

3. DISPOSE OF WASTE PROPERLY

» Do not burn or bury rubbish, but pack up and carry all waste with you including food waste. This includes apple cores and orange peels.

» Don't be a tosser – take your cigarettes with you.

» Use an established toilet or take a shovel and bury it.

» Your stream isn't your kitchen sink or shower.....to wash yourself or your dishes, carry water 100 meters from streams and pools and use small amounts of soap.

4. LEAVE WHAT YOU FIND

» Preserve the past: observe but do not touch cultural or historic structures and artefacts.

» Leave rocks, plants and other natural objects as you find them.

» Do not transport firewood as this can spread weed seeds and soil pathogens.

» Clean your vehicle (including tyres) of mud which may contain dieback fungus or invasive weed seeds.

5. MINIMISE THE IMPACT OF FIRE

» Check for fire bans and, if possible, use a fuel stove for cooking rather than a fire.

» If you decide to have a fire, keep them small and use established fire rings.

» Try to minimise the use of fire wood – it is also an important habitat for snakes, reptiles and birds.

» When finished, make sure to put the fire out completely.

6. RESPECT WILDLIFE

» Never approach or feed animals or birds. Feeding wildlife damages their health and alters natural behaviours.

» Control pet dogs at all times or leave them at home.

» Avoid driving at night, dawn or dusk, as this is when animals are most active.

» Slow down and let animals move off the track. If you hit an animal, stop to check if it is alive or has pouch young.

» If needed, call WIRES wildlife rescue service on 1300 094 737.

7. BE CONSIDERATE OF YOUR HOSTS AND OTHER VISITORS

» Know the rules - check with all land-owners for permission to travel across their land and abide by their regulations.

» Read and obey signage. Leave gates as found.

» Help keep sites and tracks good for your mates too – protect the quality of the track and leave no trace!

leave no trace

FOR MORE INFORMATION:

Leave No Trace Australia

P.O. Box 71, Cottesloe, WA. 6911

Ph: (08) 9384 9062

Email: info@LNT.org.au

www.LNT.org.au

Adventure Activity Standards

www.LNT.org.au/adventureactivitystandards/4WD

NSW Forests

http://www.dpi.nsw.gov.au/forests/recreation

Mid Georges River Sustainability Initiative

www.georgesriver.org.au

Appendix 11 MGRSI update for GRCCC

Mid Georges River
Sustainability Initiative

Project update for GRCCC - Thursday 24 February 2011

Yeramba Lagoon

- Bush regeneration and weeding is progressing along Amberdale drainage line, with works due for completion in March
- Corrective services team began regen works at Kennedy St in early January and will continue until June
- A grassed swale at Amberdale Reserve, accompanied by interpretive signage and sandstone sculptures, will be installed in March
- Biological control with the Salvinia weevil is ongoing. National Parks will monitor progress and an additional release may occur in spring.
- Concept design for weir modification draft report has been received and comments were sent back to consultants at the end of January
- New 'dob in a dumper' signs have been installed along Henry Lawson Drive and 'Bin it, don't leave it!' signs are being made for the fishing spot opposite Yeramba Lagoon
- Construction of an Environmentally Friendly Sea Wall along the river in Fitzpatrick Park and opposite the lagoon is due to commence this month

Mill Creek

- On ground works at various sites due to finish in March. This includes stormwater channel works in Alfords Point and Menai, erosion control and track rehabilitation by the Indigenous land management team, and bush regeneration at Barnes Crescent.
- Corrective services team has completed track rehabilitation, erosion control and planting in Sandy Point
- More access restriction locations are being confirmed by SCC and will be installed over the next 2-3 months
- Bushland regulations signage is being produced for problem areas in Alfords Point and Menai
- The Sandy Point to Mill Creek Loop Track has been scoped and bollards will be installed in the coming weeks. Track notes to accompany the walk will be published on Georges River and NPWS websites
- Sites have been selected for inclusion in Sutherland's water quality monitoring program

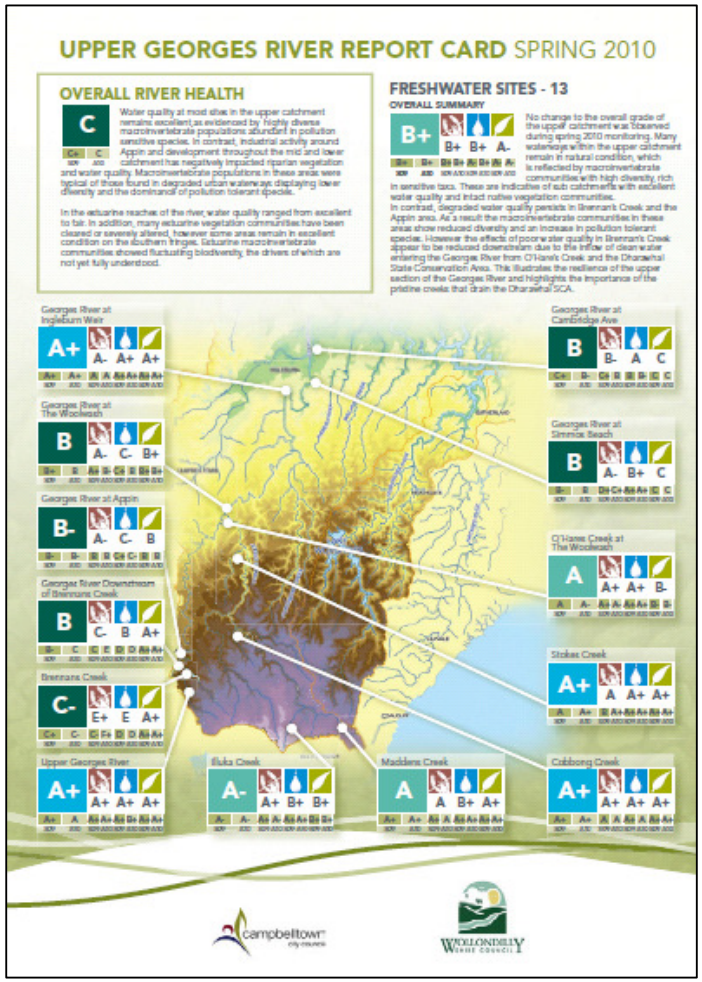
Education

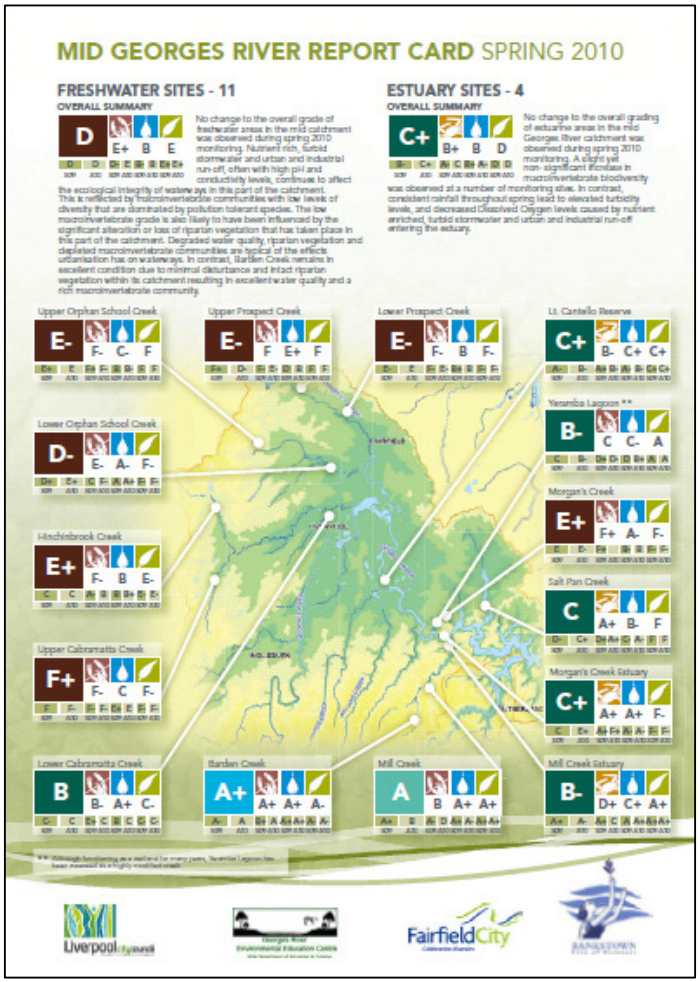
- The Georges River Cruise conference on sustainable water management was held on the 17 February with ~70 guests
- In the Yeramba catchment 17 households are participating in stormwater education by putting "We're protecting Yeramba Lagoon" picket signs in their front gardens, with individual messages like "We wash our car on the grass" "We don't sweep garden waste down the drain" and "We pick up our dog's poo"
- 2011 calendars have been distributed throughout the catchments - one featuring residents and community groups with a connection to Yeramba Lagoon, and the other showcasing images from the Mill Creek photography competition
- Brochures on responsible 4WD and trail bike use are being developed and promoted in conjunction with Leave No Trace. Currently awaiting draft designs.

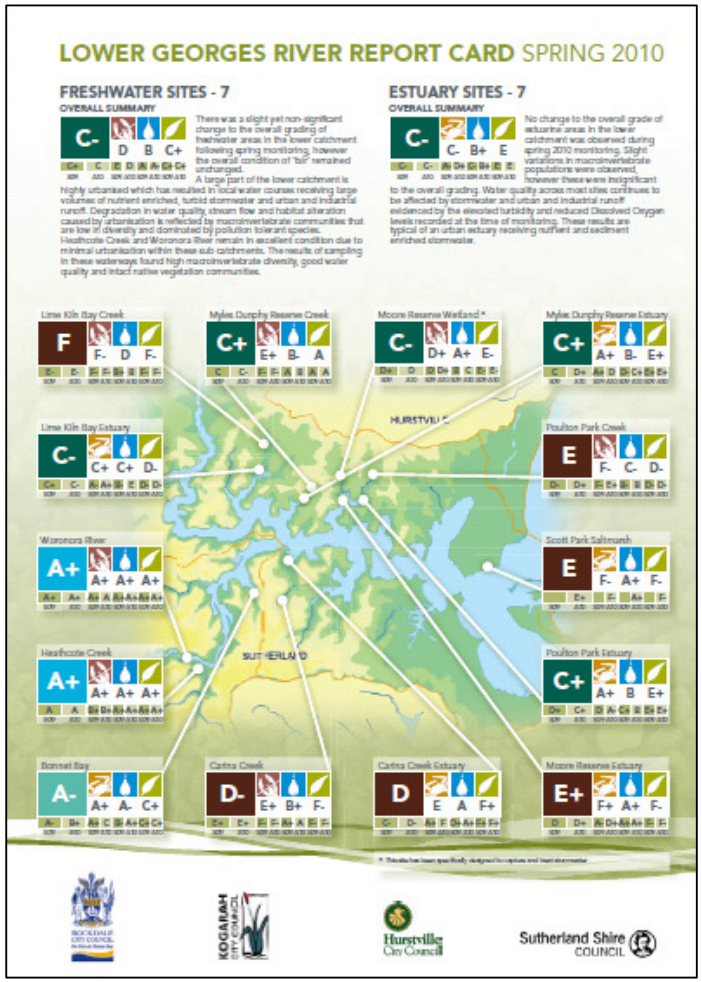
General

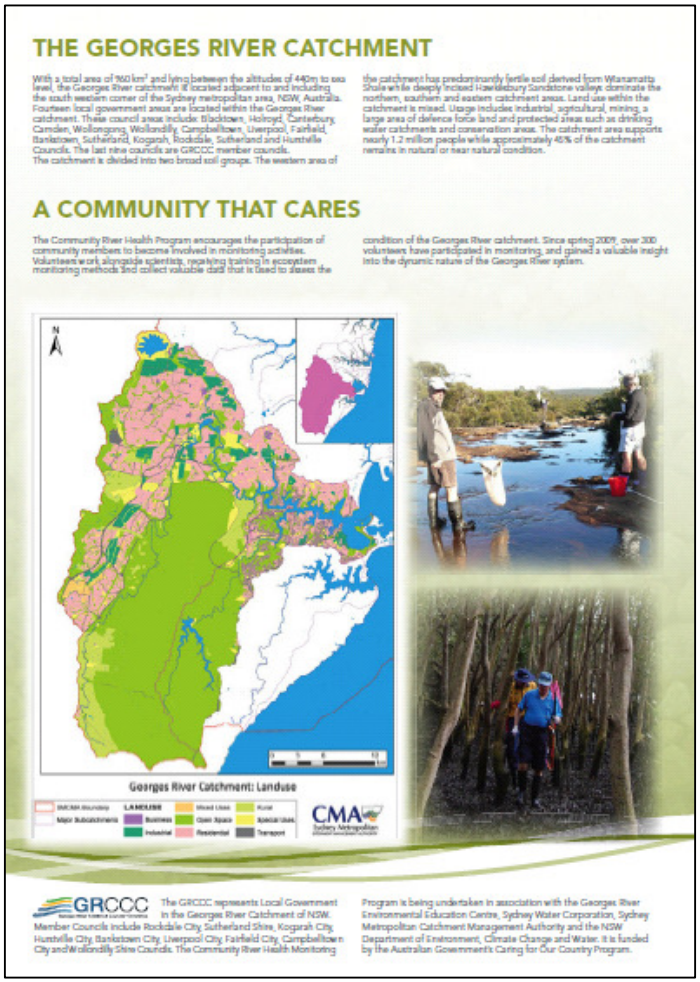
- The Final Project Report is due to the Trust on 20 May.

Appendix 12 River Health report card, spring 2010


UPPER GEORGES RIVER REPORT CARD SPRING 2010
OVERALL RIVER HEALTH
C
Water quality at most sites in the upper catchment remains excellent,as evidenced by highly diverse macroinvertebrate populations abundant in pollution sensitive species. In contrast, industrial activity around Appin and development throughout the mid and lower catchment has negatively impacted riparian vegetation and water quality. Macroinvertebrate populations in these areas were typical of those found in degraded urban waterways displaying lower diversity and the dominance of pollution tolerant species.
In the estuarine reaches of the river, water quality ranged from excellent to fair. In addition, many estuarine vegetation communities have been cleared or severely altered, however some areas remain in excellent condition on the southern fringes. Estuarine macroinvertebrate communities showed fluctuating biodiversity, the drivers of which are not yet fully understood.
FRESHWATER SITES - 13
OVERALL SUMMARY
B+
No change to the overall grade of the upper catchment was observed during spring 2010 monitoring. Many waterways within the upper catchment remain in natural condition, which is reflected by macroinvertebrate communities with high diversity, rich in sensitive taxa. These are indicative of sub catchments with excellent water quality and intact native vegetation communities.
In contrast, degraded water quality persists in Brennans Creek and the Appin area. As a result the macroinvertebrate communities in these areas show reduced diversity and an increase in pollution tolerant species. However the effects of poor water quality in Brennans Creek appear to be reduced downstream due to the inflow of clean water entering the Georges River from O'Hares Creek and the Dharawal State Conservation Area. This illustrates the resilience of the upper section of the Georges River and highlights the importance of the pristine creeks that drain the Dharawal SCA.
Georges River at Ingleburn Weir
A+
Georges River at The Woolwash
B
Georges River at Appin
B-
Georges River Downstream of Brennans Creek
B
Brennans Creek
C-
Upper Georges River
A+
Iluka Creek
A-
Maddens Creek
A
Georges River at Cambridge Ave
B
Georges River at Simmos Beach
B
O'Hares Creek at The Woolwash
A
Stokes Creek
A+
Cabbong Creek
A+
campbelltown city council
WOLLONDILLY SHIRE COUNCIL


MID GEORGES RIVER REPORT CARD SPRING 2010
FRESHWATER SITES - 11
OVERALL SUMMARY
D
No change to the overall grade of freshwater areas in the mid catchment was observed during spring 2010 monitoring. Nutrient rich, turbid stormwater and urban and industrial run-off, often with high pH and conductivity levels, continues to affect the ecological integrity of waterways in this part of the catchment. This is reflected by macroinvertebrate communities with low levels of diversity that are dominated by pollution tolerant species. The low macroinvertebrate grade is also likely to have been influenced by the significant alteration or loss of riparian vegetation that has taken place in this part of the catchment. Degraded water quality, riparian vegetation and depleted macroinvertebrate communities are typical of the effects urbanisation has on waterways. In contrast, Bardten Creek remains in excellent condition due to minimal disturbance and intact riparian vegetation within its catchment resulting in excellent water quality and a rich macroinvertebrate community.
ESTUARY SITES - 4
OVERALL SUMMARY
C+
No change to the overall grading of estuarine areas in the mid Georges River catchment was observed during spring 2010 monitoring. A slight yet non- significant increase in macroinvertebrate biodiversity was observed at a number of monitoring sites. In contrast, consistent rainfall throughout spring lead to elevated turbidity levels, and decreased Dissolved Oxygen levels caused by nutrient enriched, turbid stormwater and urban and industrial run-off entering the estuary.
Upper Orphan School Creek
E-
Upper Prospect Creek
E-
Lower Prospect Creek
E-
Lt Cantello Reserve
C+
Lower Orphan School Creek
D-
Yeramba Lagoon **
B-
Hinchinbrook Creek
E+
Morgan's Creek
E+
Upper Cabramatta Creek
F+
Salt Pan Creek
C
Morgan's Creek Estuary
C+
Lower Cabramatta Creek
B
Bardten Creek
A+
Mill Creek
A
Mill Creek Estuary
B-
Liverpool
Georges River Environmental Education Centre
FairfieldCity


LOWER GEORGES RIVER REPORT CARD SPRING 2010
FRESHWATER SITES - 7
OVERALL SUMMARY
C-
There was a slight yet non-significant change to the overall grading of freshwater areas in the lower catchment following spring monitoring, however the overall condition of 'fair' remained unchanged.
A large part of the lower catchment is highly urbanised which has resulted in local water courses receiving large volumes of nutrient enriched, turbid stormwater and urban and industrial runoff. Degradation in water quality, stream flow and habitat alteration caused by urbanisation is reflected by macroinvertebrate communities that are low in diversity and dominated by pollution tolerant species.
Heathcote Creek and Woronora River remain in excellent condition due to minimal urbanisation within these sub catchments. The results of sampling in these waterways found high macroinvertebrate diversity, good water quality and intact native vegetation communities.
ESTUARY SITES - 7
OVERALL SUMMARY
C-
No change to the overall grade of estuarine areas in the lower catchment was observed during spring 2010 monitoring. Slight variations in macroinvertebrate populations were observed, however these were insignificant to the overall grading. Water quality across most sites continues to be affected by stormwater and urban and industrial runoff evidenced by the elevated turbidity and reduced Dissolved Oxygen levels recorded at the time of monitoring. These results are typical of an urban estuary receiving nutrient and sediment enriched stormwater.
Lime Kiln Bay Creek
F
Mylec Dunphy Reserve Creek
C+
Moore Reserve Wetland *
C-
Mylec Dunphy Reserve Estuary
C+
Lime Kiln Bay Estuary
C-
Poulton Park Creek
E
Woronora River
A+
Scott Park Saltmarsh
E
Heathcote Creek
A+
Poulton Park Estuary
C+
Bonnet Bay
A-
Carina Creek
D-
Carina Creek Estuary
D
Moore Reserve Estuary
E+
HURSTVILLE
SUTHERLAND
Rockdale City Council
Kogarah City Council
Hurstville City Council
Sutherland Shire Council


THE GEORGES RIVER CATCHMENT
With a total area of 960 km² and lying between the altitudes of 440m to sea level, the Georges River catchment is located adjacent to and including the south western corner of the Sydney metropolitan area, NSW, Australia. Fourteen local government areas are located within the Georges River catchment. These council areas include: Blacktown, Holroyd, Canterbury, Camden, Wollongong, Wollondilly, Campbelltown, Liverpool, Fairfield, Bankstown, Sutherland, Kogarah, Rockdale, Sutherland and Hurstville Councils. The last nine councils are GRCCC member councils.
The catchment is divided into two broad soil groups. The western area of the catchment has predominantly fertile soil derived from Wianamatta Shale while deeply incised Hawkesbury Sandstone valleys dominate the northern, southern and eastern catchment areas. Land use within the catchment is mixed. Usage includes industrial, agricultural, mining, a large area of defence force land and protected areas such as drinking water catchments and conservation areas. The catchment area supports nearly 1.2 million people while approximately 46% of the catchment remains in natural or near natural condition.
A COMMUNITY THAT CARES
The Community River Health Program encourages the participation of community members to become involved in monitoring activities. Volunteers work alongside scientists, receiving training in ecosystem monitoring methods and collect valuable data that is used to assess the condition of the Georges River catchment. Since spring 2009, over 300 volunteers have participated in monitoring, and gained a valuable insight into the dynamic nature of the Georges River system.
N
Georges River Catchment: Landuse
CMA
GRCCC
The GRCCC represents Local Government in the Georges River Catchment of NSW. Member Councils include Rockdale City, Sutherland Shire, Kogarah City, Hurstville City, Bankstown City, Liverpool City, Fairfield City, Campbelltown City and Wollondilly Shire Councils. The Community River Health Monitoring Program is being undertaken in association with the Georges River Environmental Education Centre, Sydney Water Corporation, Sydney Metropolitan Catchment Management Authority and the NSW Department of Environment, Climate Change and Water. It is funded by the Australian Government's Caring for Our Country Program.

Appendix 13 Photos