5 Biodiversity

The Great Lakes supports a variety of unique landscapes and vegetation communities as well as a diversity of plants and animals. The local economy relies heavily on tourism and primary production, which depend upon a healthy and functioning environment. Therefore, the conservation of the regions' biodiversity is critical.

It is increasingly recognised that the natural environment performs essential biological and ecosystem services such as water quality protection. However, human impacts are placing an increased pressure on the variety of species present and the integrity of habitats within the LGA. Land development and clearing particularly are significant threats to our native plants and animals. Unless these impacts are managed appropriately the extent of biodiversity currently present in the region will decrease. Ultimately this will impact on the economy, the wellbeing of residents as well as the regions' aesthetics and general appeal.

Figure 5.1 Biodiversity refers to the variety of species, individuals and landscapes in an area

5.1 Native vegetation

Introduction

The extent and integrity of natural vegetation is, along with water quality, the most important environmental indicator for the Great Lakes LGA. Adequate native vegetation representation across the LGA is associated with significant direct and indirect environmental benefits, along with a range of socio-economic opportunities and values. Conversely, the degradation of native vegetation beyond appropriate thresholds is known to result in significant declines in biodiversity, water quality, land quality (eg. salinity, rising watertables, erosion), and subsequently affect land productivity and critical social and economic resources. It has been demonstrated that vegetation decline can impinge seriously on attributes of the landscape that underpin the sustainability and viability of the entire Great Lakes area and permanently alter the values that the community regard as being important. Land clearing also worsens the carbon balance and contributes to global warming.

Monitoring

No comprehensive, detailed accurate and appropriately-scaled account of the vegetation of the entire Great Lakes LGA has been collated. In 2003, mapping of vegetation communities was produced by Council for the eastern half of the LGA, but this mapping has been subsequently determined to be of limited scale and accuracy to assist local-scale, on-ground decision-making. Consequently, it is a priority to undertake vegetation community description and mapping across the LGA and processes and methods are being implemented in this regard.

With regards to vegetation change, no agency has collated a base map of vegetation of the LGA and no agency routinely monitors rates of vegetation change in a meaningful manner. However, these are both critically important to strategic, proactive and integrated natural resource management and biodiversity conservation. Council intends to address this deficiency through a defined vegetation monitoring protocol to be implemented as part of subsequent SoE reporting processes.

A secondary component of this indicator requires that Council monitor and report on approved native vegetation clearing operations within the LGA. This includes native vegetation cleared under approval through the Hunter Central Rivers Catchment Management Authority under the *Native Vegetation Act* 2003, clearing under approval through the OEH or clearing by Council under the *Environmental Planning and Assessment Act* 1979. This indicator also includes vegetation (both native and exotic) cleared and replaced through Council's Tree Preservation Order.

Finally, the issue of unauthorised clearing is also considered and reported on. This is restricted to an analysis of the number of breaches investigated by the Office of Environment and Heritage.

Figure 5.1.1 Important vegetation - a healthy and functioning riparian zone on the Boolambayte Creek, Boolambayte

Results

Until a formal protocol for local vegetation mapping and monitoring is developed, data from Hunter REMS regional mapping project is all that will be provided as an overall indicator of the extent of vegetation in the LGA.

Table 5.1.1 Extent of vegetation across Great Lakes LGA

LGA	LGA area (ha)	Veg (ha)	% Veg
Great Lakes	337414	243929	72.29

Source: Hunter REMS 2006

Information has been sourced from the Catchment Management Authority regarding clearing approved under the *Native Vegetation Act* 2003 within the Great Lakes LGA for the SoE reporting period. This information was provided by the Department of Natural Resources previously, but this department has since been dissolved.

Table 5.1.2 Clearing of Native Vegetation Consents by CMA and OEH

Clearing Type	09/10 (ha)	10/11 (ha)	11/12 (ha)
Clearing	0	0	0
Silvicultural/ Selective Logging/ Private Native Forestry	No data	No data	No data
TOTAL	0	0	0

The number of trees removed and replaced through Council's Tree Preservation Order is as follows:

Table 5.1.3 Trees removed and replaced through TPO and Greening Strategy process

	09/10	10/11	11/12
Number trees removed	507	488	No data
Number native	210	159	No data
Number trees refused removal	298	310	No data
Number planted as offset	770	605	No data

Source: Great Lakes Council

In relation to clearing associated with developments approved by Great Lakes Council, some 3.64 hectares of native vegetation was cleared during the reporting period, as shown by the table below. 51.25 hectares of native vegetation has been cleared since the first reporting period 09/10.

Table 5.1.4 Clearing of Native Vegetation associated with DA Referrals

Clearing of Native Vegetation associated with DA Referrals	09/10 (ha)	10/11 (ha)	11/12 (ha)
Littoral Rainforest*	0	0	0
Cabbage Palm Forest	0	0	0
Riparian Forest*	0	0	0
Swamp Mahogany Swamp Forest	0	1.42	0
Swamp Mahogany/ Paperbark Swamp Forest*	0	0	0
Broad-leaved Paperbark Swamp Forest*	0	0	0
Swamp Oak Swamp Forest*	0	0	0
Swamp Oak/ Paperbark Swamp Forest*	0	0	0
Blackbutt Grassy Open Forest	0	0	0
Blackbutt Coastal Sands Open Forest	0.55	11.64	0
Blackbutt/ Broad-leaved Paperbark Forest	0	0	0
Blackbutt/ Tallowwood Grassy Open Forest	0.57	0.20	0.68
Tallowwood Moist Open Forest	0	0.06	0
Tallowwood/ Grey Gum Dry Open Forest	0.10	0.12	0.50
Flooded Gum or Flooded Gum/ Tallowwood Moist Forest	0.30	0	0.08
Grey Gum Dry Open Forest	0	0	0
Red Mahogany/ Broad-leaved Paperbark Swamp Forest*	0	0	0.15
Stringybark Open Forest	0	0	0
Spotted Gum Open Forest/ Woodland	0.10	0.20	0
Spotted Gum/ Ironbark/ White Mahogany/ Grey Gum Open Forest	7.96	4.86	0.76
Ironbark or Ironbark/ Forest Red Gum/ Spotted Gum Forest	0	0.18	0
Forest Red Gum Forest	0.06	1.30	0.75
Cabbage Gum/ Rough-barked Apple Open Woodland*	0	0	0
Smooth-barked Apple Open Woodland	0	0	0
Smooth-barked Apple/ Red Mahogany Dry Open Forest	0	0.15	0
Smooth-barked Apple/ Sydney Peppermint/ Bloodwood Dry Open Forest	1.68	0.15	0
Banksia	0	0	0
Scribbly Gum Open Forest	0.05	8.00	0.05
Red Bloodwood Open Woodland	0	0	0
Heathland	0	0	0
Disturbed Shrubland	0.68	7.19	0
Coastal Grassy Headland*	0	0	0
Sand Ridge/ Dune	0	0	0
Mixed Open Forest/ Woodland Type	0.24	0	0
TOTAL	12.29	35.320	3.64

* Possible Endangered Ecological Community on the Threatened Species Conservation Act

Source: Great Lakes Council

Table 5.1.5 Numbers of Native Trees Cleared from DA Referrals in urban Hawks Nest/ Tea Gardens (of significance due to the endangered Koala population)

Numbers of Native Trees Cleared from DA Referrals in Hawks Nest/ Tea Gardens (of significance due to the endangered Koala population)	09/10	10/11	11/12
Blackbutt	0	0	12
Red Mahogany	0	0	0
Smooth-barked Apple	0	0	0
Red Bloodwood	0	0	0
Swamp Mahogany*	2	0	0
Bangalay*	0	0	0
Flooded Gum*	3	0	0
Spotted Gum	0	0	0
Broad-leaved Paperbark	0	0	0
Native trees – unspecified	9	1	3
TOTAL	14	1	15

* Preferred local Koala food tree species

Source: Great Lakes Council

Illegal or unauthorised clearing remains a key issue for Council and pertinent State authorities. No Data has been received from OEH concerning investigation or prosecutions for illegal clearing activities.

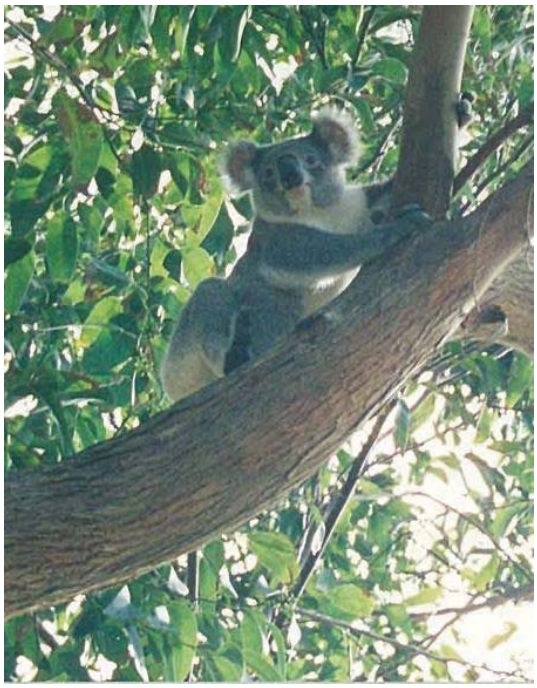


Figure 5.1.2 The clearing and fragmentation of vegetation for development in Hawks Nest and Tea Gardens is the greatest threat to the local endangered koalas

Response and future directions

As stated in the previous comprehensive SoE, it remains fundamental that Council, within its areas of influence, adequately manages, conserves and where required restores native vegetation and protects the landscape from any significant depletion of native vegetation representation across the LGA. Council must also recognise that in some localities and community types, native vegetation restoration is clearly very important. As such, Council should recognise and seek to achieve the directives of the *Native Vegetation Act* 2003, which include:

- Ending broad scale clearing unless it improves or maintains environmental values
- Protecting high conservation value vegetation
- Restoring and rehabilitating native vegetation

Great Lakes Council currently restores and replants native vegetation in association with Landcare, Coastcare, landholders, in Parks and Reserves and through street-scaping. It is hoped that these efforts can be reported in future SoE reports as an indication of Council's response to pressures on Native Vegetation. Additionally, there is a need to develop policy to ensure that these restoration efforts are made equal to or in excess of the vegetation lost through the TPO and DA consent processes so that we see a net gain in Native Vegetation across the LGA rather than an ongoing or cumulative net loss.

Figure 5.1.3 Coast Care volunteer planting native trees

The issue of native vegetation representation and extent in the Great Lakes LGA is one of the most fundamental and important indicators. However, the usefulness and accuracy of data is limited by several key and fundamental actions. These are a high priority for Council to address, and comprise:

- Mapping of the vegetation across full extent of the LGA such that a single picture of vegetation is accurately compiled in accordance with valid classification schemes and methods; and
- Development of resources and a protocol for monitoring vegetation change via analysis of imagery for each comprehensive SoE report.

Following collation of the baseline data of vegetation across the entire LGA, the Natural Systems and Estuaries Branch shall develop, exhibit, adopt and implement a Vegetation Strategy.

It is currently proposed that for every Comprehensive SoE (once every four years), Council shall obtain updated aerial photography or appropriate resolution satellite images for the entire LGA. This imagery shall be analysed both remotely and visually to identify where loss and changes to natural vegetation type, structure or extent have occurred. Ground-truthing would also be required. The vegetation mapping shall be updated on the basis of this investigation and a concise report shall describe the changes to vegetation type and extent over the four-year assessment period. This information is critical in that it represents an LGA-wide analysis of cumulative change and may allow the identification of vegetation communities and localities suffering from the greatest clearing pressures.

The data generated would be useful for strategic and development assessment planning and contribute to conservation planning. It should be used to amend and adopt refined priorities through Council's Biodiversity Conservation Framework.

Table 5.1.6 Identified needs for action regarding vegetation

Identified Need for Action	Recommended key projects or actions for consideration in next year's Management Plan	Relevant Council section	Are there existing resources for action	Commence by/timeframe
Complete vegetation mapping and description for the Great Lakes LGA	Vegetation Strategy (refine, update and implement)	Natural Systems	Partial	Ongoing
Develop a monitoring protocol and implement the monitoring of vegetation changes through satellite or aerial imagery and ground truthing	Develop a Vegetation Monitoring Protocol	Natural Systems	Partial	Within 2yrs
Prepare and adopt a Biodiversity Conservation Strategy and Framework	Biodiversity Conservation Framework (develop and adopt)	Natural Systems	Partial	Within 2yrs
Develop and expand biodiversity education initiatives and activities	Biodiversity education (develop and expand initiatives)	Natural Systems	Partial	Ongoing
Devise and implement an effective DA assessment protocol that includes adequate conditions of consent, flora and fauna survey guidelines and development design	Develop a policy/ direction for Development Assessment advice	Natural Systems	Partial	Ongoing
Create a Landscaping Code that reflects proposed outcomes of Council's Greening Strategy	Develop Landscaping Code	Parks and Recreation	Partial	Immediate
Implement an LGA wide program of acquiring high resolution Satellite Imagery on a four yearly basis	Acquire Satellite Imagery	Council wide	Partial	Within 2yrs

5.2 Conserved Land

Introduction

Public and formal private conservation provides for the protection of biodiversity, the recovery of threatened species, the protection of scenic amenity, as well as a range of social, recreational, economic and educational/ scientific outcomes. Council, amongst other relevant agencies, is required to strive towards the achievement of a comprehensive, adequate and representative reserve system, under the NSW Biodiversity Strategy and the Australian Natural Heritage Charter.

In this regard, there is a need to monitor the extent, and guide with local knowledge, the strategic additions of land to the public conservation estate as well as privately conserved lands.

Monitoring

Great Lakes Council shall collate and maintain a map of conserved land throughout the LGA and differentiate between the conservation mechanisms that apply to such lands. Furthermore, Council shall review the additions of land to conservation during each reporting period. Such information shall contribute to strategic and targeted biodiversity conservation frameworks.

There is a range of levels and security associated with the varying conservation instruments. This includes (at the most secure level), the public conservation estate (National Park, Nature Reserves, State Conservation Areas) and binding private land conservation instruments that are on-title and operate in perpetuity (VCA, Registered Property Agreement, Conservation Trust Agreement). At the lowest level of security, there are non-binding conservation agreements that apply to private landholdings. However, these can be altered or withdrawn at any time and provide no real security. As such, non-binding conservation is not considered in the overall summary of conserved lands.

Results

Table 5.2.1 Conserved Land in the Great Lakes LGA. Land Conserved in the Public Conservation Estate (ha)

Land Conserved in the Public Conservation Estate (hectares)	09/10 (ha)	10/11 (ha)	11/12 (ha)
National Parks (7)	66,499	66,499	66,499
Myall Lakes National Park	48,183	48,183	48,183
Wallingat National Park	6,544	6,544	6,544
Ghin-Doo-Ee National Park	4,809	4,809	4,809
Barrington Tops National Park (part)	2,693	2,693	2,695
Karuah National Park	2,691	2,691	2,691
Booti Booti National Park	1,536	1,536	1,536
Gir-um-bit National Park	43	43	43
Nature Reserves (16)	4,894	5,529	5,529
Karuah Nature Reserve	2,743	2,743	2,743
Darawank Nature Reserve	776	1,200	1,200
Coolongolook Nature Reserve	202	202	202
Corrie Island Nature Reserve	164	164	164
Minimbah Nature Reserve	130	341	341
Smiths Lake Nature Reserve	24	24	24
Seal Rocks Nature Reserve	2	2	2
Bull Island Nature Reserve	1	1	1
Monkerai Nature Reserve	1	1	1
Wallis Island Nature Reserve	586	586	586
Regatta Island Nature Reserve	111	111	111
Mills Island Nature Reserve	58	58	58
Yahoo Island Nature Reserve	51	51	51
Bandicoot Island Nature Reserve	29	29	29
Flat Island Nature Reserve	9	9	9
Durands Island Nature Reserve	7	7	7
State Conservation Areas (3)	713	713	713
Black Bulga State Conservation Area	516	516	526
Karuah State Conservation Area	71	71	71
Bulahdelah State Conservation Area	126	126	126
Council owned and managed Open Space- natural areas	516	516	918
Land Acquired for Conservation (not gazetted)	773	52	52
TOTAL	73,395	73,309	73,711

Source: OEH/ Great Lakes Council

Table 5.2.2 Land Conserved in Binding Private Land Covenants

Land Conserved in Binding Private Land Covenants (Hectares)	09/10 (ha)	10/11 (ha)	11/12 (ha)
OEH Voluntary Conservation Agreements (VCA) (1)	39	98	98
PVP Clearing Offset Area or Incentive Area	No data	No data	No data
CMA/ DIPNR Registered Property Agreements (14)	496	496	496
DEH Conservation Agreement (0)	-	0	0
Nature Conservation Trust Conservation Trust Agreement (0)	-	0	0
Acquisition by Conservancy Agencies (Australian Wildlife Conservancy, Bush Heritage Trust, Earth Sanctuaries, Birds Australia, etc) (0)	-	0	0
Community Title Conservation Lots (-)	342	342	342
S88B or s88E Instruments/ Covenants over Private Land for Conservation (-)	No Data	No data	No data
TOTAL	877	936	936

Source: OEH/ Great Lakes Council

Table 5.2.3 Land in Non-binding Private Land Covenants (hectares)

	10/11	11/12
OEH Wildlife Refuge (WR) (9)	10 * 8228.59 ha	10 * 8228.59 ha
OEH Management Contract(MC) (0)	2 16 ha	2 16 ha
Land for Wildlife (0)	No Data	No Data
CMA Management Contract (0)	12	12
TOTAL	8244.59 ha	8244.59

* Currently 10 WRs proclaimed in other years not in.

* MCs under the NVC Act current during

Source: OEH

Table 5.2.4 Other Conservation (hectares)

	09/10 (ha)	10/11 (ha)	11/12 (ha)
Critical Habitat Declarations (0)	0	0	0
SEPP14 Coastal Wetlands	12,999	12,999	12,999
SEPP26 Littoral Rainforest	167	167	167
Environmental Protection Zones (Great Lakes LEP zones 7a-f)	12,489	12,656	12,656
Marine Park Sanctuary zones	17,631	17,631	17,631

Source: OEH/ Great Lakes Council

Table 5.2.5 Summary of Conserved Lands

Conservation Category	Binding Conservation (Public and private) Area (ha)	Binding Conservation Percentage of LGA (337,300ha)
Conservation Agreements (CA)	2 95.72 ha In perpetuity	0.028%
Registered Property Agreement (RPA)	11 390 ha In perpetuity	0.115%
	3 95 ha Term	0.028%

* Currently 2 CAs – Wards River Rainforest and Wirra Willa. Wards River CA established in.

* RPAs under the NVC Act current during

Source: OEH

Figure 5.2.1 Landholders can place portions of their land under conservation agreement to help preserve biodiversity

Summary and future direction

While there is a relatively accurate picture of the extent of conserved land in the LGA (which is presently 28% of the LGA), there is a very incomplete picture of the biodiversity that is present within the reported formal conservation areas of the LGA, which hinders the local analysis of the reservation status of individual species, vegetation communities and ecosystem types across the Council area. Further, the conservation estate is below the threshold level argued by some scientists, of 30%, and thus cannot be seen to be comprehensive, adequate or representative.

There are also some limitations concerning the completeness of the reported area of conserved land. This is due to the difficulties encountered in compiling and sharing data across a number of different government agencies and a range of different privacy and access provisions.

The SoE report has established the need for a Great Lakes Protected Area Network/ Strategy to be established to address these issues and to guide and report on additions to the conserved land estate over time. This group would also provide input to the wider Biodiversity Conservation Framework. Local Council is an appropriate agency to manage and administer the concept of a Protected Area Network for the LGA. Obviously, there are a range of other agencies and stakeholders also involved, including the Hunter/ Central Rivers CMA and OEH (who have responsibility for managing the public conservation estate). The Protected Area Network/ Strategy would enable wider data sharing and cooperation between these relevant conservation agencies and establish and pursue conservation mechanisms, areas and targets. The terms of this strategy should be established as part of the development of the SoE reporting process.

Table 5.2.6 Identified needs for action regarding conserved land

Identified Need for Action	Recommended key projects or actions for consideration in next year's Management Plan	Relevant Council section	Are there existing resources for action	Commence by/timeframe
Identify, develop and implement a Great Lakes Protected Area Network and Strategy, in association with relevant agencies (CMA, OEH, DoP) to facilitate data sharing and strategic biodiversity conservation reference areas, mechanisms and targets.	Great Lakes Protected Area Strategy (develop)	Natural Systems	Partial	Within 2yrs
Council conduct an audit of its land to identify, zone and manage all important Council bushland reserves for effective and appropriate conservation.	Great Lakes Protected Area Strategy (develop)	Natural Systems/ Parks and Recreation	Partial	Within 2yrs

5.3 Corridors

Introduction

Land use for the purpose of agriculture, urban development and many other changes to the natural environment has greatly reduced the amount of habitat available to wildlife. The fragments of natural vegetation that remain are often small and isolated from one another by open pasture or urban development. Such fragmentation can act as a significant barrier to wildlife movement. As most wildlife need to traverse the landscape when foraging, dispersing, recolonising or migrating, the availability of secure movement avenues of vegetation cover is very important. It is widely recognised that wildlife in a habitat 'island' may have insufficient area of adjacent habitat to forage in, or disperse along. This can lead to the vulnerability of some species to catastrophes such as disease and bushfire, and to gradual changes like inbreeding and variations in climate.

Habitat corridors, or strips of natural vegetation connecting 'island' habitats, have been identified as a means of re-connecting isolated populations. A system of corridor links is more likely to sustain wildlife populations throughout the fluctuations and catastrophes that they inevitably undergo. Thus, habitat corridors can increase the value of existing isolated habitats. Further, habitat corridors have a range of social and economic benefits.

Monitoring

The Office of Environment and Heritage (OEH) has modelled fauna corridors across the north coast of NSW, including the Great Lakes LGA. This modelling provides the only current data pertaining to the identification and mapping of fauna corridors strategically across the LGA. This modelling did not consider non-forest species (e.g. wetland fauna) and was not responsive to land tenure and property boundaries. Also, as it has not been confirmed through detailed local analysis and refined, such data cannot realistically be adopted in its present form, but does constitute an important resource on which to base local or LGA wide corridor strategies and contribute to DA and strategic planning. The SoE process is important to monitor the progress in identifying, mapping and conserving/ restoring fauna corridors in a strategic and targeted manner across the LGA.

Results

The names of the 70 modelled corridors of the LGA that have been identified by OEH have been published in a previous comprehensive SoE. There has been no specific further refinement or development of wildlife corridor knowledge, conservation or planning in the LGA since the publishing of the key regional corridors project. Consequently, no additional results can be provided for this SoE. It is hoped that works to refine and update this mapping for the highest priority corridors can be strategically commenced in the near future. This may include and/ or benefit from the technical assistance of the Hunter Councils Environment Division.

Figure 5.3.1 Residential and development and clearing for agriculture leads to fragmentation of habitat vegetation

Summary and future direction

There is a need for Council, in combination with relevant agencies, to implement the appropriate scale revision of corridor studies and commence to implement a proactive, integrated corridor strategy. This might include refinement and mapping and ultimately involve restoration/ revegetation and private land conservation through incentives. Until such time as the key habitats and corridors program is refined and updated with a local emphasis and included in statutory plans, the information referred to in this indicator would remain advisory only. There is a clear need to resolve and consider local corridor planning programs across key areas of the LGA and for the highest priority corridor links, such as the Myall Lakes to Wallingat link.

Table 5.3.1 Identified needs for action regarding corridors

Identified Need for Action	Recommended key projects or actions for consideration in next year's Management Plan	Relevant Council section	Are there existing resources for action	Commence by/timeframe
Develop and implement an integrated corridor strategy in partnership with relevant agencies to identify, zone, conserve, manage and where required restore and reinstate wildlife corridors in the LGA	• Great Lakes Protected Area Strategy (develop) • Vegetation Strategy (refine, update and implement)	Natural Systems	Partial	Within 2yrs

5.4 Noxious and environmental weeds

Introduction

Invasion by weeds is one of Australia's most serious and expensive land degradation problems. A weed is generally characterised as a plant growing where it is not wanted or where it was not originally present. The more serious weeds in the Great Lakes Local Government Area (LGA) are considered as either weeds of national significance, environmental or noxious weeds. The term environmental weed refers to weeds that have the potential to affect the integrity of local bushland whereas noxious weeds are declared under the Noxious Weeds Act 1993, as any plant which causes serious economic loss to agriculture, or has a detrimental affect on humans, animals or the environment. A list of Weeds of National Significance (WoNS) has been published by the Australian Weeds Committee National Initiative. The WoNS list has recently undergone review and 12 new and emerging national threats have been added. A list of WoNS weeds is available from http://www.weeds.org.au/WoNS/

The *Noxious Weeds Act 1993 №11* and Weed declaration lists have recently undergone review. Some significant changes have been made to the act to give Local Control Authorities (LCA's) more power to enforce certain functions of the act. Details of these changes can be found at http://www.legislation.nsw.gov.au/viewtop/inforce/act+11+1993+FIRST+0+N

Class 1 noxious weeds are plants that pose a potentially serious threat to primary production or the environment and are not present in the State or are present only to a limited extent. The plant must be eradicated from the land and the land must be kept free of the plant. It is an offence to sell, propagate or knowingly distribute these plants. Notifiable weeds-state prohibited plants. Occurences of plants in this category, must be reported to the LCA (Great Lakes Council) within 24 hours of detection. No new occurrences of Class 1 weeds have been detected.

Class 2 noxious weeds are plants that pose a potentially serious threat to primary production or the environment in a region to which the order applies and are not present in the region or are present only to a limited extent. The plant must be eradicated from the land and the land must be kept free of the plant. Notifiable weeds-regionally prohibited plants. Occurences of plants in this category, must be reported to the LCA (Great Lakes Council) within 24 hours of detection.1 new occurrence of Cape Broom / Montpellier Broom (*Genista monspessulana*) was detected at Bungwahl within the Wallis Lake Catchment.

Class 3 noxious weeds are plants that pose a serious threat to primary production or the environment of an area to which the order applies, are not widely distributed in the area and are likely to spread in the area or to another area. These weeds must be regionally controlled. The plant must be fully and continuously suppressed and destroyed. No new occurrences of Class 3 weeds have been detected.

Class 4 noxious weeds are plants that pose a threat to primary production, the environment or human and animal health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area. These are locally controlled weeds that are managed according to requirements set out by Council. The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority. No new occurrences of Class 4 weeds have been detected.

Class 5 noxious weeds and their seeds are Notifiable weeds and are sale restricted. That is, it is an offence to sell, propagate or knowingly distribute these plants. Occurences of plants in this category, must be reported to the LCA (Great Lakes Council) within 24 hours of detection.

A list of weed species occurring in each class of the Noxious Weeds Act is available from Council or http://ww.dpi.nsw.gov.au/agriculture/pestsweeds/weeds/noxweed

Certain weed species in the following table have undergone declaration changes in the Great Lakes LGA as per weed control orders 28 as gazetted:

Figure 5.4.1 Cape Broom. (*Genista monspessulana*)

Common name	Scientific name	From class	To class
Clockweed	*Gaura lindheimeri*	5	Undeclared
Onion Grass	*Romulea spp & vars*	5	Undeclared
Sand Oat	*Avena strigosa*	5	Undeclared
Aleman Grass	*Erinochloa polystachia*	Undeclared	2
Cape Broom or Montpellier Broom	*Genista manspessulana*	Undeclared	2
Hydrocoyle	*Hydrocotyl ranunculoides*	Undeclared	1
Kosters Curse	*Clidemia hirta*	Undeclared	1
Mikania	*Mikania micrantha*	Undeclared	1

Several new & emerging weed incursions have been detected on the mid north coast of NSW and include Blue Perrywinkle (*Vinca major*), Sweet Acacia / Mimosa Bush (*Acacia famesiana*), A Rattlepod (*Crotalaria lunata*), African olive (*Olea europaea* ssp. *cuspidata*). Specific new and emerging species detected in Great Lakes Council area include Blue Heliotrope (*Heliotropium amplexicaule*) and Cape Broom / Montpellier Broom (*Genista monspessulana*), the Western Australian Crested Wattle (*Paraserianthes lophantha* ssp. *lophantha*). Apart from the latter spp, all known infestations of these plants have been treated and are undergoing monitoring.

The 2011/2012 financial year saw the implementation of year 2 of the regional application for the NSW Weeds Action Program (WAP). The WAP replaces the method previously used to apply for and distribute state funds for the management of Noxious Weeds in local control areas of NSW. A more coordinated and accountable, regional approach to weed management has been implemented across NSW, with a greater emphasis on the monitoring and evaluation of weed control programs and the placing of a higher priority on the management of new and emerging weeds. As a part of these changes, Great Lakes Council has contributed to the on going development of a suite of regional plans and strategies that build on the framework of the WAP.

Due to this new system the next few years will see all high priority weed species under go a formal weed risk assessment process. This process will bring about further changes to the current status of state and locally declared weed species and enable Council to allocate funds more efficiently and better prioritise the plants and areas they manage for weeds.

Several new plants are currently ear marked for declaration to class 3 and 4 weed categories. These changes will be announced upon the gazetting of weed control order 30.

Monitoring

Weed management is the responsibility of Council's Noxious and Environmental Weeds Officer. Due to the dynamic and vast distribution of weed species Council is unable to measure weed distribution across the LGA in quantitative or numerical terms. For the purposes of State of Environment Reporting, Council's Weed Officer has estimated the distribution of noxious and significant environmental weeds, occurring in the LGA, based on field records and observations.

Figure 5.4.2 Monitoring Cabomba densities at Tea Gardens

Figure 5.4.3 Harvesting Salvinia at Tea Gardens with a Truxor.

Figure 5.4.4Aerial spraying Bennett's Beach Hawks Nest.

Results

Table 5.4.1 Noxious Weeds and their distribution in the Great Lakes LGA

Weed Species	Estimated Distribution
African Boxthom *Lycium ferocissimum*	Occasional & Localised
Alligator weed *Alternanthera philoxeroides* (WONS)	Occasional & Localised
Bathurst/Noogora/Californian/cockle burrs *Xanthium* spp	Common & Widespread
Bitou Bush *Chrysanthemoides monilifera* ssp *rotundata* (WONS)	Abundant & Localised
Blackberry *Rubus fruticosus aggregate* spp (WONS)	Common & Widespread
Bridal Creeper *Asparagus asparagoides* (WONS)	Occasional & Localised
Broadleaf Pepper Tree *Schinus terebinthifolius*	Occasional &Localised
Cape Broom / Montpellier Broom Genista monspessulana (WONS)	Occasional &Localised
Chinese Violet	Not Present/Weed Alert
Crofton Weed *Ageratina adenophora*	Common & Widespread
East Indian Hygrophila *Hygrophila polysperma*	Occasional & Localised
Giant Parramatta Grass *Sporobolus fertilis*	Common & Widespread
Giant Rats Tail Grass *Sporobolus pyramidalis*	Occasional & Localised
Green Cestrum *Cestrum parqui*	Occasional & Localised
Groundsel Bush *Baccharis halimifolia*	Occasional & Localised
Hygrophila *Hygrophila costata*	Occasional & Localised
Kidney Leaf Mud Plantain *Heteranthera reniformis*	Not Present/Weed Alert
Leafy Elodea/Dense Waterweed	Occasional & Localised
Long Leaf Willow Primrose *Ludwigia longifolia*	Occasional & Localised
Mother of millions *Bryophyllum species*	Occasional & Widespread
Pampas Grass *Cortaderia* spp	Occasional & Localised
Patersons Curse *Echium* spp	Occasional & Localised
Salvinia *Salvinia molesta* (WONS)	Occasional & Widespread
Senegal Tea Plant *Gymnocoronis spilanthoides*	Not Present/Weed Alert
St. Johns Wort *Hypericum perforatum*	Occasional & Localised
Tropical Soda Apple *Solanum viarum*	Not Present/Weed Alert
Water Hyacinth *Eichhomia crassipes*	Occasional & Widespread
Water Lettuce *Pistia stratiotes*	Occasional & Localised

Figure 5.4.5
Water Hyacinth Flower

Figure 5.4.6 Water Hyacinth on the Karuah River Floodplain.

Table 5.4.1 Environmental Weeds and their distribution in the Great Lakes LGA

Weed Species	Estimated Distribution
African Love Grass *Eragrostis curvula*	Common & Localised
African Olive *Olea europaea* ssp. *Africana*	Occasional & Localised
Asparagus Fern *Asparagus aethiopicus*	Common & Localised
Asparagus Fern *Asparagus plumosus*	Occasional & Localised
Bamboo (Rhizamatous) *Phyllostachys* spp	Occasional & Localised
Black Locust *Robinia psuedoacacia* var.	Occasional & Localised
Blue Heliotrope *Heliotropium amplexicaule*	Occasional & Localised
Blue Perrywinkle *Vinca major*	Occasional & Localised
Brazilian Nightshade *Solanum seaforthianum*	Occasional & Widespread
Camphor Laurel *Cinnamomum camphora*	Common & Widespread
Cape Ivy/German Ivy/Climbing Cineraria/Creeping Groundsel *Delairea odorata, Climbing Senecio* spp.	Common & Localised
Cassia/ Senna *Senna pendula* var. *glabrata*	Common & Widespread
Castor Oil Plant *Ricinus communis*	Occasional & Widespread
Cats Claw Creeper *Macfadyena ungui - cati*	Occasional & Localised
Chinese Tallowood *Triadica sebifera*	
Coolatai Grass/Giant Coolatai Grass *Hyparrhenia hirta; H. rufa*	Occasional & Widespread
Coral Tree – Cockspur *Erythrina crista-galli*	Occasional & Localised
Coral Tree – Indian *Erythrina sykesii*	Occasional & Localised
European Olive *Olea europaea*	*Weed Alert* (likely to become a significant problem)
Firethorn *Pyracantha* spp.	Occasional & Localised
Fire weed *Senecio madagascariensis*	Common & Widespread
Formosa Lily *Lilium formosanum*	Occasional & Localised
Giant Reed *Arundo donax*	Occasional & Localised
Glory Lilly *Gloriosa superba*	Occasional & Localised
Indian Hawthorn *Rhapiolepis indica*	Occasional & Localised
Japanese Honeysuckle *Lonicera japonica*	Common & Widespread
Madeira Vine *Anredera cordifolia*	Occasional & Widespread
Mickey Mouse Plant *Ochna serrulata*	Occasional & Localised
Mist Flower *Ageratina riparia*	Common & Widespread
Morning Glory *Ipomoea indica, Ipomea cairica*	Common & Widespread
Moth Vine *Araujia sericifera*	Occasional & Widespread
Myrtle Leaf Milkwort *Polygala myrtifolia*	Occasional & Localised
Mysore Thorn *Caesalpinia decapetala*	Occasional & Localised
Narrow Leaf Cotton bush *Gomphocarpus fruticosus*	Occasional & Widespread
Orange Jessamine *Murraya paniculata*	Occasional & Localised
Parrots Feather *Myriophyllum aquaticum*	Common & Localised
Passion Flower/Fruit *Passiflora* spp.	Common & Widespread
Pine Trees *Pinus* Spp.	Occasional & Widespread
Privet *Ligustrum sinense Ligustrum lucidum*	Common & Widespread
Purple Broom *Polygala virgata*	Common & Widespread
Rattle Pod *Crotalaria lunata*	Occasional & Localised
Umbrella Tree (Qld) *Schefflera actinophylla*	Common & Localised
Wandering Jew *Tradescantia albiflora*	Common & Widespread
Wild Tobacco *Solanum mauritianum*	Common & Widespread
Yellow Bells *Tecoma stans*	Occasional & Widespread
Yellow Waterlily *Nymphaea Mexicana*	Occasional & Localised

Response and future direction

The ongoing control and monitoring of new and emerging weeds and established noxious aquatic weeds such as Tropical Soda Apple, Salvinia, Cabomba, Water Hyacinth but especially Alligator Weed have taken priority due to their aggressive nature, and threat to severely degrade our waterways. Infestations of these weeds are on the increase.

A number of weed management projects have been commenced / continued during the 2011 – 2012 financial year. Some of the higher profile projects include:-

- Ongoing - A regional project in conjunction with the Mid North Coast Weeds Advisory Committee funded by Hunter Central Rivers Catchment Management Authority (HCRCMA), targeting emerging thorny plants such as Black locust (*Robinia psuedoacacia*) and Mysore thorn (*Caesalpinia decapetala*) at Stroud and Tahlee.
- Ongoing - A regional project in conjunction with the Mid North Coast Weeds Advisory Committee funded by HCRCMA targeting the emerging vine weed Madeira vine (*Anredera cordifolia*) at Forster, Tuncurry, Smiths Lake, Coolongolook, Minimbah and Bungwahl.
- Ongoing - A $35,000 follow up aerial spraying project was undertaken at Hawks Nest, Pacific Palms and Tuncurry to compliment on ground works undertaken by Council and its vast network of volunteer groups. 264 hectares of Bitou Bush (Bitou Bush *Chrysanthemoides monilifera* ssp *rotundata*) was treated at Bennett's Beach, Yacaaba Peninsula, Sand Bar Beach, Cellito Beach, Bald Head and cliff formations to, and including Boomerang Point Headland and the Nine Mile Beach at Tuncurry. Further follow up will take place in subsequent years in an attempt to reduce and deplete the seed bank.
- Ongoing - Great Lakes Council in conjunction with Mid North Coast Weed Coordinating Committee and the NSW DPI have undertaken the first pass treatments on a number of sites in the Caring for Our Country grant totalling $191,760 to target all known Cabomba infestations that pose a threat to the Ramsar listed Myall lakes system.
- Ongoing - Year 3 of a cross agency project in conjunction with the National Parks and Wildlife Service funded by HCRCMA, targeting Parrots Feather (*Myriophyllum aquaticum*) to reduce its impact on the Ramsar listed Myall Lakes. In total $97,426 was received to be delivered over a 15 year period.
- Ongoing - A plant replacement program was delivered to the Seal Rocks community. All properties within the village area were targeted for the presence of noxious and environmental weeds with the aim to educate the community about the impact of weeds on its surrounding environment. Free desirable native replacement plants and assistance for the removal of undesirable species was on offer to those who needed assistance.
- Ongoing - over the past 8 years Great Lakes Council has invested in excess of $60,000 intensively managing an Alligator Weed eradication project. 16 sites within 3 localities (all known infestations) on public and private land have been treated on a regular basis, with 3 sites having been free of the weed for 5 years now. A combination of Integrated pest management techniques have been implemented, including manual removal, herbicide spraying for suppression, and other herbicide trials in an attempt to broaden the effective weed management "tool box."
- Commenced - During the reporting period, 43 local agricultural shows, community landcare events, farmers meetings and field days have been held by Council staff involved with the management of weeds and sustainable farming. Information sheets have been made readily available to the public on request and on Council's website. Regular media releases have also been conducted, including a monthly article in the North Coast Town and Country. Council has produced a landholder information pack that contains numerous high value documents on a compact disk that is distributed at events as well as during property inspections. The disc is "versioned" and is updated on a regular basis to maintain currency.

There has been the continuation of planned control strategies for Bitou Bush and other terrestrial weeds, with works undertaken by local community groups at various locations assisted by Council. Council supports a network of 893 registered volunteers across 70 working groups involved in general reserve maintenance and natural areas restoration and protection.

Biological control remains high on the agenda for Great Lakes Council. Through its Noxious Weeds Program, Council financially contributes to the NSW Biological Control Task force, to assist in the research and development of new bio-agents, for a number of plant hosts. Council is eagerly awaiting the wide scale release of Nigrospora Crown Rot (*Nigrospora oryzae*) to assist in the long-term management of weedy *Sporobolus* species including Giant Parramatta Grass.

Previously the leaf sucking tingid fly *Carvalhotingis visenda* was released in a small infestation of Cats Claw Creeper at Upper Monkerai monitoring is ongoing. Lantana rust *Prospodium tuberculatum* although now being established in a widespread area of the Mid North Coast it is not yet having a major impact on infestations. The Biological Control Taskforce is working on the development of new bio-agents for Lantana and most recently a beetle (*Plectonycha correntina*) has been raised as a biological control for Madeira Vine. Salvinia weevil (*Cyrtobagous savliniae*) are continually being released and monitored across the Great Lakes LGA. In one particular release site, 7 hectares of tertiary growth Salvia at North Arm Cove, has seen a 95% reduction in biomass over a 5 year period proving to be an increasingly important part of a successful integrated pest management program. This site has become A model site for the mid north coast. a Salvinia biological control workshop was recently held at this site and another at Tea Gardens to empower the community with the necessary skills to successfully manage biological control work sites.

Council has previously contributed to and adopted the Mid North Coast Regional Weeds Strategy 2008 - 2012 and regional weed control management plans for Alligator Weed, Bitou Bush, Bird Lolly weeds, Noxious floating aquatic weeds, Giant Parramatta Grass, Crofton Weed, Groundsel Bush, Cabomba, St Johns Wort, Red flowering

Figure 5.4.7 Photos depicting a 95% reduction in plant biomass from January 2005 to May 2010 due to biological control.

Lantana, Asparagus weeds and Vine weeds. These comprehensive plans have now become obsolete and are making way for a more simple 2 page plan formatted akin to Councils existing class 4 weed management plans. These plans will be developed for all high priority species in the mid north coast region.

Private property inspections are carried out in accordance with the WAP, and are directed in strategic areas to help protect high value assets of an agricultural, natural and passive nature. The provision of an educational package containing information to assist residents management weeds, is paramount to the success of the Inspectorion Program. Councils main inspection program was focused in localised catchments adjacent to high value ecosystems including wetlands and waterways, upholding Councils long term investment in the protection and rehabilitation of these significant environmental assets. Council will continue to enforce the Noxious Weed Act where deemed necessary. In the first instance Council will seek to educate and encourage landowners to control weeds. Emphasis will always be on a personal approach with an accompanying letter. Notices will be Weed

issued where landowners fail to co-operate fully in the control of noxious weeds on their property or are conducting activities that serve to facilitate the spread of noxious weeds. This action is usually successful and Council has rarely needed to resort to Court Action, despite the legal ability to do so.

Great Lakes Council has one full time weed officer, who is responsible for all control, administration and mapping duties. Council has recently employed a temporary part time officer to assist with weed management duties. Due to the extensive and dynamic nature of weed infestations and current resource limitations Council will be focusing on the management of new incursions and weeds of limited distribution, the issue of wide spread weeds in the LGA is likely to worsen over time, rather than remain static or improve.

Figure 5.4.8 Aquatic weed survey on the Coolongolook River.

Table 5.4.3 Identified needs for action regarding weeds

Identified Need for Action	Recommended key projects or actions for consideration in next year's Management Plan	Relevant Council section	Are there existing resources for action	Commence by/timeframe
Continue weed mapping, volunteer support and educational/promotional duties	Continue and improve weed management activities	Parks & Recreational Services	Yes	Ongoing
Develop weed management plans for all noxious weeds found in LGA	Continue and improve weed management activities	Parks & Recreational Services	Partial	Ongoing
Implement on-ground control works for all Class 2, and 3 Noxious weeds, selected Class 4 weeds and Environmental Weeds	Continue and improve weed management activities	Parks & Recreational Services	No	Ongoing
Continue to enforce Noxious Weeds Act	Continue and improve weed management activities	Parks & Recreational Services	Partial	Ongoing
Consider the need to expand the Noxious and Environmental Weed activities of Council by increasing staff in this area	Continue and improve weed management activities	Parks & Recreational Services	No	Ongoing

5.5 Seagrass

Introduction

Seagrass beds are a fragile and intricate component of our estuaries and play an important role in the healthy functioning of our waterways. Seagrass beds provide essential ecosystem services, such as: nursery provision to around 50% of the world's fisheries; nutrient cycling (valued at around $3.8 trillion per year); sediment stabilisation, oxygenation of estuarine waters and shoreline protection. Perhaps most significantly, seagrass beds and coastal marshes form some of the most powerful Carbon sinks in the world, sequestering Carbon 35 times faster than tropical rainforest. They are then capable of storing this Carbon for 1000's of years. Despite their significance, the extent of seagrass beds throughout NSW are in decline with more than two thirds of seagrass beds destroyed over the past 30 years. Seagrass decline is a global trend that has been attributed to human impacts. Threatening processes include pollution, development, dredging, recreational activities (inappropriate boating) and poor land management. Current levels of seagrass decline are cause for concern since after loss, the beds then actively leak Carbon into the atmosphere at a rate estimated to be 3 times that of Australia's current annual Greenhouse emissions.

Seagrass beds are sensitive to many factors including turbidity, pH, nutrient levels, temperature and physical disturbance. Recent studies on the seagrass sediment cores of Botany Bay (MCreadie etal 2012) indicate that current rates of sedimentation are 7 times the rate prior to colonisation. There has been a concurrent increase in the micro-algal signature of post-colonisation cores.

The local lake systems comprising Wallis, Smiths and Myall Lakes support some of the most extensive seagrass communities within NSW. Wallis Lake alone is well known for containing more area of seagrass than any other NSW estuary or lake; and for containing the most northern population of Strapweed (Posidonia australis) within Australia. Four additional native species of seagrass including Eelgrass (Zostera capricorni), Paddleweed (Halophila ovalis) and Sea Tassel (Ruppia megacarpa) and Halodule tridentata are also found within Wallis Lake. The occurrence of H. tridentata in Wallis Lake forms the southern most distribution of this species in mainland Australia.

Seagrasses also provide habitat for some of Wallis Lake's sponge species, many of which are yet to be scientifically described.

Monitoring

In 2002, Council developed a community seagrass-monitoring program to assess small-scale seasonal variability in seagrass beds within Wallis Lake. This program aimed to involve community volunteers in determining the health of Wallis Lake and its catchment and to monitor the effectiveness of environmental management within the region. Previously to this reporting period monitoring occurred at 11 sites within Wallis Lake. Volunteers measured the presence and density of seagrass, macroalgae and epiphytes species as well as the turbidity, depth and general observations.

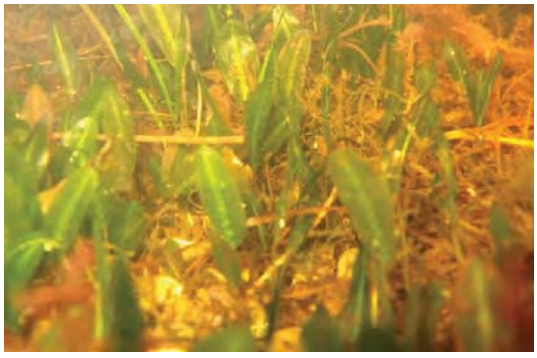


Figure 5.5.1 Paddleweed - *Halophila ovalis*

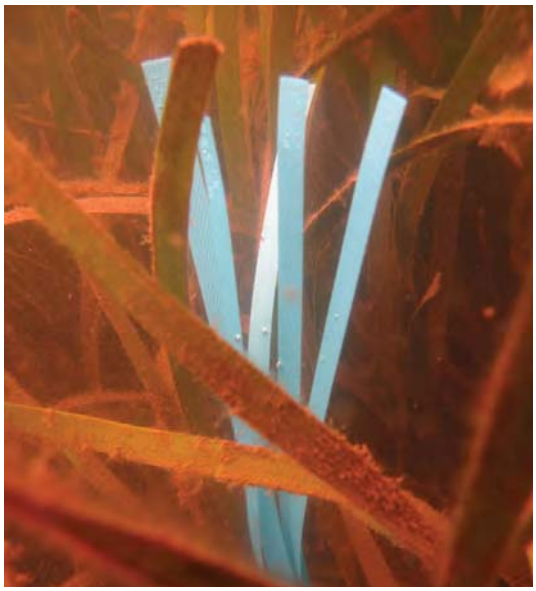


Figure 5.5.2 False seagrass straps installed amongst *Posidonia* beds in Wallis Lake, August 2011

Summary and future direction

Unfortunately, data collected through Council's Community Seagrass Monitoring Program has been rendered unusable for this report due to its vastness and subjective nature. In the delivery of the WQIP, Council has contracted the Department of Primary Industries to map the seagrass beds in the Forster Keys / Pipers Bay area of Wallis Lake. DPI is using aerial imagery to determine areas and extent of sea grass beds as well species composition in the study area. They are testing the validity of such data by ground truthing and will be able to generate robust maps of seagrass distribution and composition in the Pipers Bay area of Wallis Lake. Council are developing a program, in conjunction with OEH scientists, to measure epiphytic grow on seagrass in the study area. This program provides clear information on seagrass health in the study area. The method is relatively simple and easy to manage in terms of data and analysis. Council will use the method to educate residents about the importance of seagrass as well engaging volunteers in a 'user-friendly' and meaningful seagrass monitoring program.

Figure 5.5.3 Community seagrass monitoring training

Table 5.5.1 Identified needs for action regarding seagrass

Identified Need for Action	Recommended key projects or actions for consideration in next year's Management Plan	Relevant Council section	Are there existing resources for action	Commence by/timeframe
Develop user-friendly seagrass monitoring and community engagement program for residents of Pipers Bay/Forster Keys.	Seagrass Epiphyte Monitoring Protocol developed and delivered with quarterly monitoring events	Natural Systems	Y	June 2012
Provide on-going general education and awareness on the value of seagrass through the Healthy Lakes Program/ Summer Coast Care Program	Healthy Lakes Program (continue expanding initiatives through the Summer Coastcare Program)	Natural Systems	Y	Within 2yrs

5.6 Recovery and threat abatement plans

Introduction

In New South Wales, threatened native plants and animals, populations and communities are listed on the *Threatened Species Conservation Act* 1995 (with the exception of fish and marine plants which are listed on the *Fisheries Management Act*). These Acts provide for the identification, conservation and recovery of threatened species, populations and communities and also aim to reduce the threats faced by those species.

Since its amendment in 2003, the preparation and implementation of recovery plans for each species, population or ecological community listed as threatened is no longer mandatory, although the recovery planning mechanism does remain for relevant threatened biodiversity. Instead, there is a requirement for the preparation and implementation of priority action statements for threatened entities. Where recovery plans are prepared and implemented, they are typically designed to return the species, population or ecological community to a point where it is viable in nature and is no longer at risk of extinction. Among other things, recovery plans outline the actions that government and other organisations are bound to undertake to achieve that recovery.

Figure 5.6.1 The Swift Parrot

It is a legislative requirement of the SoE process that actions within approved recovery plans are reported on annually.

An analysis of recorded sightings of threatened biodiversity indicates that the Great Lakes LGA contains 125 threatened entities as shown in Table 4.6.1.

Table 5.6.1 Number of threatened entities known to occur within the Great Lakes LGA.

Threatened biodiversity within the Great Lakes LGA			
Group	No. known in Great Lakes LGA 09/10	No. known in Great Lakes LGA 10/11	No. Known in Great Lakes LGA 11/12
Endangered populations	3	3	3
Endangered/ Vulnerable ecological communities	11	12	12
Threatened flora	28	29	30
Threatened mammals	27	28	28
Threatened frogs	6	6	6
Threatened reptiles	1	1	4
Threatened birds	45	45	45
Threatened aquatic fauna (estuarine)	1	1	3
Total	122	125	131

Source: Great Lakes Council

To date, within the Great Lakes LGA, the following Approved Recovery Plans are currently operational:

- State Recovery Plan for the Endangered Koala Population of Hawks Nest/ Tea Gardens
- State Recovery Plan for the Yellow-bellied Glider
- State Recovery Plan for the Red Goshawk
- State Recovery Plan for the Little Tern
- State Recovery Plan for the Bush Stone-curlew
- National Recovery Plan for the Swift Parrot

Monitoring

For each SoE report, an annual summary will be presented on Council's progress towards relevant recovery actions for each of the State Recovery Plans mentioned above. Only recovery actions that Council has a lead or supporting role in implementing will be reported against.

Results

Table 5.6.2 Hawks Nest and Tea Gardens Endangered Koala Population Recovery Plan Implementation outcomes achieved to date.

Hawks Nest and Tea Gardens Endangered Koala Population Recovery Plan Actions		Council Action	
Action		Commenced	Completed
1.1	Plan coordination	Yes	In Progress
1.2	Develop working group	Yes	Yes
1.3	Monitoring program	No	No
2.1	Mapping and reporting	Yes	No
3.1	Prioritise management areas	No	No
3.2	Survey habitat links	Yes	No
3.3	Survey/ assessment guidelines	Yes	No
3.4	Blackspot identification	Yes	No
3.5	Strategic streetscaping	Yes	No
3.6	Companion animal policy	No	No
3.7	Coordination of dog control	Yes	No
4.1	Habitat zoning	Yes	No
4.2	Awareness of protection measures	No	No
4.3	Support BFMC	No	No
4.4	GLC Plans of Management	Yes	No
5.1	Rehabilitation/ replanting advice	Yes	No
6.1	Establishment of database	Yes	No
6.2	Education and awareness	Yes	No
7.1	Information exchange	Yes	No
7.2	Identification of release sites	Yes	No

Table 5.6.3 Little Tern Recovery Plan Implementation outcomes achieved to date.

Little Tern Recovery Plan Actions (where Council is an implementation partner)		Council Action	
Action		Commenced	Completed
1.1	Inform and consult with land managers	No	No
2.1	Intensive management of nesting, resting and fledgling feeding sites	No	No
3.1	Investigate the potential for the incidental creation of island nesting sites using dredge spoil	No	No
8.2	Targeting community groups	No	No
8.4	Liaison with interest groups	No	No

Table 5.6.4 Red Goshawk Recovery Plan Implementation outcomes achieved to date.

Red Goshawk Recovery Plan Actions (where Council is an implementation partner)		Council Action	
Action		Commenced	Completed
3.1	Formulate standardised survey methods	No	No
4.1	Communicate environmental impact assessment and survey guidelines	No	No
4.2	Education package on identification, distribution, habitat, status and threats	No	No
5.4	Management of populations on public land	No	No
5.5	Awareness of long-term protection measures	No	No
5.6	Maintain strict security around nest sites	No	No

Table 5.6.5 Yellow-bellied Glider Recovery Plan Implementation outcomes achieved to date.

Yellow-bellied Glider Recovery Plan Actions (where Council is an implementation partner)		Council Action	
	Action	Commenced	Completed
2.1	Formulate standardised survey methods	No	No
2.3	Inclusion of regional based habitat types, sap trees and sap tree species in EPI	No	No
2.6	Consideration of impacts of fragmentation by road, easement and linear clearing design	No	No
3.1	Identification of significant populations and their associated specific management issues	No	No
4.1	Strategic research	No	No
4.2	Information package for community awareness of habitat sap trees and protection and enhancement	No	No

Table 5.6.6 Bush Stone-curlew Recovery Plan Implementation outcomes achieved to date.

Bush Stone-curlew Recovery Plan Actions (where Council is an implementation partner		Council Action	
	Action	Commenced	Completed
1.1	Support existing projects	No	No
2.1	Publicity activities to raise awareness	No	No
2.2	Maintain and distribute information materials	No	No
2.4	Bush Stone Curlew summit	No	No
3.1	Identify and map habitat	No	No
3.2	Field and community surveys	No	No
3.3	Predator and pest control programs	No	No
3.4	Annual monitoring of populations	No	No
3.5	Manage habitat (non-public land)	No	No
3.6	Apply for off-label permits for 1080 baiting programs	No	No
3.7	Protect and manage habitat on public land	No	No
3.8	Encourage habitat protection on private land	No	No
3.9	Establish and support community groups	No	No
3.10	Prepare and implement management plans	No	No
4.2	Identify sites for translocations	No	No
4.4	Secure funding for post-release monitoring	No	No
6.1	EIA and survey guidelines	No	No
6.2	Consideration during EPI biodiversity certification	No	No
6.5	Enter records into Atlas of NSW Wildlife	No	No
7.1	Ecological research	No	No
8.3	Research into habitat degradation	No	No
11.1	Source funding for implementation	No	No

Table 5.6.7 Swift Parrot Recovery Plan Implementation outcomes achieved to date.

National Swift Parrot Recovery Plan Actions (where Council may be an implementation partner)	Council Action	
Action	Commenced	Completed
1a. Identify the extent and quality of foraging habitat within the over-wintering range (especially Coastal Spotted Gum, Swamp Mahogany and northern Forest Red Gum/ Ironbark Forests)	No	No
2a. Mapping of foraging and breeding habitat	No	No
2b. Management and protection of habitat	No	No
5a. Community and volunteer network	No	No

Table 5.6.8 Large Forest Owls Recovery Plan Implementation outcomes achieved to date.

Large Forest Owls Recovery Plan Actions (where Council is an implementation partner	Council Action	
Action	Commenced	Completed
2.1 Develop sampling strategy and regional monitoring protocols	No	No
2.2 Investigate cooperative involvement of other agencies in monitoring	No	No
2.3 Implement regional monitoring program	No	No
4.1 Prepare and disseminate EIA guidelines	No	No
4.2 Monitor effectiveness of concurrence and licence conditions	No	No
4.3 Develop prescriptive guidelines	No	No
4.5 Facilitate consideration of large forest owls during biodiversity certification assessments	No	No
5.1 Prepare guidelines for habitat protection, management and survey	No	No
6.2 Promote awareness of research needs	No	No
7.1 Encourage and coordinate involvement of community groups	No	No
8.2 Seek to integrate recovery actions	No	No

Table 5.6.9 National Regent Honeyeater Recovery Plan Implementation outcomes achieved to date.

National Regent Honeyeater Recovery Plan Actions (where Council may be an implementation partner)		Council Action	
Action		Commenced	Completed
1	Establish expanded Operations Groups in all known regularly used sites	No	No
2	Develop generic guidelines for content of regional work plans	No	No
2	Prepare regional work plans for the key regions	No	No
2	Develop an information package on habitat requirements and guidelines for habitat management	No	No
2	Ensure habitat management guidelines are reflected in regional ecosystem management plans	No	No
2	Identify patches of significant habitats and promote habitat management guidelines to relevant land managers and agency staff	No	No
5	State agency staff and Operations Groups to promote appropriate management of significant habitat patches	No	No

Table 5.6.10 National Wallum-dependent Frog Species Recovery Plan Implementation outcomes achieved to date.

National Wallum-dependent Frog Species Recovery Plan Actions (where Council may be an implementation partner)		Council Action	
Action		Commenced	Completed
1.2	Map habitat	No	No
1.3	Conduct surveys	No	No
2.1	Ensure appropriate legislative protection of wallum froglet habitat	No	No
2.3	Apply guidelines for habitat protection and management	No	No
3	Acquire additional information on threats to inform management	No	No
4.1	Fact sheets and poster boards	No	No
4.2	Dissemination of information on wallum froglet habitat management and protection	No	No
5	Rehabilitate degraded wallum froglet habitat	No	No
6.1	Develop methodology for monitoring	No	No
6.2	Undertake monitoring	No	No

Table 5.6.11 Brush-tailed Rock Wallaby Recovery Plan Implementation outcomes achieved to date.

Brush-tailed Rock Wallaby Recovery Plan Actions (where Council is an implementation partner)		Council Action	
Action		Commenced	Completed
6	Standardised survey techniques for BTRW presence/ absence	No	No
7	Monitoring techniques for estimating BTRW abundance	No	No
11	Research BTRW ecology	No	No
12	Database on past and present occupation of BTRW sites and management actions and review	No	No
13	Best practice guidelines for site management	No	No
14	Site-specific management programs for priority BTRW sites within best practice guidelines	No	No
15	Management network to control predators at priority sites	No	No
16	Management network to control feral competitors at priority sites	No	No
17	Broader community support for ongoing predator and competitor control programs	No	No
18	Identify sites and land management actions to ameliorate impacts of habitat loss	No	No
23	Generic community information and support for BTRW recovery	No	No
24	Promote opportunities for community involvement in BTRW recovery programs	No	No
26	Establish community support groups in significant populations	No	No

The names of the 70 modelled corridors of the LGA that have been identified by OEH have been published in a previous comprehensive SoE. There has been no specific further refinement or development of wildlife corridor knowledge, conservation or planning in the LGA since the publishing of the key regional corridors project. Consequently, no additional results can be provided for this SoE. It is hoped that works to refine and update this mapping for the highest priority corridors can be strategically commenced in the near future. This may include and/ or benefit from the technical assistance of the Hunter Councils Environment Division.

Trend Analysis

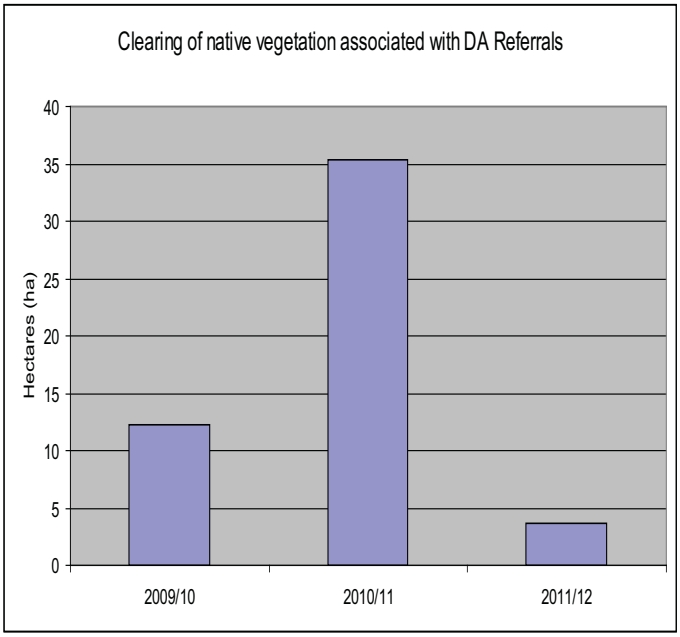


Figure 5.6.2 Total native vegetation clearing associated with DA referrals

The data shows a large spike in native vegetation clearing asssociated with DA Referrals occured in 2010/11 with 36 hectares cleared, up from 12.29 in 2009/10. For 2011/12 there was a major reduction with 3.64 hectares cleared.

Summary and future direction

There is a need for Council, in combination with relevant agencies, to implement the appropriate scale revision of corridor studies and commence to implement a proactive, integrated corridor strategy. This might include refinement and mapping and ultimately involve restoration/ revegetation and private land conservation through incentives. Until such time as the key habitats and corridors program is refined and updated with a local emphasis and included in statutory plans, the information referred to in this indicator would remain advisory only. There is a clear need to resolve and consider local corridor planning programs across key areas of the LGA and for the highest priority corridor links, such as the Myall Lakes to Wallingat link.

Table 5.6.1 Identified needs for action regarding threatened species

Identified Need for Action	Recommended key projects or actions for consideration in next year's Management Plan	Relevant Council section	Are there existing resources for action	Commence by/timeframe
Work with OEH to implement actions in Relevant Recovery Plans.	• Assist in implementation of Threatened Species Recovery Plans and Priority Action Statements	Natural Systems	N	Within 2yrs
Continue to be a lead agency in the implementation of the Hawks Nest Tea Gardens Koala Recovery Plan	• Assist in implementation of Threatened Species Recovery Plans and Priority Action Statements	Natural Systems	Y	Ongoing
Develop and implement a shire-wide (comprehensive) Koala Plan of Management to support Recovery Planning for this species	• Assist in implementation of Threatened Species Recovery Plans and Priority Action Statements	Natural Systems	Partial	Within 2yrs
Develop and implement education on threatened species, populations and communities	• Assist in implementation of Threatened Species Recovery Plans and Priority Action Statements • Biodiversity education (develop and expand initiatives)	Natural Systems	Partial	Within 2yrs
Develop and implement a program to support ecological research into key threatened species and ecologically endangered communities in the LGA	• Assist in implementation of Threatened Species Recovery Plans and Priority Action Statements	Natural Systems	N	Within 2yrs
Map and conserve the extent of Endangered Ecological Communities in the LGA	• Assist in implementation of Threatened Species Recovery Plans and Priority Action Statements	Natural Systems	N	Within 2yrs

6 Waste and toxic hazards

If not disposed of thoughtfully, many of the substances we use can have a devastating effect if released into the environment. Water, air and land pollution results from the release of waste and toxic hazards into our environment and can lead to significant site contamination issues. Legislation relating to a number of dangerous chemicals and waste products has been gazetted to reduce the impact of these substances on human health and the environment. However we still have some way to go in reducing the potential of waste and toxic hazards seriously affecting our natural environment.

Figure 6.1.1 Recycled material ready for market at the Tuncurry Waste Management Centre

6.1 Waste

Introduction

Waste management is an issue for Local Government in relation to both human and environmental health. Waste disposal methods have been based on engineered landfill methods, which are the accepted standard for waste disposal. However, there has been a shift towards providing a more sustainable waste management system that provides incentives to reduce waste, opportunities to reuse recover or recycle materials and ways to efficiently dispose of the residual waste in a satisfactory manner. As such a move from landfill to integrated waste management centres has been adopted. This move has occurred in line with waste management reforms with the introduction of the *Waste Avoidance and Resource Recovery Act* 2000. Reducing waste through the methods mentioned above not only conserves raw materials (thus reducing the environmental impacts of extractive activities throughout the world), but it also reduces the need to convert more areas into landfill sites.

Councils Waste Management Services section is responsible for managing four (4) waste management centres in the LGA at Tuncurry, Tea Gardens, Bulahdelah and Stroud. Licensing under the *POEO Act* (1997) has been issued for the Tuncurry operation, due to its size, and as such Council has a legal responsibility to fulfil monitoring obligations, and ensure environmental protection.

Monitoring

At each centre the quantity of total waste is monitored as well as the breakdown of each waste component including total waste to landfill, recycling, green waste, kerb-side recycling and chemical/ hazardous waste. However, as different units of measure have been used, there are issues with the compatibility of such data. Subsequently, for the purpose of this report, data measured by volume is converted into weight as per acceptable methods of calculation (EPA land filling guidelines). Furthermore the total weight of waste per capita is based on the predicted population as derived by the 2006 census.

Results

Through the process of routine garbage collection, recycling initiatives and public use of Councils Waste Management Centres 80,693 tonnes of waste was collected during the reporting period. A proportion, approximately 31%, goes to landfill with the remaining waste distributed among Councils recycling initiatives. This includes green waste, scrap metal, general recycling material including plastic, paper, glass, metal and materials collected through the kerb-side recycling program.

Table 6.1.1 The total amount of waste collected including a break down of components for recycling.

	2009/10	10/11	11/12
Total Waste (Tonnes)	56279	80693	91914
Total Waste Per Capita (Tonnes)	1.4	2	2.58
Total Waste Land filled (Tonnes)	23810	24739	251.24
Green Waste (Tonnes)	9585	9345	9965
Scrap Metal Recycling (Tonnes)	823	825	703
General Recycling (Tonnes)	1888	4917	2207
Kerb Side Recycling (Tonnes)	3127	4307	4982
Clean Fill (Landfilled) (Estimate in Tonnes)	16500	36534	43681
Reuse Items (estimate only in Tonnes)	91	5.94	52.78
Chemical / Hazardous Waste (Tonnes)			
Oil	17	13.04	14.40
Batteries	32	8.70	8.08
Chemicals	0	0	0

Source: Great Lakes Council

Figure 6.1.2 Concrete crushing (recycling into roadbase) – Tuncurry waste management centre

Response

The Waste Services section of Council has introduced a number of programs in order to help reduce waste production in the LGA, including:

- The three bin program (providing three separate bins to all residents for green waste, general waste, and recycling)
- The Waste Watchers education program to local schools
- Promotion and coordination of Keep Australia Beautiful Day/Clean up Australia Day/Recycling Week
- Regular bulky waste cleanups
- Development of Reuse, Recycling and Waste Transfer Stations
- Formulating a Policy and Procedures Statement on Hazardous Waste receiving and handling
- Development of shared waste infrastructures and services with Taree and Gloucester Councils (Minimbah Landfill)
- Trialling of resource recovery options for materials such as mattresses, building materials, rechargeable batteries, smoke detectors, gas bottles and computer towers
- Reprocessing of construction and demolition waste - concrete, bricks and tiles
- Active member of MidWaste, a partnership between councils in the Mid North Coast region, resulting in a number of cost sharing and improved efficiency outcomes such as the securing of regional scrap metal and greenwaste contractors and the Primary Schools recycling program.
- Greenhouse gas monitoring of Tuncurry Landfill and capping of landfills to facilitate the passive oxidisation of methane.

Trend Analysis

This trend analysis has separated the data into two types of waste. The first division of data represents the total amount of waste; total waste landfilled; and clean fill (landfilled). The second division represents recycled or reusable material.

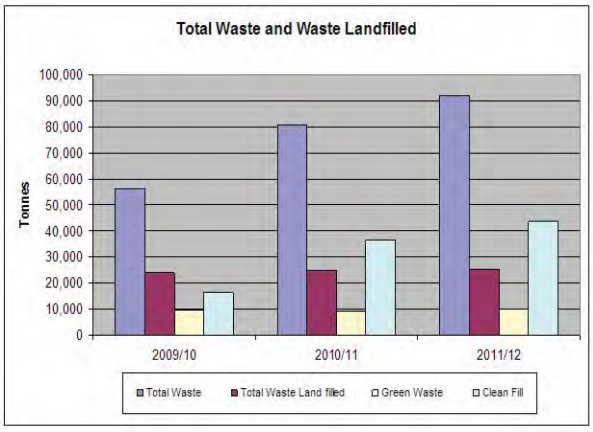


Figure 6.1.3 Total waste and waste landfilled

The amount of waste collected has increased over the past 3 reporting periods, with total waste landfilled and green waste having only minor increases over this period. The amount of clean fill has consistently increased since 2009/10.

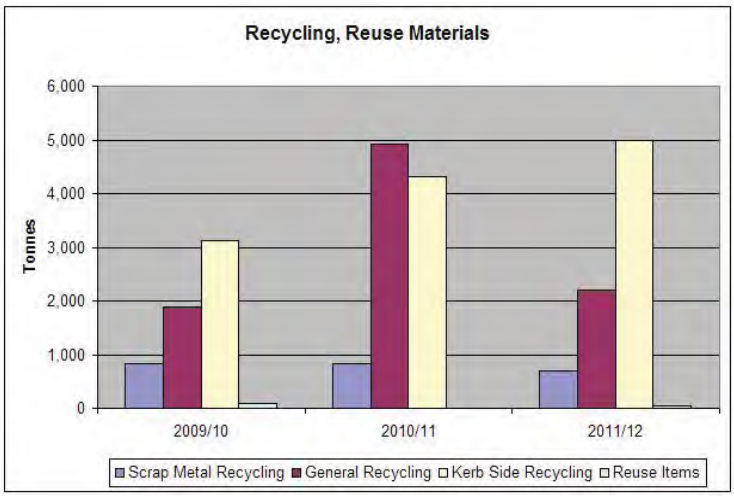


Figure 14.4.1 Recycling and Reuse Materials

The amount of general recycling that has occured over the last 3 reporting periods has varied considerably. The current reporting period shows a decline in scrap metal recycling which may be as a result of the increasing value of scrap metal leading to the sale of scrap metal to private companies. The recycling of reuse materials has remained consistent, although there has been a significant decrease in reuse materials from the previous 2008/09 comprehensive report.

Future directions

The disposal of waste is an ongoing issue that has long term implications for the health of our natural environment. With continuing development and increasing affluence, there will be greater pressure on our landfills and the natural environment. The implications of this has long been recognised with a move to developing more sustainable waste management practices to minimise the quantity of rubbish and hazardous materials entering landfills and, in turn, reducing the impact on the local environment.

The State Government's Waste Avoidance and Resource Recovery Strategy focuses on turning unavoidable waste into a valuable resource. This strategy guides the efforts of State and Local government agencies, industry and the broader community in waste prevention and avoidance, reuse and recycling.

Great Lakes Council is committed to reducing the quantity of waste that enters our landfill. Subsequently alternate waste management methods including recycling and reuse of many materials is encouraged. Council has also put in place a pricing policy to encourage the separation and recycling of material that is received at the waste management centre. However this is a community wide issue, which requires the commitment and cooperation of all residents to ensure the impact we have on the local environment is minimised when it comes to the management of our waste.

It is therefore hoped that this indicator will show a decrease in the quantity of waste that is disposed of in landfill and a corresponding increase in the amount or proportion of material that is recycled and reused.

Table 6.1.2 Identified needs for action regarding waste

Identified Need for Action	Recommended key projects or actions for consideration in next year's Management Plan	Relevant Council section	Are there existing resources for action	Commence by/timeframe
Continue to implement promotional and educational activities that aim to reduce waste to landfill.	Continue and improve waste education initiatives	Waste Services	Y	Ongoing
Continue to expand and improve waste recovery options	Implement Waste Strategy actions into new contracts	Waste Services	Y	Ongoing
Work with Environmental Health and Natural Systems sections to target reduction of urban litter, particularly cigarette butts, plastic bags and fishing line.	Continue and improve waste education initiatives	Waste Services	Partial	Within 2yrs
Work with Purchasing Officer to buy recycled content products	Implement Sustainable Purchasing Policy	Council wide	Y	Ongoing
Management of environmental hazards associated with waste management	Development of an Environmental Management System for the Bulahdelah Waste Transfer Station	Natural Systems and Waste Services	Y	Ongoing - Stage 1 completed

6.2 Sewage treatment and disposal

Introduction

Inadequate sewage treatment and disposal can pose a significant threat to public and environmental health. As such, stringent regulations in the form of licensing have been imposed for all effluent management authorities. Within the Great Lakes, MidCoast Water manages the reticulated sewer system in line with licensing conditions issued by the Department of Environment, Climate Change and Water. In the Great Lakes LGA those living in most towns and villages (comprising 92% of population) have access to the centralised sewerage network with rural and some small village areas generally relying on individual/ on-site sewage management methods (e.g. septic systems).

Effluent discharged into the sewer system is managed at one of five (5) sewage treatment plants (STP) located at Forster, Hallidays Point, Stroud, Hawks Nest or Bulahdelah. The Tuncurry plant has been decommissioned with waste transferred to Hallidays Point. Old Stroud STP has been decommissioned and the new STP started operation in May 2009. The new STP includes 30 ML wet weather storage which allows increasing effluent re-use by farm irrigation.

Dwellings outside the reticulated sewer network rely on on-site sewage management systems (OSMS) as a means of wastewater treatment and disposal. Various appropriate on-site systems are available. Great Lakes Council is responsible for managing OSMS, all of which are required by legislation to be registered with the Council. The registration process assists Council to assess and manage the impact of OSMS with regard to public and environmental health.

Environmentally, both OSMS and sewage systems work effectively if maintained and managed appropriately. As the reticulated sewer system is heavily regulated and bound by licensing agreements, management is relatively effective. Nevertheless, there are serious risks associated with spills of untreated effluent or overflows of sewage from the sewer system. On-site Sewage Management Systems (OSMS) on the other hand are privately managed and their regulation and management is difficult. Neglected OSMS may pose a threat to the local environment if effluent enters nearby waterways or seeps into the ground water.

As an indicator of environmental health, the monitoring of the number of dwellings connected to reticulated sewer and the number of on-site systems provides an indication of pressure placed on the local environment.

Monitoring

Council's Environmental Health section is able to provide information in relation to the number of properties serviced by OSMSs, the type installed and the number of new on-site systems registered.

MidCoast Water is the region's sewage service provider and as such information is sourced from this authority in regards to the number of properties serviced by the sewage system, the type of connection and the number of new connections approved in the reporting year.

MidCoast Water carries out a number of environmental testing programs to monitor the impact of treated effluent release on the receiving water environment. This includes the monitoring of Karuah River, Frys Creek and the Myall River, at Bulahdelah. Groundwater in the disposal areas at Hawks Nest, Hallidays Point and Stroud are also monitored and MCW conducts ecological assessments through the Forster STP ocean release study every 5 years. The ocean study includes flora and fauna in different locations and bioaccumulation of potential contaminants of concern in fish and invertebrates.

Figure 6.2.1 Sewage treatment at MidCoast Water's Hallidays Point sewage treatment plant.

Results

In total there are currently 4137 properties operating registered On-site Sewage Management Systems. A breakdown of these systems has been provided in the table below.

Table 6.2.1 Number of properties operating OSMS and the type of systems installed.

System	09/10	10/11	11/12
Aerated Wastewater Treatment Systems	961	965	975
On-site Disposal Systems	2043	2045	2053
Pump-out Systems	628	629	657
Composting Toilets	66	68	55
Chemical Toilets	39	36	34
Sanitary Pans	17	17	16
Pit Toilets	60	61	65
Mound	81	83	83
Sand Filter	69	71	68
Reed Bed	65	66	60
Biological Filter	32	32	35
Pump to Sewer	14	14	15
Commercial Treatment Plant	8	7	7
Other Systems	25	43	120
TOTAL	4108	4137	4193

Table 6.2.2 Number of new OSMSs installation approvals

Number of new installation approvals:
38

Source: Great Lakes Council

For the reporting period 38 new systems have been approved for installation.

For the reporting period 16 621 properties were connected to the reticulated sewage system, 93 of these were new connections. The total volume of wastewater collected in Great Lakes sewerage system during 2011/12 was 3612 million litres.

Table 6.2.3 Connections to reticulated sewer and waste water collected

	09/10	10/11	11/12
Number of properties connected to reticulated sewage system	16429	16528	16621
Number of new connections	88	99	93
Total volume of waste water collected (million litres)	3426	3540	3612

Source: MidCoast Wat

Trend Analysis

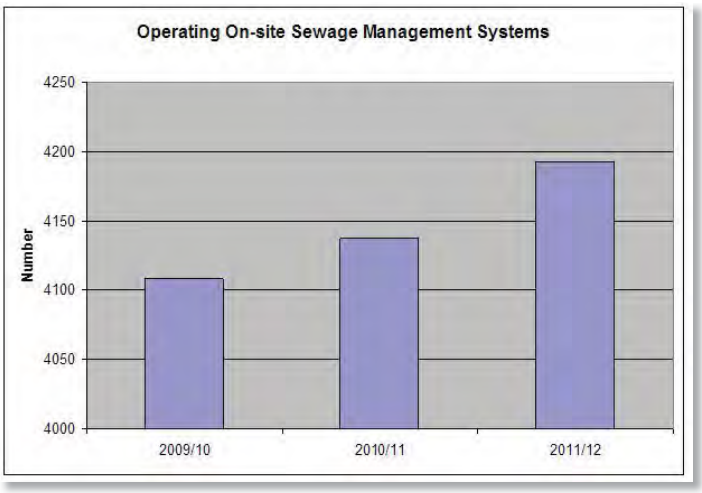


Figure 6.2.2 Total number of on-site sewage management systems

The number of OSMS systems that are operating in the Great Lakes LGA has been steadily increasing over the previous 3 reporting periods. This is most likely attributed to the increase in population, particularly in the outlying unsewered villages and towns.

Summary

Due to financial and environmental limitations it is not feasible to connect all properties within the Great Lakes LGA to the reticulated sewer system. Therefore a proportion of property owners have to utilise On-site Sewage Management Systems to treat their sewage.

However OSMS's are often difficult to regulate, so it is harder to ensure environmental safety from overflows and leaks. Hopefully over time, SoE reporting will indicate an increase in the number of properties connected to the sewage network

and a reduction in the number of properties utilising OSMS's.

Current Response and future directions

Great Lakes Council inspects a minimum of 500 on-site systems per year to ensure they meet environmental and health requirements.

Midcoast water undertakes various projects to improve sewage treatment in the LGA. While no developments have occurred within the reporting year, projects aimed at improving sewage treatment will continue in future years.

6.3 Toxic spills/Pollution Incidents

Introduction

Toxic spills are usually random, one-off incidents that have the potential to cause great pressure on the Great Lakes environment. For example, toxic spills could result from sewage overflows, serious truck crashes or other contamination events. All toxic spills have an impact on the natural environment. The extent of this damage

is determined by the substance(s) released, their amount and the location/ extent of the spill, especially its proximity to sensitive environmental features.

Monitoring

Fire and Rescue NSW and the Rural Fire Service usually respond to incident-based toxic spill events and Fire and Rescue maintains records on the incidents responded to. Further, OEH, the Environmental Protection Authority, and Council's Environmental Services section respond and manage toxic spill events in this LGA.

Results

Fire and Rescue NSW are responsible for maintaining records on toxic spills.

For the last two reporting periods their records are as follows:

Table 6.3.1 Number and Type of spills in LGA

Type and Number	2009/10	10/11	11/12
Combustible spills	0	0	0
Heat related	0	0	0
Other hazardous materials	0	0	0
Miscellaneous hazardous	0	0	0
Aircraft incidents	0	0	0
Other	0	0	0
Total	0	0	0

Source: Fire and Rescue NSW

The information on Table 5.3.2 represents pollution incidents reported to the OEH/EPA where the EPA is the Appropriate Regulatory Authority (ARA) for the incident. Generally Council will not have a role in managing or responding to these reports but the data indicates what incidents have occurred in the LGA.

Table 6.3.2 Number and Type of spills in LGA where OEH/EPA is the ARA

Type and Number	2009/10	10/11	11/12
Air	14	6	8
Chemicals	2	4	4
Threatened Species	3	1	3
NatVeg	11	16	11
Contaminated Land	1	0	0
Noise	33	27	27
Pesticides	3	1	2
Water	6	10	17
Total	73	65	72

The information on Table 5.3.3 represents calls made by Great Lakes residents direct to the OEH Environment Line where some form of pollution or environmental issue was occurring. In these cases, after an initial assessment by Environment Line, it was determined that Great Lakes Council was the ARA and the caller was referred and/or transferred back to Council for further action or investigation.

Table 6.3.3 Number and Type of spills in LGA referred to GLC from OEH

Type and Number	2009/10	10/11	11/12
Air	2	1	7
Corporate	1	15	10
Noise	1	4	3
Water	1	13	8
Land/Nat Veg	N/A	N/A	12
Waste	N/A	N/A	8
Total	5	33	48

The data from Fire and Rescue and OEH does not give an indication of the nature or seriousness of the substance(s) spilled.

Trend Analysis

The number and type of incidents occuring in the Great Lakes LGA has remained steady for the 3 reporting periods. The number of incidents referred to Great Lakes Council from the OEH/EPA has increased for each reporting period.

Summary

It is important that all toxic spills are recorded and that Council is satisfied that all responses to such incidents are appropriate and effective. It is particularly important that a means to identify if there is an area of high risk or recurrence of spills is implemented such that toxic spill blackspots can be identified and appropriately managed.

7 Land

The way we plan and construct our built landscape has a direct impact on the health and function of our natural environment. Development in response to the demands of the increasing population remains one of the largest impacts on the Great Lakes LGA. Unless this development is planned in a sustainable and environmentally appropriate manner and includes the provision for open space, nature reserves, biodiversity, etc the very aesthetics and charm of the Great Lakes will be irreversibly lost.

7.1 Development pressures

Introduction

Development provides for much needed growth in urban populations and employment and provides for increasing affluence and socio-economic growth over time. However, inappropriate development in environmentally sensitive areas can have detrimental and serious effects on the environment on which we all rely. Over-development can also have cumulative environmental impacts that may be less obvious but equally serious. There is a clear need for development to be sustainable and within the thresholds imposed by social, physical and environmental conditions. Consequently, Council has significant responsibilities to carefully manage and provide for growth and development in a sustainable and responsible manner.

This SoE recognises that development can impact on the environment negatively. While it is not a direct indication of specific and measurable environmental impact, the number of development applications approved within the LGA does provide a measure of the amount increased demand for urban land and subdivision, which may in turn increase clearing pressures and affects on waterways through increased pollution.

As well as describing the annual trends associated with the number of Development Approvals within the LGA, this indicator describes trends in relation to how many of these Development Applications involve the consideration of environmental factors, i.e. how many DAs have the potential to exert significant pressures on the environment.

Monitoring

Data pertaining to the number and type of activities consented to through development approvals is collected and maintained by Council's Planning and Environmental Services division. When development activities are likely to require consideration of environment factors they are referred to the Natural Systems section, where data on the nature and scope of environmental impacts is collected and is included in this SoE.

This indicator also considers the changes to planning zones made during the year in relation to area (ie. rural to environmental protection). This information is collected by the Strategic Planning section.

Results

For the 2011/12 reporting period Great Lakes Council received 452 development applications and processed 430 construction certificates.

Table 7.1.1 Number of Development Applications and Construction Certificates received.

Year	Number of Development Applications	Number of Construction Certificates
09/10	601	563
10/11	590	506
11/12	452	430

57 DA's were referred to Council's Natural Systems and Estuaries section pertaining to environmental matters. From these referrals, the following data has been collated:

Trend Analysis

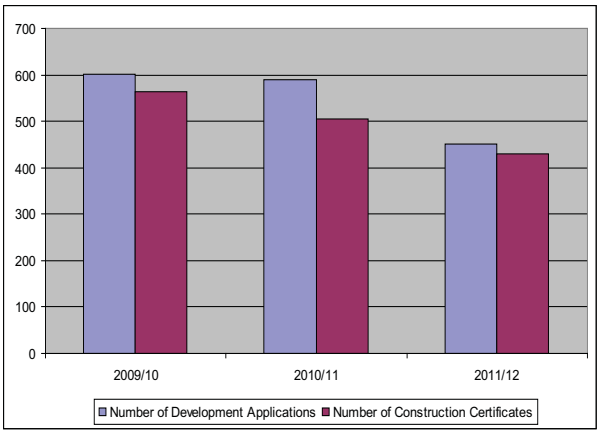


Figure 7.1.1 Development applications & construction certificates

The data shows that the number of development applications and construction certificates has decreased over the previous 3 reporting periods.

Table 7.1.1 Number of DAs referred to Council's Natural Systems Section on Ecological Grounds

No. of DA Referrals to Natural Systems on Ecological Grounds			
Location	09/10	10/11	11/12
Bombah Point	1	0	0
Boolambayte	0	0	0
Booral	2	4	2
Bulahdelah	7	0	1
Bundabah	1	0	0
Bungwahl	1	0	2
Bunyah	0	1	1
Carrington	0	0	0
Coolongolook	2	5	0
Coomba Park	2	0	0
Darawank	1	1	3
Duralie	0	0	0
Failford	8	7	7
Forster	4	2	4
Girvan	0	0	0
Green Point	0	0	0
Hawks Nest	0	5	5
Karuah	0	0	0
Limeburners	3	0	0
Markwell	1	1	0
Mayers Flat	2	0	2
Minimbah	0	1	1
Monkerai	0	1	1
Nabiac	1	1	3
Nerong	0	1	0
Nooroo	1	0	0
North Arm Cove	2	2	3
Pacific Palms	3	3	5
Pindimar	0	2	0
Seal Rocks	0	0	2
Shallow Bay	0	0	3
Smiths Lake	4	4	12
Stroud	1	1	1
Stroud Road	0	1	1
Tarbuck Park	0	0	1
Tea Gardens	3	4	5
The Branch	1	0	2
Tiona	0	0	0
Topi Topi	0	1	0
Tuncurry	2	4	2
Upper Karuah River	1	0	0
Upper Myall	0	0	0
Wallingat	1	1	0
Wallis Island	0	0	0
Wallis Lake	1	0	0
Wards River	2	2	1
Warranulla	0	1	0
Washpool	1	0	0
Weismantels	0	0	1
Whoota	0	1	0
Wootton	1	0	0
Total	60	57	72

Table 7.1.2 Type of Development referrals to the Natural Systems section on Ecological Grounds

No of DA Referrals to Natural Systems on Ecological Grounds			
Development Type	09/10	10/11	11/12
Aged Care	0	1	0
Agriculture	0	0	0
Aquaculture	0	0	0
Billboard/ Sign	0	0	1
Boat Ramp/ Jetty	2	1	4
Boat Shed	0	0	1
Boundary Adjustment	1	2	3
Building Envelope	0	1	0
Bulk earthworks/ filling of land	0	2	0
Bushfire APZ	0	0	1
Carpark	0	0	1
Commercial Development	2	3	1
Dredging	3	0	0
Driveway/ Road	1	0	0
Extensions/ additions	0	2	1
Fence	0	0	7
Industrial Development	0	0	0
Landscaping/ Landscape Mound	0	0	0
Mining/ Extraction	0	0	0
Multiple dwellings	1	1	1
Place of Worship	0	0	0
Poultry/ Turkey Shed	1	2	1
Public Events/ Recreation	1	3	2
Retaining Wall	1	1	0
Rural Land-sharing Development	0	1	0
Sheds/ Garages	1	0	2

Single dwelling - residential zone	24	5	17
Single dwelling - rural residential zone		6	4
Single dwelling - rural zone		12	8
Single dwelling - conservation zone		1	1
Subdivision - residential (14:36 lots)	5	7	3
Subdivision - rural residential (2:63 lots)		2	3
Subdivision - rural (8:7 lots)	12	3	7
Swimming Pool	0	0	0
Tall Building	0	0	0
Telecommunications	1	0	0
Tourist Development	2	1	3
Waste Facilities	2	0	0
Total	60	57	72

Table 7.1.3 Ecological reporting and outcomes for DAs referred to Natural Systems

Ecological Reporting and outcomes	09/10	10/11	11/12
No/ Percentage of DA's requiring no specific ecological reporting	49 (81.7%)	43 (75.4%)	59 (81.9%)
No/ Percentage of DA's requiring/ provided with an Assessment of Significance	10 (16.7%)	14 (24.6%)	13 (18.1%)
No/ Percentage of DA's requiring an SIS	0 (0%)	0 (0.0%)	0 (0.0%)
No/ Percentage of DA's requiring an EIS	1 (1.7%)	0 (0.0%)	0 (0.0%)
No/ Percentage of DA's approved with no ecological conditions	1 (1.7%)	3 (5.3%)	4 (5.6%)
No/ Percentage of DA's approved subject to specified ecological conditions	54 (90.0%)	53 (93.0%)	60 (83.3%)
No/ Percentage of DA's where assessment was deferred pending the provision of additional information	2 (3.3%)	0 (0.0%)	1 (1.4%)
No/ Percentage of DA's recommended for refusal by the Natural Systems Branch on ecological grounds	3 (5.0%)	1 (1.8%)	7 (9.7%)
No of DA's assessed as State Significant Developments	2[1]	0	0
No of DA's assessed in the NSW Land and Environment Court	2[2]	0	0

Table 7.1.4 Referred DAs relating to Threatened Species

Threatened Species	09/10	10/11	11/12
No/ Percentage of DA's involving land known or found to contain habitat of an endangered ecological community	8 (13.3%)	2 (3.5%)	11 (15.3%)
No/ Percentage of DA's involving land known or found to contain the habitat of an endangered population	0 (0%)	2 (3.5%)	0 (0.0%)
No/ Percentage of DA's involving land known or found to contain threatened flora or fauna species	11 (18.3%)	15 (26.3%)	8 (11.1%)
No of DA's where the following species, populations or communities were detected:			
Asperula asthenes	0	1	1
Corunastylis littoralis	0	0	1
Lindernia alsinoides	1	0	1
Syzygium paniculatum	0	0	0
Brush-tailed Phascogale	0	1	0
Koala	1	4	4
Yellow-bellied Glider	0	0	0
Squirrel Glider	2	5	3
Grey-headed Flying Fox	1	4	2
Eastern Blossom Bat	0	0	0
Yellow-bellied Sheathtail Bat	0	0	0
Eastern Freetail Bat	1	0	0
Eastern False Pipistrelle	0	1	1
Greater Broad-nosed Bat	0	3	1
Little Bent-wing Bat	3	2	1
Eastern Bent-wing Bat	2	0	2
Southern Myotis	1	0	1
Eastern Cave Bat	2	0	0
Wallum Froglet	0	3	0
Osprey	0	0	0
Pied Oystercatcher	1	0	0
Glossy Black Cockatoo	5	1	1
Powerful Owl	0	0	1
Barking Owl	1	0	0
Masked Owl	1	0	0
Grass Owl	0	0	0
Varied Sitella	0	1	1
Subtropical Coastal Floodplain Forest EEC	0	1	0
Swamp Oak EEC	3	0	4
Swamp Sclerophyll Forest EEC	1	1	4
Saltmarsh EEC	1	2	0
Littoral Rainforest EEC	1	0	3
Lowland Rainforest EEC	3	0	0
Themeda Grassland EEC	0	0	0

The following table gives an indication of the area of land occurring within each zoning in the Great Lakes LGA. These zones determine what developments can and cannot take place in certain areas and represent an important method of strategic planning. Over time, reporting this information will indicate the growth or decline of important zones such as 7a1 Environmental Protection. Please note that some figures recorded may appear inaccurate as they have been sourced from planning documents that have not been progressively updated to reflect changes in tenure (for example, the area of National Parks is known to be larger than the area represented in zone 8 and the area of Open Space reported in Section 6.2 is greater than the area represented in zone 6a).

Figure 7.1.2 Development can mean the loss of important habitat for fauna

Table 7.1.6 Area of land contained in each zone

Planning Zone	Area (ha) in each zone 2009/10	Area (ha) in each zone 2010/11	Area (ha) in each zone 2011/12
1(a) Rural	194,711	194,500	194,250
1(c) Future Urban Investigation	2,139	1956.65	1927.26
1(d) Small Holdings	1,372	1471.61	1474.07
1(d1) Rural Residential	107	128.008	149.261
1(f) Forestry	78,357	78357.23	78357.23
2 Village	1,263	1263.18	1263.31
2(a) Low Density Residential	970	1052.41	1131.33
2(b) Medium Density Residential	150	151.871	159.376
2(c) High Density Residential	38	37.515	37.515
2(f) Mixed Residential-Commercial	206	205.526	231.364
2(g) Environmental living/ low impact development	34	34.432	34.432
3(a) General Business	35	35.163	35.163
3(d) Special Business Waterfront	6	6.286	6.286
4(a) General Industrial	83	94.119	94.119
5(a) Special Uses	215	212.071	217.071
5(c) Local Road Reservation	4	9.235	9.235
5(d) Arterial Road Reservation	-	-	-
6(a) Open Space	567	576.151	576.151
7(a) Wetlands & Littoral Rainforest	2,403	2314.31	2314.31
7(a1) Environmental Protection	1,010	1264.96	1417.82
7(b) Conservation	6,599	6599.48	6605.7
7(c) Scenic Protection	1,857	1857.46	1857.46
7(f1) Coastal Lands Protection	557	557.054	529.558
7(f2) Coastal Lands Acquisition	63	62.938	62.938
8(a) National Parks & State Recreation	34,507	34506.91	34506.79
8(b) National Parks & State Recreation Areas	191	191.053	191.053

Restricted Access – 1.287 ha

B6 – 3.247 ha

MLEP – 1,183.06 ha

Table 7.1.7 Strategic Plans in Progress

Project	Location	Area of land rezoned from 1 (c)* or unspecified to Environment Protection (ha)	Area of land rezoned from 1 (c)* or unspecified to Residential/ Rural Residential/ Industrial etc (ha)	Status
LEP No. 27 & 50	North Hawks Nest	500	90	Draft LEP adopted by Council. Awaiting VPA signoff before submitting to Minister to be made.
LEP No. 13	Pacific Palms -Stage 2	350	17	LEP (Stage 2), VPA and DCP currently being prepared.
LEP No. 52	Carmona Drive	6.7	21	Draft LEP and DCP adopted by Council awaiting finalisation of VPA. Land rezoned
LEP No. 72	Tropic Gardens Drive	33	9	Draft LEP adopted by Council awaiting finalisation of VPA and DCP
LEP No. 70	North Shearwater	48	74	Pending gazettal. VPA on exhibition
LEP No. 23	Myall River Downs	Not yet determined	Not yet determined	Planning Proposal endorsed by Department of Planning for exhibition
LEP No. 73	Fairview West	0	21	Draft LEP adopted by Council awaiting finalisation of VPA
LEP No. 46	Follyfoot Farm	7	21	Land rezoned
LEP No. 74	Bulahdelah	Not yet determined	Not yet determined	Planning Proposal/ Draft LEP submitted to the Minister for Planning

* 1(c) - Future Urban Investigation

LEP = Local Environmental Plan,

LES = Local Environmental Study

VPA = Voluntary Planning Agreement

Response

Council currently has a number of strategic plans in place to manage development. Strategic landuse planning is the forward planning which provides an overall sense of direction and a context for detailed decisions that councils and state agencies make in relation to future land use and service provision. A strategic plan outlines a vision for the future development of a region or locality and a strategy to achieve it.

Strategic planning can be done for part of, or the entire local government area (LGA). Strategic plans sit at the top of the planning hierarchy and set the overall "big-picture" with consistent aims, objectives and guiding principles. Local Environmental Plans (LEP) allows the strategic plans to be implemented by setting rules for the development of specified land. Finally, Development Control Plans (DCP) outline the detailed development outcomes of subject areas.

More detailed information on Strategic Plans and Local Environmental Plans is available from Council Offices and Council's website.

Summary and future directions

Inappropriate development is a key threat to the health of our local environment and needs to be monitored carefully. There is an identified need to establish a small working group and re-formulate internal Council reporting and data management procedures so that development statistics are accurately reportable. There is also a need to formulate a clear process and procedure to ensure that all developments that concern environmental factors are given adequate consideration by the appropriate environmental staff in council.

Table 7.1.8 Identified needs for action regarding land development

Identified Need for Action	Recommended key projects or actions for consideration in next year's Management Plan	Relevant Council section	Are there existing resources for action	Commence by/timeframe
Develop and implement a policy for ecological considerations in development assessment planning that includes standard survey and assessment guidelines, standard ecological conditions and codes of practice/ design considerations for pertinent ecological features	Develop a policy/ direction for Development Assessment advice	Natural Systems	N	Ongoing

7.2 Open space

Introduction

Council, as part of its ongoing commitment to provide appropriate and effective sport and recreation opportunities, currently manages an array of reserves that make up the open space network. This network includes land categorised into sports fields, parks, bushland, and reserve. Each have a specific purpose and the basis of supply is underpinned by community need, access to opportunities and a general ratio per population. Each of these qualifiers can not be used in isolation, however, combined make a powerful strategic tool in identifying the requirements of the existing and future population.

Monitoring and results

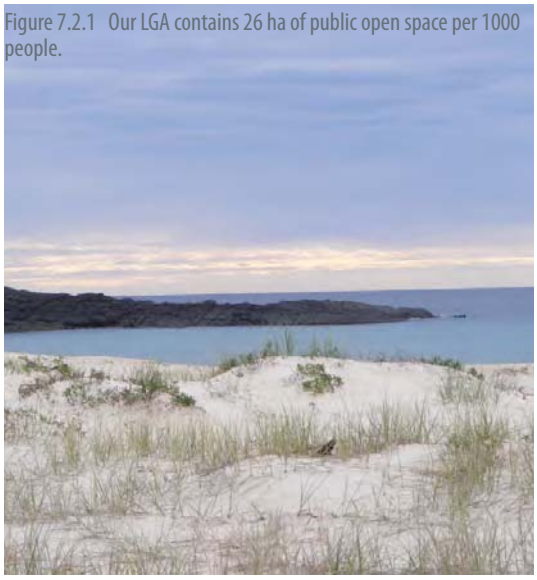
The cataloguing of these opportunities, and the needs assessed from a gap analysis, are contained in the Recreation Open Space Strategy Plan (2006). That plan highlighted the current population has 746ha of land offered in various forms to meet the recreation, social and cultural needs of the community. In 2011/12 the amount of Council owned and managed open space - natural areas was 918 ha. There are also significant stretches of natural areas including foreshores that ensure the ecological sustainability of vulnerable areas is maintained. The data collected in 2011/12 suggests that there is currently 26ha of open space per 1000 people.

As mentioned, the provision of open space purely on a ratio basis is not guaranteed to meet demand. It should be underpinned by additional user analysis. In 2009, council finalised the findings of its comprehensive community survey. The results of which showed the communities opinion on the importance of Parks and Reserves was "Highly" and the current provision as being "Satisfactory".

Summary and future directions

Recognising both assessment tools need to be updated the Recreation Open Space Strategy Plan is scheduled for review in 2012. This will identify what previously determined needs have been fulfilled and what still require addressing. This will be a continuing process as community needs change over time and the provision of quality open space is essential in assisting with community well being.

Figure 7.2.1 Our LGA contains 26 ha of public open space per 1000 people.



7.3 Roads

Introduction

The construction and use of roads, even when sensitively designed, can significantly impact on the local environment. A number of issues which may arise due to road development include:

- Chemical and noise pollution
- Fragmentation of wildlife habitat
- The formation of barriers to wildlife movement and dispersal
- Mortality of wildlife through collisions with vehicles
- Impact on the aesthetic value of an area
- Pollution issues during construction and use
- Vegetation removal
- Degradation of natural patterns and processes eg. erosion
- The spread of weeds and feral pests

As such, where possible the construction of roads should be minimised and where road development is essential, all of the above issues need to be considered and resolved to ensure minimal impact on the local environment.

Monitoring

Records are available within the Transport Assets section of Council's Engineering Division, on an annual basis, in relation to the total length and area of urban, rural and regional roads that are maintained by Council. This data also provides a record on the proportion of unsealed and sealed roads in the LGA.

The intent of this indicator is to monitor the construction and quality of roads within urban, rural and regional areas of the LGA.

Results

In total the Great Lakes LGA contains 1,119 km of council controlled roads. Table 6.3.1 identifies the proportion of the road network that is unsealed.

Table 7.3.1 Total length and area of Council maintained roads and proportion of unsealed roads.

	09/10	10/11	11/12
Urban Road Length (km)	260	262	263
Proportion Unsealed of Urban Road Length	6.5%	6.9%	7.1%
Rural Road Length (km)	698	699	700
Proportion Unsealed of Rural Road Length)	63.9	66.6	69.1
Regional Road Length (km)	136	136	136
Proportion Unsealed of Regional Road Length)	0%	0%	0%
Total Road Length (km)	1116	1119	1121
Total Proportion of unsealed length	41.6%	41.4%	41.3%
Total Road Area (m2)	7,193,664	7,210,303	7,213, 401
Total Proportion of Unsealed Area	32.5%	32.4%	32.3%

Source: Great Lakes Council.

Please note: road network was remeasured in 2005.

Summary

Sealed roads occupy the majority of the total Council controlled road network in relation to both total road length and total road area. However a significant length of unsealed roads is present in this LGA, particularly in rural areas.

Response and future directions

Council is aware of the environmental impacts of roads, in particular the impacts of unsealed roads (for example erosion and sedimentation of waterways and drainage lines). Council currently has a rolling program in place to seal all urban unsealed roads over a twenty year period from 1998. This is part of the Urban Road Construction Program.

The Rural Road Construction Program was deferred for the 20010/11 reporting year. Road sealing of the approaches to Old Inn Road crossing and Wild Cattle Creek were completed in 2011/12 as a result of acquired funding. Further erosion and sediment control and sealing works were also completed on Reynolds Road, Hubbards Road South and Viloet Hill Road. The following is the priority list when the program recommences:

- Bundabah Road
- Seal Rocks Road
- Bombah Point Road
- Wattley Hill Road
- The Branch Lane
- Willina Road

Figure 7.3.1Roads, such as the Pacific highway, greatly damage and fragment habitat

Table 7.3.2 Identified needs for action regarding roads

Identified Need for Action	Recommended key projects or actions for consideration in next year's Management Plan	Relevant Council section	Are there existing resources for action	Commence by/timeframe
Develop plans and procedures for managing and reducing environmental impacts during road maintenance (Roadside environmental management plans/strategies).	Roadside Environmental Management Plan (progress development)	Engineering Services	Y	Ongoing
Reduce sediment and erosion impacts from road construction	Implement and monitor erosion and sediment control management system for road construction	Natural systems and Engineering Services	Y	Ongoing

8 Air

The quality of the air we breathe has always been a contentious issue in Australia. Through a deterioration of air quality, the health of the community can be compromised and the sustainability of our lifestyles and economies can be negatively impacted.

Air quality within the Great Lakes is comparatively good due to the area's low population base and minimal industrial operations. However, residents of the Great Lakes contribute to the overall deterioration of the world's atmosphere through the electricity we use, the cars we drive, the wood we burn in our heaters, etc. Of great concern is climate change and the amount of carbon we contribute to the atmosphere. The predicted effects of global warming would have a significant impact on our infrastructure, the environment and our lifestyles. This would be due to the predicted occurrences of sea level rise and altered climate (increased storms, etc).

Figure 8.1 Car exhaust emits pollution into the atmosphere.

8.1 Electricity usage and green house gas emissions

Introduction

Burning fossil fuels such as coal for the generation of electricity has been identified as a major contributor to global warming. During the generation process carbon dioxide, a greenhouse gas is emitted. Naturally carbon dioxide is an essential part of the atmosphere. However in excessive amounts carbon dioxide can overheat the earth. This warming has the potential to drastically alter natural systems to the point where plant and animal species are unable to adapt to the new conditions and may die out. There is also the risk that melting polar ice caps will cause higher sea levels that could greatly impact on coastal regions such as the Great Lakes.

Due to the impact of energy generation on the environment and the non renewable nature of fossil fuels, renewable sources of energy such as wind, tidal and solar power are being investigated globally. Until such time as alternate sources of energy become widely available it is essential that energy use be kept to a minimum to reduce the effect of carbon dioxide on the environment.

Monitoring

Overall greenhouse gas emission from electricity usage within the Great Lakes is relatively low due to our small population size. Information in relation to energy sources, usage and emission of greenhouse gas within domestic and commercial premises is available from the regional electricity authority, Essential Energy.

Results

The table below shows the breakdown of energy consumption in the Great Lakes LGA.

Figure 8.1.1 Burning fossil fuels for electricity contributes to global warming

Table 8.1.1 Energy consumption for Great Lakes LGA

Year	2009/10	2010/11	2011/12
Residential energy usage (MWhs)	115,209	120,618	111,577
Commercial energy usage (MWhs)	79,682	79,025	79,082
Total MWh's	194,891	199,643	190,659
Residential CO2 produced (tonnes)	122,698	129,061	118,829
Commercial CO2 produced (tonnes)	84,861	84,557	84,222
Total CO2 tonnes	207,558	213,618	203,051

Source: Essential Energy

The table above shows the Great Lakes LGA used 190,659 Mega Watt hours of electricity over the reporting period and produced 203,051 tonnes of carbon dioxide by using this electricity.

Trend Analysis

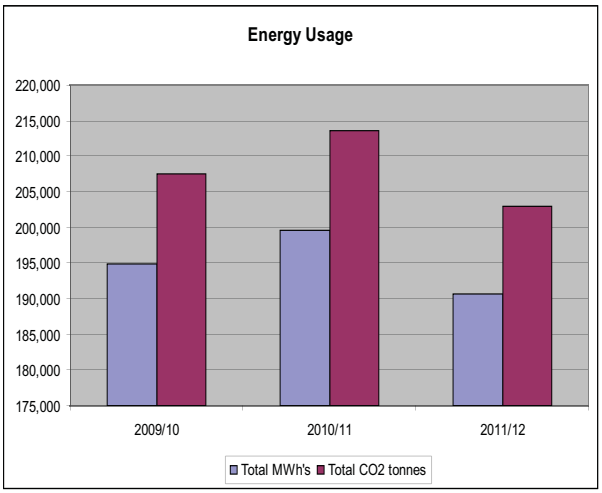


Figure 8.1.2 Total energy use and CO2 emissions for the LGA

There have been only relatively small changes in the amount of energy used and carbon emitted over the 3 data collection periods. The data indicates that 2011/12 recorded lower energy use and carbon emissions than 2009/10 and 2010/11. This may be indicative of rising energy costs and increasing awareness and use of renewable energy sources.

The Great Lakes LGA has an approximate growth rate of 1.33% per annum. While total carbon emissions have increased slightly over recent years, total CO2 emissions per head of population have reduced (see below).

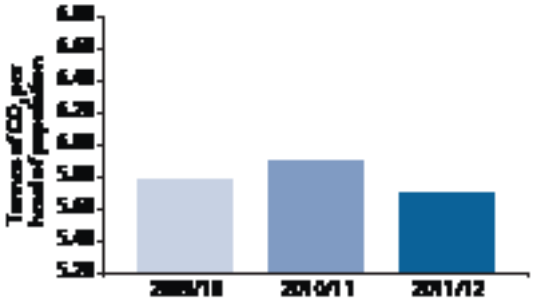


Figure 8.1.3 Carbon emissions per head of population for Great Lakes LGA

Response and future directions

There is growing evidence indicating that coal powered electricity is unsustainable and detrimentally effects our environment, particularly through global warming and climate change. All sectors of society need to take action to reduce unsustainable electricity consumption including residents, business and government.

During the reporting period, and in line with the previous recommendation from last years SoE report, energy audits have been conducted at major council buildings and GLC is currently monitoring all of its electricity and water consuming assets through the Planet Footprint Environmental Scorekeeping service. The results of this will feed into the development of policy for all of council and assist the development of key-performance indicators for the sustainability of council's operations into the future.

Table 8.1.2 Identified needs for action regarding electricity usage and green house gas emissions

Identified Need for Action	Recommended key projects or actions for consideration in next year's Management Plan	Relevant Council section	Are there existing resources for action	Commence by/timeframe
Develop indicators to include greenhouse emissions from other sources eg. Car use, food production.	Continue to implement Great Lakes Councils Sustainability Strategy	Natural Systems	Partial	Within 2yrs
Attempt to formulate policy and action such that Council operations and decision making progress towards being carbon neutral	Continue to implement Great Lakes Councils Sustainability Strategy / Review integration of existing Sustainability Strategy with Community Strategic Plan	Natural Systems	N	Within 5yrs

9 Noise

Noise pollution can disturb our work, concentration, relaxation and sleep. It can cause stress and create or worsen physical problems such as high blood pressure, chronic exhaustion and heart disease. A quieter environment is a restful place that promotes relaxation and a happier and healthier community.

Within the Great Lakes premises/ activities that create potential excessive noise are regulated through the DA process. Furthermore Council addresses separate noise complaints in accordance with the POEO Act. Therefore noise generation is not considered a viable indicator of environmental trends at this time. As such, no indicators for this theme are deemed relevant to Council's SoE process at this time.

10 Heritage

The NSW Heritage Act 1977 defines environmental heritage as being 'those places, buildings, works, relics, moveable objects, and precincts, of State or local heritage significance'. Two key pieces of legislation, the National Parks and Wildlife Act 1974 and the Environmental Planning and Assessment Act 1979, protect Aboriginal heritage within the Great Lakes LGA.

10.1 Non-Aboriginal heritage

Introduction

Sites of natural and cultural heritage significance are subject to pressures from development and urbanisation, particularly where developments are proposed or take place immediately in the vicinity of such heritage items. Heritage items are also subject to environmental and additional anthropogenic pressures depending on their nature and tenure.

Monitoring and results

Council's Strategic Planning section has compiled a Great Lakes Heritage Study, which was adopted by Council in May 2007. The study, which has been developed with the aid of the community, identifies items of heritage significance and heritage conservation areas. The study is based on guidelines issued by the NSW Heritage Office for community based heritage studies and lists 354 heritage items, including contributory items. Items of contributory significance have been identified as having heritage significance but after consideration have not been recommended for individual heritage listing.

Figure 10.1.1 Pilot Hill, Forster is listed as a place of local historical importance - maritime shipping

Table 9.1.1 lists 19 items of natural heritage significance, and their respective identifier codes, which have been listed within the Great Lakes Heritage Study.

Table 10.1.1 Natural Heritage Items

Location	Heritage site
BULAHDELAH	1. Bulahdelah Mountain also known as the Alum Mountain (Bu04) - Includes the Underground Rock Orchid, Rock Orchid - Dendrobium species, Aboriginal Scarred Trees, and the Alum Mountain Park.
CARRINGTON	2. Three Moreton Bay Fig Trees on waterfront near oyster lease (Ca13) - (contributory item only). 3. Tahlee House grounds and gardens (Ca10) - Important relics of early garden and landscape styles.
FORSTER	4. Waterfront, Little St, waterside vegetation, the 'little baths' and concrete block from Albert von Ehlefeldt's shop and bakery wharf - (Fo08) - Includes important remnants of remaining littoral vegetation 5. Forster Breakwater (Fo08) - Of maritime shipping historical importance. 6. Pilot Hill, Forster (Fo09) - Of maritime shipping historical importance as well as important open space reserve, local landmark and geographical feature. 7. Cape Hawke Drive, Reynolds Hill (Fo17) - Includes Moreton Bay Fig.
NABIAC	8. Dwelling including Canary Island Palms (Na04) - Mature Canary Island Palms with conspicuous streetscape element.
SEAL ROCKS	9. Blowhole (SR09) - possibly of Aboriginal significance. Further investigation by NPWS required (contributory item only).
STROUD ROAD	10. Washpool, near Washpool Bridge (SD03) - Important site from Australian Agricultural Company days but no physical evidence remains other than the pool (also listed as an item of heritage significance in Great Lakes LEP 1996).
TEA GARDENS/ HAWKS NEST/ WINDA WHOPPA	11. Large fig tree near 59 marine Drive and large fig tree outside Police Residence, 51 Marine Drive (TG17) - Strong streetscape value.The first item in particular is an excellent example of its type.Both appear to be native to the area. 12. Norfolk Island pines near 45 - 47 Marine Drive (TG34) - Prominent streetscape elements and historically popular and significant planting in seaside and riverbank localities (one suffering dieback). 13. Norfolk Island pines, 38 The Anchorage, Winda Woppa (HN06) - Significance as a landmark and historic navigational point. 14. Memorial Park (TG36) - War memorial park and entrance gates.
TIONA	15. The Green Cathedral including adjacent wharf remains (Ti01) - Important for social and historical reasons as the Great Lakes area's first and only outdoor cathedral.
TUNCURRY	16. John Wright Park including Norfolk Pines (Tu08) - Important association with the Wright family. Important landscape waterfront element. 17. Memorial Park (TU14) - Important open space and visual element of the proposed Tuncurry Heritage Conservation Area. 18. Six Canary Island palms on Taree St and at Tokelau (Tu10) - Conspicuous streetscape elements that enhance the proposed Tuncurry Heritage Conservation Area's historical significance. 19. Norfolk Island Pines, Tokelau (TU11) - Conspicuous streetscape elements that enhance the proposed Tuncurry Heritage Conservation Area's historical significance.

The Heritage Study, including the location of heritage items can be viewed on Council's website, or alternately can be purchased at Council's Offices upon request.

10.2 Aboriginal heritage

Introduction

Similarly to natural and cultural heritage items, sites of Aboriginal heritage are also subject to development and environmental pressures.

There is a legislative requirement for Councils to consider items and sites of Aboriginal cultural significance in their decision making processes. As such, archaeological investigations are commonly required as supporting material for Development Applications, Local Environmental Studies and Reviews of Environmental Factors. The management/ conservation of Aboriginal cultural sites is often a complex issue that entails such considerations as adequate site protection, cultural sensitivities, etc.

Monitoring

Aboriginal Site management is principally the responsibility of the Office of Environment and Heritage (OEH), with the assistance of the relevant Local Aboriginal Land Council/ Aboriginal community. An Aboriginal Heritage Information Management System (AHIMS) is administered by OEH with respect to Aboriginal Sites. The AHIMS includes a database and recording cards for all Aboriginal objects, Aboriginal places and other Aboriginal heritage values in NSW that have been reported to the NPWS in addition to a database index of archaeological reports and a library of these reports.

Previous SoE reports had attempted to include an indicator on Aboriginal sites and their management (protection, destruction, etc). However, considering that much of the information on Aboriginal historical sites/items is maintained by the OEH this has proved to be beyond the scope of the SoE. As such, no indicator for Aboriginal site management has been provided in the present SoE report.

Results

The Great Lakes Heritage Study was intended to cover all aspects of European cultural and natural heritage. During the preparation of the study a number of Aboriginal sites/items were brought to the attention of Council. These items were included in the study to ensure their ongoing protection, notwithstanding that OEH (under the National Parks & Wildlife Act 1974) is the primary agency responsible for the identification and listing of Aboriginal items/sites of heritage significance.

Continued investigation is needed to accurately document items and sites of Aboriginal cultural heritage significance that have not previously been identified within the Great Lakes area by either OEH or Council.

Summary and future directions

This SoE has identified the need for enhanced liaison, understanding and cooperation between Council, the Aboriginal community and the relevant government agencies to ensure that sites are appropriately managed and protected. This should occur both through proactive land management programs and through development and rezoning proposals.

To this end, Council should aim to foster and promote constructive liaison with the local Aboriginal community and establish appropriate and meaningful protocols for Aboriginal site management and protection in the Development Application process, rezonings and its own works program.

Figure 10.2.1 Aboriginal Heritage Conservation Officer, Steve Brereton delivers a cultural heritage education session at Burgess Beach open campsite

Table 10.2.1 Identified needs for action regarding Aboriginal heritage

Identified Need for Action	Recommended key projects or actions for consideration in next year's Management Plan	Relevant Council section	Are there existing resources for action	Commence by/timeframe
Investigate the employment of a Aboriginal Liaison Officer such that greater cooperation and action with respect of cultural sensitivity, liaison and opportunities can be achieved between Council and the local Aboriginal community, with respect of economic, social and environmental outcomes;	Aboriginal Liaison Officer (employment)	Council wide	N	Immediate
As part of any future review of Council's development consent processes, devise and implement an appropriate range of tools for respecting, managing and protecting Aboriginal heritage and allowing greater consultation, between Council and the local Aboriginal community, in the determination/ approvals process. Develop a framework that considers and addresses issues associated with landscape conservation with due respect to cultural sensitivities.	Collaborative Framework for consideration of Aboriginal Heritage	Council wide	N	Within 2yrs
	Cultural heritage training for relevant staff	Council wide	N	Within 2 yrs

11 Community Involvement

11.1 Community volunteers

Great Lakes Council facilitates and supports many voluntary groups that work on council property across the LGA. This includes, weeding, revegetation works, water quality monitoring and an underwater group. The following table provides and outline of the groups and their main activities.

Group	Work Location	Vegetation Community	Weeds	Main tasks (Group)	Meeting Time / Frequency
Blueys Beach Dunecare	Blueys Beach	Coastal Heath with Littoral Rainforest patches (on headland and at southern end of beach).	Bitou (*Chrysanthemoides monilifera* var. *rotunda*), Senna (*Senna pendula* var *glabrata*, Mother of Millions (*Bryophyllum* sp.), Lantana (*Lantana camara*), Turkey Rhubarb (*Acetosa sagitatta*), Glory Lily (*Gloriosa superba*), Gazania (*Gazania rigens*), Asparagus Fern (*Asparagus aethiopicus*)	Bitou Bush removal along beach, Asparagus Fern on Headland Trail, Senna, Lantana	One Saturday per month, 2-3 hours
Bennetts Head Landcare	Bennetts Head	Themeda Grassland next to cliff, with scattered rainforest patches, adjacent to large mown areas. Large rainforest area to the south of Lookout	Lantana (*Lantana camara*), Mother Millions (*Bryophyllum* sp.), Madiera Vine (*Anredera cordifolia*), Paspalum, Kikuyu.		Friday mornings, 2-3 hours.
Boomerang Beach DuneCare	North Boomerang	Coastal Heath / Scrub, Tuckeroo patches throughout (hind dune and in southern area near toilet), Themeda Grassland at foot of Boomerang Head.	Main threat = Bitou (*Chrysanthemoides monilifera* var. *rotunda*), also Asparagus fern (*Asparagus aethiopicus*), Senna (*Senna pendula* var *glabrata*), Gazania (*Gazania rigens*), and Lantana (*Lantana camara*)	Working from northern end, targeting bitou and other emergent weeds, replanting.	Thursday mornings, 8:30am, 2-3 hours
Burgess Beach CoastCare	Burgess Beach	Littoral Rainforest, with *Cynanchum elegans* (3 populations).	Climber weeds (see mgt plan), Senna (*Senna pendula* var *glabrata*), Lantana (*Lantana camara*), Bitou (*Chrysanthemoides monilifera* var. *rotunda*)	Awaiting approval to commence works	Monday mornings, 8am, 2-3 hours
Burraneer Saltmarsh	Burraneer Road	Saltmarsh, Mangrove, Casuarina / Sclerophyll forest	Lantana, Senna, Ipomoea, White Passionflower, *Asparagus aethiopicus*, *Araujia hortorum*	Primary and follow-up weeding	As required (only one volunteer)

Group	Work Location	Vegetation Community	Weeds	Main tasks (Group)	Meeting Time / Frequency
Coomba Aquatic Club Landcare	Coomba Aquatic Gardens	Wetland - Saltmarsh, Casuarina / Palm Forest; Peninsula - Eucalyptus tereticornis/ spotted gum/ casuarina, with rainforest emergents along southern flank.	Moth Vine (*Araujia hortorum*) *Passiflora suberosa*, *Ipomoea cairica*, *Asparagus aethiopicus*, *Asparagus asparagoides*, *Senna pendula* var. *glabrata*, *Senecio mikanioides*	Ground Maintenance (Mowing, track maintenance, amenity maintenance), follow-up weeding on peninsula bushland and wetland.	Thursday mornings, 8:30am, 2-3 hours
Coomba Foreshore Group	Coomba Foreshore	Swamp Oak, Forest Red Gum with rainforest emergents.	Lantana (*Lantana camara*), Madiera Vine (*Anredera cordifolia*), *Passiflora subpeltata*, *Ipomoea cairica*, *Asparagus aethiopicus*, Grass weeds (Rhodes, Panic Veldt, Kikuyu).	Most of the primary weeding is complete (Lantana removal along path), follow-up weeding of vine weeds and lantana, planting.	Tuesday mornings, 9am, 2-3 hours
Coomba Road Saltmarsh	Opposite 16 Coomba Road	Saltmarsh, Mangrove, Mown edges	*Asparagus aethiopicus, A. asparagoides, Ipomoea cairica, Araujia hortorum*.	Follow-up weeding, planting	As required
Darawank Park	Wallamba River, Darawahk	Mown park, with Casuarina edge along Wallamba	Mother of Millions, *Senna pendula* var. *glabrata, Lantana camara, Cinnamomum camphora, Ipomoea indica*	Mowing, planting	Weekly, Thurs morning 8-10am
Friends of Booti Booti - Elizabeth Beach (NP)	Elizabeth Beach	Littoral Rainforest, Coastal Scrub	Climbing Asparagus (*Asparagus plumosus*), Lantana (*Lantana camara*), Bitou (*Chrysanthemoides monilifera* var. *rotunda*)	Track fence posts removed, primary weeding along track completed	Inactive
Friends of Booti Booti - Shelley Beach (NP)	Shelley Beach	Littoral Rainforest, Coastal Scrub (including Melaleca armillaris stands), Coastal Heath, Themeda Grassland, Wet and Dry Sclerophyll forest	Lantana (*Lantana camara*), Bitou (*Chrysanthemoides monilifera* var. *rotunda*), *Passiflora subpeltata, Araujia hortorum*	Followup weeding around Shelley beach and up to fire trail.	Third Thursday of each month; 8am, 3 hours

Group	Work Location	Vegetation Community	Weeds	Main tasks (Group)	Meeting Time / Frequency
Friends of Pebbly Beach	Bennetts Head	Littoral Rainforest (Frewins Walk), Coastal Scrub (Banksia, Themeda).	*Asparagus aethiopicus, Lantana camara, Tradescantia albiflora, Senna pendula* var. *glabrata, Senencio mikanoides, Ipomoea cairica, Ehrharta erecta*	follow-up weeding, track maintenance, mowing, landscaping	Friday mornings, 7:30am, 2-3 hours.
Green Point CoastCare	Green Point Foreshore	Casuarina, Palm Forest, Forest Red gum with rainforest emergents	*Ipomoea indica, I. Cairica, Senna pendula* var. *glabrata, Asparagus aethiopicus, Lantana camara, Tradescantia albiflora*	follow-up weeding, planting,	Thursday mornings 8:30am, 2-3 hours
Myall Koala & Environmental Support Group	Koala Reserve, Hawks Nest	Various, Swamp Mahogany, Broad-leaved Paperbark, Blackbutt	*Ipomoea indica, I. Cairica, Senna pendula* var. *glabrata, Asparagus aethiopicus, Lantana camara, Tradescantia albiflora, Chrysanthemoides monilifera* var *rotunda*.	follow-up weeding, planting,	Various
Nabiac Landcare	Bullocky Wharf, Nabiac	Swamp Oak, Forest Red Gum with rainforest emergents.	*Ligustrum lucidium, Cinnamomum camphora, Lantana camara, Tradescantia albiflora*	follow-up weeding, planting,	Wednesday mornings, 8-11am
One Mile DuneCare	One Mile Beach	Littoral Rainforest with *Cynanchum elegans*	Yucca, *Asparagus aethiopicus*, *Senecio mikanoides, Ipomoea cairica, I. Indica, Solanum seaforthianum, Ochna serrulata, Senna pendula* var. *glabrata*	follow-up weeding, planting	Weekly, Wednesday morning, 8:30am, 2-3hours
Pindimar CoastCare	Pindimar Foreshore	Mangrove, mown foreshore with scattered remnant trees	Opuntia, Bitou (*Chrysanthemoides monilifera* var. *rotunda*), *Gazania rigens*	weeding	Various
Smiths Lake Foreshore Group	Frothy Coffee, Smiths Lake	Swamp Oak/ Broad-leaved Paperbark; Dry Sclerophyll Forest (Grey Gum, Spotted Gum; Blackbutt, Angophora) with rainforest patches (in gullies) and heath on sand hills.	*Lantana camara, Olea africanus, Chrysanthemoides monilifera* var. *rotunda*, *Ipomoea indica, Thunbergia elata, Asparagus aethiopicus*	follow-up weeding	Weekly, Wednesday morning, 9am, 2-3hours
Smiths Lake Landcare	Cellito Beach	Littoral Rainforest, Coastal Scrub, Themeda Grassland on Sea-cliffs	Bitou (*Chrysanthemoides monilifera* var. *rotunda*), Senna (*Senna pendula* var *glabrata*, Lantana (*Lantana camara*), Cape Ivy (*Senecio mikanoides*), Moth Vine (*Araujia hortorum*), Brazillian Nightshade (*Solaum seaforthianum*)	follow-up weeding , planting, garbage removal,	Weekly, Monday morning, 8-11am

Group	Work Location	Vegetation Community	Weeds	Main tasks (Group)	Meeting Time / Frequency
The Sanctuary Group	The Sanctuary, Forster Community Nursery, Tuncurry	Broad-leaved Paperbark; Wet heath; Angophora/ Blackbutt/ Banksia	*Cinnamomum camphora, Lantana camara, Lonicera japonica, Senna pendula* var. *glabrata, Ochna serrulata*	follow-up weeding; Nursery work	Weekly, Tuesday morning, 8-12
Tarbuck Bay BushCare	Tarbuck Foreshore	Swamp Oak / Eucalyptus grandis	*Ipomoea cairica, Thunbergia elata, Chrysanthemoides monilifera* var. *rotunda*, *Lantana camara, Senna pendula* var. *glabrata*	Currently only mowing	Inactive
Tuncurry DuneCare	Tuncurry Beach	Coastal Scrub / Tuckeroo	*Asparagus aethiopicus, Lantana camara, Senna pendula* var. *glabrata, Ipomoea cairica, Gloriosa superba*	follow-up weeding, planting, rubbish removal	Weekly, Friday mornings 8:30am, 2-3 hours
Tuncurry Flora Reserve	Tuncurry Flora Reserve	Blackbutt / Angophora	-	follow-up weeding , planting, garbage removal,	Weekly, Monday 9-11am
Seal Rocks Community Group	Seal Rocks Headland	Littoral Rainforest	*Asparagus plumosus, Senna pendula* var. *glabrata, Chyrsanthemoides monilifera* var. r*otunda, Asparagus aethiopicus*	follow-up weeding, rubbish removal	Quarterly, Saturday mornings 9am, 2-3 hours
North Arm Cove Environment Group	Cove Bvd Foreshore Reserve	Dry Sclerophyll Forest	*Asparagus aethiopicus, Lantana camara, Chrysanthemoides monilifera* var. *rotunda*	Primary and follow-up weeding	Weekly, Thurs morning 8-10am
Great Lakes Underwater Group	Blackhead to Port Stephens near shore reefs.	Marine	None found to date	Monitoring marine biodiversity and collecting marine debris	Various
Dad's Navy	Pipers Creek	Estuarine	None found to date	Estuarine clean-up, water quality testing	As needed
Forster Community Gardens	Penenton Creek	Sub-tropical rainforest on Floodplain; mangrove. Riparian	*Anredera cordifolia, Senna pendula* var *glabrata*, *Asparagus aethiopicus, Lantana camara, Cinnamomum camphora,* Neph	Vegetable gardens and riparian regeneration	Tuesday mornings, 9am, 2-3 hours
Great Lakes Coastal Land Management Network	Region Wide	N/A -	N/A -	Representative Committee formed to discuss coastal priorities for volunteer groups and funding in the Great Lakes Area.	Meet quarterly

Response

Council will continue to support the actions of community groups involved in on-ground environmental management activities.

Table 11.1.1 Identified needs for action regarding community involvement

Identified Need for Action	Recommended key projects or actions for consideration in next year's Management Plan	Relevant Council section	Are there existing resources for action	Commence by/timeframe
Continue to implement actions that target improvements in and protection of water quality (area of significant community concern)	• Implement actions identified in the Water Quality Improvement Plan • Wallis Lake Catchment Management (progress implementation), • Healthy Lakes Program (continue and expand initiatives)	Natural Systems	Y	Ongoing
Continually develop actions to address issues recognised as very important to the community, such as protection of vegetation and biodiversity and the control of development so that it is sustainable and environmentally appropriate.	Implement Sustainability Strategy	Natural Systems, Whole of Council	Y	Ongoing
Develop and implement an education program aimed at increasing the empowerment of community members to have input into environmental management	Develop Education for Sustainability strategy and environmental initiatives	Natural Systems	Partial	Within 2yrs
Recognise the preference of the community for information on environmental issues to be sourced from newspapers and utilise this in education initiatives (and education strategies)	Develop Education for Sustainability strategy and environmental initiatives	Natural Systems	Y	Ongoing

12 Environmental Plans & Strategies

It is generally recognised that sound environmental management and the achievement of key environmental outcomes needs to be based on effective planning principles. Consequently, Great Lakes Council has developed a range of Plans and Strategies to guide natural resource management and identify/ implement high priority actions across a range of natural resource management issues. This includes catchment and estuary management, urban stormwater management and threatened species recovery planning.

The State of the Environment reporting framework is an ideal vehicle in which to achieve enhanced and strategic natural resource management. One of its key aims is to report on environmental achievements, but also this revised SoE procedure is intended to formulate a holistic and strategic action plan that addresses priorities and which is incorporated in the Management Plan, budget and work plan program. In this manner, the SoE can identify and describe the actions within relevant plans and strategies, report on achievements and outline and propose models to address priority actions within a strategic and holistic manner. This process will ensure that important and well resourced plans and strategies are not ignored or inadequately referenced.

The relevant environmental plans and strategies that are active, operational and in the process of being implemented with Council as a lead agency or nominated partner are listed in Table 11 against a summary of their progress.

To maintain a strategic approach to environmental management the progress of these plans and strategies need to be reviewed annually. An annual review of environmental plans and programs should also be used to evaluate the effectiveness of these programs in improving the environment. Obviously, this review should be based on the findings and outcomes of this SoE report, with specific reference to the outcomes of the key environmental indicators. The outcomes of this review should be reflected in the management systems of Great Lakes Council and be reported in subsequent SoE reports.

Water Quality Improvement Plan, Wallis, Smiths and Myall Lakes, Great Lakes Council, 2008				
Number of Actions	Actions completed or ongoing	Actions commenced	Actions yet to commence	Planned Review
44	19	3	22	2015
Smiths Lake Estuary Management Study and Management Plan, Webb McKeown & Associates, 2001				
Number of Actions	Actions completed or ongoing	Actions commenced	Actions yet to commence	Planned Review
54	21	3	23	Overdue
Wallis Lake Catchment Management Plan, Great Lakes Council, 2003				
Number of Actions	Actions completed or ongoing	Actions commenced	Actions yet to commence	Planned Review
95	46	18	29	Commenced 2012
Lower Wallamba Rivercare Plan, Skelton, S, 2003				
Number of Actions	Actions completed or ongoing	Actions commenced	Actions yet to commence	Planned Review
23	12	3	8	-
Wallis Lake Estuary Management Plan, Great Lakes Council, 2005				
Number of Actions	Actions completed or ongoing	Actions commenced	Actions yet to commence	Planned Review
158	67	40	70	Commenced 2012
Darawahk Creek and Frogalla Swamp Wetland Management Plan, Wetland Care Australia, 2004				
Number of Actions	Actions completed or ongoing	Actions commenced	Actions yet to commence	Planned Review
23	7	14	2	-
Hawks Nest and Tea Gardens Endangered Koala Population Recovery Plan, NSW DEC, 2004				
Number of Actions	Actions completed or ongoing	Actions commenced	Actions yet to commence	Planned Review
21	6	12	3	-
Wallis Lake Stormwater Source Control Study, Jelliffe Environmental, 2000				
Number of Actions	Actions completed or ongoing	Actions commenced	Actions yet to commence	Planned Review
26	11	5	6	-
Tea Gardens, Hawks Nest and Bulahdelah Stormwater Management Plan, Jelliffe Environmental, 2000				
Number of Actions	Actions completed or ongoing	Actions commenced	Actions yet to commence	Planned Review
No Data	No Data	No Data	No Data	No Data
Port Stephens, Myall Lakes Estuary Management Plan, Umwelt (Australia), 2000				
Number of Actions	Actions completed or ongoing	Actions commenced	Actions yet to commence	Planned Review
68	17	56	46	Overdue

13 Acronyms & Abbreviations

DPI	NSW Department of Primary Industries (Fisheries)
ESD	Ecologically Sustainable Development
GIS	Geographic Information System
GLC	Great Lakes Council
GPT	Gross Pollutant Trap
GTCC	Greater Taree City Council
HCRCMA	Hunter Central Rivers Catchment Management Authority
HRC	Healthy Rivers Commission
LEP	Local Environmental Plan
LGA	Local Government Area
MER	Monitoring Evaluation and Reporting
MCW	MidCoast Water
NPWS	National Parks and Wildlife Service
NRM	Natural Resource Management
NSW	New South Wales
OECD	Organisation for Economic Corporation and Development
OEH	NSW Office of Environment and Heritage
PAL	Participatory Action Learning
POEO Act	Protection of the Environment Operations Act
PSR	Pressure - State - Response
SoE	State of the Environment
TPO	Tree Preservation Order
WoNS	Weeds of National Significance
WQIP	Water Quality Improvement Plan
WSUD	Water Sensitive Urban Design

14 Appendix 1

2012 Waterway & Catchment Report Card for Wallis, Smiths and Myall Lakes

2012 waterway & catchment REPORT CARD

for Wallis & Myall Lakes & Karuah Estuary

Great Lakes COUNCIL

NSW Office of Environment & Heritage

Hunter Central Rivers CMA

Greater Taree City Council

CARING FOR OUR COUNTRY

LANDCARE

Water quality improvement projects are made possible by the Great Lakes Environmental Special Rate

Wallis Lake

Water quality report card

Pipers Creek

B 2012 | B 2011 | B 2007

chlorophyll: poor — good

turbidity: poor — good

The ecological health in Pipers Creek was good, and results were similar to 2011. While Pipers Creek was very clear, the high nutrient loads from the urban catchment of Forster resulted in algal levels that were higher than desired, and greater than last year. The very wet summer of 2012 would have influenced these results.

Wallis Lake

B 2012 | A 2011 | A 2007

chlorophyll: poor — good

turbidity: poor — good

Wallis Lake is of a high conservation value, with abundant seagrass and high biodiversity. Ecological health was good, but has declined slightly from last year due to nutrient loads from the catchment in this year's wet conditions. Water clarity was excellent but there was mild growth of algae.

Charlotte Bay

A 2012 | A 2011 | A 2007

chlorophyll: poor — good

turbidity: poor — good

Charlotte Bay is of high conservation value, with abundant seagrass and high biodiversity. Ecological health remained excellent, but there was a small increase in algal levels due to nutrient from the catchment in this year's wet conditions. Water clarity was excellent.

Mid Wallamba estuary

C 2012 | D 2011 | D 2007

chlorophyll: poor — good

turbidity: poor — good

The waters of the Wallamba River Estuary are often murky and have high algal levels. There has been a slight improvement in algae and water clarity from last year.

Management actions 2007-2012

Removal of aquatic weeds

16 hectares of Cabomba infested waterways treated

Sustainable farming practices

79 landholders participating in six Sustainable Farming Groups

Protection and rehabilitation of key habitats

Acquiring and conserving 640ha of wetlands at Damwakh, Minimbah and Lower Wallambah/ North Tuncurry to protect water quality and biodiversity

Sustainable gardening practices

46 urban residents active in Sustainable Gardening

Water sensitive urban design

Seven water quality gardens and two wetlands built to treat 36 hectares of land in the Pipers and Muddy Creek Catchments

Bank stabilisation

Stabilising 4.2km of the Wallamba River with rock protection, planting 8,000 native plants and conserving 8.6km of streambank

Bushfire habilitation

40 volunteers active in bush regeneration at nine sites

Catchments of the Wallis and Myall Lakes and Karuah Estuary

Smiths Lake

Smiths Lake was not sampled this year due to it's excellent rating last year and the fact that it was opened to the ocean during the sampling period (early summer) making it difficult to compare this years results to last year.

Smiths Lake opened following high rainfall, December 2011

Myall Lakes

Water quality report card

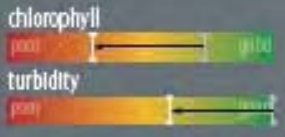
Myall Lake

B
2012

Myall Lake has high conservation values, it is an internationally listed protected wetland and is part of Myall Lakes National Park. Overall, the health was good. Water clarity in the Myall Lake was excellent but there was some undesirable growth of algae.

Bombah Broadwater

D 2012 B 2011 B 2009



Overall, there was a decrease in ecological health. Water clarity in the Bombah Broadwater was only fair and due to blue-green algal booms over the summer algal abundance was very high. High summer rainfall and nutrient loads from the catchment created conditions suitable for algae to bloom.

Management actions 2007-2012

Removal of aquatic weeds

Aquatic weeds treated along 46 kms of streambank

Sustainable farming practices

28 landholders participating in two Sustainable Farming Groups

Protection and rehabilitation of key habitats

Creating a major wildlife corridor at Durness protecting 90 hectares of land and revegetating 70 hectares with 70,000 native plants

Erosion control

74 km roads and tails closed, rehabilitated and maintained to reduce erosion and sedimentation in Myall Lakes National Park

Protection and rehabilitation of key habitats

A spulding 37 Ha of wetlands in the Bulahdelah area to protect water quality and biodiversity

Karuah Estuary

Water quality report card

Karuah Estuary

C
2012

Water clarity in the Karuah River was very poor, but there were only low to moderate algal levels. These algal levels are an improvement on earlier years, but the high turbidity continues to be an issue in the Karuah River estuary.

Management actions 2007-2012

Removal of aquatic weeds

Over eight kilometres of Lewis Creek treated for Alligator Weed using an integrated pest management program

Report Card Overview

Introduction

This is the second Report Card for the waterways and catchments of Wallis, and Myall Lakes and this year new information has been presented for the Karuah River and Myall Lake. The water quality data presented here was collected throughout the waterways during the summer of 2011/12.

Each waterway has received a grade based on the data which tells us the condition of the waterways this year. As more and more data is collected, we should be able to establish whether the waterways are improving or declining. We will also be able to evaluate the impacts of extreme events (such as floods) and identify trouble spots and areas in need of protection and rehabilitation.

Methods

This Report Card is intended to read like a report card a student might receive at school. It assesses the condition or health of the waterways compared with what we would like it to be. A healthy waterway can be characterised by clear water and low levels of algae. It would provide habitat for a wide range of plants and animals. This report card is rated for ecological health rather than other human related environmental health issues such as drinking water quality, safety for swimming, bacteria, viruses or our ability to harvest shellfish or fish.

To calculate the Report Card grade, scientists have assessed the condition of particular components of the waterways using indicators. Just as your body temperature is used as an indicator that something may be wrong with your own health, indicators are used to show if something is out of balance or unhealthy in the system.

Further details on the information contained in this report card are available in the 2012 State of the Environment Report

Two indicators have been used to assess the condition of the waterways, Chlorophyll a is the amount of microscopic algae in the water and high levels indicate high inputs of nutrients. Turbidity, or water clarity, is a measure of the amount of sediment or dirt suspended in the water. Sensors are used by scientists to collect the information.

Measurements were taken six times over the 2011-2012 summer at eight sites across the region. The condition of each site is established by comparing the indicator levels to a benchmark level measured from an undisturbed, healthy site of a similar type.

The information collected is converted into a grading system. Grades have been set after looking at scores from over 130 sites across the state. The grade indicates where a site ranks in comparison to the other sites.

Grade	Result	Description
A	Excellent	The highest 20% of scores in the state
B	Good	Next 20% of high scores in the state
C	Fair	Middle 40% of scores in the state
D	Poor	Lower 15% of scores in the state
F	Fail	Lowest 5% of scores in the state

This report card presents the ecological health for 2012 and (where available) also shows data from previous years for comparison. The sliding scale bar from poor to good shows how indicator levels have changed from one reporting period to the next.

Rainfall results

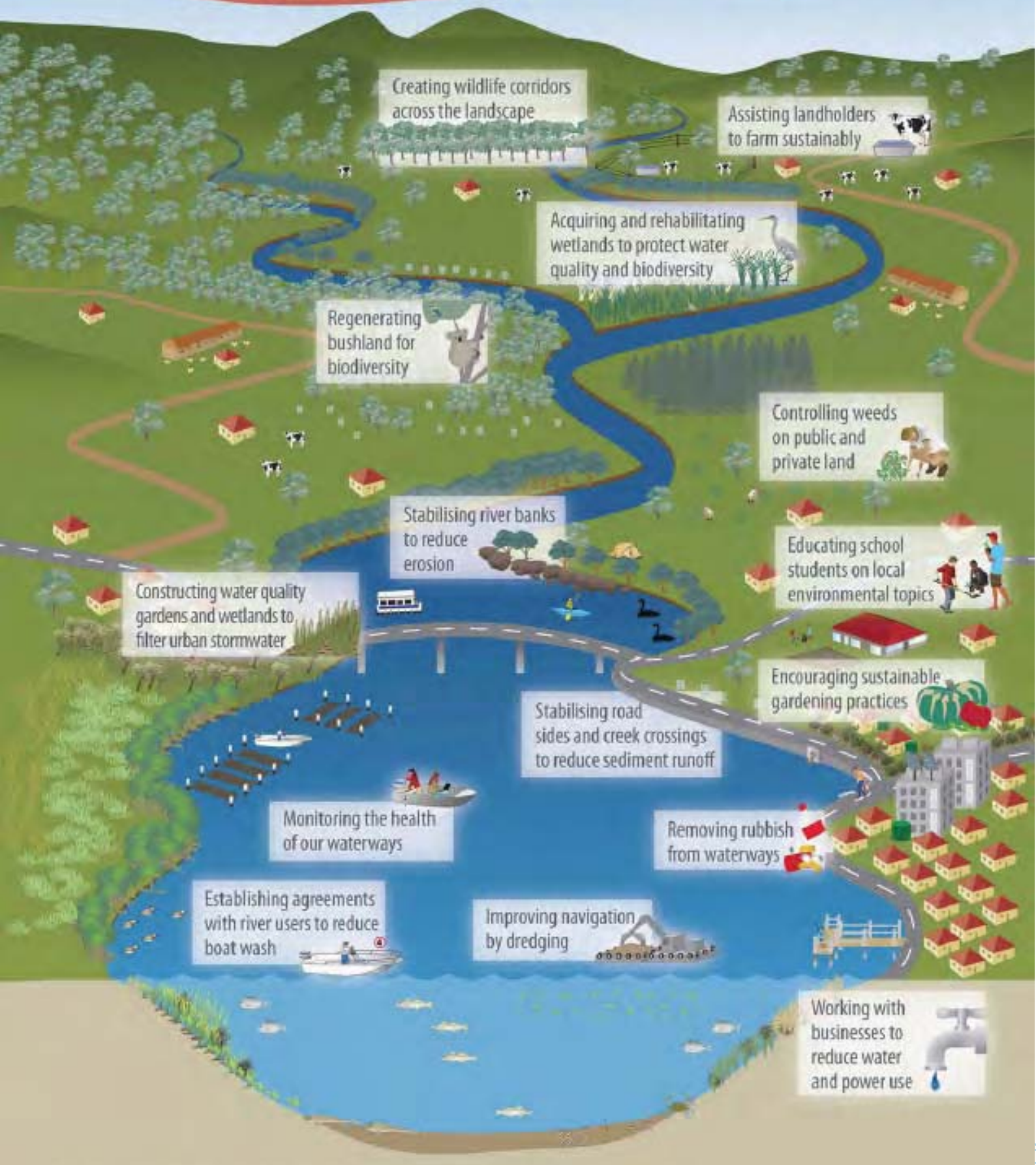
The amount of rainfall that occurs when sampling for the report card influences the report card results. If there is more rain, there is more runoff in the catchment resulting in greater quantities of sediment and nutrients entering our waterways. In 2011/12 rainfall was very high, 1.5 times higher than the average for the previous years.

The Karuah River estuary - moderate health

In 2011, Scientists were called on to complete a comprehensive health check for the Karuah River estuary, prompted by the need to develop an catchment management plan. There was a mix of good and bad results for indicators of ecological health. Biodiversity and abundance of fish and invertebrates were as high as could be expected and indicators of biological stress were low. Seagrass habitats were declining and almost non-existent. Saltmarsh habitats were declining and being encroached upon by mangrove habitats. The Karuah River had very low water clarity, but also low algal abundance. Overall, the ecological condition in the Karuah River was moderate, but pressures on the estuary must be managed to prevent degradation.


Adam McSorley, OEH

Your Environmental Special Rate in action...



- Management actions in this report card are part funded by the Environmental Special Rate
- Council has used the Environmental Special Rate to attract grant funding, tripling its value
- The Environmental Special Rate has been in place since 2001
- Continuation of the Environmental Special Rate is essential to maintain and improve waterway and catchment health

Great Lakes
COUNCIL

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