State of the Environment Report
2010 / 2011
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INTRODUCTION

The State of the Environment (SoE) Report is a statutory reporting requirement of the *Local Government Act, 1993.*

Its purpose is to:

- Identify specific pressures being placed upon the ecological sustainability of the shire.
- Report on responses being undertaken to help address these pressures.
- Monitor and evaluate the effectiveness of these responses.
- Identify additional environmental management priorities.

With this knowledge, Tweed Shire Council can allocate its environmental management resources more effectively and strengthen its integrated planning and reporting framework to progress sustainability outcomes.

A regional State of Environment Reporting process was instigated in 2011. While the first regional SoE report is still a number of years away, it signals a shift from environmental reporting to the shire boundary, to environmental reporting across a geographic region. This approach is expected to strengthen regional collaboration and contribute to more efficient allocation of environmental management resources. Once the regional framework is established, a comprehensive regional SoE report with an emphasis on environmental pressures will be produced every four years, at the start of each local government term. Interim local reports will be produced annually, with an emphasis on local action in response to identified pressures.
This section of the report includes:

- Built Environment
- Water Supply
- Waste Water Management
- Solid Waste Management
- Transport Infrastructure
- Environmental Education and Capacity Building
STATE OF THE ENVIRONMENT REPORT 2010 / 2011

BUILT ENVIRONMENT

CONDITION

At a Glance

- Tweed Shire covers an area of approximately 1303 square kilometres.
- About two-thirds of the Tweed has a rural zoning. (LEP 2000)
- In 2006, the Tweed population was 82,955 (ABS 2006). It is estimated this increased to 90,090 by 30 June 2010 (Preliminary updated estimates based on 2006 Census data).
- 64 per cent of the shire population is located in the Tweed Heads area, which consists of Tweed Heads, Tweed Heads South, Tweed Heads West, Bilambil, Terranora, Banora Point, Fingal Head and Kingscliff. (ABS 2006).
- 11 per cent of the shire population is located in the Tweed’s other coastal towns and villages, which are situated south of Kingscliff. (ABS 2006).
- 25 per cent of the Tweed’s population is located in the rural areas, which largely comprises Murwillumbah, Uki, Tyalgum, Chillingham and other villages surrounding these areas. (ABS 2006).
- New land release areas are expected to increase the shire population by more than 40,000 people during the next 20 years.
- Further shire profile information can be found at www.tweed.nsw.gov.au/TweedShireProfile

PRESSURE

At a Glance

<table>
<thead>
<tr>
<th>Environmental pressures associated with the built environment</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Greenfields development</strong> (new subdivisions and industrial estates)</td>
<td><img src="image" alt="Greenfields" /></td>
</tr>
<tr>
<td>- Increase in the shire’s urban footprint and an associated reduction in the size, function and connectivity of natural ecosystems</td>
<td></td>
</tr>
<tr>
<td>- Demands on the water supply catchment</td>
<td></td>
</tr>
<tr>
<td>- Waste management</td>
<td></td>
</tr>
<tr>
<td>- End-point greenhouse gas emissions (e.g. transport and electricity)</td>
<td></td>
</tr>
<tr>
<td>- Diffuse source waterways pollution (e.g. stormwater)</td>
<td></td>
</tr>
<tr>
<td>- Point source waterways pollution (e.g. waste water)</td>
<td></td>
</tr>
<tr>
<td><strong>Brownfields development</strong> (in-fill in developed areas)</td>
<td><img src="image" alt="Brownfields" /></td>
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<tr>
<td>- Demands on the water supply catchment</td>
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<tr>
<td>- Waste management</td>
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<td>- End-point greenhouse gas emissions (transport and electricity)</td>
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<td>- Diffuse source waterways pollution (e.g. stormwater)</td>
<td></td>
</tr>
<tr>
<td>- Point source waterways pollution (e.g. waste water)</td>
<td></td>
</tr>
</tbody>
</table>

These pressures are likely to increase in proportion to population
Pressure Indicators

Estimated Resident Population, Tweed Shire Council

Source: Australian Bureau of Statistics, Cat. No. 3218.0 - Regional Population Growth, Australia, 2009

<table>
<thead>
<tr>
<th>Year (ending June 30)</th>
<th>Separate dwellings</th>
<th>Other dwellings</th>
<th>Total dwellings</th>
<th>Separate dwellings</th>
<th>Other dwellings</th>
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<td>1995-96</td>
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<td>41</td>
<td>193</td>
<td>--</td>
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</tr>
</tbody>
</table>

Source: Australian Bureau of Statistics, Building Activity, Australia, (catalogue number 8752.0 to 8752.7)

* Annual change represents the difference in number from the preceding year. Negative numbers denote a drop in the number of approvals from the previous year, and positive numbers an increase.

The number of building approvals are driven by activity in the construction industry and fluctuates from year to year. These fluctuations are the result of the short-term nature of many construction projects, and the cyclical nature of the industry. Building activity depends on many factors — interest rates, availability of mortgage funds, government spending, and business investment — that vary with the state of the economy. A recent example of economic changes and their impact on building approvals was the introduction of a Goods and Services Tax (GST) in July 2000. A spike in building activity was seen before the tax was introduced and declines in the months following.
**Additional Indicators**

- Water Consumption
- Solid Waste Generation
- Waste Water Generation
- Greenhouse Gas Generation
- Waterway Health
- Bushland and Biodiversity

**RESPONSE**

**Land Use Planning**

Council’s land use planning formulates strategies to conserve and restore the Tweed’s environmental qualities, facilitate the orderly and economic development of land and enhance the population’s well-being.

Land use planning documents include the Tweed Local Environmental Plan (LEP) and the Tweed Development Control Plan (DCP). The LEP provides the land-use planning framework by identifying the land use zones for the entire shire, detailing the objectives of each zone and describing a list of prohibited and permissible uses for each zone. The DCP provides detailed development guidelines for specific localities or the entire shire to ensure appropriate development design.

**Specific Land Use Planning Initiatives**

Specific land use planning initiatives for environmental management are listed below in order from newest to oldest. This format gives regular readers of the SoE Report easy access to the most recent initiatives, while allowing infrequent readers to view a catalogued history of responses.

Icons at the end of each response represent the pressure being targeted.

**Draft Local Environment Plan (2010)**

*Responsibility: Planning and Regulation Division*

*Status: Ongoing*

In 2006, it was mandated that all councils in NSW review their individual Local Environmental Plans and produce new LEPs in the format prescribed by the Standard Instruments (Local Environmental Plans) Order 2006 (amended January 2008) (The Order). Council has previously resolved, in accordance with Section 54 of the Environmental Planning and Assessment Act 1979, to create a new shire-wide Local Environmental Plan (LEP) and its preparation began in 2006.

**Tweed Urban and Employment Land Strategy 2009**

*Responsibility: Planning and Regulation Division*

*Status: Ongoing*

On 17 March 2009, Council resolved to adopt the Tweed Urban and Employment Land Release Strategy, prepared by Council’s Planning Reforms Unit and an external consultant.

The Tweed Urban and Employment Land Release Strategy (TUELRS) revises the proposals for urban growth and development and presents an urban growth strategy for the next 25 years. The strategy identifies a bank of suitable land that should be brought forward if needed. But by adopting the findings of the strategy, Council reaffirmed its position on land
use policy. It identified its preferred option to deal with growth and change was to: ‘Rely on existing zoned areas and increase the density of development in key urban areas.’

TUELRS sets a program for release of land, which is to be balanced against need and demand. The strategy requires that all greenfield sites identified for further investigation, if deemed appropriate for rezoning, must be master-planned prior to the rezoning process to ensure there is orderly, sustainable and sufficient use of land. Each potential employment land release area (or group of areas) will require an amendment to the Tweed LEP and might require Development Control Plan provisions, a Section 94 Contributions Plan and/or a planning agreement with Tweed Shire Council. A planning proposal would be required by the NSW Government.

**Smart Housing Tips**
Responsibility: Planning and Regulation Division. NRM Unit – Sustainability Program
Status: Ongoing

In 2009, Council updated its website to include information about designing and building a home that is more comfortable to live in, cheaper to run and has minimal impact on the environment. To view this information, visit [http://www.tweed.nsw.gov.au/PlanDevBuild/SmartHousing.aspx](http://www.tweed.nsw.gov.au/PlanDevBuild/SmartHousing.aspx)

**Hastings Point Height Limit**
Responsibility: Planning and Regulation Division
Status: Ongoing

Council resolved in November 2008 to amend Tweed Development Control Plan (Tweed DCP) guidelines controlling development south of Cudgera Creek Bridge at Hastings Point, reducing the building height from three storeys to two. It was amended to restrict the potential impact of future development which arose before Council could complete a Hastings Point Locality Plan and DCP, which will provide site and development-specific guidelines for Hastings Point.

Following this decision, a Council meeting in November 2008 refused a development application for a three-storey complex of seven units on the corner of the Tweed Coast Road and Young Street at Hastings Point.

In July 2005, Council decided to amend the Tweed Local Environment Plan (LEP) 2000 to reduce the maximum height of buildings south of Cudgera Creek Bridge at Hastings Point from three storeys to two. However, advice from the NSW Department of Planning prompted Council to abandon the draft LEP process in December 2006, in light of the need to provide a broader strategic context to building heights across Tweed Shire.

In response to community concern about the scale of new development in Hastings Point, Council engaged a consultant in August 2007 to determine if the three-storey limit and density controls under the Tweed LEP 2000 were appropriate for development in Hastings Point. The consultant’s study covered the residential area south of Cudgera Creek Bridge, which comprised 44 lots. The consultant, Ruker and Associates, and Council staff held two consultation workshops with the area’s residents, landowners and Hastings Point Progress Association representatives. Their feedback was used to finalise the study report.

The report concluded that existing controls under the Tweed LEP and DCP were not adequate to guide the development of three-storey and larger multi-dwelling developments, which could have a significant impact on the character of a small coastal village like Hastings Point.
Pottsville Locality Based Development Code

Responsibility: Planning and Regulation Division
Status: Ongoing

A draft Locality Plan for Pottsville, prepared by Architectus Pty Ltd on behalf of Council, was released for public comment during 2008. However, Council resolved on 12 August 2008 to reassess the village’s potential to support a retail supermarket, in response to a developer’s court challenge for a supermarket in the Seabreeze Estate. This challenge was later dismissed by the court.

Since then, Council’s Planning Reforms Unit has undertaken further detailed analysis of the village centre and broader general improvements to the exhibited draft plan. The document primarily aims to guide development which reaffirms Pottsville’s broad settlement pattern, through a framework that fosters active consideration of environmental constraints, while enhancing the existing ‘connected villages’ structure. The village centre will be consolidated as the Pottsville community’s primary activity hub, by increasing its opportunity for retail, commercial and accommodation development. It aims to encourage a mix of business and community uses, improving the quality of the public domain and enriching the experience of its users.

Kings Forest

Responsibility: Planning and Regulation Division
Status: Ongoing

Kings Forest is a ‘State significant site’ under the provisions of the State Environmental Planning Policy - Major Development. The NSW Department of Planning is considering a Part 3(A) application, under the Environmental Planning and Assessment Act (1979), for a concept plan for a mixed residential / commercial / recreational development. The proposal includes a site-specific Koala Plan of Management and other environmental management plans. The development is likely to be staged over 10 to 20 years, with an approximate population of 10,000 people.

Cobaki Lakes

Responsibility: Planning and Regulation Division
Status: Ongoing

Cobaki Lakes is a proposed development to accommodate a new population of approximately 12,000 people over the next 10 to 20 years. Its staged development is the subject of a ‘major project’ application under the provisions of Part 3(A) of the Environmental Planning and Assessment Act (1979). The NSW Department of Planning is the consent authority and is considering a concept plan proposal for a residential subdivision including a town centre, open space, schools and roads. The proposal includes management plans addressing ecological, stormwater, flood, acid sulfate soils, groundwater and bushfire issues.

Nightcap Village

Responsibility: Planning and Regulation Division
Status: Ongoing

Nightcap Village is a proposed development to construct a new village with an expected population of approximately 1000 people.

Conditions have been imposed regarding environmental rehabilitation of existing areas, including:
- The riparian zone.
- A 50m buffer to the Tweed River.
- Prohibiting cats and dogs to protect threatened species.
- Full funding of water and sewage by the developer and community association.
- Management of Aboriginal archaeology, including an Aboriginal heritage display.
A condition has also been imposed about the formulation and approval of a design code for the village, to guide future built form.

**Area E**

*Responsibility: Planning and Regulation Division*

*Status: Ongoing*

An LEP amendment to rezone Area E Residential 2(c) was gazetted in 2007.

Development of the site cannot begin until a site-specific DCP, s94 plan and other documents to guide development of the site have been exhibited and adopted. Area E is a Terranora greenfield site that will accommodate approximately 4000 people over the 182-hectare site. The site is heavily constrained and borders a fragile environmental wetland at its northern end. Council is acting with extreme care to ensure development of the site and rehabilitation and management of the wetland and other environmental areas is undertaken in a sustainable manner. The policy process will include a site-specific Wetland Rehabilitation Plan and Stormwater Management Plan.

**Development Control Plan Amalgamation**

*Responsibility: Planning and Regulation Division*

*Status: Ongoing*

Council’s individual Development Control Plans were amalgamated into one document in 2008, as part of a planning reforms process (see below). The new Development Control Plan (DCP) contains detailed guidelines that illustrate the controls applicable to a particular type of development or a particular area. The DCP aims to:

- Achieve development that is consistent with the social, economic and environmental values of the Tweed.
- Promote ecologically sustainable development principles.
- Form part of a range of documents that guides the shire towards a more sustainable future.
- Provide design issues, performance criteria and standards for development, both on a shire-wide basis and for particular development areas.

**Environmental Enforcement Levy**

*Responsibility: Planning and Regulation Division*

*Status: Ongoing*

An Environmental Enforcement Levy for development applications was introduced in 2007, to recover costs Council incurred when investigating complaints or conducting audits associated with construction activities. The Environmental Enforcement Levy was set at 0.1 per cent of the contract price of a development, with a maximum charge of $2,000.

**Ecologist / Specialist Planner**

*Responsibility: Planning and Regulation Division*

*Status: Ongoing*

In 2007, Council appointed an ecologist/specialist planner in the Development Assessment Unit to provide expert advice to the Planning and Regulation Division about:

- Biodiversity issues associated with development.
- Restoration of natural areas of Crown land or land to be dedicated to Council.
Planning Reforms
Responsibility: Planning and Regulation Division
Status: Ongoing

In 2006, Council started preparing new planning controls that are consistent with the NSW Government standard template. Key environmental outcomes associated with the planning reforms process include:

- Implementation of Council’s Vegetation Management Plan, to protect significant ecological areas though new clauses in the LEP and the inclusion of a bushland/vegetation map overlay.
- Significant clauses in the LEP template, included specifically to address ecological issues such as:
  - Environmentally sensitive areas excluded from exempt and complying development provisions.
  - Environmental and sustainable development evaluation.
  - Development next to water bodies.
  - Preservation of trees and vegetation.
  - Habitat protection.
  - Development in and next to Environmental Protection Zones.
  - Development on steep land and in water catchments.
  - Heritage conservation.
- Implementation of Locality Plans for Council’s towns and villages, to reinforce protection of ecological areas by establishing general urban footprints and including provisions to conserve significant environmental areas.

This work continued in 2008/09, with extensive consultation between Council and the NSW Department of Planning to prepare the Draft Tweed LEP 2010.

Building Reforms
Responsibility: Planning and Regulation Division
Status: Repealed in 2008

Council’s new land-forming policies took effect in October 2006, bringing in several significant amendments to preserve natural hillsides, minimise cut-and-fill earthworks and promote water-sensitive urban design in residential developments. Section A14 of Council’s Development Control Plan (Cut and Fill on Residential Land) affects all residential development on sloping land, or developments involving significant earthworks. The changes include:

- Continuous slabs are no longer allowed on sites with slopes of 10 per cent or greater.
- Limits on maximum impermeable areas (such as roofs, pathways, decks and pools) to minimise stormwater runoff.
- Mandatory water-sensitive urban design for residential developments.
- A maximum permissible cut/fill depth of one metre over the lot.
- Variations to limits on cut/fill earthworks are only permitted to create a flat-yard space which does not exceed 15 per cent of the lot area.

In April 2008, Section A14 was repealed and the major land-forming controls were incorporated into DCP A5.
**Far North Coast Regional Strategy**

*Responsibility: NSW Government*

*Status: Ongoing*

The NSW Government produced a 25-year land use strategy in 2006, to guide local planning in the local government areas of Tweed, Ballina, Byron, Kyogle, Lismore and Richmond Valley. The regional strategy consolidates and builds upon previous planning work, including the Northern Rivers Regional Strategy and local council settlement strategies.

The 2006 strategy aims to manage the region’s expected high growth rate in a sustainable manner. It represents the agreed NSW Government position on the future of the Far North Coast. It will be the overriding strategic planning document for the region and has been prepared to complement and inform other relevant State and local planning instruments.

It is supported by a number of other documents including the Settlement Planning Guidelines, the North Coast Urban Design Guidelines and the Regional Industry and Economic Plan. The Far North Coast Regional Strategy applies to the period 2006–31 and will be reviewed every five years.

**NSW Building and Sustainability Index**

*Responsibility: NSW Government*

*Status: Ongoing*

The NSW Government introduced the Building and Sustainability Index (BaSIX) in 2004. BaSIX ensures homes are designed to use less potable water and produce fewer greenhouse gas emissions, by setting energy and water reduction targets for houses and units. For more information, go to [www.basix.nsw.gov.au](http://www.basix.nsw.gov.au)

**Tweed Vegetation Management Strategy 2004**

*Responsibility: NRM Unit – Biodiversity Program*

*Status: Ongoing*

In 2004, Council introduced the Tweed Vegetation Management Strategy (TVMS) to inform the shire’s land use planning instruments. Refer to the [Bushland and Biodiversity](#) section of this report for details of this management document.

Work continued in 2008/09 to implement the TVMS by drafting the Tweed LEP 2010. The findings were translated into comprehensive mapping overlays to be included in the LEP.

**Constructed Wetlands**

*Responsibility: Planning the Regulation Division*

*Status: Ongoing*

In 2002, Council introduced a requirement for greenfield development to incorporate constructed wetlands into their design, to reduce the impacts of urban stormwater on local waterways. Well designed wetlands prevent sediments, organic matter and nutrients (such as phosphorous and nitrogen) from entering waterways.
**Socio-Economic Development Controls**

*Responsibility: Planning and Regulation Division  
Status: Ongoing*

Council introduced a Socio-Economic Development Control Plan in 2002 to ensure development applications that are likely to have a significant social and/or economic impact are properly considered in accordance with State and local land-use planning instruments.

In 2008, this DCP was amalgamated into the new Tweed Shire DCP as part of the planning reforms process.

**Compliance Officer**

*Responsibility: Planning and Regulation Division  
Status: Ongoing*

In 2002, Council appointed a Compliance Officer in the Development Assessment Unit to monitor and enforce compliance with conditions of development consent and respond to complaints relevant to divisional regulatory responsibilities.

**Locality Specific Development Controls**

*Responsibility: Planning and Regulation Division  
Status: Ongoing*

In 2000, Council started to introduce locality plans for specific areas of Tweed Shire, to address issues such as maintaining village character and recognising an area's unique environmental issues. Plans have been developed for number of areas including Koala Beach, Uki, Cobaki Lakes and the Murwillumbah town centre.

These plans were amalgamated into the new Tweed Shire DCP in 2008, as part of the planning reforms process.

**Energy Smart Homes**

*Responsibility: Planning and Regulation Division  
Status: Superseded in 2004*

In 2000, Council sought to improve the energy efficiency of new houses in the shire by adopting Development Control Plan No. 39 – Energy Smart Homes. DCP 39 included requirements for northern orientation of living spaces, ceiling insulation, breezeways, roof eaves and solar hot water but was superseded by the NSW Building and Sustainability Index in 2004.

**Tweed Urban Stormwater Quality Management Plan**

*Responsibility: Engineering and Operations Division  
Status: Ongoing*

Tweed Shire Smart House

Responsibility: NRM Unit – Sustainability Program
Status: Sold in 2003

In 2000, Council constructed a demonstration home with a range of sustainable design features including grid interactive solar power, heat pump hot water, northern orientation, insulation and thermal mass for passive cooling and heating, and rainwater supply for toilets, gardens and washing machines. Between 2000 and 2003, the Smart House introduced more than 12,000 people to the benefits of environmentally-friendly design. Proceeds from the sale of the Smart House were used to design and build Council’s environmental education trailer, the Catchment Activity Model (CAM). Refer to Environmental Education and Capacity Building for more information about CAM.

Local Environment Plan (2000)

Responsibility: Planning and Regulation Division
Status: Ongoing

In 1998, Council initiated the first of a two-stage review of the existing shire-wide LEP 1987 and Tweed LEP No 24 (covering the Clarrie Hall Dam catchment). Stage 1 of the review sought to integrate the two documents into a single LEP. The second stage reviewed the shire’s environmental protection zones and their provisions. The draft LEP was placed on public exhibition, following gazettal by the State Government, and was adopted by Council in 2000.

Subdivisions

Responsibility: Planning and Regulation Division
Status: Ongoing

In the early 1990s, Council introduced a Subdivisions Development Control Plan to establish guidelines and standards for subdivisions. It includes a range of urban design principles including transport and pedestrian infrastructure, stormwater control, preservation of natural topography and green space buffers.

The Subdivisions DCP was updated in 2008 and amalgamated into the new Tweed Shire DCP as part of the planning reforms process.

In August 2008, Council adopted an amendment to the Tweed DCP, part A5 Subdivision Manual, to take into account Council’s Floodplain Risk Management Study and Plan. In particular, it addresses the requirements of Part 3 of the Tweed Valley Floodplain Risk Management Study – Habitable Land Use on the Floodplain. This reflects changes to relevant legislation and the certification procedures for Subdivision Works – Accredited Certifiers.

Local Environment Plan (1987)

Responsibility: Planning and Regulation Division
Status: Superseded by LEP 2000

In 1982, Council resolved to prepare a LEP to replace previous land use planning instruments with a comprehensive planning document. The LEP was placed on public exhibition, a public hearing on the submissions was held and the amended document was finally gazetted by the State Government in January 1988. One of the aims of the LEP is to protect and restore areas of significant environmental value. Strategies used by LEP (1987) included the creation of environmental protection zones.
S.94 Contribution Plans
Responsibility: Planning and Regulation Division
Status: Ongoing

Section 94 Developer Contribution Plans were introduced in 1979 so developer contributions could be levied for the timely provision of facilities and infrastructure such as roads, bus shelters, open space, footpaths and cycle paths.

Related Issues
Water Supply
Waste-water Management
Solid Waste Management
Transport Infrastructure
Catchment Management
WATER SUPPLY

CONDITION

At a Glance

- There are three water supply networks in Tweed Shire. Two small networks supply the rural villages of Tyalgum and Uki, while the major network supplies Tweed Heads and surrounds, the Tweed Coast and the Murwillumbah district.

The major network draws its water from the Tweed River, upstream of the Bray Park weir. The weir acts as a tidal barrage, preventing the saline estuary water from entering the fresh water supply. Flows into the weir are supplemented by releases from the Clarrie Hall Dam on Doon Doon Creek, a tributary to the Tweed River.

Interestingly, Clarrie Hall Dam is only used to supplement the town water supply. For much of the year, natural flows in the Tweed River supply the network’s water. Water is only released from the dam when flows in the freshwater section of the Tweed River fall below 95 per cent, usually during winter and spring.

These releases contribute to environmental flows in the river during the drier months of the year, with the water flowing down Doon Doon Creek and into the Tweed River upstream of Uki village. It then flows down to Bray Park Weir, where it is extracted, treated and pumped through a network of over 660km of pipes to 23 reservoirs throughout the Tweed. These reservoirs have a storage capacity of 106 megalitres (ML).

- The Water Treatment Plant runs for 10 to 15 hours a day, operating during off-peak hours as much as possible to reduce peak electricity costs.

- The total operating and maintenance cost of extracting, treating and distributing one million litres (one megalitre) of water is approximately $580.

- Full details of the water supply network, including treatment processes, can be found at: www.tweed.nsw.gov.au/water

PRESSURE

At a Glance

<table>
<thead>
<tr>
<th>Environmental pressures associated with water supply</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water extraction rates and the associated impacts on environmental flows.</td>
<td>![WATER EXTRACTION]</td>
</tr>
<tr>
<td>Altered flow patterns of natural watercourses which can lead to:</td>
<td>![FLOW PATTERNS]</td>
</tr>
<tr>
<td>o Degraded water quality.</td>
<td></td>
</tr>
<tr>
<td>o Reduced riverine habitat.</td>
<td></td>
</tr>
<tr>
<td>o Reduced flooding of riparian zones, floodplains and wetlands.</td>
<td></td>
</tr>
<tr>
<td>o Increases in algal blooms.</td>
<td></td>
</tr>
<tr>
<td>o Erosion of river channels. (DEC 2004).</td>
<td></td>
</tr>
</tbody>
</table>
Energy use and greenhouse gas emissions associated with treatment and supply of water.

These pressures are likely to increase in proportion to population.

**Pressure Indicators**

**Water Consumption by sector (including percentage of annual total)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Residential</th>
<th>Commercial</th>
<th>Industrial</th>
<th>Rural</th>
<th>Institutional</th>
<th>Bulk Sales</th>
<th>Public Uses</th>
<th>Unaccounted water (e.g. leakage)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>5815 (63%)</td>
<td>1584 (17%)</td>
<td>201 (2%)</td>
<td>162 (2%)</td>
<td>185 (2%)</td>
<td>100 (1%)</td>
<td>242 (3%)</td>
<td>902 (10%)</td>
<td>9190 (100%)</td>
</tr>
<tr>
<td>1995/96</td>
<td>5163 (60%)</td>
<td>1400 (16%)</td>
<td>144 (2%)</td>
<td>150 (2%)</td>
<td>171 (2%)</td>
<td>70 (1%)</td>
<td>257 (3%)</td>
<td>1170 (14%)</td>
<td>8526 (100%)</td>
</tr>
<tr>
<td>2000/01</td>
<td>5833 (60%)</td>
<td>1827 (19%)</td>
<td>211 (2%)</td>
<td>171 (2%)</td>
<td>195 (2%)</td>
<td>105 (1%)</td>
<td>260 (3%)</td>
<td>1081 (11%)</td>
<td>9683 (100%)</td>
</tr>
<tr>
<td>2005/06</td>
<td>5703 (60%)</td>
<td>1563 (16%)</td>
<td>241 (3%)</td>
<td>166 (2%)</td>
<td>170 (2%)</td>
<td>57 (1%)</td>
<td>241 (3%)</td>
<td>1245 (13%)</td>
<td>9386 (100%)</td>
</tr>
<tr>
<td>2006/07</td>
<td>6004 (64%)</td>
<td>1401 (15%)</td>
<td>143 (1%)</td>
<td>47 (0%)</td>
<td>209 (2%)</td>
<td>38 (0%)</td>
<td>258 (3%)</td>
<td>1465 (15%)</td>
<td>9566 (100%)</td>
</tr>
<tr>
<td>2007/08</td>
<td>5251 (59.43%)</td>
<td>1015 (11.49%)</td>
<td>242 (2.74%)</td>
<td>154 (1.74%)</td>
<td>600 (6.79%)</td>
<td>66 (0.75%)</td>
<td>181 (2.05%)</td>
<td>1327 (15.01%)</td>
<td>8836 (100%)</td>
</tr>
<tr>
<td>2008/09</td>
<td>5441 (62.98%)</td>
<td>1142 (13.22%)</td>
<td>212 (2.45%)</td>
<td>110 (1.27%)</td>
<td>436 (5.05%)</td>
<td>79 (0.91%)</td>
<td>162 (1.88%)</td>
<td>1057 (12.24%)</td>
<td>8639 (100%)</td>
</tr>
<tr>
<td>2009/10</td>
<td>5281 (54.59%)</td>
<td>1855 (19.18%)</td>
<td>18 (0.19%)</td>
<td>617 (6.38%)</td>
<td>216 (2.23%)</td>
<td>1 (0.1%)</td>
<td>187 (1.93%)</td>
<td>1499 (15.49%)</td>
<td>9674 (100%)</td>
</tr>
<tr>
<td>2010/11</td>
<td>5136 (60.52%)</td>
<td>1271 (14.97%)</td>
<td>137 (1.62%)</td>
<td>113 (1.33%)</td>
<td>316 (3.72%)</td>
<td>0 (0%)</td>
<td>137 (1.61%)</td>
<td>1377 (16.23%)</td>
<td>8487 (100%)</td>
</tr>
</tbody>
</table>

Source: TSC Water Unit

### Residential Water Consumption

<table>
<thead>
<tr>
<th>Year</th>
<th>Population Connected to Town Water</th>
<th>Annual Residential Consumption (Megalitres)</th>
<th>Annual Residential Consumption Per Person (Litres)</th>
<th>Daily Residential Consumption Per Person (Litres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000/01</td>
<td>64,624</td>
<td>5833</td>
<td>90,261</td>
<td>247</td>
</tr>
<tr>
<td>2001/02</td>
<td>65,614</td>
<td>6215</td>
<td>94,721</td>
<td>260</td>
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<tr>
<td>2002/03</td>
<td>66,604</td>
<td>5552</td>
<td>83,358</td>
<td>228</td>
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<tr>
<td>2003/04</td>
<td>67,594</td>
<td>5690</td>
<td>84,179</td>
<td>231</td>
</tr>
<tr>
<td>2004/05</td>
<td>68,584</td>
<td>5996</td>
<td>87,426</td>
<td>240</td>
</tr>
<tr>
<td>2005/06</td>
<td>69,574</td>
<td>5,703</td>
<td>81,970</td>
<td>225</td>
</tr>
<tr>
<td>2006/07</td>
<td>70,564</td>
<td>6,004</td>
<td>85,086</td>
<td>233</td>
</tr>
</tbody>
</table>

### Indicator: User-Pays Water Pricing

<table>
<thead>
<tr>
<th>Year</th>
<th>Charge for 1000 litres (1 kilolitre) of water</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002/03</td>
<td>$0.60</td>
</tr>
<tr>
<td>2003/04</td>
<td>$0.62</td>
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<tr>
<td>2004/05</td>
<td>$0.68</td>
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<td>2005/06</td>
<td>$0.82</td>
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<td>2006/07</td>
<td>$1.04</td>
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<td>$1.23</td>
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<td>$1.36</td>
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<tr>
<td>2009/10</td>
<td>$1.50</td>
</tr>
<tr>
<td>2010/11</td>
<td>$1.65</td>
</tr>
</tbody>
</table>

Source: Tweed Shire Council Water Unit

### Indicator - Surface Water and Groundwater Extraction: NSW Department of Water and Energy regulates surface water and groundwater extraction throughout NSW and maintains a public register of water access licenses and water allocations.

### RESPONSE

Each response seeks to address one or more of the identified pressures. Responses are listed in order from newest to oldest. This format gives regular readers of the SoE Report easy access to the most recent initiatives, while allowing infrequent readers to view a catalogued history of responses. Icons at the end of each response represent the pressures being targeted.

### Water Supply Augmentation

Council’s Integrated Water Cycle Management Strategy identifies the need to upgrade the capacity of the Tweed’s major water supply system. Tweed Shire’s population is expected to increase substantially during the next 25 years and Council and the community need to act to ensure there will be enough water to satisfy demand.

Council has completed a study of augmentation options, with input from the community and other stakeholders, and is considering the best way forward.
Clarrie Hall Dam Spillway Upgrade

Council is planning to upgrade the Clarrie Hall Dam’s spillway capacity to ensure the dam can continue to safely accommodate extreme flood events.

When Clarrie Hall Dam was commissioned in the early 1980s, it complied with the engineering standards of the day. Since then, better models have improved rainfall predictions and there is a better understanding of extreme weather patterns. The NSW Dams Safety Committee establishes safety requirements for dams in NSW and has upgraded these safety standards in response to improved predictions of weather events.

Clarrie Hall Dam is extremely safe for day-to-day operations and it can withstand floods many times greater than the largest flood on record. However, it needs to be upgraded to meet the committee’s new standards to prepare for floods which might occur in extreme rainfall events. The probability of such events occurring is extremely small.

The proposed upgrade of the spillway would ensure the safety of people and property downstream of Clarrie Hall Dam.

Drought Management Strategy

Council will review its Drought Management Strategy in 2011, particularly provisions for water restrictions. It is anticipated a draft of the revised restrictions will be publicly exhibited for comment in late 2011.

Water Loss Management

A water loss management program, incorporating a leak detection program and pressure management, is being implemented as part of Council’s Demand Management Strategy. Flow tests, otherwise known as drop tests, on Council’s water reservoirs are the first step to identify water supply zones where leakages might be occurring. Drop tests have been carried out on reservoirs at Tweed Heads, Tweed Heads West, Burringbar, Tyalgum and Uki. All of Council’s reservoir zones will be progressively tested over a three-year period.

In 2010, Council gained $14,968 in funding through the Water Loss Management Program. Council completed a leak detection survey of 45km of water mains in the area fed by Razorback, one of the major reservoirs. Flow meters were installed on the pump station that feeds two water supply zones. These meters are providing ongoing measurements of night flows, enabling a direct comparison of water meter data with supply to these areas so leakage and illegal water use can be monitored in the future. The project is estimated to have resulted in sustainable annual water savings of 90ML, which represents approximately one per cent of unaccounted losses.

In 2011, Council will purchase leak detection equipment to help locate suspected leaks. Flow meters will continue to be installed, to establish District Metered Areas that will improve Council’s ability to carry out water balances on the water supply system.

Rainwater Tank Policy

Key projects identified by the Demand Management Strategy also include a rainwater tank program designed to promote the installation of rainwater tanks for non-potable uses, to reduce the consumption of water from the reticulated supply.

As a first step, a review of Council’s rainwater tank policy was conducted in May 2011. Council initially adopted a Rainwater Tank Policy in 2005.
Facilitate the installation and use of domestic rainwater tanks in Tweed Shire to supplement the Tweed Shire bulk water supply.

Reducing the intensity and frequency of stormwater runoff from urban areas.

The policy also outlined necessary requirements to protect the public water supply from cross connection with private rainwater tanks.

It was complemented by an Exempt Development Checklist which allowed residents to determine if they needed to submit a Development Application before installing a rainwater tank.

The revised policy produced in 2011, entitled Rainwater Tanks in Urban Areas, applies to rainwater tanks installed for residential use in urban areas that are connected to the Tweed’s reticulated water supply. The draft policy was placed on public exhibition from 4 July to 15 August 2011 and it is envisaged Council will adopt the policy, with any amendments, in October 2011.

In keeping with Council’s adopted Demand Management Strategy, the policy complements BASIX and aims to go a step further to reduce water demand in Tweed Shire. While Council cannot override BASIX requirements for single dwellings, the policy recommends a minimum tank size of 5000 litres, capturing rainwater from a roof catchment area of 160 square metres or more. For multi-dwellings, the policy recommends the maximum possible tank size and 80-90 per cent of the roof catchment area.

Community Education / Support

Most of the programs that comprise Council’s Demand Management and Integrated Water Management Strategies incorporate an important education component. Council is engaged a full-time Water Education Officer in September 2011, to help develop and implement education and training resources to support these programs.

Water Saving Rebate

A water saving retrofit/rebate program for residential water customers over the next three years is another important element outlined in the Demand Management Strategy and included in its budget.

A total of $531,700 has been budgeted for the Residential Water Saving Rebate, which was launched on 1 July 2011 and is expected to continue until 30 June 2014.

In the first instance, the rebate is up to $70 towards the cost of water efficient, WELS-rated (Water Efficiency Labelling and Standards Scheme) showerheads, tap aerators, replacement spouts, mixers and the associated installation costs. Participation in the rebate and its effectiveness over the first year is being monitored and the scheme might be modified in years two and three.

Excess Water Charge for High Consumers

Council continues to support a pricing mechanism that encourages water conservation. In 2010/11, the standard user-pays tariff applied for consumption up to 350 kilolitres. A higher tariff was charged for consumption exceeding this amount.

This replaced an excess water charge introduced by Council in 2008, which introduced a higher tariff for households that consumed more than 450 kilolitres per year.
A user pays system was introduced for the Tweed's town water supply in 2002, to send a strong water conservation signal to consumers through water pricing. User-pays pricing and ‘step’ charges encourage consumers to review their water usage, to reduce consumption and their associated bills. This also helps delay growth-related capital works.

**Demand Management Strategy**

The Water Supply Demand Management Strategy (DMS) is a key element of the Integrated Water Cycle Management Strategy.

Stage 1 of the Demand Management Strategy - and its recommendations to address demand management in greenfield (new) and brownfield (existing) residential areas - was adopted by Council in February 2009. The installation of water-efficient appliances and rainwater tanks, connected to toilet, laundry and outdoor uses, became mandatory for all new developments. Similar installations are also encouraged for existing homes.

This aimed to reduce consumption by approximately 36 per cent - or 80,000 litres per year - in new homes, based on water use in an average-sized household. Other recommendations will provide further savings, such as a water-loss management program and residential education programs.

Stage 2 of the strategy - which addresses demand management in commercial and industrial areas - and a summary report of both stages were adopted by Council in October 2010.

In April and May 2010, Council adopted a three-year implementation plan and budget for the DMS. Council adopted key performance indicators to monitor the performance of the overall DMS implementation, as well as additional performance indicators for individual programs. The three-year DMS implementation includes several key projects:

- DMS Program Planning.
- Performance Tracking Framework.
- Water Billing Process Review.
- Residential Retrofits and Rebates.
- Rainwater Tank Program.
- Top 20 Water Users – Non-Residential Program.
- Open Space Irrigation Guidelines + Water Efficient Garden Policy.
- Unaccounted for Water.
- Other Major Water Users – Top 100.
- Permanent Water Restrictions.
- Recycled Water Projects.
- Leakage Reduction Program.
- Water Sensitive Urban Design.

The estimated budget for the DMS implementation over the next three years is $2.45 million.

Integrated Water Cycle Management Strategy

Integrated Water Cycle Management (IWCM) seeks to ensure safe and reliable water supplies without compromising the ecological function of a water catchment. It is based around a holistic approach to managing water supply, waste water, stormwater and waterway health within long-term strategic planning goals.

In 2006, Council adopted Phase 1 of an Integrated Water Cycle Management (IWCM) Strategy for Tweed Shire. It included 26 actions to improve the way water is used in the Tweed.

Council began Phase 2 in February 2009. This phase includes studies to better define and manage key issues. The studies include population and water demand projections, examine water supply and water extractions from the environment, and measures to increase the amount of water supplied from alternative sources such as recycled water and rainwater tanks.

This led to the adoption of long-term strategies for the integrated delivery of water supply, sewerage and stormwater services. Recent studies include:

- Tweed Shire Demand Management Strategy.
- Tweed Shire Drought Management Strategy.
- Tweed Shire Recycled Water Opportunities Report.
- Risk Based Water Quality Management Plan.
- Tweed District Water Supply Augmentation Options Report – Course Screening

A report to Council in February 2011 summarised progress on the implementation of the IWCM Strategy and its action items, last updated in January 2009.

There are now 21 updated IWCM Strategy actions, arranged under the headings:

- Overarching Strategies and Plans
- Urban Water
- Urban Waste Water
- Urban Stormwater
- Urban Design
- Catchment Management


Community Education / Support

Refer to Environmental Education and Capacity Building for education-based initiatives to raise awareness about the urban water cycle and the importance of water-wise behaviour.

Environmental Flows

The development of Macro Water Sharing Plans for the region was continued in 2008. These plans require Council to release water from Clarrie Hall Dam to match river inflows during dry periods when flows fall below 95 per cent of base levels. Other water extractors, such as irrigators, will be directed to stop pumping during these events.
Community Retrofit Program

In 2007, Council built on previous community retrofit programs by partnering with an accredited provider under the NSW Greenhouse Gas Abatement Scheme. The partnership offered Tweed residents the free supply and installation of ‘water wise’ showers, flush converters for single-flush toilets and aerators for kitchen taps. Refer to Showerhead and Light Globe Giveaway 1, 2 and 3 in Environmental Education and Capacity Building to see how the free community retrofit program evolved, including participation rates, water savings and greenhouse gas abatement.

Development Services Plan for Water Supply Services

A Development Servicing Plan (DSP) for Water Supply Services was finalised in 2007 to enable Council to levy contributions when an anticipated development is likely to increase demand for water supply services. The DSP was principally designed to identify demand for capacity in water supply infrastructure as a result of development and to provide that capacity through development contributions.

Water Restrictions Policy

The Tweed Shire Water Restrictions Policy was amended in 2007 to improve water security by increasing the supply levels which trigger water restrictions. To view the latest information about water restrictions and triggers visit www.tweed.nsw.gov.au/water

Secure Yield Projections

In 2007, Council revised the secure yield of the Tweed Water Supply from 27,500 megalitres per year (ML/year) - capable of sustaining a future population of 189,000 - down to an estimated 13,750 ML/year supporting a population of 94,000. This reduction in estimated yield was triggered by improved modelling techniques, accounting for recent drought events and allowing for the release of environmental river flows.

Leak Detection Program

In 2007, Council began preliminary investigations into a Leak Detection Program through the NSW Water Directorate.

Domestic Greywater Reuse

Since 2002, Council has sought to improve community knowledge about the use of domestic grey water, as part of Council’s On-Site Sewage Management Program. Refer to Waste water Section of this report for more details.

Recycled Water Projects

In the mid 1980’s Council commenced its first recycled water project by supplying irrigation water to the Tweed-Coolangatta Golf Course. Refer to the Waste-water Section of this report for details of recycled water initiatives that have reduced demand on the town water supply.
Waterway Health
Since the early 1980s, Council has endeavoured to maintain water quality in the water supply catchment to:
- Promote catchment health.
- Reduce the energy input required to treat the town water supply.

Refer to Waterway Health for details of recent initiatives, including the establishment of River Health Grants.

Clarrie Hall Dam
Clarrie Hall Dam was completed in 1982 and provides the Tweed’s water supply during drier months of the year. When flows in freshwater reaches of the Tweed River fall below 95 per cent, water is released from the dam, flows down Doon Doon Creek and into the Tweed River. Water is then extracted downstream at the Bray Park weir, treated and pumped via a network of over 660km of pipes to reservoirs throughout the shire. The town water network services more than 80 per cent of the Tweed population. For more information about the urban water cycle, visit www.tweed.nsw.gov.au/water

Groundwater Management
Groundwater use is managed by the NSW Department of Water and Energy. Council has not undertaken any specific initiatives to manage pressures on the groundwater supply at this stage.

Related Topics
- Built Environment
- Waste-water Management
- Waterway Health
- Environmental Education and Capacity Building
Upgrading the Banora Point Waste Water Treatment Plant.
WASTE WATER MANAGEMENT

CONDITION

At a Glance

- Waste water is the water-borne wastes of a community. Pollutants comprise approximately 0.1 per cent of this water (by weight), while the remaining 99.9 per cent is pure water.
- It does not include roof water or surface runoff; this is known as stormwater.
- Wastewater is generated by residences, hospitals, commercial and light industrial sites such as clubs, caravan parks, restaurants and commercial laundries.
- In Tweed Shire, the average daily residential consumption of town water is 182 litres per person. About 75 per cent of this is discharged to the wastewater collection system and transferred to the nearest Wastewater Treatment Plant (WwTP). The treated wastewater is then discharged back into the environment or recycled for non-potable uses.
- WwTPs are located at Banora Point, Hastings Point, Kingscliff, Murwillumbah, Tumbulgum, Tyalgum and Uki.
- 90 per cent of wastewater that enters the treatment plants is treated to tertiary standards (treatment standards are explained below).
- Council’s wastewater network services approximately 82 per cent of the Tweed population.
- On-Site Sewage Management Systems (e.g. septic tanks) service approximately 18 per cent of Tweed Shire residents.
- Definitions:
  - Primary treatment – Screens water and removes grit. Removes a substantial amount of suspended matter but little or no colloidal or dissolved matter.
  - Secondary treatment – Follows primary treatment and is typically a biological process designed to remove 85 per cent of the biological oxygen demand and suspended solids in the waste water. Converts ammonia to nitrate.
  - Tertiary treatment – Follows or is often incorporated into the secondary process to reduce phosphorous levels to less than two milligrams per litre (mg/L) and nitrogen to below 15 mg/L. It also removes more suspended solids and reduces the biological oxygen demand of the secondary-treated waste water. It often also includes a final filtration process. Advanced tertiary processes can remove phosphorous below 0.5 mg/L and nitrogen to less than 5 mg/L.
  - Recycled water – Waste water treated to a level suitable for commercial applications, residential outdoor use, toilet flushing and clothes washing. To achieve this level, tertiary-treated waste water is further filtered to at least micro-filtration level. It is then further disinfected with a specific wave length of ultraviolet light or ozone and finally, like drinking water, it is chlorinated to provide a residual disinfection capability.
PRESSURE

At a Glance

Environmental pressures associated with waste water management

<table>
<thead>
<tr>
<th>Code</th>
<th>Discharge of treated waste water to local waterways</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The strength and volume of liquid trade waste</td>
</tr>
<tr>
<td></td>
<td>High failure rates of on-site sewage management systems and the associated impacts on adjacent waterways</td>
</tr>
<tr>
<td></td>
<td>Greenhouse gas emissions associated with:</td>
</tr>
<tr>
<td></td>
<td>- Energy input for the treatment and disposal of waste water.</td>
</tr>
<tr>
<td></td>
<td>- Methane generation from the treatment process.</td>
</tr>
</tbody>
</table>

These pressures are likely to increase in proportion to population.

Waste Water Management Indicators

<table>
<thead>
<tr>
<th>Year</th>
<th>Population serviced by sewer (%)</th>
<th>Total volume of waste water (ML)</th>
<th>Waste water reused (ML)</th>
<th>Percentage of waste water reused (%)</th>
<th>Waste water discharged to waterways (ML)</th>
<th>Number of sewer overflows</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002/03</td>
<td>81.7</td>
<td>7808</td>
<td>244</td>
<td>3.2</td>
<td>7564</td>
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<tr>
<td>2003/04</td>
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<td>2004/05</td>
<td>82.7</td>
<td>8250</td>
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<td>4.8</td>
<td>7874</td>
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<td>8776</td>
<td>267</td>
<td>3.1</td>
<td>8509</td>
<td>5**</td>
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<tr>
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<td>81.7*</td>
<td>7253</td>
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<td>4.9</td>
<td>6914</td>
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<td>9</td>
<td>8218</td>
<td>41</td>
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<tr>
<td>2009/10</td>
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<td>8528</td>
<td>775</td>
<td>10</td>
<td>7753</td>
<td>19</td>
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<tr>
<td>2010/11</td>
<td>82.62</td>
<td>9162</td>
<td>436</td>
<td>4.8</td>
<td>8726</td>
<td>36</td>
</tr>
</tbody>
</table>

Source: Tweed Shire Council Water Unit

* The reduction in population serviced by sewer is due to revised data from the 2006 ABS Census.
** Low incidences of sewer overflows in 2005/06 may be due to reporting on ‘dry weather’ overflows only.
NOTE: This table has been revised to reflect corrections made to source data in September 2008.
<table>
<thead>
<tr>
<th>Indicator: On-Site Sewage Management Systems (OSSMS)</th>
<th>Number of new OSSMS built</th>
<th>Total number of OSSMS (approx)</th>
<th>Number of approvals to operate issued</th>
<th>Number of site inspections carried out</th>
<th>Number of improvement notices issued</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002/03</td>
<td>103</td>
<td>4000</td>
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<tr>
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<td>152</td>
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<td>165</td>
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<tr>
<td>2005/06</td>
<td>120</td>
<td>6450</td>
<td>393</td>
<td>600</td>
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<td>2006/07</td>
<td>120</td>
<td>6580</td>
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<td>420</td>
<td>250</td>
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<td>2007/08</td>
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<td>6672</td>
<td>152</td>
<td>244</td>
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<td>6808</td>
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<td>2010/11</td>
<td>85</td>
<td>6905</td>
<td>415</td>
<td>520</td>
<td>385</td>
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</table>

Source: Tweed Shire Council Environmental Health Unit

**RESPONSE**

Each response seeks to address one or more identified pressure. Responses are listed in order from newest to oldest. This format gives regular readers of the SoE Report easy access to the most recent initiatives, while allowing infrequent readers to view a catalogued history of responses.

Icons at the end of each response represent the pressure being targeted.

**Burringbar / Mooball Wastewater Treatment Plant**

*Responsibility: Water Unit*

*Status: New*

The villages of Burringbar and Mooball are serviced by septic tanks and most are prone to failure. A centralised waste water system will be constructed to protect public health, provide greater amenity to the villages and reduce uncontrolled discharges from septic tanks into the environment.

The impetus to construct a centralised waste water system increases as the townships’ populations grow, elevating the loads discharged to the environment through septic tanks and their associated absorption trenches, and increasing the potential risks from overflows.

Council considered several waste water collection, transport and treatment options, then adopted a combined modified gravity sewage collection and transport system with a waste water treatment plant located on Pottsville Mooball Road.

A Review of Environmental Factors was prepared for the preferred option in 2005 and Development Consent for the proposed scheme was issued in March 2009.
The Burringbar Mooball Waste Water Scheme comprises:

- Construction of a Burringbar & Mooball village wastewater reticulation scheme, including installation of conventional gravity sewers, rising mains, sewer pumping stations and low-pressure pump unit systems.

In July 2011, Ledonne Constructions Pty Ltd was awarded the tender to construct a Council-designed reticulation scheme. A separate tender to design, construct, test and commission the waste water treatment plant was awarded to AJ Lucas Operations Pty Ltd during the same month.

The $9 million project will be jointly funded from property owner contributions (approximately five per cent), a State Government grant and Council's Sewerage Fund. The total value of State Government funding has not been determined but is expected to be approximately 40 per cent of the project value.

Works are expected to be completed by the end of 2012. Residents will be notified when the wastewater system is available for connection, once it has been tested and commissioned.

**Banora Point Wastewater Treatment Plant Upgrade**

**Responsibility: Water Unit**  
**Status: Ongoing**

Banora Point WWTP was constructed to its current design capacity of 15 megalitres per day (ML/day) in 1995. The plant is operating close to its design capacity, with average flows to the plant nearing 15 ML/day.

The treatment plant’s catchment, which includes Tweed Heads, Banora Point, Terranora and Bilambil Heights, continues to expand because of new developments and infill. It is estimated the population of this catchment will increase by 75 per cent over the next 30 years.

Council completed an Environmental Impact Statement (EIS) Report in 2005 to assess nine options for upgrading the Banora Point and Tweed Heads West WWTPs, to:

- Cater for predicted future population growth in these areas.
- Protect environmental values in the Lower Tweed Estuary.
- Meet the community’s water quality expectations.

After a rigorous evaluation process, Council opted to upgrade the plants to produce recycled water for domestic non-potable applications in new developments. It also resolved to undertake capital investment in catchment rehabilitation and discharge unused water to Terranora Creek.

In March 2009, Council committed to upgrading the Banora Point and West Tweed WWTP sites, to improve waste water quality to meet Department of Environment, Climate Change and Water (DECCW) criteria. The upgrades were also required to service predicted increases in population in the Tweed/Banora catchment area and to meet the community’s water quality expectations.

Without an increase in the plants’ capacity, development in the Cobaki, Terranora and Bilambil areas would not be able to proceed.

Council is upgrading the Banora Point plant to increase its capacity to 18 ML/d and significantly improve the quality of discharged effluent. The increased capacity will service the equivalent of approximately 4,500 new homes.

Treated effluent from the plant is discharged to Terranora Inlet, which is part of the Tweed River system. An environmental impact statement prepared as part of the approvals phase showed
improved effluent quality from the Banora Point WWTP would enhance the quality of water in the lower Tweed estuary.

The treatment plant is being upgraded to ensure the staged provision of necessary infrastructure is in place to service growth in this region, while protecting the environment of the lower Tweed estuary.

Tenix Australia has been awarded a contract to upgrade the WWTP. Construction started in September 2010 and will take approximately 18 months to complete.

Most of the project’s capital investment is allocated to significantly improving the final quality of discharged effluent. A new five-stage Bardenpho process and the inclusion of tertiary-stage filters will reduce the concentrations of:

- Nitrogen by 40 per cent.
- Phosphorous by 90 per cent.

As a result, there will be no nett increase in nutrients entering the environment even though there will be more homes and businesses creating waste water. Filtration and disinfection equipment are also being upgraded as part of the works. These multi-barrier treatment systems protect human and environmental health.

The $35 million project is being funded by Council, with the assistance of a $16.8 million interest-free loan from the NSW State Government Local Infrastructure Fund.

**Recycled Water Projects**

*Responsibility: Water Unit*

*Status: Ongoing*

Council recycled 4.8 per cent of its treated waste water in 2010/11 and is implementing a sampling and monitoring program for its existing recycled water projects. The monitoring regime is consistent with Australian guidelines for water recycling.

Existing recycled water projects in Tweed Shire:

- **Chinderah golf course** - Recycling up to 110 megalitres per year (ML/a) from Kingscliff WWTP. Operating since 2009; approved sampling program in place.
- **Condong co-generation facility** – Recycling up to 584ML/a from Murwillumbah WWTP and operating since 2007.
- **Coolangatta Tweed Heads Golf Club** – Recycling up to 250ML/a from Banora Point WWTP. Operating since 1987; sampling program being developed.
- **Tyalgum pasture irrigation** – Recycling up to 25ML/a from Tyalgum WWTP. Operating since 1987; sampling program being developed.
- **Uki koala fodder tree plantation** – Recycling up to 9ML/a from Uki WWTP. Operating since 2004; sampling program in place.

Several other recycled water opportunities have been identified and are at various stages of investigation and design:

- **Arkinstall Park and Memorial Gardens** - Recycling up to 230ML/a from Banora Pt WWTP. Concept design for both completed 2008; construction planned for 2013.
- **Tyalgum Koala Fodder tree plantation** - Concept design to be completed 2011/12 with construction 2012/13.
- **Burringbar/Mooball recycled water scheme** – Recycling up to 20ML/a. Can be pursued once the new WWTP is operating.
- **Chinderah ti tree plantation** – Recycling up to 950ML/a from Kingscliff WWTP. Under consideration.
Kingscliff recycled water scheme – Recycling up to 180ML/a from Kingscliff WWTP. Concept design completed 2005; to be revisited once future development in West Kingscliff becomes clearer.

Les Burger Field (rugby club), Bogangar – Recycling up to 55kL/d from Hastings Pt WWTP. Construction of pipeline and storage tank completed; connection to irrigation system continuing; due to be operating by August 2012.

Barry Sheppard Oval and Round Mountain Pony Club – Recycling up to 200ML/a from Hastings Pt WWTP. Pipeline has been constructed; need consideration continuing.

Tweed Heads South industrial area – Under preliminary consideration. Will depend on Banora Point WWTP upgrade and customer effluent quality requirements.

West Kingscliff residential area – To be investigated for future development.

West Kingscliff industrial estate – Identified in the Demand Management Strategy as an option to investigate prior to future development.

Council is willing to receive and assess submissions from developers who propose water recycling at new developments.

**Demand Management Strategy**

*Responsibility: Water Unit*

*Status: Ongoing*

Council’s Demand Management Strategy (DMS) aims to deliver a range of waste water management options, including water conservation to reduce waste water inflows and identifying options to use recycled water to reduce:

- Demand on the town water supply.
- Discharge volumes to local waterways.

Stage 1 of the strategy and its recommendations, which address demand management in greenfield (new) and brownfield (existing) residential areas, were adopted by Council in February 2009.

Stage 2, which addresses demand management in commercial and industrial areas, and a summary report of both stages were adopted by Council in October 2010.

In April and May 2010, Council adopted a three-year implementation plan and budget for the DMS. Council also adopted key performance indicators to monitor the performance of the strategy’s implementation, as well as additional performance indicators for individual programs. The three-year DMS implementation includes several key projects:

- DMS Program Planning
- Performance Tracking Framework
- Water Billing Process Review
- Residential Retrofits and Rebates
- Rainwater Tank Program
- Top 20 Water Users – Non-Residential Program
- Open Space Irrigation Guidelines + Water Efficient Garden Policy
- Unaccounted for Water
- Other Major Water Users – Top 100
- Permanent Water Restrictions
- Recycled Water Projects
- Leakage Reduction Program
- Water Sensitive Urban Design
The estimated budget for the DMS implementation over the next three years is $2.45 million.


Trade Waste Policy

*Responsibility: Water Unit*

*Status: Ongoing*

Council’s Liquid Trade Waste Policy was reviewed and approved by the NSW Office of Water in 2010. The policy was developed in 1997 for the disposal of trade waste to the wastewater system. It is based around a user-pays system to encourage water efficiency and lower waste water discharge levels from commercial and industrial activities.

A comprehensive schedule of annual inspections of all liquid trade waste customers was developed and implemented in early 2011. Premises are inspected in three strands:

- Restaurant/cafe/food outlet.
- Mechanical workshop.
- Miscellaneous (all other premises).

Tests are carried out on grease arrestors, to check the adequacy of pump-out frequency, and waste water discharged to sewer, as necessary, to check compliance with Council’s policy and ensure correct fees are charged.

Information about liquid trade waste customers has been managed using a customised database which helps track trade waste agreements, monitoring requirements, inspections, waste water quality and charges. This system is due to be updated and improved in the latter half of 2011, to better integrate with Council’s broader customer database and a new water management system. This will improve the level of service available to new and existing liquid trade waste customers. It will also enhance Council’s ability to manage the impact of liquid trade waste on waste water assets.

Council had previously established a Trade Waste Program in 1992, to manage the volume and strength of trade waste discharges to the waste water system. The ongoing program is based around monitoring of licensed premises in the Trade Waste Register.

Sewer Overflow Monitoring

*Responsibility: Water Unit*

*Status: Completed in 2007*

Council has conducted an audit of its waste water network in 2007 to identify potential overflow points. It identified about 100 potential overflow sites; most were sewer manholes.

In July 2011, Council began a project that will run over a number of years, to install level monitoring and overflow alarms at these sites. An overflow alarm system allows Council’s Water Unit staff to take corrective action, whenever possible, in the event of a likely or actual overflow.

Community Education / Support

*Responsibility: Water Unit*

*Status: Ongoing*

There are important education components in the majority of programs in Council’s Demand Management and Integrated Water Management Strategies, as well as other activities undertaken by Council’s Water Unit. Council engaged a full-time Water Education Officer in September 2011, to help develop and implement education and training resources to support these programs.
Integrated Water Cycle Management Strategy Update

Responsibility: Water Unit
Status: Ongoing

Integrated Water Cycle Management (IWCM) ensures safe and reliable water supplies without compromising the ecological function of the water catchment. It is based around a holistic approach to managing water supply, waste water, stormwater and waterway health within long-term strategic planning goals.

Council adopted an IWCM Strategy in 2006 to provide a framework and long-term focus for the integrated delivery of water supply, waste water and stormwater services.

The IWCM Strategy defines the catchment, water resources and urban water characteristics of Tweed Shire and plans for the management of critical issues:

- The ability of existing surface waters to adequately service future populations
- The impacts of urban stormwater and effluent on the Lower Tweed Estuary
- The impacts of agricultural runoff on the Upper Tweed River and Bray Park Weir.

A report to Council in February 2011 provided a summary of progress on the IWCM Strategy’s implementation and its action items, last updated in January 2009.

There are now 21 updated IWCM Strategy actions, arranged under six headings:

- Overarching Strategies and Plans
- Urban Water
- Urban Waste Water
- Urban Stormwater
- Urban Design
- Catchment Management


Recycled Water Projects – Chinderah Golf Course and Les Burger Field

Responsibility: Water Unit
Status: Ongoing

In 2009, Council started supplying recycled water from Kingscliff WWTP to the Chinderah Golf Course for irrigation. This initiative will reduce demand on the Cudgen groundwater aquifer, while reducing waste water discharges to the Tweed River by up to 100 megalitres per year.

In the same year, Council began supplying recycled water from Hastings Point WWTP to irrigate the Les Burger Rugby League Sports Fields. This promises to reduce the facilities’ annual town water consumption by an average of 180 megalitres per year.

Kingscliff Wastewater Treatment Plant Upgrade

Responsibility: Water Unit
Status: Completed November 2008

A new $45 million Kingscliff WWTP was opened in 2008. It has an initial capacity to treat waste water from 25,000 people but has been designed to be upgraded to a capacity of 50,000 people. The
facility serves the villages of Kingscliff, Fingal Head, Chinderah, South Kingscliff (Salt) and Casuarina.

The plant’s treatment process must meet stringent wastewater discharge requirements determined during its Environmental Impact Study. It also needed to be simple to operate and extremely robust, to guard against shock loads on the plant.

The treatment process is undertaken in three stages:

- **Primary treatment** - Fine screening, grit removal and odour control.
- **Secondary treatment** – Waste water enters;
  - an anaerobic reactor,
  - then an oxidation tank,
  - a secondary anoxic zone,
  - a secondary aerobic zone,
  - a clarification process.
- **Tertiary treatment** – Waste water enters;
  - a secondary pump station,
  - filtration,
  - chlorination,
  - de-chlorination.

The resulting waste water discharged by the plant has very low nutrient limits, making it a world-class treatment facility. The plant has a maximum nitrogen limit of five milligrams per litre and phosphorus limit of 0.3 milligrams per litre.

Following treatment, waste water is released to the Tweed Estuary at the intersection of Chinderah Bay Drive and Wommin Bay Road, Chinderah.

A recycled water scheme with the adjoining Chinderah Golf Course reduces waste water discharge volumes at the estuary by up to 100 megalitres per year.

The new plant replaced a previous Kingscliff WWTP which had been upgraded to secondary standards in 1998 to reduce discharge impacts on the Tweed River.

**Recycled Water Project - Condong Sugar Mill**

*Responsibility: Water Unit*

*Status: Ongoing*

In 2007, Council started supplying recycled water from Murwillumbah WWTP to the Condong Sugar Mill to use as cooling water in the electricity co-generation process. This avoided additional demand on the town water supply by an average of 584 megalitres each year, while improving water quality in the Rous River by reducing discharge volumes.

**Grey-water Reuse**

*Responsibility: Water Unit*

*Status: Ongoing*

In 2007, Council sought to increase community awareness about domestic grey-water reuse by promoting NSW Government fact sheets. To view these fact sheets, visit [www.tweed.nsw.gov.au/water](http://www.tweed.nsw.gov.au/water) and click on ‘water saving tips’.
Pump Station Telemetry Upgrade

Responsibility: Water Unit
Status: Completed in 2007

The Shire-wide pump station monitoring telemetry system was upgraded in 2007 to improve monitoring of the network for operating efficiency and incident responses.

Sewage Overflow Abatement Strategy

Responsibility: Water Unit
Status: Completed in 2007

A Sewage Overflow Abatement Strategy was developed in 2007 to reduce the likelihood of wastewater overflows and improve response techniques. The strategy informed the development of five capital works program.

Murwillumbah Advanced Tertiary Treatment Plant

Responsibility: Water Unit
Status: Completed in 2007

A tertiary treatment plant module was added to the Murwillumbah WWTP in 2007 to achieve advanced tertiary treatment standards, so waste water could be reused at the Condong Sugar Mill in its cogeneration process.

Development Servicing Plan for Wastewater Services

Responsibility: Water Unit
Status: Completed in 2007

In 2007, a Development Servicing Plan (DSP) for Waste Water Services was finalised so Council could levy contributions when anticipated development is likely to increase demand for waste water services. The DSP is principally designed to identify demand for capacity in waste water infrastructure as a result of development and to provide for that capacity through development contributions.

Hastings Point Wastewater Treatment Plant Upgrade

Responsibility: Water Unit
Status: Completed in 2005

Hastings Point WWTP was upgraded in 2005 to service Cabarita, Bogangar, Hastings Point and Pottsville. Waste water within this catchment is treated to tertiary standards and discharged through a dune disposal system east of the plant.

In 2009, a recycled water scheme was implemented to supply irrigation water to the nearby Les Burger Sports Fields. Refer above for details.
Uki Wastewater Treatment Plant and Recycled Water Project –

Uki Plantation Irrigation

Responsibility: Water Unit
Status: WWTP Completed in 2004
: Uki Plantation Irrigation ongoing

In 2004, a WWTP was constructed to service Uki village. Waste water is treated to secondary standards and recycled using on-site plantation irrigation.

Since 2004, recycled water from Uki WWTP has been used to irrigate 8.75 hectares of eucalyptus trees. Branches are harvested from the trees to feed koalas at Currumbin Wildlife Sanctuary. The system has been designed to utilise all of the treated waste water from Uki village.

24-Hour Emergency Response Line

Responsibility: Water Unit
Status: Ongoing

Council established a 24-hour emergency response line in 2003 to respond to out-of-hours wastewater and water incidents (e.g. pump station overflows) in a more effective manner. This initiative has significantly reduced the impacts of overflow incidents on surrounding environments.

On-Site Sewage Management

Responsibility: Environment and Health Unit
Status: Ongoing

On-site sewage management systems (OSSMS), such as septic tanks and absorption trenches or aerated water treatment systems and irrigation systems, are intended to enable residences and businesses in areas without sewerage to dispose of waste water in a way that does not threaten public health, damage the environment or create a nuisance.

In 2002, Council developed a program to improve the management of OSSMS in Tweed Shire, in response to growing concerns about the potential environmental and human health risks associated with the failure of these systems.

Key aspects of the program:

- A requirement for all system owners to obtain an 'approval to operate' their systems.
- Raise homeowners’ awareness of the issue and help them improve and maintain the performance of their systems.
- Inspections of systems throughout the Tweed to allocate a risk rating. The risk rating determines the frequency of ongoing inspections.
- Issue improvement notices such as removal of sludge from primary treatment tanks, replacing or repairing failing waste water land application areas and installing biological septic tank outlet filters.

Murwillumbah Wastewater Treatment Plant Upgrade

Responsibility: Water Unit
Status: Completed in 2001

Murwillumbah WWTP was upgraded to tertiary standards in 2001 to reduce discharge impacts on the Rous River.
Tumbulgum Wastewater Treatment Plant

Responsibility: Water Unit  
Status: Completed in 1996

A WWTP was constructed to service Tumbulgum village in 1996. Wastewater is treated to tertiary standards and discharged into the Tweed River, downstream of the village.

Banora Point Wastewater Treatment Plant Upgrade

Responsibility: Water Unit  
Status: Completed in 1995

In 1995, the Banora Point WWTP was upgraded to tertiary standards to reduce discharge impacts on Terranora Inlet. The discharge point is beneath the Highway overpass on Dry Dock Road in Tweed Heads South.

Tyalgum Wastewater Treatment Plant / Pasture Irrigation

Responsibility: Water Unit  
Status: Completed in 1990

In 1990, a WWTP was constructed to service Tyalgum village. Waste water is treated to secondary standards and recycled through on-site pasture irrigation. This initiative reduces waste water discharge to local waterways by an average of 25 megalitres per year.

Tweed Heads West Wastewater Treatment Plant Upgrade

Responsibility: Water Unit  
Status: Decommissioned in 2008

Tweed Heads West WWTP was upgraded to secondary standards in 1988 to reduce discharge impacts on Terranora Inlet. The discharge point is beneath the highway overpass on Dry Dock Road, Tweed Heads South.

The plant was decommissioned in 2008 and waste water from the service catchment is now treated at Banora Point WWTP.

Banora Point Recycled Water Project - Golf Course Irrigation

Responsibility: Water Unit  
Status: Ongoing

Since 1987, recycled water from Banora Point WWTP has been used to irrigate sections of the Coolangatta Tweed Heads golf courses. This initiative reduces wastewater discharge to local waterways by an average of 250 megalitres per year.

Related Topics

Built Environment  
Water Supply  
Waterway Health
Erosion at Kingscliff beach.
Do the Right Bin education campaign.
SOLID WASTE MANAGEMENT

CONDITION
At a Glance
Council contracts out the collection of household waste, recycling, optional green waste services, public litter bins and provides a biannual bulky household waste collection. The contractor undertakes the day-to-day management of the Stotts Creek Resource Recovery Centre, including the operation of the current putrescibles landfill, inert landfill cell and green waste processing. The contractor sub-contracts the operations of the tip shop and Materials Recovery Facility (i.e. sorting of recyclables).

PRESSURE
At a Glance

<table>
<thead>
<tr>
<th>Environmental Pressures Associated with Solid Waste Management</th>
<th>Icon</th>
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<tbody>
<tr>
<td>Climate change:</td>
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<tr>
<td>• Indirect greenhouse gas emissions associated with the consumption of goods and services</td>
<td><img src="image" alt="Climate Change Icon" /></td>
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<tr>
<td>• Directed greenhouse gas emissions associated with waste collection and disposal</td>
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<tr>
<td>Construction waste – Construction and demolition waste has been declining in recent years because of a downturn in the construction industry</td>
<td><img src="image" alt="Construction Icon" /></td>
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<tr>
<td>Domestic waste – More than 30 per cent of the total waste stream is from the domestic sector</td>
<td><img src="image" alt="Domestic Icon" /></td>
</tr>
<tr>
<td>Commercial and industrial – An uptake in co-mingled and cardboard recycling has slightly improved this waste sector’s performance</td>
<td><img src="image" alt="Commercial Icon" /></td>
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<tr>
<td>Landfill leachate – Heavy rainfall and associated infiltration of the landfill site</td>
<td><img src="image" alt="Landfill Leachate Icon" /></td>
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These pressures are likely to increase in proportion to population
### Pressure Indicators

#### Indicator: Solid Waste 2005/06

<table>
<thead>
<tr>
<th></th>
<th>Total (Tonnes)</th>
<th>Landfill (Tonnes)</th>
<th>Recycled (Tonnes)</th>
<th>Percentage recycled</th>
<th>Percentage of total waste stream</th>
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<tr>
<td>Domestic</td>
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<td>23.72</td>
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<td>617</td>
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<td>0.72</td>
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<td>Hard rubbish clean-up</td>
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<td><strong>TOTAL</strong></td>
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<td><strong>62,589.5</strong></td>
<td><strong>20,222.5</strong></td>
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<td><strong>99.99</strong></td>
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#### Indicator: Solid Waste 2006/07

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<th>Total (Tonnes)</th>
<th>Landfill (Tonnes)</th>
<th>Recycled (Tonnes)</th>
<th>Percentage recycled</th>
<th>Percentage of total waste stream</th>
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<tr>
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<tr>
<td>Hard rubbish clean-up</td>
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<td>4,46</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>85,607</strong></td>
<td><strong>58,182.0</strong></td>
<td><strong>26,425.0</strong></td>
<td><strong>30.84</strong></td>
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#### Indicator: Solid Waste 2007/08

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<th>Total (Tonnes)</th>
<th>Landfill (Tonnes)</th>
<th>Recycled (Tonnes)</th>
<th>Percentage recycled</th>
<th>Percentage of total waste stream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>32,698.41</td>
<td>23,356.80</td>
<td>9341.61</td>
<td>28.57*</td>
<td>35.71</td>
</tr>
<tr>
<td>Commercial and industrial</td>
<td>26,692.38</td>
<td>26,692.38</td>
<td>0</td>
<td>0</td>
<td>29.15</td>
</tr>
<tr>
<td>Construction</td>
<td>15,365.92</td>
<td>4274.35</td>
<td>11,091.57</td>
<td>72</td>
<td>16.78</td>
</tr>
<tr>
<td>Green waste</td>
<td>9537.60</td>
<td>0</td>
<td>9537.60</td>
<td>100</td>
<td>10.42</td>
</tr>
<tr>
<td>Hazardous waste</td>
<td>694.28</td>
<td>694.28</td>
<td>0</td>
<td>0</td>
<td>0.76</td>
</tr>
<tr>
<td>Hard rubbish clean-up</td>
<td>1877.01</td>
<td>887.01</td>
<td>1,000</td>
<td>53.27</td>
<td>2.05</td>
</tr>
<tr>
<td>Other</td>
<td>4691.42</td>
<td>46,92.21</td>
<td>0</td>
<td>0</td>
<td>5.12</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>91,557.02</strong></td>
<td><strong>55,894.89</strong></td>
<td><strong>30,970.78</strong></td>
<td><strong>33.83</strong></td>
<td><strong>99.99</strong></td>
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</tbody>
</table>
### Indicator: Solid Waste 2008/09

<table>
<thead>
<tr>
<th>Category</th>
<th>Total (Tonnes)</th>
<th>Landfill (Tonnes)</th>
<th>Recycled (Tonnes)</th>
<th>Percentage recycled</th>
<th>Percentage of total waste stream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>30919.77</td>
<td>22222.73</td>
<td>8697.04</td>
<td>28.12</td>
<td>30.63</td>
</tr>
<tr>
<td>Commercial and industrial</td>
<td>24357.60</td>
<td>23036.10</td>
<td>1321.50</td>
<td>5.42</td>
<td>24.13</td>
</tr>
<tr>
<td>Construction</td>
<td>16492.70</td>
<td>9147.78</td>
<td>7344.92*</td>
<td>44.53</td>
<td>16.33</td>
</tr>
<tr>
<td>Green waste</td>
<td>8845.20</td>
<td>0</td>
<td>8845.20</td>
<td>100</td>
<td>8.76</td>
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<td>Hazardous waste</td>
<td>2580.44</td>
<td>2580.44</td>
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<td>0</td>
<td>2.55</td>
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<tr>
<td>Hard rubbish clean-up</td>
<td>1779.40</td>
<td>585</td>
<td>1194.40</td>
<td>67.12</td>
<td>1.76</td>
</tr>
<tr>
<td>Other</td>
<td>4958.76</td>
<td>4958.76</td>
<td>0</td>
<td>0</td>
<td>4.91</td>
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<td>VENM (clean fill)</td>
<td>11006.74</td>
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<td>11006.74</td>
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</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100940.6</strong></td>
<td><strong>62530.81</strong></td>
<td><strong>38409.80</strong></td>
<td><strong>38.05</strong></td>
<td><strong>99.97</strong></td>
</tr>
</tbody>
</table>

*This figure includes materials recovered for sale at the Tip Shop

### Indicator: Solid Waste 2009/10

<table>
<thead>
<tr>
<th>Category</th>
<th>Total (Tonnes)</th>
<th>Landfill (Tonnes)</th>
<th>Recycled (Tonnes)</th>
<th>Percentage recycled</th>
<th>Percentage of total waste stream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>30616.84</td>
<td>20848.91</td>
<td>9767.93</td>
<td>31.90</td>
<td>31.30</td>
</tr>
<tr>
<td>Commercial and industrial</td>
<td>28221.49</td>
<td>24997.44</td>
<td>3224.05</td>
<td>11.42</td>
<td>28.85</td>
</tr>
<tr>
<td>Construction</td>
<td>14220.66</td>
<td>6832.10</td>
<td>7388.56</td>
<td>51.95</td>
<td>14.53</td>
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<tr>
<td>Green waste</td>
<td>11512.98</td>
<td>0</td>
<td>11512.98</td>
<td>100</td>
<td>11.77</td>
</tr>
<tr>
<td>Hazardous waste</td>
<td>550.93</td>
<td>550.93</td>
<td>0</td>
<td>0</td>
<td>0.56</td>
</tr>
<tr>
<td>Hard rubbish clean-up</td>
<td>1530.55</td>
<td>1530.55</td>
<td>0*</td>
<td>0</td>
<td>1.56</td>
</tr>
<tr>
<td>Other Council</td>
<td>5676.00</td>
<td>4609.58</td>
<td>1066.42</td>
<td>18.78</td>
<td>5.80</td>
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<tr>
<td>VENM (clean fill)</td>
<td>5474.83</td>
<td>0</td>
<td>5474.83</td>
<td>100</td>
<td>5.59</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>97804.28</strong></td>
<td><strong>59369.51</strong></td>
<td><strong>38434.77</strong></td>
<td><strong>39.29</strong></td>
<td><strong>99.97</strong></td>
</tr>
</tbody>
</table>

Source: Tweed Shire Council Waste Management Section

*Metal and reusable items recovered from Council Hard Rubbish Pick Up are represented in Construction recycling tonnes

<table>
<thead>
<tr>
<th>Indicator: Solid Waste 2010/11</th>
<th>Total (Tonnes)</th>
<th>Landfill (Tonnes)</th>
<th>Recycled (Tonnes)</th>
<th>Percentage recycled</th>
<th>Percentage of total waste stream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>30241.04</td>
<td>17002.48</td>
<td>13238.56</td>
<td>43.78</td>
<td>34.81</td>
</tr>
<tr>
<td>Commercial and industrial</td>
<td>28368.38</td>
<td>22411.24</td>
<td>5957.14</td>
<td>20.99</td>
<td>32.65</td>
</tr>
<tr>
<td>Construction</td>
<td>6730.53</td>
<td>4889.06</td>
<td>1841.47</td>
<td>27.36</td>
<td>7.65</td>
</tr>
<tr>
<td>Green waste</td>
<td>12817.68</td>
<td>0</td>
<td>12817.68</td>
<td>100</td>
<td>14.75</td>
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<tr>
<td>Hazardous waste</td>
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<td>1152.93</td>
<td>0</td>
<td>0</td>
<td>1.33</td>
</tr>
<tr>
<td>Hard rubbish clean-up</td>
<td>2147.33</td>
<td>2147.33*</td>
<td>0</td>
<td>0</td>
<td>2.47</td>
</tr>
<tr>
<td>Other Council</td>
<td>4198.90</td>
<td>2721.02</td>
<td>1477.88</td>
<td>35.19</td>
<td>4.83</td>
</tr>
<tr>
<td>VENM (clean fill)</td>
<td>1221</td>
<td>0</td>
<td>1221</td>
<td>100</td>
<td>1.41</td>
</tr>
<tr>
<td>TOTAL</td>
<td>86877.79</td>
<td>50324.06</td>
<td>36553.73</td>
<td>42.07</td>
<td>99.7</td>
</tr>
</tbody>
</table>

*Metal and reusable items recovered from Council Hard Rubbish Pick Up are represented in C & I recycling tonnes

Source: Tweed Shire Council Waste Management Section

**RESPONSE**

Each response seeks to address one or more identified pressure. Responses are listed in order from newest to oldest. This format gives regular readers of the SoE Report easy access to the most recent initiatives, while allowing infrequent readers to view a catalogued history of responses.

Icons at the end of each response represent the pressure being targeted.

**Waste Management Education**

Refer to [Environmental Education and Capacity Building](#) for details of waste management education initiatives.

**New Materials Recovery Facility**

A new material recovery facility was constructed at Chinderah to sort and process recyclables from kerbside collection. The Northern Rivers Materials Recovery Facility (MRF) at Chinderah was opened on 24 March 2011. It replaces the MRF at Stotts Creek Resource Recovery Centre, which needed extensive upgrading. The facility uses state-of-the-art technology to recover paper, cardboard, plastics, aluminum, glass and metal, and segregates materials so they are ready for transport to be reused in manufacturing processes.

**New Bin System**

*Responsibility: Waste Management Unit*

*Status: Ongoing*

In December 2009, the divided garbage/recycling bin system was replaced with a multi-bin system which is designed on best-practice resource recovery. It aims to improve recycling yields and quality from the kerbside-collected materials.

The system comprises a 140-litre red-lid bin for garbage (collected weekly) a 240-litre yellow-lid bin for recycling (collected fortnightly) and an optional green-lid bin (collected fortnightly) for garden refuse.
Council’s waste contractor has provided kerbside collection of household rubbish since the early 1960s. Approximately 95 per cent of Tweed households are serviced by weekly kerbside collections. Wheelie bins were introduced to Tweed Shire in 1997.

Recycling rates continue to increase since the introduction of the multi-bin system. Refer to the solid waste tables (above).

**Fluorescent Light Globe Recycling**
Responsibility: Waste Management Unit
Status: Ongoing

In 2009, Council began a recycling program to keep fluorescent lights out of landfill. Ordinary incandescent lamps can be disposed of via the kerbside collection service. However, fluorescent tubes, compact fluorescent light (CFL) globes and some other high intensity lamps contain mercury and require special consideration for appropriate disposal.

**Street-Level Recycling**
Responsibility: Waste Management Unit
Status: Ongoing

In 2008, Council started installing recycling facilities in public spaces, often called street-level recycling. Priority areas in the first phase of the roll-out include high pedestrian areas such as shopping precincts and popular Council parks.

The new system complements kerbside recycling services and helps divert waste from landfill by providing the community with the opportunity to recycle bottles, cans, paper and plastic while in public places.

**Landfill Receipts**
Responsibility: Building and Health Unit
Status: Ongoing

In 2008, Council placed a standard condition of consent on construction and demolition activities. The condition stipulates that landfill disposal receipts must be kept as a record of proper disposal methods.

**Bin Audits**
Responsibility: Waste Management Unit
Status: Completed in 2008

Council participated in a Waste Composition Audit in 2008/09 to determine the weight of bins, how much recyclable material was being lost in the waste stream, and contamination in the bins. The audit was conducted to NSW Department of Environment Climate Change and Water (DECCW) best-practice standards and provided valuable data on characterisation of the domestic waste stream.
Clean Fill Diversion  
*Responsibility: Waste Management Unit*  
*Status: Ongoing*  

Virgin-excavated natural material (i.e. clean fill) represents more than 10 per cent of the construction waste stream. Clean fill is a valuable resource that is stockpiled and used on-site for revegetation and occasional daily cover of the tip face. It is reported as a recyclable product in the pressure indicator table (shown above).

Solid Waste Management Strategy  
*Responsibility: Waste Management Unit*  
*Status: Ongoing*  

Council adopted a Waste Management Strategy in 2007 to enable Council and the community to implement sustainable waste management practices. Council is currently participating in a review of regional resource sharing opportunities, which will form a regional waste management strategy for the Northern Rivers. This strategy will guide infrastructure investment for recycling, waste processing and disposal in the region. The strategy is expected to be finalised in 2012.

Electronic Waste Recycling  
*Responsibility: Waste Management Unit*  
*Status: Ongoing*  

In 2007, Council started an electronic waste (e-waste) drop-off program in response to emerging waste management issue. Around 98 per cent of e-waste can be recycled. In 2010/2011, 49 tonnes was collected at Stotts Creek Resource Recovery Centre and sent to a purpose-built recycling facility, which equates to more than four tonnes every month.

Free Metal Collection Service  
*Responsibility: Waste Management Unit*  
*Status: Ongoing*  

In 2007, a free metal collection service for derelict motor vehicles, abandoned farm machinery and unwanted white goods was established. A contractor collects the unwanted metal materials, with Council facilitating the collection process through promotion and administration.

This free service means whitegoods such as washing machines, fridges and dryers can be collected from residents all year round, rather than taking up room in the shed, waiting for Council’s six-monthly household clean-up.

Landfill Gate Pricing  
*Responsibility: Waste Management Unit*  
*Status: Completed in 2007*  

Gate prices for disposing of waste at the landfill was amended in 2007 to encourage builders to sort their waste into recyclables (e.g. concrete, metals), re-usables (e.g. wood) and waste. A review of landfill practices in 2008 led to a continuation of reduced prices for concrete, metals, rubble, and green waste. However, the builders single fee for ‘sorted waste’ was removed. The 2007/08 recycling figures for this waste stream were over-reported and a natural adjustment can be seen in 2008/09. Refer to the pressure indicator tables (above) for recycling figures.
Commercial Recycling Program
Responsibility: Waste Management Unit
Status: Ongoing

A commercial waste recycling program was developed in 2007 to reduce the volumes of commercial waste going to landfill. To encourage increased recycling rates in the commercial sector, 240-litre bins for recycling are provided at a subsidised price.

Multiple Occupancy Dwellings
Responsibility: Waste Management Unit
Status: Ongoing

Most multiple-occupancy dwellings now participate in the normal kerbside recycling collection service. However, unit complexes using a bulk-waste bin must have a commensurate amount of recycling wheelie bins to provide a recycling opportunity to residents.

Green Waste Collection
Responsibility: Waste Management Unit
Status: Ongoing

In 2005, Council established a domestic green waste collection service to reduce the amount of garden waste being discarded in the waste section of domestic rubbish bins.

Green waste bins are collected fortnightly and the contents are mulched at the Stotts Creek Resource Recovery Centre for commercial and private sales. Refer to Response Indicators for the volumes of domestic green waste that have been diverted from landfill because of this service.

Landfill Gas Management
Responsibility: Waste Management Unit
Status: Ongoing

A methane gas extraction system was constructed at Stotts Creek Resource Recovery Centre in 2003. The system captures methane produced by rotting food scraps and other vegetative matter buried in the landfill and uses it to generate electricity.

Four hundred kilowatts are supplied into the national electricity grid every hour, which is enough to power about 300 homes.

It also prevents methane emissions to the atmosphere, which is a more significant environmental outcome.

As a greenhouse gas, methane is 24 times more harmful than carbon dioxide (CO₂) and capturing it for electricity generation prevents an average of 10,000 tonnes of CO₂ (equivalent) from entering the atmosphere each year. This is equivalent to taking 2000 cars off the road.

A total of 2,038,072m³ of landfill gas was combusted in 2008/09. On average, methane comprises 53 per cent of this landfill gas, so it is estimated that 1,080,178m³ of methane was used for combustion.
Waste Wise Events

Responsibility: Waste Management Unit  
Status: Ongoing

In 2003, Council introduced a recycling service for festival and events in Tweed Shire. Rubbish and recycling bins are supplied to festival organisers upon request.

To complement this service, fact sheets on how to run a waste-wise event are also supplied to festival organisers, including a ‘stallholders and food vendors’ guide to avoid non-recyclable or non-biodegradable packaging for food and drinks.

Waste Oil Recycling

Responsibility: Waste Management Unit  
Status: Ongoing

In 2002, a waste oil recovery facility was constructed at the Stotts Creek Resource Recovery Facility. The service is free of charge and provides ratepayers with an environmentally responsible option to dispose of their waste oil (e.g. engine oil). Approximately 21,700 litres were recovered in 2010/11 for reuse and recycling.

Brick and Concrete Recycling

Responsibility: Waste Management Unit  
Status: Ongoing

In 2001, Council and the shire’s waste contractor developed a program to divert construction waste from landfill by recycling brick and concrete at the Stotts Creek Resource Recovery Centre.

Farm Chemical Container Collection

Responsibility: Waste Management Unit  
Status: Ongoing

Since 2000, Council has participated in the national Drum Muster Program to promote collection and recycling of used farm chemical containers.

The Drum Muster Program results in large volumes of waste being diverted from landfill and a significant reduction in the potential for land and water contamination from inappropriately discarded chemical containers. Refer to Response Indicators for volumes of containers collected to date.

Landfill Leachate Management

Responsibility: Waste Management Unit  
Status: Ongoing

Since the late 1980s, Council has implemented ongoing works to manage the impact of leachate on downstream waterways and groundwater at the landfill component of the Stotts Creek Resource Recovery Centre. Leachate is rainfall that percolates through the landfill, extracting nutrients and impurities from the buried waste.

Leachate management is undertaken by:

- Diverting storm water away from landfill areas to reduce percolation volumes.
- Collection ponds below the landfill areas to capture leachate and stop it escaping into the surrounding environment.
- Vetiver grass planted on capped landfill areas and sloping batters of the landfill areas.
- Using leachate pumped from the collection ponds to irrigate vetiver grass on the capped landfill areas. This process helps remove large volumes of nutrients and impurities from the leachate water (i.e. taken up by the vetiver grass).
- Floating rafts of vetiver grass used in the leachate ponds for the same purpose.
- Ongoing monitoring of surface and groundwater to ensure leachate management is meeting the required standard.

**Hard Rubbish Collection**

*Responsibility: Waste Management Unit*
*Status: Ongoing*

Since around 1979, Council has provided a twice-yearly collection of domestic rubbish which, because of its nature (such as shape or size), cannot be disposed of in the normal weekly garbage collection service. The biannual Household Cleanup Campaign is available to all residents who receive a weekly domestic garbage collection service. Metal items are recovered at the landfill for recycling.

Refer to Pressure Indicators for volumes of waste collected and recycled as part of this service.

**Related Issues**

- Built Environment
- Atmosphere
- Environmental Education and Capacity Building
Murwillumbah town centre.
TRANSPORT INFRASTRUCTURE

CONDITION

At a Glance

- In 2007, there were 55,200 vehicles registered in Tweed Shire and 54,700 licensed drivers and riders. This equates to more than one vehicle per license.

- Council has responsibility for approximately 1200km of Tweed roads and an extensive pedestrian and cycleway network.

- By 2010, transport will be the single biggest source of direct greenhouse gas emissions in the Tweed. (TSC 2003)

- The Tweed’s population is expected to grow by more than 40,000 people by 2030, so investment in walking, cycling and public transport infrastructure will be important tools in managing road congestion in urban centres.

PRESSURE

At a Glance

<table>
<thead>
<tr>
<th>A dependence on vehicle-based transport is causing many adverse pressures on the natural environment</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Climate change</strong> - Vehicle-related emissions are forecast to become the biggest source of greenhouse gas emissions by 2010</td>
<td><img src="CLIMATE_CHANGE" alt="Climate Change" /></td>
</tr>
<tr>
<td><strong>Stormwater pollution</strong> - Impervious surfaces associated with transport infrastructure create stormwater discharges and associated pollution of local waterways</td>
<td><img src="DIFFUSE" alt="Diffuse Pollution" /></td>
</tr>
<tr>
<td><strong>Road kills</strong> - Road infrastructure and vehicle numbers lead to a proportional increase in wildlife injuries and road kills</td>
<td><img src="ROAD_KILL" alt="Road Kill" /></td>
</tr>
<tr>
<td><strong>Roadside vegetation</strong> - Roads and associated roadside vegetation maintenance increase the potential for weed dispersal and habitat modification</td>
<td><img src="ROADSIDE_MOWING" alt="Roadside Mowing" /></td>
</tr>
</tbody>
</table>
Native vegetation clearing - Road infrastructure and the associated urban footprint leads to a reduction in the size, function and connectivity of natural ecosystems

These pressures are likely to increase in proportion to population

Pressure Indicators - Transport

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shire population</td>
<td>67,082</td>
<td>74,380</td>
<td>82,955</td>
<td>84,564*</td>
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<tr>
<td>Vehicle registrations</td>
<td>37,666</td>
<td>43,560</td>
<td>53,594</td>
<td>55,315</td>
</tr>
<tr>
<td>Registrations per shire resident</td>
<td>0.56</td>
<td>0.58</td>
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<tr>
<td>Licensed drivers and riders</td>
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<td>47,162</td>
<td>53,342</td>
<td>54,700</td>
</tr>
<tr>
<td>Licenses per resident</td>
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<td>0.64</td>
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</tr>
<tr>
<td>Vehicles per license</td>
<td>N/A</td>
<td>0.92</td>
<td>1.00</td>
<td>1.01</td>
</tr>
</tbody>
</table>

*Population projection

Indicator: Total Community CO₂ Emissions in 1996 and 2010 (Forecast Year)

Source: TSC 2003

RESPONSE

Each response seeks to address one or more identified pressure. Responses are listed in order from newest to oldest. This format gives regular readers of the SoE Report easy access to the most recent initiatives, while allowing infrequent readers to view a catalogued history of responses.

Icons at the end of each response represent the pressure being targeted.
Tweed Coast Cycleway
Responsibility: Engineering and Operations Division
Status: Completed
In 2000, Council started construction of a 28km cycleway/shared path along the ocean foreshore from Fingal Head to Pottsville.
In 2010, the final section of the cycleway was completed between South Kingscliff and Casuarina Beach.

Northern Rivers Carpool
Responsibility: NRM Unit – Sustainability Program
Status: Ongoing
Council developed a community carpool website in 2009, in partnership with six other Northern Rivers councils, to provide commuters with a practical alternative to travelling alone in their vehicles. Registered commuters with similar travel patterns are matched to form a carpool.
The concept has since been adopted by other regions, including western Sydney, Mackay and the NSW Mid North Coast.
Visit www.nrcarpool.org for more information or to join the carpool.

Pottsville CBD – High Pedestrian Activity Zone
Responsibility: Engineering and Operations Division
Status: Completed in 2008
In 2008, the Pottsville central business district was identified as a high pedestrian activity zone. A 40km/h speed limit was implemented and streetscaping was installed to calm traffic and improve pedestrian safety. Improving pedestrian access in the town centre will encourage walking and hopefully reduce the number of vehicle trips, particularly for residents living within walking distance to the CBD.

Murwillumbah Service Lane – Shared Zone
Responsibility: Engineering and Operations Division
Status: Completed in 2008
Proudsfoot Lane in Murwillumbah was identified as a shared zone in 2008. Signage and other streetscaping were installed to calm traffic and improve pedestrian safety. A 10km/h speed limit was established to reduce vehicle speeds in the laneway.
Improving pedestrian access in the town centre will facilitate walking, with a view to reducing the number of vehicle trips, particularly for residents living within walking distance to the CBD.
The stormwater system also allows for infiltration of water to the garden beds to reduce the impacts of stormwater pollution on the Tweed River.

Town Walks
Responsibility: NRM Unit – Sustainability Program
Status: Ongoing
In 2008, Council updated its website to include information about a number of urban walking trails, to encourage recreational walking in Tweed Shire.
Road Mortality Hotspots
Responsibility: Engineering and Operations Division
Status: Completed in 2007

Koala Black Spot road signs were installed on sections of Clothiers Creek Road in 2007, to encourage motorists to watch out for wildlife in these areas.

In 2009, additional signage was installed along the Tweed Coast. This was accompanied by a media campaign to raise awareness about ways to reduce the incidence of wildlife road kills.

Public Transport Directory
Responsibility: Community and Cultural Services Unit
Status: Ongoing

Council developed a web-based public transport directory in 2006, to reduce reliance on the private motor vehicle by promoting public transport as an alternative mode of transport.

Section 94 Contributions
Responsibility: Engineering and Operations Division
Status: Ongoing

In 2005, the Section 94 contribution plans for bus shelters and cycleways were amended to reflect increases in construction costs. Section 94 contribution plans address the levying of developer contributions to help provide community infrastructure.

There is demand for additional bus shelters because of population growth in the Tweed, particularly in areas of new subdivision or development.

Similarly, development in Tweed Shire is also generating great demand for cycleways.

Cycleways and Footpaths
Responsibility: Engineering and Operations Division
Status: Ongoing

Council continues to build upon the network of cycleways and footpaths throughout the Tweed.

A key aim of this infrastructure is to reduce reliance on the private motor vehicle by providing infrastructure that promotes safe and convenient walking and cycling.

Refer to the Footpath and Cycleway Directory for locations and routes of cycleways.

Community Road Safety Plan
Responsibility: Engineering and Operations Division
Status: Ongoing

In 1997, Council developed a road safety plan for Tweed Shire. It sought to reduce the incidence, severity and cost of road crashes to the Tweed community, through a approach combining consultation, research, education, enforcement, promotion, engineering and coordination.

It included a bicycle objective, to 'implement strategies to reduce the risks involved with bicycle travel', and a pedestrian objective, ‘to reduce the risk of injury to all ages through education and encourage engineering remediation in black spot areas'.
Roadside Vegetation Maintenance

Responsibility: Engineering and Operations Division
Status: Ongoing

Refer to Council Operations for details of initiatives aimed at reducing the impact of roadside maintenance on native vegetation and local biodiversity.

Tweed Bicycle Plan

Responsibility: Engineering and Operations Division
Status: Ongoing

Council developed a shire-wide bicycle plan in 1995 to create a strategic approach to implementing cycle infrastructure in Tweed Shire.

In 2009, work began on a comprehensive review of the plan to reflect new urban land releases and links with attractions such as town centres and community facilities.

Related Topics

Built Environment
Atmosphere

An official opening of the cycleway at Bray Park.
ENVIRONMENTAL EDUCATION AND CAPACITY BUILDING

CONDITION

At a Glance
Community engagement and participation is a key ingredient to successfully addressing local environmental issues. Community participation:

- Gives a human face to environmental issues.
- Empowers people to become active agents of sustainable and equitable development.
- Promotes an understanding that communities are pivotal to changing attitudes towards environmental issues.

PRESSURE

At a Glance

<table>
<thead>
<tr>
<th>Pressures that prevent high levels of community participation to help address environmental issues</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>Barriers to volunteer participation, such as:</td>
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<td>- Time constraints</td>
<td><img src="https://via.placeholder.com/150" alt="Volunteer Icon" /></td>
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<tr>
<td>- Lack of resources to support volunteers</td>
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<tr>
<td>- Training requirements</td>
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<tr>
<td>- Insurance issues</td>
<td></td>
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<tr>
<td>- Lack of awareness about local environmental volunteer groups</td>
<td></td>
</tr>
<tr>
<td>Lack of community awareness and engagement about local environmental issues such as waterway health, rare and endangered species, invasive weeds, feral animals and habitat fragmentation.</td>
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<tr>
<td>Lack of institutional awareness and capacity to proactively respond to local and global environmental issues.</td>
<td><img src="https://via.placeholder.com/150" alt="Capacity Icon" /></td>
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</table>

RESPONSE

Each response seeks to address one or more identified pressure. Responses are listed in order from newest to oldest. This format gives regular readers of the SoE Report easy access to the most recent initiatives while allowing infrequent readers to view a catalogued history of responses.

Icons at the end of each response represent the pressure being targeted.
Environmental Volunteers Manual
Council - with assistance from the Catchment Management Authority and Tweed Landcare - produced a ‘care groups’ manual in March 2011, to help environmental volunteer groups such as Landcare and Coastcare train members and implement projects in accordance with occupational health and safety requirements.

Water Education Facility
Council completed the fit-out of a water education room at the Bray Park Water Treatment Plant in June 2010. The display was incorporated into the design of the upgraded plant, to improve the experience for group tours. Display topics include:

- How the plant treats water for drinking (from catchment to tap)
- The importance of a healthy catchment.
- How and where water is distributed.
- The history of water treatment in Tweed Shire.

The educational components of the plant include a display area in the foyer, an upstairs viewing platform, theatre room and DVD.

Back to Basics
In 2011, Council ran a four-month community education program to highlight key messages for recycling. Simple messages outlined what can and cannot be recycled in the Tweed and were advertised through media such as cinema advertising and signs on buses and bus shelters.

They were also publicised in Council's weekly newsletter, The Tweed Link, Council's website and through local newspapers.

The campaign sought to get the message out to as many people as possible - to residents and visitors to the area.

Contamination Management Program
In 2011, Council undertook a Contamination Management Program, conducted by contractors of the North East Waste Forum. Five areas in Tweed Shire were selected and 200 properties within each area were randomly chosen to have their recycling bin inspected.

All participating properties were left with an updated multi-bin system brochure, a letter to explain the program and a tag. Each tag either had a sticker to congratulate the resident on doing a great job or it noted contamination and other problems.

Tweed Shire Solar Community
In 2010, Council developed a program to increase voluntary uptake of solar photovoltaic systems in the community. The Tweed Shire Solar Community Program is a partnership between Council and a solar panel installer to offer Tweed property owners quality solar photovoltaic systems at affordable prices.
The offer was available to a maximum of 400 private property owners and the program filled this quota. In addition, 20 community facilities received a two-kilowatt solar photovoltaic system to reduce energy costs and their associated carbon footprint.

**Sustainable Streets**

In 2010, Council partnered with Byron Shire Council to launch Sustainable Streets, a grass roots initiative to improve environmental outcomes one neighbourhood at a time. Participants attend a series of weekend workshops and information sessions about saving water and energy, reducing waste, eating local produce and shopping ethically.

Participating streets include Murwillumbah Street - Murwillumbah, Banksia Avenue - Bogangar, Smiths Creek Road - Uki, Robin Street - South Golden Beach, Tristran Parade – Mullumbimby Creek and New City Road/Stuart Street – Mullumbimby. For more information, visit www.tweed.nsw.gov.au/sustainability

**Council Rates Incentive Goes Green**

*Responsibility: Revenue and Customer Service Unit. NRM Unit – Sustainability Program.*  
*Status: Ongoing*

Since 2009, residents who pay their rates in full enter a draw to win energy and water-efficient retrofits of their homes. The three prizes - valued at $3,000, $2,000 and $1,000 - are extremely flexible, with previous winners choosing solar hot water, solar power, energy and water-efficient appliances, as well as window treatments to minimise heat gain during summer.

**Cycling Proficiency Workshops**

*Responsibility: NRM Unit – Sustainability Program*  
*Status: Completed June 2009*

Contrary to the old saying ‘it’s like riding a bike’, cycling is actually a learned skill which can deteriorate with lack of use. In June 2009, Council and AustCycle Training teamed up to offer Tweed residents the opportunity to improve their cycling skills with the help of an accredited AustCycle trainer. Free courses were held in Murwillumbah, Pottsville and Banora Point.

Quality education and rider training enables more people to ride bikes, have fun, stay safe and effectively using what is possibly the most efficient machine ever invented – the bicycle.

Course participants learnt balancing, pedalling and manoeuvring skills safely, then acquired the knowledge and skills to negotiate traffic and ride in groups.

**Waste-Wise Schools**

*Responsibility: Environmental Education Officer*  
*Status: Ongoing*

Council developed a Waste-Wise Schools program in 2009. The program provides support for schools to establish school-wide recycling and composting systems and includes activities such as the litter-free lunch activity.

Website Update – Water

*Responsibility: Water Unit*
*Status: Completed February 2009*

The water and waste water section of Council’s website was updated in 2009 to include a range of water saving fact sheets including:
- The availability of rebates.
- How to read your water meter.
- Room-by-room guides to create a water-wise home.
- A ‘do it yourself’ home water audit.


On-line Water Consumption Calculator

*Responsibility: NRM Unit – Sustainability Program. Water Unit*
*Status: completed February 2009*

Council developed an on-line water calculator in 2009 so residents can use data from their biannual water bills to calculate how much water they use each day. The calculator allows householders to benchmark their water consumption against the shire average and daily target.

NRM Community Support Officer

*Responsibility: NRM Unit – Sustainability Program / NRCMA*
*Status: Ongoing*

In October 2008, Council worked in partnership with the Northern Rivers Catchment Management Authority (NRCMA) to create a community education position within Council’s Natural Resource Management (NRM) Unit. The officer was employed to foster increased community knowledge and understanding of natural resources and their sustainable management, and highlight opportunities for community involvement in NRCMA and NRM projects and initiatives.

Council Staff Tree Planting Day

*Responsibility: NRM Unit – Waterways Program*
*Status: Completed October 2008*

In October 2008, staff from Council’s Community and Natural Resources Division undertook the final stages of a revegetation project on land around the Uki Waste Water Treatment Plant. More than 500 trees were planted along the riparian zone of a tributary to Smiths Creek.

Previous stages of the project involved fencing to keep cattle away from the creek and providing water troughs. Council undertook the revegetation project to demonstrate best practice for waterway management and grazing on its own land.

The project brought the added benefit of capacity building within the organisation for land management practices and catchment rehabilitation.
Environmental Guide to the Tweed Coast
Responsibility: NRM Unit – Coastline Program
Status: Completed October 2008

Council published an Environmental Guide to the Tweed Coast in October 2008, to inform and educate residents and visitors about the Tweed Coast, its special features and how they can help conserve the Tweed's high biodiversity and natural areas.

Copies of the booklet are available from Visitor Information Centres, Council offices and libraries. Copies have also been supplied to local schools.

Tweed River Projects DVD
Responsibility: NRM Unit – Waterways Program
Status: Completed October 2008

In October 2008, Council produced an educational DVD which details Council’s Natural Resource Management (NRM) initiatives on the Tweed River. The 15-minute DVD is a snapshot of Council’s NRM projects which encompass riparian habitat rehabilitation, bank erosion, stormwater treatment, acid sulfate soil management, boating facilities, ecosystem health monitoring and the Tweed River Festival.

Climate Action Kids
Responsibility: Environmental Education Officer / Tweed CAN
Status: Ongoing

In 2008, Council Tweed Climate Action Now worked in partnership to develop an in-class activity to educate students about ways to reduce their carbon footprint. The lesson taught students a few simple ways to take action on climate change by switching off lights, reducing lunch box waste and smart was to travel to school.

Treasures of the Tweed Mural
Responsibility: Community and Cultural Services Unit
Status: Ongoing

Council worked in partnership with Job Futures, Tweed Landcare and Murwillumbah Services Club to create a public art mural along 700m of the Murwillumbah flood levee wall. The Treasures of the Tweed mural highlights the region’s unique threatened flora, fauna and ecological communities and aims to create an iconic landmark for the area. The initiative began in 2008 and is scheduled for completion in 2010.

NRM Project Inventory
Responsibility: NRM Unit – Biodiversity Program
Status: Ongoing

In 2008, Council initiated the creation of a database to collate and store information on NRM projects in Tweed Shire. The database is linked to a computer mapping system and allow NRM managers to more accurately document, target, plan and monitor on-ground works funded from a range of sources. It is a more systematic approach which also increases transparency and improves access to external grant funding. It is intended the database will be reviewed annually.
Bushland Mapping Update

Responsibility: NRM Unit – Biodiversity Program
Status: Ongoing

In 2008, Council initiated a review of vegetation mapping used for the Tweed Vegetation Management Strategy 2004, which was based on aerial photography from September 2000 and July 2001. The updated mapping will reflect changes in the landscape between these dates and more recent aerial photography in May 2007.

In addition to providing a useful indicator of environmental change (such as land clearing), more accurate and contemporary vegetation mapping will assist in land use planning, development control, bushfire management and habitat restoration initiatives.

Council-Supported Environmental Committees

Responsibility: NRM Unit – Biodiversity Program, NRM Unit – Waterways Program
Status: Ongoing

Since the early 1990s, Council has supported community-based committees that seek to improve environmental outcomes in Tweed Shire. In 2009, these committees included:

- Tweed River Committee.
- Tweed Coastal Committee.
- Koala Beach Wildlife Habitat Management Committee.
- Tweed Coast Dunecare Advisory Committee.

Community interests on these committees have an important role in directing and advising Council, and other natural resource managers, on environmental projects and expenditure. They also improve communication with the broader community, including volunteers.

Refer to Catchment Management for more detail on these committees.

Environmental Education Officer

Responsibility: Waste Management Unit
Status: Ongoing

In 2008, Council created a full-time position to implement environmental education initiatives in the Tweed, particularly for waste management, water efficiency, waterway health, biodiversity conservation, floodplain management, sustainability and climate change.

Energy Monitoring Equipment for High Schools

Responsibility: NRM Unit – Sustainability Program
Status: Stage 2 due for completion early 2010.

In 2008, every high school between Clarence Valley in the south, Kyogle Shire in the west and Tweed Shire in the north was offered free energy monitoring equipment and associated support material to enable students to conduct energy and greenhouse gas audits of their schools. The Power to Make a Difference Program was funded from the 'showerhead and light globe giveaway number two' (detailed below).

A project officer was appointed through Lismore City Council in 2009 to provide follow-up support for all participating schools.
Assistance for Landcare Groups on Public Land

Responsibility: NRM Unit – Waterways Program
Status: Ongoing

In 2008, Council formalised a program to provide assistance to Landcare groups undertaking riparian rehabilitation works on public land. Council can supply trees, mulch, advice and, in some circumstances, professional support from bush regeneration contractors. Works are occurring at Uki, Byangum, Barney’s Point and Bilambil.

Sustainable Living Centre

Responsibility: Waste Management Unit, Water Unit, NRM Unit
Status: Ongoing

Council opened a purpose-built environmental education centre at the Kingscliff Waste Water Treatment Plant in 2008. The Sustainable Living Centre is set to become Council’s environmental education hub, housing interactive exhibits, product showcases and a state-of-the-art training room. It is designed to inspire the adoption of sustainable behaviours in everyday life, by raising awareness about environmental issues and community-based solutions.

Extension and Advocacy

Responsibility: NRM Unit
Status: Ongoing

The 2007 formation of Council’s NRM section strengthened the organisation’s capacity to:
- Respond to enquiries from individuals and community groups.
- Provide specialist environmental advice to other sections of Council.
- Liaise and coordinate environmental programs with State and federal agencies.
- Seek external funding.
- Facilitate NRM partnerships and promote sound management of natural resources.

Residential Rebate Program

Responsibility: NSW Department of Environment and Climate Change
Status: Reviewed annually

In 2007 and 2008, Council approached the NSW Department of Environment, Climate Change and Water (DECCW) to run a series of advertisements and editorials in Council’s weekly newsletter, the Tweed Link, to promote the department’s Residential Rebate Program. The program offers households up to $1,500 for rainwater tanks, up to $1,200 for solar hot water and, until 30 June 2008, provided up to $300 for ceiling insulation. Refer to Response Indicators for figures on successful rebate applications in the shire.

Climate Action Tips

Responsibility: NRM Unit – Sustainability Program
Status: Completed in 2008

In 2007 and 2008, Council ran a series of climate action tips in the Tweed Link to raise awareness about climate change and the practical action role everyone can take to reduce greenhouse gas emissions. Topics included carbon footprinting, energy efficiency, water efficiency, waste management, active transport, rebate opportunities, food miles, carbon sequestration and biodiversity conservation.
Showerhead and Light Globe Giveaways

Responsibility: NRM Unit – Sustainability Program

Council conducted three showerhead and light globe giveaways from 2005 to 2008.

Number 1
In 2005, Council partnered with NECO Pty Ltd to give away 2000 energy and water-saving kits to Tweed residents. The kits comprised a water-saving showerhead and five energy-saving light globes. They were funded through the NSW Greenhouse Gas Abatement Scheme and were given away in less than two days.

To increase the likelihood of installation, residents were required to exchange their old showerhead to receive the kit.

Results from the Sustainable Households Project (see below) were used to promote the giveaway and dispel a misconception that water-saving showerheads did not deliver a quality shower. Lessons learnt from the giveaway informed future efforts to promote household water and energy efficiency in Tweed Shire.

Number 2
Council joined with six other north coast councils in 2006 to promote a showerhead and light globe giveaway run by Easy Being Green Pty/Ltd. The giveaway kit comprised one water-saving showerhead and six energy-saving light globes.

For every kit given away, Easy Being Green donated $2 for climate change education in the region. It raised $44,000 for climate change education, after 22,000 kits were given away in the region, including 6968 in the Tweed. Funds were managed by the Northern Rivers Group on Energy and a portion was used to supply and install energy monitoring equipment in high schools throughout the region.

Refer to Energy Monitoring Equipment in Local Schools (above) for more information on this initiative.

Number 3
Council partnered with Fieldforce Environmental in 2007 to offer households an improved version of previous showerhead and light globe giveaways. The Enviro Saver Program, still funded through the NSW Greenhouse Gas Abatement Scheme (GGAS), included free installation of all showers and incandescent lights within the home.

The program included an installation component because GGAS evaluations of previous giveaways throughout the State found a large number of lights and showers were not installed by the householder. To maximise water saving benefits, Council also asked Fieldforce to install aerators in the kitchen taps and flush converters in single-flush toilets. This part of the program was funded by Council’s Water Unit.

When the program concluded in December 2008, it had helped more than 50% of Tweed households had improved their energy and water efficiency. Refer to Response Indicators for details of participation rates, greenhouse gas savings and water savings.
Caldera Art Awards

Responsibility: NRM Unit – Biodiversity Program
Status: Ongoing

Council, in conjunction with Wildlife Art Australia, helped establish the Tweed Naturally Art Awards in 2007 to focus community attention on the unique and internationally significant plants, animals, habitats, natural landscapes and conservation issues of the Tweed region. The annual art exhibition, now known as the Caldera Art Awards, includes the publication of a detailed catalogue which becomes a permanent record of the artworks and accompanying educational descriptions.

Tweed Landcare Inc also benefits from voluntary donations from the sale of works. The awards are run as part of the annual Tweed River Festival. For more information visit www.calderaart.org.au

Environmental Education Strategy

Responsibility: NRM Unit – Sustainability Program, Waste Management Unit
Status: Ongoing

In 2007, Council started developing an Environmental Education Strategy to help effectively allocate educational resources and progress towards the long-term vision for environmental education and community capacity building. Competing priorities meant finalisation of this strategy was delayed until 2009.

Volunteers Policy

Responsibility: OHS Unit
Status: Ongoing

Council adopted a Volunteers Policy in 2007 to help overcome barriers to volunteer participation, such as training requirements and a lack of resources for materials. Since its adoption, the policy has contributed to increased communication and partnerships between Council and volunteer environment groups such as Landcare and Dunecare.

Water-Wise Schools Program

Responsibility: NRM Unit – Sustainability Program, Water Unit
Status: Ongoing

In 2007, Council commenced the Water-Wise Schools Program to provide resources and assistance for schools to promote greater respect for water’s vital role in ecosystem health and human survival.

Tweed Community Catchment Nursery

Responsibility: NRM Unit – Waterways Program
Status: Ongoing

Council established a plant nursery in 2006 to supply local native species for riparian revegetation projects in Tweed Shire. The nursery, located at the Uki Waste Water Treatment Plant, propagates locally-collected seed for use by the Riparian Projects Team and local Landcare groups.

The community nursery also acts as a training venue for community members interested in learning plant propagation techniques.
Recycle Right DVD
Responsibility: Water Management Unit
Status: Superseded in 2009

In 2007, Council produced an educational DVD entitled Recycle Right. It aims to dispel some of the myths about recycling, while promoting the three Rs - Reduce, Reuse and Recycle. Key features include a behind-the-scenes look at what happens to domestic recyclables after they are emptied into the rubbish truck.

The DVD was supplied to all schools in Tweed Shire and upon request to community groups or residents wanting to know more about waste management in the Tweed. Much of the DVD content was superseded by the introduction of the multi-bin system.

Catchment Activity Model
Responsibility: NRM Unit – Sustainability Program
Status: Ongoing

In 2006, Council created a scaled working model of the Tweed catchment. Housed in a box trailer, the Catchment Activity Model (CAM) visits local schools and festivals to help people:

- Develop an appreciation for how everything in the environment is interconnected.
- Understand the environment is affected by their actions and the behaviour of other people.
- Understand the importance of behaviour change to protect the environment.
- Identify ways they can alter their own behaviours to help protect the environment.

For more information, including many photographs, visit www.tweed.nsw.gov.au and click on ‘environment’ and ‘educational resources’.

Refer to Response Indicators below for statistics on CAM demonstrations.

Waters of the Tweed Booklets
Responsibility: NRM Unit – Waterways Program
Status: Completed in 2005

The fourth in a series of environmental education booklets was produced in 2005. The Waters of the Tweed booklets were designed to inform the Tweed community about the state of the estuarine reaches of the Tweed and Rous River systems.

Sustainable Households Project
Responsibility: NRM Unit – Sustainability Program
Status: Completed in 2005

In 2005, Council partnered with Country Energy and the NSW Department of the Environment Climate Change and Water to implement a case study project to raise awareness about simple actions to reduce a household’s carbon footprint. Twenty-three Tweed households participated in a year-long case study to quantify the water, energy, greenhouse gas and monetary savings achieved through the use of three-star water efficient showers, compact fluorescent light globes and green-power electricity. The project’s final report is available at www.tweed.nsw.gov.au/sustainability
**Catchment Catch-up**  
*Responsibility: NRM Unit – Waterways Program  
Status: Ongoing*

In 2005, Council launched an annual forum on catchment management, as part of the Tweed River Festival. The Catchment Catch-up is a chance for Tweed residents, environmental professionals and Council staff to present and exchange news in the field of natural resource management in the Tweed Valley.

**Tweed / Kenya Mentoring Program**  
*Responsibility: NRM Unit – Waterways Program, Water Unit  
Status: Ongoing*

The Tweed community, led by Council, initiated the Tweed Kenya Mentoring Program in 2003. The program aims to ‘improve community and environmental health for Kenyan families, by increasing access to safe water and sanitation, while building individual skills and capacity and maintaining bonds of friendship and support with the Tweed community’.

The program’s annual budget is funded by voluntary wage deductions by Tweed Shire Council staff - matched dollar for dollar by Council - and supplemented with donations by local businesses and community groups. This budget supports the employment of one full-time staff member, who coordinates a range of projects from an office in Kiberia, an informal township on the outskirts of Nairobi.

In 2007, the rural community of Obambo-Kadenge hosted a Council staff member who oversaw the construction of a solar-powered water treatment facility for that community.

In November 2008, the neighbouring community of Ohaya hosted another Council staff member to oversee construction of a second water treatment facility.

The rural community of Ochilo, approximately one hour drive from Ohaya, hosted another Council staff member in March 2010, to oversee construction of a third water treatment facility.

The water treatment facilities provide access to something most Australians take for granted - clean and safe drinking water. Increased access to safe water has immediate benefits to community health by reducing exposure to diseases such as typhoid, cholera, polio and dysentery.

Severe poverty means villagers cannot afford to boil or treat their water in any way. So as well as walking long distances to collect water, they are affected by contaminants from cattle, agriculture and domestic runoff.

Safe water immediately decreases infant mortality and improves community productivity by reducing household expenditure on medicines and allowing children more opportunity to attend school.


**Directory of Community Resources**  
*Responsibility: Community and Cultural Services Unit  
Status: Ongoing*

In 2003, Council established a web-based directory of Tweed community groups and volunteer organisations. The Directory of Community Resources is a good starting point for anyone looking to engage with community groups in the area, such as Landcare or ratepayer associations.
Tweed Shire Council Website

Responsibility: Information Technology Unit, NRM Unit – Sustainability Program
Status: Ongoing

In 2001, Council started using its website, www.tweed.nsw.gov.au, to actively promote environmental management. A wide range of information on environmental issues and responses is provided on the council website, to inform and motivate the community to participate in the conservation and restoration of the Tweed’s natural assets.

Cigarette Butt Litter Prevention

Responsibility: NRM Unit – Sustainability Program
Status: Ongoing

In 2001, Council started a program to educate cigarette smokers about the cumulative impact of cigarette butt litter on local waterways. Initiatives include the free supply of portable ashtrays to smokers - distributed through shops such as cafés and tobacconists - the installation of ‘bin ya butts’ ashtrays at butt litter hotspots throughout the Tweed (target areas include hotels and taxi ranks) and media campaigns which incorporated street banners, bus shelter signage and print media.

Stormwater Education Assessment (SEA) Program

Responsibility: Building and Health Unit
Status: Completed in 2004

In 2001, a three-year program was implemented across the Tweed, Byron and Ballina areas to educate businesses about the impact of stormwater pollution on waterway health. Education and site assessments were used to provide businesses with specific operational improvements to reduce the levels of pollutants entering the stormwater system.

Tweed River Festival

Responsibility: NRM Unit
Status: Ongoing

Council established the annual Tweed River Festival in 2001 to raise awareness about the important role the Tweed’s waterways play in the community’s culture, economy and ecology. The week-long festival is usually held in October and culminates with a lantern parade along the water’s edge at Jack Evans Boat Harbour. Activities also include a networking and information exchange day known as the Catchment Catch-up, the Caldera Art Awards and guided walks of the Tweed River and coastal creeks. A paddle board carnival was added to the event list in 2008.

World Environment Day

Responsibility: NRM Unit
Status: Ongoing

Council and a number of local community groups established the Tweed’s annual World Environment Day celebration in 2000. The event is held at the beginning of June and celebrates the ecological diversity of the region, raises awareness about local environmental issues and seeks to inspire the community to help address those issues.
**Tweed Shire Resource Room**
*Responsibility: Water Unit, NRM Unit*
*Status: Complete*

In 1998, Council created a resource room to house a wide range of environmental education material, including posters, activity books, information sheets and videos. The resource room was closed in 2011, when the information was redistributed to the Sustainable Living Centre and Council website.

**Phosphorous Reduction Campaign**
*Responsibility: Building and Health Unit*
*Status: Complete*

Between 1996 and 2001, Council ran a community awareness and education program to stem the threat and cost of blue-green algal blooms and other nuisance plant growth in waterways. The program focused on the need for responsible use of water and care for waterways, particularly through a reduction of phosphorous input to sewerage and stormwater systems from detergents and household cleaning agents.

**Tweed Link**
*Responsibility: Communications and Marketing Unit*
*Status: Ongoing*

Since it was first published in 1998, Council’s weekly newsletter has been used to raise awareness of local environmental issues, inform the community of council’s environmental management initiatives and engage the community in environmental action. More than 38,000 copies are distributed to Tweed residents each week by Australia Post and since July 2009 the Tweed Link has been printed on 100% post-consumer recycled paper.


**Landcare Support**
*Responsibility: NRM Unit*
*Status: Ongoing*

Council and Tweed Landcare have been collaborating since 1997 to conserve and restore the local environment through resource sharing, networking and liaison. They have established project partnerships for on-ground works, support for natural resource management (NRM) volunteers and NRM capacity building throughout the Tweed.

**Stormwater Pollution Fact Sheets**
*Responsibility: NRM Unit – Waterways Program*
*Status: Completed in 1996*

In 1996, Council created a set of information sheets to inform the Tweed community about stormwater pollution issues and solutions. They provided advice for gardeners, builders, owners of septic tanks and users of household cleaners and chemicals. The sheets are still available on Council’s website.
School Excursions and Talks

Responsibility: NRM Unit – Sustainability Program, Water Unit, Waste Management Unit
Status: Ongoing

In the late 1990s, Council started developing a range of excursions for schools to learn more about how their area is managed. Excursions include visits to the Stotts Creek Resource Recovery Centre, Kingscliff Waste Water Treatment Plant, Bray Park Water Treatment Plant and the Sustainable Living Centre.

School talks are provided upon request and cover issues such as climate change, biodiversity, waste management and the natural and urban water cycle. Refer to Response Indicators for statistics on school excursions and visits.

Domestic Waste Management Education

Responsibility: Waste Management Unit
Status: Ongoing


Local Government Week

Responsibility: Office of the General Manager
Status: Ongoing

In the early 1990s, Council launched an annual bus tour as part of NSW Local Government Week. The tour includes landfill, water treatment plants, waste water treatment plants and bush revegetation sites, to raise participants’ awareness about local infrastructure, issues and projects.

In 2009, the bus tours were replaced by a family fun day that includes information stalls across the four operational divisions of Council. Community members can enjoy a day in the park while having easy access to information on works programs, natural resource management initiatives, land use planning, community services and regulatory services.

National Water Week

Responsibility: Water Unit, NRM Unit – Sustainability Program
Status: Ongoing

Since the early 1990s, Council has encouraged community participation in National Water Week by staging a range of activities for schools and TAFE campuses. Artwork produced through these activities, such as poster competitions, is often used in Council’s water education campaigns. Most recently, entries have been used to generate stickers and information cards for hotel bathrooms.

Related Topics

Human Settlement
Catchment Management
Atmosphere
## Response Indicators

### Council's Environmental Education Services

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<td>-</td>
<td>-</td>
<td>5</td>
<td>8</td>
<td>17</td>
</tr>
</tbody>
</table>

Source: TSC Community and Natural Resources Division

*Low number due to trailer maintenance

### Household Retrofits

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2004/05</th>
<th>2005/06</th>
<th>2006/07</th>
<th>2007/08</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of households retrofitted</td>
<td>560</td>
<td>3208</td>
<td>8635</td>
<td>4036</td>
<td>16,439</td>
</tr>
<tr>
<td>3-Star WELS showerheads</td>
<td>1400</td>
<td>8021</td>
<td>9372</td>
<td>3638</td>
<td>22,431</td>
</tr>
<tr>
<td>3-Star WELS tap aerators</td>
<td>0</td>
<td>0</td>
<td>1771</td>
<td>836</td>
<td>2607</td>
</tr>
<tr>
<td>Flush converters for single-flush toilets</td>
<td>1000</td>
<td>500</td>
<td>142</td>
<td>214</td>
<td>1856</td>
</tr>
<tr>
<td>Compact fluorescent light globes</td>
<td>10,000</td>
<td>65,274</td>
<td>170,803</td>
<td>73,562</td>
<td>319,639</td>
</tr>
<tr>
<td>Annual water savings – (Million litres - estimated)</td>
<td>11</td>
<td>64</td>
<td>207</td>
<td>85</td>
<td>367</td>
</tr>
<tr>
<td>Annual GhG savings (Tonnes CO₂)</td>
<td>560</td>
<td>3208</td>
<td>8635</td>
<td>4036</td>
<td>16,439</td>
</tr>
</tbody>
</table>

Source: Tweed Shire Council Natural Resource Management Unit

Note: 04/05 and 05/06 retrofits were product giveaways only, so water and GhG savings have been calculated using an assumed 40 per cent installation rate. Retrofits after 05/06 included installation, so a 100 per cent installation rate has been assumed to calculate savings.

### NSW Government rebates in Tweed Shire

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2007/08</th>
<th>2008/09</th>
<th>2009/10*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of rainwater tank rebates (cumulative)</td>
<td>217</td>
<td>427</td>
<td>676</td>
</tr>
<tr>
<td>Number of solar hot water rebates (cumulative)</td>
<td>193</td>
<td>1516</td>
<td>4941</td>
</tr>
<tr>
<td>Number of insulation rebates (cumulative)</td>
<td>65</td>
<td>300</td>
<td>1166</td>
</tr>
<tr>
<td>Number of washing machine rebates (cumulative)</td>
<td>N/A</td>
<td>332</td>
<td>1065</td>
</tr>
<tr>
<td>Number of dual flush toilet rebates (cumulative)</td>
<td>-</td>
<td>-</td>
<td>80</td>
</tr>
<tr>
<td>Total number of rebates (cumulative)</td>
<td>475</td>
<td>2575</td>
<td>7928</td>
</tr>
</tbody>
</table>

Source: NSW Department of Environment, Climate Change and Water *Up to 30 September 2010
CATCHMENT MANAGEMENT
CATCHMENT MANAGEMENT

Catchment management is reported under three themes:

- **Waterway Health.**
- **Bushland and Biodiversity.**
- **Soils and Sustainable Agriculture.**

These themes are purely for reporting purposes, as an integrated approach to catchment management is progressively implemented by a number of organisations including:

- Northern Rivers Catchment Management Authority (NRCMA).
- Tweed Shire Council – Natural Resource Management Unit.
- Council-supported environmental committees;
  - Tweed River Committee,
  - Tweed Coastal Committee,
  - Koala Beach Wildlife Habitat Management Committee and
  - Tweed Coast Dunecare Advisory Committee.
- Tweed Landcare Inc.
- Far North Coast Weeds.

**Northern Rivers Catchment Management Authority**

The NRCMA is one of 13 CMAs established across NSW in January 2004. It is a statutory authority with a board that reports directly to the Minister for Environment, Climate Change and Water.

CMAs were established to engage regional communities in natural resource management.

The NRCMA’s key responsibilities include working with the Northern Rivers community to develop and implement a 10-year Catchment Action Plan, a strategic document for the sustainable management of natural resources within the region’s catchments. It contains targets that guide NRCMA investment over the next decade.

For more information visit [www.northern.cma.nsw.gov.au](http://www.northern.cma.nsw.gov.au)

**Natural Resource Management Unit**

Council’s Natural Resource Management (NRM) Unit was created as part of a restructure of Council in 2007. The unit is responsible for managing, conserving and rehabilitating Tweed Shire’s natural environment, by developing management plans, implementing projects and providing advice on environmental policies and procedures.

The unit has five key program areas:

- Biodiversity.
- Waterways.
- Coastline.
- Floodplains and sustainable agriculture.
- Sustainability and climate change.
Tweed River Committee
The Tweed River Committee was formed in 1992 and comprises community representatives, State Government agencies, Councillors and Council staff. The committee meets bi-monthly and advises Council on issues about implementing the Tweed Estuary Management Plan and Tweed Vegetation Management Strategy. It initiates projects which address issues such as water quality, river bank stability, recreational use and education.

Tweed Coastal Committee
The Tweed Coastal Committee was created in 1995 to oversee implementation of projects to conserve and restore ecosystem health in the Tweed’s three coastal estuaries. The committee consists of representatives from each of the Tweed Coast villages, State Government agencies, Councillors and Council staff. It advises Council on coastal asset management and implements projects identified in the Tweed Coastal Estuaries Management Plan.

Koala Beach Wildlife Habitat Management Committee
Koala Beach Estate is a 500-lot residential development between Pottsville and Hastings Point. It covers about 380 hectares, including nearly 300 hectares set aside for environmental protection.

Residents of the estate contribute a special environmental levy used to implement numerous management plans and development consent conditions aimed at the ongoing protection, management and restoration of the estate’s considerable environmental values. These works are directed by the Koala Beach Wildlife Habitat Management Committee, which meets bi-monthly and comprises representatives of Council, the Australian Koala Foundation and residents.

Tweed Dunecare Coordinating Committee
The Tweed Dunecare Coordinating Committee formed in the early 1990s. It a sub-committee of the Tweed Coastal Committee and provides coordination and assistance to Tweed Coast Dune Care and Coast Care groups.

Tweed Landcare Inc.
Tweed Landcare Incorporated formed in 1997. It is a non-profit community organisation working in the Tweed catchment to conserve and restore bushland habitat. It supports Landcare, Bushcare Rivercare and Coastcare projects within the community through education, advice, on-ground participation, networking, consultation and assistance with access to resources.

To get involved or for information on catchment management initiatives being undertaken by Tweed Landcare, visit www.tweedlandcare.org.au

Far North Coast Weeds
Far North Coast Weeds is a Local Control Authority under the Noxious Weeds Act, 1993 and is responsible for administering the Noxious Weed Act for the Ballina, Byron, Kyogle, Lismore City, Richmond Valley and Tweed councils. It was created to protect and enhance the Far North Coast environment by managing the impact of noxious weeds on all classes of land within the County District and actively encourage best-practice techniques and land use. For more information, visit www.fncw.nsw.gov.au
WATERWAY HEALTH

CONDITION

At a Glance

- Tweed Shire is also a geographical catchment, with all of the Tweed River and coastal tributaries contained within the shire boundaries. This alignment of geographical and local government boundaries creates a range of unique opportunities for catchment management, including an alignment of goals for urban water cycle management with natural resource management.
- The **Tweed River** catchment is both rugged and compact (1100km²). It has three major arms, the Rous, Oxley and Tweed. The **Rous River** joins the Tweed River at Tumbulgum in the upper estuary, while the **Oxley River** joins the Tweed further upstream at Byangum.
- The lower estuary is dominated by the Terranora and Cobaki Broadwaters, which are large shallow tidal wetlands. They join the Tweed River via Terranora Inlet, near Tweed Heads. The broadwaters are fed by the Bilambil, Duroby and Cobaki Creeks.
- The Tweed River discharges into the Pacific Ocean at Point Danger, Tweed Heads.
- **Cudgen Creek** meets the sea near the township of Kingscliff. It follows a meandering, 9.4km course from Cudgen Lake at Bogangar.
- **Cudgera Creek** meets the sea at Hastings Point. It has a reasonably straight channel and follows a 3.5km course north from Pottsville. It has three major branches, Christies Creek opposite the mouth, Palmvale Creek which branches off at North Pottsville, and Cudgera Creek which continues to the south. Cudgera Creek has a relatively small catchment of approximately 50km².
- **Mooball Creek** is the largest and most southern of the three creeks. The waterway runs parallel to the coastal dunes, extending approximately 9km south from its mouth at Potts Point. Mooball Creek has a catchment of approximately 117km².
- **Riparian vegetation** - Refer to the Bushland and Biodiversity section of this report for details on the type and condition of riparian vegetation in Tweed Shire.
- **Water quality** in all of the Tweed’s waterways is impacted by runoff from adjacent land uses and, in some sections of the river, the discharge of treated sewage effluent.
Waterways and Sub-catchments

**Oxley River Tributaries**
- Tyalgum Creek (f)
- North Pumpenbil Creek (f)
- South Pumpenbil Creek (f)
- Brays Creek (f)
- Back Creek (f)
- Hopping Dicks Creek (f)
- Wollumbin Creek (f)

**Rous River Tributaries**
- Pat Smith Creek (f)
- Numinbah Creek (f)
- Couchy Creek (f)
- Hopkins Creek (f)
- Commissioners Creek into Doon Doon Creek (f)
- Chowan Creek into Rolands Creek (f)
- Smiths Creek (f)
- Oxley River (f)
- Dunbible Creek (c)
- Condong Creek (c)
- Mayal Creek (c)
- *Rous River (c)*
- Leddays Creek (c)
- *Terranora Broadwater / Inlet (e)*

**Tweed River Tributaries**
- Kunghur Creek (f)
- Perch Creek (f)
- Byrill Creek (f)
- Commissioners Creek into Doon Doon Creek (f)
- Chowan Creek into Rolands Creek (f)
- Smiths Creek (f)
- Oxley (f)
- Dungay Creek (c)
- Condong Creek (c)
- Mayal Creek (c)
- Cobaki Broadwater (e)

**Terranora Broadwater Tributaries**
- Bilambil Creek (c)
- Duroby Creek (c)
- *Cobaki Broadwater (e)*

**Cobaki Broadwater Tributaries**
- Cobaki Creek into Pigabeen Creek (c)

**Coastal Waterways**
- Cudgen Lake (e)
- Cudgen Creek (e)
- Cudgera Creek (e)
- Mooball Creek (e)

**Southern Waterways**
- Crabbes Creek (f)
- Burringbar Creek (f)
# PRESSURE

## At a Glance

<table>
<thead>
<tr>
<th>Key Pressures on Waterway Health</th>
<th>Pressure Icon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barriers to fish passage (weirs, road crossings and floodgates)</td>
<td><img src="image" alt="FLOW PATTERNS" /></td>
</tr>
<tr>
<td>Acid sulfate soil run-off (low pH and metals discharging to waterways)</td>
<td><img src="image" alt="ACID SULFATE SOILS" /></td>
</tr>
<tr>
<td>Invasive environmental weeds in riparian vegetation</td>
<td><img src="image" alt="WEEDS" /></td>
</tr>
<tr>
<td>Loss of riparian vegetation and catchment clearing</td>
<td><img src="image" alt="HABITAT" /></td>
</tr>
<tr>
<td>Point-source pollution (waste water treatment plant discharges)</td>
<td><img src="image" alt="POINT SOURCE" /></td>
</tr>
<tr>
<td>Diffuse-source pollution (stormwater, agricultural run-off, failing on-site sewage management systems, erosion of topsoil)</td>
<td><img src="image" alt="DIFFUSE" /></td>
</tr>
<tr>
<td>Stock access to waterways leading to erosion and fouling of water</td>
<td><img src="image" alt="STOCK ACCESS" /></td>
</tr>
<tr>
<td>River water extraction and alteration of natural-flow regimes</td>
<td><img src="image" alt="WATER EXTRACTION" /></td>
</tr>
</tbody>
</table>
Key Pressures on Waterway Health | Pressure Icon
--- | ---
Stream bank erosion from high-flow events and boat wake | BANK EROSION

**RESPONSE**

Each response seeks to address one or more identified pressure. Responses are listed in order from newest to oldest. This format gives regular readers of the SoE Report easy access to the most recent initiatives, while allowing infrequent readers to view a catalogued history of responses.

Icons at the end of each response represent the pressure being targeted.

**Education and Capacity Building**

Refer to [Environmental Education and Capacity Building](#) for details of waterway health initiatives that have a specific education and/or capacity-building focus.

**Tweed Coastal Creeks and Catchment Management Plan**

Responsibility: NRM Unit – Waterways Program
Status: ongoing

In 2011, Council started reviewing the 2004 Tweed Coast Estuaries Management Plan. The revised plan will take into account the land uses and issues affecting the waterways’ estuaries and upper catchments. It will include a list of actions to be undertaken to protect and restore the environmental and recreational values.

The 2004 plan addressed the Cudgen, Cudgera and Mooball Creeks, to conserve and restore the ecological and recreational values of these small barrier estuaries.

**Urban Stormwater Quality Management Plan – Review**

Responsibility: NRM Unit – Waterways Program
Status: ongoing

Council prepared its Urban Stormwater Quality Management Plan in 2000 and started reviewing it in 2011, to ensure it reflects contemporary best management practice. A program of inspecting Council’s existing stormwater quality management devices will also be initiated through the review.

**Fish Friendly Farms**

Responsibility: NRM Unit – Waterways Program
Status: ongoing

In 2011, Council partnered with the NSW Department of Primary Industries – Fisheries and landholders in the Cobaki and Terranora catchments to protect fish habitat on and off their properties through sustainable agricultural practices.
The program encourages actions which enhance the health of Tweed rivers and creeks and build native fish populations, including:

- Retaining large woody debris (snags) in streams.
- Growing native vegetation on stream banks (riparian area).
- Installing fish-friendly crossings.
- Controlling or treating agricultural run-off.
- Providing water for stock off-stream.
- Protecting wetlands.

**Estuary Ecosystem Health Report Card**

*Responsibility: NRM Unit – Waterways Program*

*Status: Completed June 2009*

In June 2009, Council completed a detailed investigation into the estuary ecosystem health of the Terranora and Cobaki Broadwaters. Information on water quality, fish populations, seagrass and mangrove uptake of effluent-related nutrients was combined to provide a score from A to F for estuary health.

Overall, the health of the Tweed's estuarine system received a 'C' (fair). This score strongly indicates a need to improve management of upper catchments and urban runoff to maintain the broadwaters as healthy habitats for biodiversity and recreational use.

The Estuary Ecosystem Health Report Card format is extremely effective in communicating scientific data to convey complex ecological concepts to the community. It is hoped the report cards will create a greater appreciation of the state of our waterways and motivate people to:

- Reduce their impacts on the Tweed’s waterways.
- Act as advocates for waterway health when interacting with friends, neighbours and government agencies.


**Bilambil Creek and Charles Bay Reserve Riparian Corridor Project**

*Responsibility: NRM Unit – Waterways Program*

*Status: Ongoing*

In 2009, Council starting working cooperatively with Landcare and landholders to revegetate the northern bank of the Bilambil Creek estuary, from Bilambil Village to Terranora Broadwater. The project will establish a riparian corridor approximately 3km long.

Works include weed control, planting and fencing to restrict stock access. Works will have immediate benefits on water quality and the condition of stream banks. Project costs are shared by Council and Australian Government Caring for our Country Grants.
Cudgera Creek Baseline Ecological Assessment
Responsibility: NRM Unit – Waterways Program
Status: Completed October 2009

In October 2009, Council investigated biological components of the Cudgera Creek estuary, in response to community concerns about the environmental impacts of agricultural and urban development on Cudgera Creek. The assessment was presented in a report and monitoring will continue as required to track long-term trends in the waterway’s health.

The study shows the Cudgera Creek estuary ecosystem is not as healthy as a comparable, undeveloped coastal creek, because of a combination of agricultural and urban development.

Byrrill Creek Riparian Rehabilitation Project
Responsibility: NRM Unit – Waterways Program
Status: Completed April 2009

In March 2009, Council received an Environmental Trust Grant of $80,000 over two years to expand its Byrrill Creek Riparian Rehabilitation Project to May 2011. Council started the Byrrill Creek Riparian Restoration Project in 2005, with funding from the NSW Environmental Trust, to conserve and enhance one of the best examples of riparian vegetation in the Tweed. It funded bush regeneration contractors to undertake weed control on 17 properties in the Byrrill Creek sub-catchment, which equates to 14km of stream length and 48 hectares of weed suppression.

There are now 19 properties involved in the project. Continued investment by the Environmental Trust will allow Council and the Tweed River Committee to maintain those restored areas and build upon them by undertaking weed and cattle control in new areas totalling another 5km of creek bank.

Tweed River Riparian Restoration - Uki
Responsibility: NRM Unit – Waterways Program
Status: ongoing

Since 2008, Council has worked with Landcare members to rehabilitate numerous sites on the banks of the Tweed River surrounding Uki village. In 2011, 1800 trees were planted in Pat Smith Park at an event to celebrate National Tree Day. The site also benefitted from the removal of riparian vine weeds and will be maintained into the future. The site will be expanded in 2012 to accommodate more community-based tree planting.

Water Quality Monitoring / Data Assessment Program
Responsibility: NRM Unit – Waterways Program
Status: Due for completion in 2009.

In 2007, Council initiated a comprehensive review of seven years of water quality monitoring results in the Tweed estuary. This review will be used to identify key issues and develop targeted responses.
**Fish Passage Barrier Removal**

*Responsibility: NRM Unit – Waterways Program  
Status: Ongoing*

Since 2007, Council has been working with the NSW Department of Primary Industries - Fisheries to remove 15 unused waterway structures that obstruct fish movement, such as old road crossings, weirs and log sills. The program forms part of a larger state-wide approach coordinated by NSW Fisheries and ties into Council’s Cobaki and Terranora Broadwater Management Plan.

A study by NSW Fisheries revealed a total of 89 fish-passage obstructions through Tweed Shire. Fifteen were identified as high priorities for removal. Council aims to remove one fish-passage obstruction per year and ensure any new culvert constructions are fish friendly.

**River Health Grants Scheme**

*Responsibility: NRM Unit – Waterways Program  
Status: Ongoing*

Since 2007, Council has offered landholders in priority sub-catchments the opportunity to improve riparian land management through technical support and subsidised material purchases such as stock watering points, fencing materials to restrict stock access to creek banks and native plant stock for site revegetation.

River Health Grants have enabled Council and 66 landholders to improve the management of 30km of riverbank in the catchment.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of landholders participating in the scheme (cumulative)</td>
<td>15</td>
<td>23</td>
<td>39</td>
<td>50</td>
<td>67</td>
</tr>
<tr>
<td>Kilometres of riverbank under improved management (cumulative)</td>
<td>9.7</td>
<td>13</td>
<td>20</td>
<td>26</td>
<td>31</td>
</tr>
<tr>
<td>Number of plants planted</td>
<td>2000</td>
<td>4500</td>
<td>7500</td>
<td></td>
<td></td>
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</table>

Source: TSC NRM Unit – Waterways Program

**Stock Access to Waterways**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilometres of riverbank fenced to restrict stock access (cumulative)</td>
<td>8.8</td>
<td>11.5</td>
<td>17</td>
<td>24.5</td>
<td>28</td>
</tr>
</tbody>
</table>

Source: TSC NRM Unit – Waterways Program

**Riverbank Policy**

*Responsibility: NRM Unit – Waterways Program  
Status: Ongoing*

In 2007, Council adopted a policy to manage riverbank stabilisation works, in accordance with the Tweed River Estuary Bank Management Plan, November 1998.
Bray Park Weir Pool Riparian Management

*Responsibility: NRM Unit – Waterways Program*
*Status: Ongoing*

In 2006, Council sought to restore riparian vegetation and waterway health by restricting stock access to the weir pool used to extract the town water supply. Working with the landholder, Council provided water troughs and a dairy lane allowing the river to be fenced off and revegetated with native species.

A 1.2km section of the Tweed River is being rehabilitated through this project. Work continued in 2008/09.

Oxley Cove Peninsular Vegetation Rehabilitation Works

*Responsibility: NRM Unit – Waterways Program*
*Status: Ongoing*

Council’s Riparian Projects Team began rehabilitation works at the eastern end of Oxley Cove peninsular in 2006, on the banks of the Tweed River at Banora Point. Wetland and swamp oak vegetation communities are being cleared of weeds to allow natural regeneration of native plants and preservation of fauna habitat.

This area is one of the largest stands of publicly-owned native vegetation in the lower estuary. The project aims to control access to the area to reduce illegal rubbish dumping and destructive vehicle use. Work continued in this area in 2008/09.

Tweed Community Catchment Nursery

*Responsibility: NRM Unit – Waterways Program*
*Status: Ongoing*

Council established a plant nursery in 2006 to supply local native species for riparian revegetation projects in Tweed Shire. Located at the Uki Waste Water Treatment Plant, the nursery propagates locally-collected seed for use by the Riparian Projects Team and local Landcare groups.

The community nursery also serves as a training venue for community members interested in learning plant propagation techniques.

Knox Park Constructed Wetland

*Responsibility: NRM Unit – Waterways Program*
*Status: Ongoing*

In 2005, Council constructed small wetlands at the inlet and outlet points of Knox Park Pond in Murwillumbah. It sought to improve the quality of stormwater runoff being discharged to the Tweed River via Lavendar Creek.

Lower Estuary River Bank Stabilisation

*Responsibility: NRM Unit – Waterways Program*
*Status: Completed in 2005*

In 2005, Council completed major river bank stabilisation projects at Chinderah and Banora Point’s Oxley Cove Canal Estate. Approximately 200m of eroding riverbank was armoured with rock.
Tyalgum Weir Pool Revegetation  
*Responsibility: NRM Unit – Waterways Program  
*Status: Ongoing*  

In 2005, Council started working with Tweed Landcare to revegetate areas near the weir pool at Tyalgum. Major plantings took place during the annual Wollumbin Festival, with around 1000 trees planted each year.  

This project is improving the quality of riparian habitat in the area and is a step towards managing water problems occasionally experienced in the Tyalgum Weir pool.

Floodgate Modifications  
*Responsibility: NRM Unit – Sustainable Agriculture Program  
*Status: Ongoing*  

In 2004, Council and Tweed Valley cane farmers began floodgate modifications to improve water quality in cane drains and associated waterways. They installed tidal floodgates on high-priority cane drains on the coastal floodplain, to improve tidal flow and fish passage. Refer to Response Indicators in the *Soils and Sustainable Agriculture* section for the number of floodgates modified.

Riparian Projects Team  
*Responsibility: NRM Unit – Waterways Program  
*Status: Ongoing*  

In 2004, Council established a work team comprising four full-time employees to help improve the health of riparian vegetation in Tweed Shire through weed management and revegetation projects in key locations. The team of dedicated bush regenerators works year round on projects including the Community Catchment Nursery, Tyalgum Weir Pool revegetation and Oxley Cove Peninsula revegetation. The Riparian Projects Team also provides support to volunteer environmental groups undertaking bushland revegetation in riparian zones.

Estuarine Vegetation Monitoring Program  
*Responsibility: NRM Unit – Waterways Program  
*Status: Ongoing*  

A study was commissioned in 2003 to map mangroves, saltmarsh and seagrass communities within the lower Tweed estuary using aerial photographs, after a number of monitoring requirements were identified for the *Tweed River Entrance Sand Bypass Project*. The monitoring results are compared to baseline data collected before the bypassing system operation.

Lavender Creek Riparian Vegetation Project  
*Responsibility: NRM Unit – Waterways Program  
*Status: Ongoing?*  

Stormwater treatment systems and riparian rehabilitation were undertaken in Murwillumbah’s Lavender Creek in 2003, to reduce the impacts of urban stormwater runoff into the Tweed River. This project was enhanced by the Knox Park constructed wetland initiative in 2005.
Riparian Rehabilitation Project – Tyalgum
Waste-water Treatment Plant
Responsibility: NRM Unit – Waterways Program
Status: Ongoing

In 2002, Council’s Riparian Projects Team began rehabilitating a 1.6km section of Pumpenbil Creek next to the Tyalgum Waste Water Treatment Plant. The project was very challenging, with harsh conditions taking a severe toll on seedlings. Drought, flood, heat, grazing by wallabies and stock and, most recently, severe frost have meant progress at this site has been slower most other riparian projects. However, a total of 2200 trees have been established, in conjunction with ongoing weed control.

Waste Water Treatment and Disposal
Responsibility: Water Unit
Status: Ongoing

Refer to the Waste Water Management section of this report for actions and outcomes to improve waterway health by addressing waste water treatment plant discharges and failing on-site sewage management systems.

Stormwater Litter Traps
Responsibility: NRM Unit – Waterways Program
Status: Ongoing

Stormwater litter traps continue to be installed on high-priority stormwater outfalls:

- **Tweed Heads South industrial and commercial area (2001):** A litter boom and trap were placed on the open channel that drains into Ukerebagh Passage, which is an important estuarine wetland.
- **Duffy Street, Tweed Heads South (2002):** A litter trap and constructed wetland were installed on an open stormwater drain that drains into Ukerebagh Passage.
- **Knox Park Pond and Lavender Creek, Murwillumbah (2003):** Riparian plantings occurred along Lavender Creek and wetland plantings at the inlet and outlet points of Knox Park Pond.
- **Cudgen Creek, Kingscliff (2001):** Two litter traps were installed on stormwater lines that drain to Cudgen Creek at Kingscliff.
- **Commercial area, Kingscliff (2003):** Litter traps were installed in gully pits along Kingcliff’s main commercial area.
- **Cabarita Beach (2006):** Ten litter traps were installed in the stormwater system at Cabarita Beach.

On-Site Sewage Management Strategy
Responsibility: Building and Health Unit
Status: Ongoing

Council adopted an On-Site Sewage Management Strategy in 2002 and began implementing an associated program to improve the management of waste water treatment devices in areas without sewerage. Refer to the Waste Water section for details of the strategy’s implementation.
Stormwater Treatment Devices
Responsibility: Planning and Regulation Division
Status: Ongoing

Since April 2000, all new subdivisions and major developments in Tweed Shire have been required to install stormwater treatment devices in accordance with the Tweed Urban Stormwater Quality Management Plan, 2000.

Options include constructed wetlands that cover a minimum of five per cent of the land to be subdivided, end-of-pipe stormwater treatment devices such as litter traps and infiltration basins in suitable soil types.

Water Quality Data Base
Responsibility: NRM Unit – Waterways Program
Status: Ongoing

In 2001, Council established a water quality database to manage data collected over many years. The database allows Council to carry out statistical analysis of data, to identify trends in water quality. A comprehensive review of water quality monitoring programs was conducted in 2008 and helped inform the production of the 2009 Estuary Ecosystem Health Report Card.

Urban Stormwater Quality Management Plan
Responsibility: Engineering and Operations Division / Planning and Regulation Division
Status: Ongoing

An Urban Stormwater Quality Management Plan was prepared in 2000 for the urban areas of Murwillumbah, Tweed Heads and surrounding areas and Tweed Coast villages. It sought to ensure urban stormwater management is addressed by Council and issues are incorporated into Council’s planning, budgetary and ongoing works activities.

Tweed River Estuary Bank Management Plan
Responsibility: NRM Unit – Waterways Program
Status: Ongoing

In 2000, the Tweed River Committee completed a management plan to address existing and future bank erosion and morphological changes of the Tweed Estuary, including the Rous River up to Kynnumboon, Terranora Inlet, Terranora Creek and the entrance to Cobaki Broadwater.

Cobaki Broadwater Management Plan
Responsibility: NRM Unit – Waterways Program
Status: Ongoing

The Tweed River Committee completed the Cobaki Broadwater Management Plan in 1998 to establish a planning framework to conserve and restore the broadwater’s ecological value and recreational amenity.
Tweed Estuary Management Studies and Lower Tweed Estuary Management Plan

Responsibility: NRM Unit – Waterways Program
Status: Ongoing

Lower Tweed River Management Studies were initiated by the NSW Department of Public Works’ Estuary Management Program in 1990. The studies set out the intrinsic natural values of the Lower Tweed Estuary, reflected by its variety of habitats and wildlife, scenic qualities and various opportunities for recreation. The studies also identify demands being placed upon the waterway by an expanding population.

It was clear a comprehensive river management plan was required to protect the ecological function of the water. The studies culminated in the Lower Tweed Estuary Management Plan (1991), which outlines an overall concept for ecologically sustainable management of the waterway. The plan distinguished between the different character of the main arm of the Tweed River and Terranora Broadwater.

Biodegradable Bait Bags

Responsibility: Building and Health Unit
Status: Ceased in 1998

Council organised the world’s first trial production of biodegradable plastic bait bags in 1996. Approximately 30,000 bags were produced for retail sale in the Tweed. Further development of the project the following year included participation in a joint initiative to lobby the State and Federal Governments. Refer to the 2001 State of the Environment Report for more information on this initiative.

Upper Tweed Estuary Management Plan

Responsibility: NRM Unit – Waterways Program
Status: Ongoing

The Tweed River Committee completed the Upper Tweed Estuary Management Plan in 1996 to complement a management framework for the lower Tweed Estuary.

Terranora Broadwater Management Plan

Responsibility: NRM Unit – Waterways Program
Status: Ongoing

In 1994, the Tweed River Committee completed a management plan for the Terranora Broadwater to deliver an integrated program of measures and works to achieve a range of commercial, recreational and environmental outcomes.

Related Issues

Built Environment
Water Supply
Waste-water Management
Environmental Education and Capacity Building
Bushland and Biodiversity
CONDITION

At a Glance

- The Tweed catchment occupies a unique and complex landform dominated by the remnant caldera of the Mt Warning / Wollumbin shield volcano. It is one of the best and largest examples of its type in the world and is listed on the NSW Geological Heritage Register.
- The Tweed region is regarded nationally and internationally as a significant centre for biodiversity. Figures compiled in the Australian Nature Conservation Agency’s State of the Environment Report (1996) suggest the region supports more species of bird, fish, amphibian, and mammals than Kakadu, and a similar numbers of reptiles. Similar numbers of species in these animal groups are only found in the wet tropics.
- About half of the shire is covered by bushland (52 per cent, 68571ha). Most of this occurs in steeper areas and outside National Parks, which comprise 16 per cent of the Tweed and 29 per cent of its bushland. There are at least 50 distinct vegetation communities within Tweed Shire. Many of them are highly depleted, inadequately conserved or listed as endangered under the Threatened species Conservation Act (1995).
- The region supports more than 50 species of migratory birds protected under international agreements.
- Approximately 80 per cent of all bushland in Tweed Shire has high or very high conservation status. Much of this occurs outside National Parks and along the coastal strip.
- Tweed Shire supports more than 200 significant plant species. Under the Threatened Species Conservation Act (1995), one is thought to be extinct, 25 are endangered and 29 are vulnerable to extinction. In addition, 96 species are listed on the Rare or Threatened Australian Plants (ROTAP) list, a national non-regulatory schedule produced by the CSIRO.
- It is estimated the region supports Australia’s highest concentration of ‘threatened’ plant species.
- Many plant species found in Tweed Shire are highly localised, with 55 essentially confined to Tweed Shire.
- The Tweed Catchment supports over 100 significant animal species. Under the Threatened Species Conservation Act (1995), 17 are listed as endangered and 88 are considered vulnerable.
- Stotts Island Nature Reserve is an excellent example of vegetation that once existed over parts of the Tweed River floodplain. It is one of numerous areas declared as critical habitat under the Threatened Species Conservation Act (1995).
- Rainforests in Tweed’s National Parks are listed on the UNESCO World Heritage Register.
### Bushland Cover in Tweed Shire

- **36%** Sustantially cleared for agricultural and urban use
- **48%** Bushland in National Parks and nature reserves
- **16%** Other Bushland

Source: TSC 2004 c

### Bushland Communities in Tweed Shire

- **Rainforest and Riparian**: 0.50%
- **Sclerophyll Forest (Bedrock)**: 20.20%
- **Sclerophyll Forest/Woodland (Sand/Alluvium)**: 15.40%
- **Melaleuca and Swamp She-Oak**: 2.90%
- **Heathlands**: 0.70%
- **Estuarine Complexes**: 1.20%
- **Sedgelands etc**: 0.80%
- **Miscellaneous / Modified etc**: 0.50%

Source: TSC 2004 c
### Pressure

#### At a Glance

<table>
<thead>
<tr>
<th>Key processes that threaten native fauna and flora in Tweed Shire</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing and fragmentation of native vegetation because of urban and other development, especially along the coast - Recognised at State and national levels as a ‘key threatening process’</td>
<td>HABITAT</td>
</tr>
<tr>
<td>Draining of swamps and wetlands - Recognised at State level as a ‘key threatening process’</td>
<td>FLOW PATTERNS</td>
</tr>
<tr>
<td>Invasion of coastal plant communities by bitou bush and other weeds - Recognised at the State level as a ‘key threatening process’</td>
<td>WEEDS</td>
</tr>
<tr>
<td>Restoration of coastal plant communities affected by sand mining - Much of the Tweed Coast is covered by post-mining regeneration and requires significant intervention to restore it to a near-natural state</td>
<td>HABITAT</td>
</tr>
<tr>
<td>Degradation of riparian habitats by camphor laurel, privet and numerous exotic vines - Riparian habitats have been decimated throughout the Tweed and the remaining areas are almost universally degraded by the invasion of camphor laurel, privet and exotic vines. Recognised at the State level as a ‘key threatening process’</td>
<td>WEEDS</td>
</tr>
<tr>
<td>Grazing and disturbance by cattle in riparian and wetland areas - Cattle are commonly able to graze within these sensitive habitats without restriction, causing erosion, sedimentation, pollution, physical damage to trees and other habitat, and facilitating weed invasion</td>
<td>STOCK ACCESS</td>
</tr>
<tr>
<td>Degradation of native vegetation at bushland edges from weed invasion - Fragmentation of natural areas by clearing creates edges which enable weed invasion and other undesirable influences. Invasion by lantana and exotic grasses is recognised at the State level as a ‘key threatening process’</td>
<td>WEEDS</td>
</tr>
</tbody>
</table>
Suppression of native regrowth by camphor laurel and other exotic species - Many exotic weeds persist during the early phases of regeneration but are eventually out-competed by slower-growing but longer-lived native species. However, camphor laurel is both fast growing and long-lived, surviving 300-400 years. Without active management, camphor laurel could continue to dominate regrowth forests indefinitely.

Predation on native fauna by cats, dogs and foxes - These animals prey on many small native mammals, birds, reptiles and frogs. Recognised at State and national levels as a ‘key threatening process’.

Competition from exotic birds such as the Indian Myna - This species has only arrived in the Tweed during the past few years but is recognised internationally as one of the top 100 most invasive alien species. It forms aggressive colonies and nests in tree hollows, threatening many parrots, cockatoos, owls, possums and gliders.

Competition and poisoning of native fauna by cane toads – Cane toads are also recognised internationally as one of the top 100 most invasive alien species. It is also poisonous to native species that commonly attempt to eat them, particularly reptiles.

Altered fire patterns – Excessively frequent bushfires are recognised at the State level as a ‘key threatening process’.

Roadside vegetation management - Many threatened plants grow along Tweed roadsides.

Native fauna road kills - Cars and trucks represent a considerable threat to some species, especially those confined to populated coastal areas. Road kills are a major cause of mortality for koalas in Tweed Shire.


**RESPONSE**

Each response seeks to address one or more identified pressure. Responses are listed in order from newest to oldest. This format gives regular readers of the SoE Report easy access to the most recent initiatives, while allowing infrequent readers to view a catalogued history of responses. Icons at the end of each response represent the pressure being targeted.
Biodiversity Program Overview

Biodiversity is one of five key program areas covered by Council's Natural Resource Management Unit. The Biodiversity Program has grown out of the Tweed Vegetation Management Strategy 2004, which was adopted by Council in April 2007 and includes a range of actions under six themes:

- **Biodiversity Planning Reforms** - Reforms to support and streamline Council's planning, development assessment and operational functions relating to biodiversity.
- **Community Awareness and Understanding** - Projects that raise Council's profile on biodiversity protection and management. Educate the community on biodiversity values. Provide a point of contact for the community on biodiversity issues. Refer to Environmental Education and Capacity Building for information on these initiatives.
- **Council Capacity Building** - Increase Council's capacity to efficiently and proactively address biodiversity and natural resource issues. Refer to Environmental Education and Capacity Building for information on these initiatives.
- **Monitoring and Research Partnerships** - Collaborative research to answer important ecological questions about biodiversity management and policy in Tweed Shire. Monitor existing biodiversity management programs and policy.
- **TSC Bushland Estate** - Coordinate and manage natural areas owned or controlled by Tweed Shire Council.
- **Biodiversity Incentives** - Incentives and support for on-ground works on public and private land. Main target areas include:
  - bushland management and rehabilitation,
  - threatened species and communities, and
  - management of threatening processes.

Tree Preservation Order (Koala Feed Trees)

*Responsibility: NRM Unit – Biodiversity Program*
*Status: ongoing*

Council adopted a Tree Preservation Order (TPO) in 2011 to protect koala habitat along the Tweed Coast and adjacent ranges. The order applies to bushland areas and four trees known to be primary food sources for koalas. Under the TPO, any clearing in areas affected by the TPO requires the consent of Council. Refer to www.tweed.nsw.gov.au for planning/approval requirements.

Comprehensive Koala Plan of Management

*Responsibility: NRM Unit – Biodiversity Program*
*Status: ongoing*

In 2011, Council completed the Tweed Coast Koala Habitat Study, which highlighted the plight of koalas on the Tweed Coast and recommended taking aggressive action to restore their numbers.

As a result of the study, Council initiated a Comprehensive Koala Plan of Management (as described under State Environmental Planning Policy No. 44 – Koala Habitat Protection) for the Tweed Coast. This plan seeks to foster viable free-ranging populations of koalas along the Tweed Coast by addressing issues such as habitat removal, bushfire regimes, road mortality, predation by domestic and wild dogs.
Invasive Species Officer

Responsibility: NRM Unit – Biodiversity Program  
Status: ongoing

In 2008, Council appointed a project officer to coordinate the monitoring and control of Indian myna birds in Tweed Shire. Key components of the program include monitoring the abundance and distribution of Indian mynas, community-based trapping, and investigating other control measures, such as shooting and nest removal. Indian mynas only arrived in the Tweed during the past few years but are recognised internationally as one of the top 100 most invasive species. They form aggressive colonies which chase many native birds away, compete for nest in tree hollows, and threaten many hollow-nesting species including parrots, cockatoos, owls, possums and gliders.

Council completed the invasive species project, funded by an Indian Myna Control grant, then expanded the project officer role in 2010 to include management of other pest animals including rabbits, foxes, wild dogs and cane toads. Managing the pressures associated with invasive species, particularly in urban and peri-urban areas, is an emerging issue that has not attracted the same level of assistance when compared to rural landscapes.

Revised Environmental Strategy for Local Environmental Plan

Responsibility: NRM Unit – Biodiversity Program  
Status: ongoing

In 2010, Council initiated a review of its environmental zonings and related provisions as part of its response to the NSW Government planning reform requirements (LEP standard instrument). The review aims to align existing environmental policies, such as the Tweed Vegetation Management Plan, with the standard instrument and community response to the draft LEP 2010.

Biodiversity Grants

Responsibility: NRM Unit – Biodiversity Program  
Status: ongoing

Council introduced its Biodiversity Grants in 2009 to expand upon the River Health Grants which are only eligible to landholders in identified priority sub-catchments. Biodiversity Grants help private landowners, community groups and researchers undertake projects that maintain and improve biodiversity values in Tweed Shire including:

- Rehabilitation of degraded habitats.
- Restoration of previously cleared areas.
- Threatened species recovery.
- Management of threatening processes.
- Monitoring and research.

<table>
<thead>
<tr>
<th>Biodiversity Grants</th>
<th>2009/10</th>
<th>2010/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of landholders participating in the scheme (cumulative)</td>
<td>17</td>
<td>43</td>
</tr>
<tr>
<td>Approximate areas of land (hectares) under improved management (cumulative)</td>
<td>16</td>
<td>33</td>
</tr>
<tr>
<td>Number of native seedlings planted (cumulative)</td>
<td>2800</td>
<td>4800</td>
</tr>
</tbody>
</table>
**Recovery of Threatened Species in Priority Implementation Areas**  
*Responsibility: NRM Unit – Biodiversity Program*  
*Status: scheduled for completion 2013*

In 2010, Council partnered with the NSW Environmental Trust and Northern Rivers Catchment Management Authority and received $300,000 in funding to implement priority actions to conserve threatened species and abate threatening processes in selected sub-catchments including the Bilambil, Duroby and Byrill Creek catchments. Actions include restoring and expanding habitats, weed control, stakeholder engagement and community and landholder education. The project extends into Byron Shire in the Brunswick Valley catchment.

**Tweed Byron Bush Futures**  
*Responsibility: NRM Unit – Biodiversity Program*  
*Status: scheduled for completion December 2011*

In 2009, the Tweed and Byron councils were awarded a $1.7 million grant to conserve and restore significant areas of urban bushland and encourage greater community involvement in caring for the environment. The grant was awarded by the NSW Environmental Trust under the Urban Sustainability Major Projects Program.

On-ground works have focused on habitat protection and restoration, managing stormwater pollution, removing rubbish, pest species management and interpretive signage.

Priority sites were selected through a comprehensive audit of bushland areas.

A community and organisational engagement campaign aimed at promoting sustainable management solutions was a major focus of the project.

Project objectives:
- Remove weeds and encourage natural regeneration at targeted sites.
- Protect bushland subject to inappropriate human use.
- Reduce threats to bushland posed by domestic pets and exotic fauna.
- Reduce stormwater and urban pollution impacts on bushland and adjacent waterways.
- Remove rubbish from bushland.
- Increase resident and community involvement in sustainable behaviours including urban bushland management.
- Improve resident and community understanding of environmental issues at the urban bushland interface.
- Increase institutional awareness and support for improved management of urban bushland.

The project complements other natural resource management initiatives managed by the Tweed and Byron councils, community groups, individual landholders, and State agencies. A steering committee comprising representatives from both councils, Tweed Landcare and Brunswick Valley Landcare is overseeing the project.

**Mitchell’s Rainforest Snail Research Project**  
*Responsibility: NRM Unit – Biodiversity Program*  
*Status: ongoing*

The critically-endangered Mitchell’s rainforest snail (*Thersites mitchellae*) became the subject of a local research project in 2009. Natural resource management staff from the Tweed, Byron and
Ballina councils teamed up with Southern Cross University students and staff to undertake ecological research on the threatened species.

There are believed to be fewer than 500 individual Mitchell’s rainforest snails left in the world, with the entire population confined to mainly coastal areas between Lennox Head and the Tweed Valley. Stotts Island Nature Reserve is one of very few areas in NSW declared as ‘critical habitat’ because it supports the largest known population of Mitchell’s rainforest snails.

**Aerial Survey for Vine Weed Mapping**

*Responsibility: NRM Unit – Waterways Program. NRM Unit – Biodiversity Program*

*Status: Completed April 2009*

In March 2009, environmental consultants working for Council took to the air to map the location and extent of infestations of madeira vine.

Madeira vine (*Anredera cordiflora*) is a South American native which grows prolifically on Tweed river and creek banks, smothering and killing mature trees and preventing the regeneration of native seedlings. It is clearly visible in early autumn as it produces long, creamy white flowers in the canopy of host trees.

The spread of introduced vine weeds in NSW is recognised as a key threat to the conservation of native flora and fauna. As a result, the NSW Environmental Trust gave Council a grant to map madeira vine and another serious weed, Cats Claw Creeper. Mapping these weeds will allow Council to develop a strategic approach to managing them.

The grant will also be used to fund weed control at priority sites.

**Tweed Coast Weed Management**

*Responsibility: NRM Unit – Biodiversity Program*

*Status: Ongoing*

In late 2008, Council obtained $35,000 in funding through the Northern Rivers Catchment Management Authority (NRCMA) for onground works to improve the condition and resilience of natural vegetation communities along the Tweed coast.

The NRCMA, through its Northern Rivers Catchment Action Plan - Coastal Theme, supports NSW Government coastal policy and planning processes that encourage local government to develop and implement Coastal Zone Management Plans. This project will implement priority actions contained within a number of coastal plans of management pertinent to the Tweed Coast.

Council will also contribute $10,000 to the project from its Biodiversity Program budget.

The project will complement ongoing bitou bush control and natural resource management works undertaken by coastal land managers and dunecare groups. They will facilitate the restoration of biodiversity in vegetation communities with high conservation values and protect threatened species and their habitats.

A number of environmental weeds - including asparagus fern, glory lily, morning glory vine, mother of millions and other succulents - will be targeted by contractors across 40 hectares of high-conservation-value vegetation at nine separate locations in the Tweed Coast Reserve. Less intensive treatment will be undertaken by Council staff across another 60 hectares.
This project is expected to reduce the incidence and density of environmental weeds, minimise the risk of new invasions, provide support for volunteer groups working in the coastal reserve and heighten community awareness of the benefits of environmental weed control.

**Biodiversity DCP**

*Responsibility: NRM Unit – Biodiversity Program; Planning and Regulation*

*Status: in progress*

In 2008, Council received support from the Northern Rivers Catchment Management Authority to prepare a model Development Control Plan (DCP) to provide detailed guidance on acceptable standards for biodiversity and habitat management for proposed developments.

While a biodiversity DCP was a key recommendation of the Tweed Vegetation Management Strategy 2004, a model plan will accommodate local circumstances while providing a more a coordinated approach to recent State Government natural resource management reforms.

**Habitat Management Plan Policy**

*Responsibility: NRM Unit – Biodiversity Program; Planning and Regulation*

*Status: Ongoing*

In 2008, Council prepared a policy to guide the scope and content of management plans for ecological restoration and ongoing management of native habitat. These plans are commonly required as a condition of development consent, to remedy unauthorised works and to guide habitat restoration works funded or overseen by Council. It is likely the policy will be incorporated into the Biodiversity DCP.

**Lower Tweed Range EEC and Threatened Species Project**

*Responsibility: NRM Unit – Biodiversity Program*

*Status: Completion expected mid 2009*

The Lower Tweed Range EEC and Threatened Species Project was initiated in 2008 with support from the Northern Rivers Catchment Management Authority. It will implement habitat restoration works in bushland remnants on private and public land, targeting Endangered Ecological Communities (EECs), threatened species and threatening processes at sites in the lower Tweed Range. The project also includes preparing and reviewing site action plans and managing agreements, community consultation, on-site training and monitoring.

**Draft Tweed LEP 2008 – Stage 1**

*Responsibility: NRM Unit – Biodiversity Program; Planning Reforms; Planning and Regulation*

*Status: Completed 2009.*

In 2006, the NSW Government introduced legislation requiring councils to prepare a new principal Local Environmental Plan (LEP), in accordance with a standard template prepared by the Department of Planning. A two-stage process was adopted in Tweed Shire.

Stage 1 involved the integration of LEP 2000 and components the draft LEP 2000 Amendment 21, which arose from the Tweed Vegetation Management Strategy 2004. This integration involved a partial review of environmental protection and waterway zone mapping, drafting and reviewing
several NRM–related LEP clauses and map overlay provisions. Refer to the Built Environment section for more detail on the LEP review.

**Unauthorised Land Clearing**

*Responsibility: NRM Unit – Biodiversity Program; Planning and Regulation*

*Status: ongoing*

Since the creation of the Natural Resource Management Unit in 2007, Council officers have taken a more active role in preventing unauthorised land clearing and tree removal, particularly along the coastal strip. Approaches include the use of ‘shame’ signage, visual screens, planting of replacement trees, media exposure and legal remedies.

**Koala Beach Wildlife Habitat Management**

*Responsibility: NRM Unit – Biodiversity Program*

*Status: Ongoing*

In 2009, Council continued to carry out habitat restoration and monitoring works in Koala Beach Estate, including:

- Monitoring of koalas, blossom bats, glossy black-cockatoos, planagales and arthraxon grass.
- Bushfire hazard reduction works
- Increased ranger patrols
- Improved signage
- Tree planting.
- Fox control.
- Bushland restoration.

These works were overseen by the Koala Beach Wildlife Habitat Management Committee.

**Blossom Bat Habitat Restoration Plan**

*Responsibility: NRM Unit – Biodiversity Program*

*Status: Ongoing*

In 2008, Council began a plan of management to restore blossom bat habitat on public land parcels between Hastings Point and Kingscliff. The plan and its implementation were negotiated through the development consent process to compensate for clearing of coast banksia for the Casuarina Beach and Salt developments. Coast banksia is a critical food source for the nectar-feeding blossom bats. Implementation will start once the plan is finalised.

**Bushfire Management**

*Responsibility: NRM Unit – Biodiversity Program*

*Status: Ongoing*

Council established a full-time position of Bushland Officer in the Natural Resource Management Unit in 2008. The role includes bushfire management initiatives for biodiversity conservation and asset protection. Bushfire management works include establishing a fire trails register in conjunction with the Rural Fire Service, upgrading and maintaining asset protection zones at the interface between urban and bushland areas and a comprehensive review of the Tweed’s Bushfire Risk Management Plan.
Plan. This review led to a more regional approach to bushfire risk management by encompassing the Tweed, Byron and Ballina local government areas.

**Bushland Reserves**  
*Responsibility: NRM Unit – Biodiversity Program*  
*Status: Ongoing*

In 2008, management of Council’s bushland reserves was transferred from the Recreation Services Unit to the newly established Natural Resource Management Unit. This initiative was accompanied by the engagement of a full-time Bushland Officer responsible for coordinating the management of bushland areas owned or under the control of Council.

**Rabbit Control**  
*Responsibility: NRM Unit*  
*Status: Ongoing*

Council conducted a preliminary rabbit control program in 2007, following a proliferation of rabbit populations in urban areas along parts of the Tweed coast and sections of Murwillumbah. Monitoring of rabbit populations is continuing, with further abatement strategies being considered.

**Fox Control**  
*Responsibility: NRM Unit*  
*Status: Ongoing*

In 2007, Council began a fox control program that primarily comprised:

- Controlling foxes in and adjacent to Koala Beach, where they have been identified as a key threat to the nesting and survival of the endangered bush stone curlew (*Burhinus grallarius*).
- Responding to public alerts about the location of fox dens in the Tweed, with fumigation and destruction of dens.

The European or red fox (*Vulpes vulpes*) is an introduced predator of native and domestic wildlife and is present in the Tweed Shire. The NSW Rural Lands Protection Board, in consultation with land owners, manage their control on rural lands. There is little in the way of effective control in urban areas because of restrictions on lethal baiting and foxes’ aversion to conventional trapping methods.

**Koala Road Mortality Hotspots**  
*Responsibility: Engineering and Operations*  
*Status: Completed*

Koala Black Spot road signs were installed on sections of Clothiers Creek Road in 2007 to encourage motorists to watch out for wildlife in these areas. Additional fauna advisory signage was installed along the Tweed Coast in 2009.
Biodiversity Program Commencement

Responsibility: NRM Unit – Biodiversity Program

Status: Ongoing

In 2006, the Tweed River Committee launched the shire’s Biodiversity Program to implement a range of actions under the Tweed Vegetation Management Strategy 2004. The program is managed by then NRM unit’s Biodiversity Program Leader.

Green Waste Collection

Responsibility: Waste Management Unit

Status: Ongoing

Council established a residential green-waste collection service in 2005. The kerb-side collection of green waste has helped reduce the spread of noxious weeds through illegal dumping of garden waste. Refer to the Waste Management section for more detail.

Planning Reforms and the Local Environment Plan

Responsibility: NRM Unit – Biodiversity Program, Planning Reforms Unit

Status: integrated into draft LEP 2008 – Stage 1.

In 2004, Council started integrating statutory aspects of the Vegetation Management Plan into the revised Local Environmental Plan, consistent with the NSW State Government standard template.

Pandanus Plant Hopper Control

Responsibility: Entomology Unit

Status: Ongoing

Since 2004, Council has sought to reduce the impact of pandanus dieback caused by the flatid insect (*Jamella Australiae*), by injecting trees with the systemic insecticide *imidacloprid*. The program helped maintain Pandanus tree health along the Tweed Coast.

Tweed Vegetation Management Strategy 2004

Responsibility: NRM Unit – Biodiversity Program, Planning Reforms Unit


Council completed a Vegetation Management Strategy for Tweed Shire in 2004. It builds upon the 1998 Tweed Vegetation Management Plan (TVMP) by:
• Identifying significant natural and environmentally sensitive areas in the Tweed that require protection and management.
• Identifying significant issues about the administration and management of Tweed’s remnant vegetation by local and State government.
• Identifying practical mechanisms Council can implement to protect and enhance Tweed Shire’s natural assets and promote catchment management and native biodiversity.
• Promoting a cooperative and integrated approach between Council, relevant State government bodies and the Tweed community to achieve the strategy’s objectives.

In 2008/09, the TVMP was used to inform vegetation management land use planning controls in the Tweed Local Environment Plan.

**Bushland Friendly Nursery Scheme**

*Responsibility: NRM Unit – Biodiversity Program, Planning Reforms Unit / Far North Coast Weeds*

*Status: Ongoing*

Council joined the Bushland Friendly Nursery Scheme (BFNS) in 2003, a joint initiative between the North Coast Weed Advisory Committee and 17 North Coast councils from Taree to the Tweed.

Plan nurseries participating in the voluntary program are required to:

• Not propagate, sell or knowingly distribute the 87 environmental weeds listed by the BFNS.
• Encourage the public to plant local native alternatives and help stop the spread of environmental weeds.

A second round of the BFNS booklets were published in 2009 and distributed to participating nurseries for supply to customers.

**Cadagi Tree Removal Program**

*Responsibility: Recreation Services Unit*

*Status: Completed in 2003*

In 2003, Council undertook a tree removal and replacement program targeting the cadagi tree, *Eucalyptus torellianas*, from Council streets. Cadagi trees are an environmental weed in the Tweed and have excessive leaf and fruit fall which end up in local waterways when planted in urban nature strips.

**Tweed Coast Bitou Bush Management**

*Responsibility: NRM Unit – Biodiversity Program*

*Status: Ongoing*

In 2002, Council and Far North Coast Weeds started an aerial spraying and on-ground weed control program to reduce the occurrence of bitou bush along the Tweed Coast. These works have been successful but ongoing work is required to prevent reinestation.

Two important projects were completed in November 2008 to address weed control in coastal ‘high conservation value’ vegetation. All weeds were targeted in the first project, focussing on Crown land from Hastings Point to Black Rocks. The second project specifically targeted bitou bush, through the NRCMA’s Bitou Bush Threat Abatement Plan.
The NRCMA has developed these projects to help manage weed infestations on public land, with Council contracted to undertake the works in the coastal zone. Work was undertaken by Council staff, contractors and assisted by DuneCare groups along the coast and has significantly decreased the area covered by bitou bush and other weeds. The Tweed is the northern containment zone for bitou bush and the aim is to stop the spread of this noxious weed back into Queensland, where it has been successfully controlled.

**Development Approval Conditions**

*Responsibility: Planning and Regulation Division*

*Status: Ongoing*

Since 2000, Council has required all new developments to implement weed control and bushland management as part of their condition of consent. This condition has helped reduce the ecological impact of new development by improving communication of environmental issues and requirements to developers prior to any on-ground work.

**Companion Animal Control**

*Responsibility: Regulatory Services Unit*

*Status: Ongoing*

The *Companion Animals Act* was introduced in 1999 to reduce the incidence of environmental disturbance caused by roaming cats and dogs. Council has primary responsibility for the Act’s implementation and has complemented the aims of the legislation with education campaigns to promote responsible pet ownership, regular microchipping and registration days and the establishment of off-leash dog exercise areas in suitable locations throughout Tweed Shire.

**North Tumbulgum Wildlife Corridor Rehabilitation Project**

*Responsibility: NRM Unit – Biodiversity Program. NRM Unit – Waterways Program*

*Status: Completed 1999*

In 1997, Council began a project identified in the Upper Tweed River Estuary Management Plan to link the core habitat area of lowland subtropical rainforest on Stotts Island Nature Reserve with the Rous River Wetland, at the confluence of the Rous and Tweed Rivers. Stotts Island Nature Reserve represents one third of all the remaining lowland subtropical island rainforest in Australia.

This project was a successful partnership between Council and the community, with the involvement of community volunteers, school groups and work-for-the-dole crews to revegetate and rehabilitate by planting more than 5000 native trees and shrubs, to complement existing vegetation. The project owes much of its success to the many work-for-the-dole participants who took part and their skilful coordination and sponsorship by Tweed Training and Enterprise Company. This project received the RiverCare 2000 bronze award and was the only work-for-the-dole project recognised in the award scheme.

**Koala Habitat Mapping**

*Responsibility: Planning Reform Unit*

*Status: Completed 1996*

In 1996, the Australian Koala Foundation completed a [Tweed Coast Koala Habitat Atlas](#) on behalf of Council, to:
• Quantify tree preferences and habitat utilisation.
• Delineate areas of primary and secondary koala habitat.
• Examine the relationship of this information in terms of State Environmental Planning Policy No 44 (Koala Habitat).
• Identify threatening processes.
• Recommend measures to provide koala populations with a measure of long-term viability.

In 2009, significant community concern at the increasing pressures on koala habitat led to a re-prioritisation of Council’s natural resource management resources to help improve koala habitat management in Tweed Shire.

**Tweed Vegetation Management Plan 1999**
*Responsibility: Planning Reforms Unit  
Status: Completed 1999*

Council commissioned a Vegetation Management Plan in 1999, with support from Greening Australia, the NSW Environmental Restoration and Rehabilitation Trust and Environment Australia. The Tweed Vegetation Management Plan 1999 included detailed vegetation mapping, assessment of ecological values, and recommendations covering a wide range of Council interests including changes to the LEP.


**Tree Preservation Orders**
*Responsibility: Planning Reforms Unit  
Status: Ongoing*

In 1990 and 2004, Council sought to conserve local biodiversity by establishing tree preservation orders for rare and significant trees in Tweed Shire. Locations of rare and significant trees are now geo-referenced in Council’s geographic information system to ensure any development or change of land use close to these sites is managed appropriately.

**Related Issues**
- Human Settlement
- Soils and Sustainable Agriculture
- Waterway Health
- Environmental Education and Capacity Building
- Council Operations
Volcanic red soil at Tyalgum after composting for more sustainable farming.
SOILS AND SUSTAINABLE AGRICULTURE

CONDITION

At a Glance

- Soil groups in the Tweed catchment include coastal sands, krasnozems, alluvials, yellow earths, red podzolics and chocolate soils. (TSC 2003a)
- Much of the floodplain area of the Tweed catchment has ‘potential’ and ‘actual’ acid sulfate soils close to the surface. (TSC 2000 b)

More Information

- A full description of soil types in the Tweed catchment is contained in Appendix 2 of the Tweed Shire State of the Environment Report 2002/03.
- Detailed soil maps for the Tweed region are available from the NSW Department of Environment and Climate Change.

PRESSURE

At a Glance

<table>
<thead>
<tr>
<th>Key pressures on the soil landscape</th>
<th>Icon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid sulfate soils, which lead to:</td>
<td></td>
</tr>
<tr>
<td>- Land degradation and reduced productivity in agricultural areas</td>
<td><img src="AcidSulfateSoils.png" alt="Icon" /></td>
</tr>
<tr>
<td>- Water quality degradation and the associated impacts on aquatic and marine ecosystems</td>
<td><img src="AcidSulfateSoils.png" alt="Icon" /></td>
</tr>
<tr>
<td>Erosion and sedimentation associated with agricultural and construction activities</td>
<td><img src="Diffuse.png" alt="Icon" /></td>
</tr>
<tr>
<td>Changing land-use patterns</td>
<td><img src="ChangingLandUse.png" alt="Icon" /></td>
</tr>
<tr>
<td>Contaminated land</td>
<td><img src="ContaminatedLand.png" alt="Icon" /></td>
</tr>
</tbody>
</table>
**Pressure Indicators**

**Indicator: Risk Mapping of Acid Sulfate Soils**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2002/03</th>
<th>2008/09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of land with a high-risk (acid sulfate soil) classification</td>
<td>13,714Ha</td>
<td>13,714Ha</td>
</tr>
<tr>
<td>Area of land with a low-risk (acid sulfate soil) classification</td>
<td>6,118Ha</td>
<td>6,118Ha</td>
</tr>
<tr>
<td>Percentage of the shire with a high-risk (acid sulfate soil) classification</td>
<td>10.5%</td>
<td>10.5%</td>
</tr>
</tbody>
</table>

Source: Tweed Shire Council_Floodplain Officer

*Note: While the area of land with high / medium / low risk classifications for acid sulfate soils has remained static over a number of years, increases in the number of construction works on the coastal floodplain has increased the potential for environmental impacts due to acid sulfate soils.*

**Indicator: Acid Sulfate Soil Hotspots**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cudgen Creek</td>
<td>799 Ha</td>
</tr>
<tr>
<td>Dulguigan</td>
<td>681 Ha</td>
</tr>
<tr>
<td>McLeods Creek – Main Trust Canal</td>
<td>2137 Ha</td>
</tr>
</tbody>
</table>

Source: Department of Natural Resources
**Indicator: Additional High Risk Acid Sulfate Soil Areas**

<table>
<thead>
<tr>
<th>Area</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Murwillumbah – Blacks Drain</td>
<td>--</td>
</tr>
<tr>
<td>Murwillumbah – Lavender Swamp</td>
<td>--</td>
</tr>
<tr>
<td>Tygalgah</td>
<td>--</td>
</tr>
</tbody>
</table>

Source: Tweed Shire Council_Natural Resource Management

**Indicator: Contaminated Land**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of sites on EPA register of contaminated land*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002/03</td>
<td>194</td>
</tr>
<tr>
<td>2008/09</td>
<td>194</td>
</tr>
<tr>
<td>2009/10</td>
<td>194</td>
</tr>
</tbody>
</table>

Source: NSW EPA_Contaminated Land Register

**Additional Indicators**

Changing Land Uses: Refer to the [Built Environment](#) section of this report.

**RESPONSE**

Each response seeks to address one or more identified pressure. Responses are listed in order from newest to oldest. This format gives regular readers of the SoE Report easy access to the most recent initiatives, while allowing infrequent readers to view a catalogued history of responses.

Icons at the end of each response represent the pressure being targeted.

**ARC Acid Sulfate Soil Research Project**

*Responsibility: NRM Unit - Sustainable Agriculture Program*

*Status: 2011 - 2014*

The University of NSW - in conjunction with the NSW Canegrowers Association, NSW Sugar Mill Cooperative and Council - is working with landholders in the Blacks Drain, Christies Creek and Reserve Creek catchments to mitigate acid sulfate soil impacts, following on from the success of a previous Australian Research Council research project.

A long-term monitoring program (pre and post remediation) will quantify the benefit of on-ground remediation works. Refer to the Blacks Drain remodeling project below for remediation methods.

**Composting Trials**

*Responsibility: NRM Unit - Sustainable Agriculture Program*

*Status: Completed*

In 2011, local landholders had access to up to 20 tonnes of compost and/or manure to demonstrate the benefits of traditional fertilisers to enhance soil carbon, nutrient cycles and soil biota. This enhances long-term soil health and crop yields. The project was originally intended to supply up to 20 landholders with compost but a high level of interest meant 35 landholders received assistance.

Funding was provided from the Australian Government Caring for our Country Program and the NSW Environmental Trust through Northern Rivers Food Links. The program was delivered by Council in partnership with Tweed Landcare.

Landholder interest demonstrated a willingness to use compost for agricultural production but very little is produced locally. The trial project showed transport is the biggest cost associated with the use of compost, with Lismore and Toowoomba the closest producers. Without a local supply, the status quo will remain.
Sustainable Agriculture Strategy

Responsibility: NRM Unit - Sustainable Agriculture Program  
Status: New

In 2011, Council started developing a Sustainable Agriculture Strategy to guide delivery of its Sustainable Agriculture Program and respond to key objectives within the Community Strategic Plan. Visit [www.tweed.nsw.gov.au/agriculture](http://www.tweed.nsw.gov.au/agriculture) to view the status of the strategy.

Sustainable Agriculture Program

Responsibility: NRM Unit - Sustainable Agriculture Program  
Status: Ongoing

In 2009, Council expanded its Floodplain Program to include all agricultural landscapes. It created a Sustainable Agriculture Program to build the environmental capacity of agricultural landholders to enhance the social, economic and ecological values of farmland in Tweed Shire. The Sustainable Agriculture Program is managed by the Sustainable Agriculture Program Leader in Council’s Natural Resource Management Unit (NRM). Expanding the scope of the former Floodplain Program is expected to achieve a more holistic approach to agricultural land-use management in the Tweed.

Blacks Drain Remodelling

Responsibility: NRM Unit - Sustainable Agriculture Program  
Status: Due for completion 2011

In 2008, Council obtained a $100,000 Urban Sustainability Grant from the NSW Environmental Trust to reduce acid sulphate-related pollutant export, such as iron, aluminium, sulphuric acid, from Blacks Drain, a well known acid sulfate soil hotspot in South Murwillumbah. Works include reducing drain depth and increasing drain width to retain drainage capacity without disturbing the acid sulfate soil layer. These works will prevent further oxidation and transport of sulfidic materials to local waterways.

Bray Park Wetland Rehabilitation

Responsibility: NRM Unit - Sustainable Agriculture Program  
Status: Due for completion 2011

In 2008, Council obtained a $200,000 Urban Sustainability Grant from the NSW Environmental Trust to improve the biodiversity values of the Bray Park Wetland by:

- Weed removal and revegetation.
- Improved public access to the adjacent parkland.
- Interpretive signs to educate the community about the important function the wetland plays in habitat for biodiversity.

Floodgate Modifications

Responsibility: NRM Unit - Sustainable Agriculture Program  
Status: Completed

In November 2008, the NRM unit completed a two-year $180,000 rehabilitation project partially funded ($100,000) by the Australian Government Environmental Trust. Ten traditional one-way valve floodgates were retrofitted to create environmentally-friendly tidal floodgates.
This project took the number of modified floodgates in Tweed Shire to 28, not including winch-operated gates. The new tidal floodgates have brought several environmental and economic benefits on the Tweed floodplain, including:

- Restoring water quality in degraded creeks and drains while retaining farm profitability.
- Improved passage for aquatic organisms and improved habitat.
- Restored connectivity between the river and creeks/drains that feed into the floodplain.
- Reduced growth of aquatic weeds and the consequent need to spray.
- Tidal, regular dilution and neutralisation of acidity and other acid sulfate soil-related pollutants in creeks and drains, to minimise damage to the river.
- Adoption and dissemination of best-management practices by Tweed cane growers.

This floodplain initiative and other projects were made possible through the ever-growing interest and collaboration of canefarmers and other floodplain landholders. There is now a high level of water quality awareness and waterway management on the Tweed Shire floodplain. Landholders are increasingly aware of the benefits of restoring a more natural character to drainage channels.

In 2000, Council partnered with State government agencies to begin a program to improve tidal flow and fish passage by modifying floodgates in drains and creeks on the floodplain. Refer to the Response Indicators for details on how many floodgates have been modified.

**Vegetative Filter Strips**

*Responsibility: NRM Unit - Sustainable Agriculture Program*

*Status: Ongoing*

In 2007, Council partnered with State government agencies and local landholders to start a program to plant vegetative filter strips (Lomandra, couch grass and native trees) along a number of floodplain waterways, reducing the impacts of acid sulphate soil runoff, erosion and sedimentation. Locations include Johnsons Creek at Condong, Blacks Drain in South Murwillumbah, McLeods Creek in Duranbah, Leddays Creek at Tumbulgum and Mooball Creek at Wooyung.

The initiative was rebadged as ‘green banks’ in 2009 and allocated a two-year budget from external funding. Refer to Response Indicators for length of drains planted to date.

**Greenhouse Gas Monitoring Study**

*Responsibility: NRM Unit - Sustainable Agriculture Program*

*Status: Ongoing*

In 2006, Council co-hosted a research project by the Australian National University to compare greenhouse gas emissions from acid sulfate soils (ASS) and non-acid sulfate soils in cane paddocks. Preliminary results indicate emissions of CO\(_2\) from ASS are at the top of the range for agricultural soils, emissions of N\(_2\)O from N-fertilised soils are much higher than expected from agricultural soils and ASS are sources of atmospheric CH\(_4\). When very wet, their emissions are comparable to rice fields and wetlands.

The next stage of study was intended to reveal how representative these figures are for the industry. However, that round of studies did not proceed as planned.

Contact Council’s Sustainable Agriculture Program Leader for an update on the study.
ARC Linkage Project: Reducing export of ASS products

Responsibility: NRM Unit - Sustainable Agriculture Program
Status: completed in 2008

Between 2005 and 2008, Council co-hosted a research project by the Australian Research Council primarily aimed at developing innovative, scientifically-sound, practicable, floodplain management techniques to reduce the impacts of acid sulfate soils drainage products on estuary and coastal water quality.

The study indicated:
- There was no evidence of extensive saline intrusion into cane as a result of tidal flushing.
- Tidal flushing helps maintain higher groundwater levels next to the drain and, therefore, result in lower aluminium and iron concentrations.
- The upper catchment is the main source of contaminants discharged from Black’s Drain.

Remedial work was recommended to focus on certain localised drains in the upper catchment and this began in 2008. It is due for completion in 2011, as part of a project funded by the NSW Environmental Trust.

Regional Floodplain Network

Responsibility: NRM Unit - Sustainable Agriculture Program
Status: Ongoing

The Regional Floodplain Network was established in 2005 to support collaborative on-ground work and research projects that enhance sustainable and innovative farming practices and encourage best management of critical coastal environments substantially affected by acid sulfate soils.

The network comprises a variety of organisations, government agencies and individuals engaged in the delivery of coastal floodplain natural resource management from Taree to the Tweed.

Cane Farming Best Practice Guidelines

Responsibility: NSW Sugar Milling Cooperative
Status: Ongoing

In 2005, the NSW Department of Environment, Climate Change and Water and the NSW Sugar Milling Cooperative developed a set of leading practice guidelines for cane farming in acid sulfate soil areas. Visit [www.nswsugar.com.au](http://www.nswsugar.com.au) to view the guidelines.

In-Filling of Cane Drains

Responsibility: NRM Unit - Sustainable Agriculture Program
Status: Ongoing

Council partnered with State government agencies and local landholders in 2005 to start a drain infilling program and associated levelling of cane land across Tweed Shire. The project sought to improve cane-land production and downstream water quality by improving management of acid sulphate soils. Works have occurred at Eviron, Bray Park, Christies Creek, Murwillumbah, Kynnumboon, Tygalgah and Chinderah.
Farmland Protection Project
Responsibility: NRCMA / TSC Planning and Regulation Division
Status: Ongoing
In 2004, the Northern Rivers Catchment Management Authority (NRCMA), with participation from Council, sought to protect important farmland from urban and rural residential development by mapping farmland and developing planning principles. For more information on the status of this initiative, contact Council’s Planning and Regulation Division.

Acid Sulfate Soil Management Plan for Minor Works
Responsibility: NRM Unit - Sustainable Agriculture Program
Status: Ongoing
In 2000, Council introduced a management plan to reduce the impact of acid sulfate soils disturbed by minor construction activities. This management plan has helped raise community awareness of acid sulfate soil issues and management responses.

Development Approvals
Responsibility: Planning and Regulation Division
Status: Ongoing
In 2000, Council introduced a requirement for development approval for any works which might disturb potential acid sulfate soils. The requirement has helped to raise community awareness of acid sulfate soil issues and management responses.

Acid Sulfate Soil Mapping
Responsibility: NRM Unit - Sustainable Agriculture Program
Status: Completed in 1999
In 1999, Council completed a mapping project to identify the likely occurrence of acid sulfate soils in Tweed Shire. This information is now contained in Council’s Geographic Information System and is used to inform land use planning and development approval processes.

Contaminated Land Policy
Responsibility: Environment and Health Unit
Status: Ongoing
Council resolved in 1999 to manage contamination in Tweed Shire by formally adopting a policy on contaminated lands.
Supporting services and instruments include contaminated land assessments and a requirement for pre-demolition testing for soil beneath concrete slabs to determine whether soil contamination from insecticides (i.e. termite control) is present.
Targeted Pressures: Contaminated Land
Response Indicators

<table>
<thead>
<tr>
<th>Floodplain Management</th>
<th>Length of cane drains in-filled (km)</th>
<th>Number of floodgates modified</th>
<th>Length of cane drains planted with vegetative filter strip (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 to 2005</td>
<td>-</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>2005/06</td>
<td>-</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>2006/07</td>
<td>12.8</td>
<td>14</td>
<td>3.9</td>
</tr>
<tr>
<td>2007/08</td>
<td>17.5</td>
<td>6</td>
<td>6.1</td>
</tr>
<tr>
<td>2008/09</td>
<td>3.5</td>
<td>2</td>
<td>3.0</td>
</tr>
<tr>
<td>2009/10</td>
<td>4.0</td>
<td>0</td>
<td>15.0</td>
</tr>
<tr>
<td>2010/11</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Total</td>
<td>37.8</td>
<td>39</td>
<td>28.0</td>
</tr>
</tbody>
</table>

Source: Tweed Shire Council NRM Unit

Related Issues

- Built Environment
- Waterway Health
- Bushland and Biodiversity
- Environmental Education and Capacity Building
- Atmosphere
Small crop farming at Cudgen.
ATMOSPHERE
## ATMOSPHERE

### CONDITION

**At a Glance**

- Australia has the highest per capita level of greenhouse gas emissions in the developed world (28 tonnes of carbon dioxide (CO₂) per person)
- The average household produces about eight tonnes of CO₂ per year from direct energy use (e.g. electricity)
- In 1994–95, 53 per cent of energy consumed in Australia was due to household consumption. This comprised energy used within households (direct from the meter) and energy used through the household consumption and manufacturing of domestically produced goods and services
- Between 1983/84 and 2003/04, energy use in the residential sector grew by 52 per cent or an average of 2.2 per cent per year.
- Fossil fuels (coal, natural gas, oil) are used to generate approximately 92 per cent of electricity in Australia.
- Eight per cent of electricity is available from renewable sources such as wind turbines and hydro-electricity plants. Consumers can purchase electricity from renewable sources through the Green Power Scheme.
- Despite being one of the cleanest sources of energy, solar energy was used in less than five per cent of Australian households in 2005. (ABS, 2004)
- Solar power generation and solar hot water is gaining popularity in Tweed Shire, demonstrated by the number of successful rebate applications and systems on rooftops.

### PRESSURE

**At a Glance**

<table>
<thead>
<tr>
<th>Climate change pressures</th>
<th>Icon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population increase and economic growth, which leads to:</td>
<td>![Climate Change Icon]</td>
</tr>
<tr>
<td>- Increased demand for electricity and other energy sources and, therefore, more ‘end-point’ and ‘embodied’ greenhouse gas emissions</td>
<td>![Climate Change Icon]</td>
</tr>
<tr>
<td>- Increased vehicle numbers and fossil fuel consumption, creating greater ‘endpoint’ greenhouse gas emissions</td>
<td>![Climate Change Icon]</td>
</tr>
<tr>
<td>Identifying, responding and adapting to climate change risks</td>
<td>![Climate Change Icon]</td>
</tr>
</tbody>
</table>
Climate Change Pressure Indicators

### Indicator: Direct Emissions from Fuel and Electricity Use

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tweed Shire population</td>
<td>66,534</td>
<td>73,821</td>
</tr>
</tbody>
</table>

*Total end-point emissions for Tweed Shire (tonnes CO\textsubscript{2}e)*

561,264 768,161

Source: TSC 2003

### Indicator: Residential Energy Consumption

<table>
<thead>
<tr>
<th></th>
<th>1983/84</th>
<th>1993/94</th>
<th>2003/04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual per capita energy use in Australia (Gigajoules)</td>
<td>17.7</td>
<td>19.3</td>
<td>20.9</td>
</tr>
</tbody>
</table>

Source: ABS 2004

### Indicator: Use Of Energy In The Household By Purpose And Related Greenhouse Gas Emissions – 2005

<table>
<thead>
<tr>
<th></th>
<th>Energy use %</th>
<th>Emissions %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appliances(a)</td>
<td>30</td>
<td>53</td>
</tr>
<tr>
<td>Heating water</td>
<td>27</td>
<td>28</td>
</tr>
<tr>
<td>Cooking</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Heating and cooling</td>
<td>39</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>


Additional Indicators

- Built Environment
- Waste Management
- Transport

**RESPONSE**

**CLIMATE CHANGE MITIGATION**

**Council Operations**

Since joining the Cities for Climate Protection Program as a pilot council in 1997 (detailed below), Council has undertaken numerous initiatives to reduce its carbon footprint including:

- Energy efficiency retrofits of existing facilities.
- Adoption of design guidelines in new Council facilities.
- Fuel efficiency measures in the vehicle fleet.
- Methane harvesting from the Stotts Creek Resource Recovery Centre.

Refer to Council Operations for details of these emission reduction initiatives and the volume of greenhouse gas reduction.

**Community**

Council has undertaken a range of initiatives to promote the reduction of household carbon footprints including:

- Sustainable Households Pilot Project.
- Household energy and water retrofit program.
- Promotion of government rebates.
- Cycleway and footpath infrastructure.
Refer to [Community Capacity Building](#) for details of community emission reduction initiatives implemented by Council.

**Regional Collaborations**

Since 2006, Council has been party to a number of regional collaborations for environmental education, energy and greenhouse gas management and floodplain management. The Clarence Valley, Richmond, Ballina, Byron, Lismore and Kyogle councils have also participated. Outcomes include establishing a Northern Rivers Carpool and the regional streetlight energy efficiency upgrade.

**Emissions Reduction Target**

In 2003, Council set targets for Council emission reductions:

- Council operations - 20 per cent below 1996 levels by 2010.
- Community emissions - 20 per cent below 1996 per capita levels by 2010.

These targets will need to be reviewed after 2010 to chart progress and establish a new goal of greenhouse gas reduction for Tweed Shire.

**Cities for Climate Protection (CCP) Program**

In 1997, Council joined the Cities for Climate Protection (**CCP**) Program, an international initiative to help local governments reduce greenhouse gas emissions in their areas. Progress through the CCP includes:

- **Milestone 1**
  Council completed a greenhouse gas audit for Council and community sectors in 1999.

- **Milestone 2**
  In 2003, Council established an emissions reduction target for the shire (see above).

- **Milestone 3**
  In 2003, Council adopted a [Local Action Plan for Greenhouse Gas Reduction](#) which identifies a range of initiatives to achieve reduction targets.

- **Milestone 4**
  In 2003, Council implemented a range of Local Action Plan initiatives and quantified the abatement achieved.

- **Milestone 5**
  In 2005, Council completed a re-inventory and quantification of all actions implemented to date.

**CCP+**

In 2005, Council joined CCP Plus, an extension program for councils who completed the milestone framework of CCP. Council joined this phase of the program to demonstrate its ongoing commitment to climate change mitigation and adaptation.

**CLIMATE CHANGE ADAPTATION**

**Climate Change Adaptation Report**

The Tweed and Byron councils undertook a climate change risk management process in 2009 to identify and prioritise climate change risks to council operations. The resulting report, funded through the Federal Government Department of Climate Change, will provide a foundation for more work in this area.
Coastline Management

Sea levels rose by a global average of 17cm in the 20th century and expected to continue to rise. There is strong national and international evidence supporting projections of sea level rises of up to 40cm by 2050 and 90cm by 2100 on the NSW coastline.

Coastal land has been subject to natural coastal hazards for thousands of years, including erosion and flooding. Projected sea level rises will increase these hazards and NSW needs to plan now for these long-term impacts to minimise social and economic disruption.

To support sea level rise adaptation, the NSW Government has prepared a Draft Sea Level Rise Policy Statement. This sets out the Government's approach to sea level rise, the risks to property owners from coastal processes and assistance government provides to councils to reduce the risks of coastal hazards.

The draft policy statement includes sea level planning benchmarks developed to support consistent consideration of sea level rises in land-use planning and coastal investment decision-making. The adopted benchmarks are for rises of 40 cm by 2050 and 90 cm by 2100, relative to 1990 mean sea levels. These benchmarks represent the Government's guidance on sea level rise projections for use in decision making and are not regulatory standards.


For up-to-date information on Council’s response to Coastline Hazard Management and the NSW Government’s Draft Sea Level Rise Policy Statement, contact the NRM Unit on (02) 6670 2400.

Floodplain Management

Since 1987, a sea level of 2.65m AHD (Australian Height Datum) has been used for flood modelling in Tweed Shire. This level is around 0.4m higher than the sea level adopted by adjoining councils.

The extra 0.4m was adopted for reasons other than climate change – such as overestimation of storm surge - but it gives Tweed flood modelling a built-in allowance for sea level rise caused by climate change.

In October 2008, the NSW Department of Environment and Climate Change issued guidelines for incorporating climate change variables into flood studies. The guideline recommends modelling variables into flood studies to examine the impacts of climate change. Variables for sea level rise:

- 0.18m (Low-level ocean impacts).
- 0.55m (Mid-tange ocean impacts).
- 0.91m (High-level ocean impacts).

Variables for increased rainfall intensity:

- 10 per cent in peak rainfall and storm volume.
- 20 per cent in peak rainfall and storm volume.
- 30 per cent in peak rainfall and storm volume.

The modelling analyses informs the Floodplain Risk Management Study process by identifying areas susceptible to increased flood levels and risk caused by climate change.

The Floodplain Risk Management Study will then formulate responses to this increased risk, which could include:

- Revised flood planning levels such as floor heights and fill heights, building additional floodways and levees.
Accepting increased frequency of inundation, loss of residential freeboard and increased flood damage.

Council resolved in 2008 to:

- Incorporate climate change variables into a revised 2005 Tweed Valley Flood Study.
- Incorporate the results of this modelling into the Tweed Valley Floodplain Risk Management Study and Plan.
- Address climate change variables in the Coastal Creeks Flood Study.

For up-to-date information on floodplain management in response to climate change impacts and DECC guidelines, contact Council's Engineering and Operations Division on (02) 6670 2400.

**Related Topics**

Human Settlement
- Built Environment
- Catchment Management
- Council Operations
Environmental Management System

In 2002, Council started integrating an Environmental Management System into its existing Occupational Health and Safety System, to ‘make environmental stewardship an integral part of Council operations’.

Council strives to achieve this objective through:

- Policies and procedure.
- Staff training and inductions.
- Risk assessments. Incident and accident reporting.
- Site specific management plans.
- Project management plans.
- Workplace auditing.
- A commitment to continual improvement.

These components are collectively known as the Tweed Shire Council Health, Safety and Environmental Management System.

Sustainability Gap Analysis

In 2010, Council undertook a sustainability gap analysis of its operational activities to identify and prioritise areas of improvement. These recommendations are being progressively implemented through Council’s corporate management team.

POLICIES AND PROCEDURES

Workplace Environmental Safety Protocol

Council’s Executive Management Team adopted a new Workplace Environmental Safety Protocol in 2008. The protocol identifies resource efficiency, pollution minimisation, greenhouse gas reduction, sustainable purchasing, training and continuous improvement as goals to reduce the environmental footprint of Council operations.

Environmental Design Guidelines for New Council Facilities

In 2008, Council’s Executive Management Team adopted a set of environmental design guidelines to ensure new council buildings, and renovations to existing buildings, have improved environmental performance. Particular attention is given to passive solar design, alternative power supply options, solar hot water, glazing, lighting, cooling, landscaping and innovative design features.

Energy and Water Monitoring

Council began a subscription service in 2007 to track energy and water consumption for all its sites and facilities. The service includes threshold triggers to identify anomalies in consumption so they are further investigated. Council aims to reduce resource consumption and greenhouse gas generation through improved asset management and accountability.

Staff Training and Inductions

In 2005, a process was established to inform new staff members of their roles and responsibilities in relation to environmental management. The induction covers key policies and
procedures, risk assessments, incident/accident reporting and a range of practical actions to reduce the environmental impact of their workplace activities.

**Local Government Award Winner**

The OMS won the management improvement category in the 2004 local government awards for integrating environmental safety into the occupational health and safety framework.

**Standard Operating Procedures**

In 2003, environmental hazard controls were incorporated into standard operating procedures to reduce the risk of environmental harm from operational activities. This approach laid a solid foundation for environmental safety throughout all levels of the organisation.

**Risk Assessment and Incident and Accident Reporting**

In 2003, environmental risk assessments and incident/accident reporting became standard procedure for operational activities.

**Improved Framework for Environmental Safety**

Council used its Health Safety and Environmental Management System to establish a sound basis for ongoing improvements to its day-to-day operations, specifically for waste management, green procurement, energy and water efficiency, greenhouse gas reduction, pollution minimisation and biodiversity conservation.

**ENERGY MANAGEMENT**

**Streetlight Network - Energy Efficiency Upgrade**

In 2011, Essential Energy (formerly Country Energy) finished upgrading Tweed Shire’s streetlight network, replacing mercury vapour lighting with fluorescent lighting. The energy-efficient measures, which cost $293,000, will save $273,000 in electricity costs each year and reduce annual greenhouse gas emissions by approximately 1014 tonnes of carbon dioxide. This equates to a 35-40 per cent reduction in the carbon footprint of the streetlight network and a three to five per cent reduction in Council’s total carbon footprint.

**Solar Power for Community Halls**

As part the Tweed Shire Solar Community Program, Council received 20 two-kilowatt solar photovoltaic systems in 2010. They were installed on Council-owned, community-managed facilities such as halls, pre-schools and sporting clubhouses. Through the program, the association managing each facility can reduce its electricity bill while showcasing solar technology for their community.

**Power Factor Correction**

Council installed a power factor correction system in the Murwillumbah Civic Centre in 2009. Initial results indicate the system has achieved an eight per cent reduction in total annual energy consumption. Investigations are planned for other facilities that might benefit from power factor correction.
**Solar Streetlights**
Council installed 14 solar streetlights at bus shelters along the Tweed Coast in 2010.

The year before, Council installed a solar streetlight at the Cudgen boat ramp and another at the Tweed Heads South skate park.

In 2008, Council installed a solar streetlight at the Murwillumbah Civic Centre and another at the Cudgen Creek footbridge in Kingscliff.

**Solar Heating for Pools**
Solar pool heating was installed at the Kingscliff and South Tweed pools in 2008, which is expected to deliver significant energy savings and greenhouse gas reductions. These savings are yet to be quantified.

**Streetlight Trials**
In 2008, Council and Country Energy began a small-scale trial of energy efficient streetlights in Murwillumbah. Two varieties of energy efficient lights were trialled to determine which is most suitable for wider applications. The trial helped inform a regional upgrade program which started in 2011.

**Office Air Conditioning System**
A rationalisation of air conditioning system began in 2008, with the installation of a variable speed drive and adjustments to the hours of operation. Both these measures contributed to power savings of approximately 40,000 kilowatt hours (kWh) per year and greenhouse gas savings of approximately 40 tonnes of CO₂ per year.

**Server Virtualisation**
Council started a process known as server virtualisation in 2008. The number of physical servers for the computer network was reduced by sourcing services from the virtual environment. Less physical servers mean less energy consumption to power the servers but, more significantly, it means less energy consumption to keep the server room cool. Total energy savings and greenhouse gas abatement is yet to be calculated.

**Workshop Lighting**
In 2008, a process was established to improve the energy efficiency of workshop 'high bay' lights. When the existing 400-watt mercury vapour lights (MVL) expire, they are replaced with 85-watt compact fluorescent lights. Any new high bay installations are also fitted with the 85-watt compact fluorescent lights (CFL).

**Office Meeting Rooms**
In 2008, fluorescent lights in the meeting rooms and council chambers at the Murwillumbah Administration Centre were replaced with lights that are 30 per cent more efficient while delivering the same light output. This measure achieved power savings of approximately 3,000kWh per year and annual greenhouse gas savings of approximately three tonnes of CO₂.
Staff Workstations
A transition to more energy-efficient computers for staff workstations was completed in 2009, reducing power consumption by approximately 25,000 kWh per year and achieving greenhouse gas savings of approximately 25 tonnes of CO$_2$ per year.

Outdoor Lighting
In 2007, Council began a process to progressively improve the energy efficiency of outdoor lighting in council reserves, such as bollard lighting along the coastal foreshore. When the existing MVL expire, they are replaced with CFL. Fifty-watt MVL are replaced with 14-watt CFL, 80-watt MVL are replaced with 25-watt CFL, 125-watt MVL are replaced with 40-watt CFL and 160-watt MVL are replaced with 40-watt CFL.

Office Printers
In 2007, Council began rationalising the number of office printers, faxes and photocopiers in the Murwillumbah Administration Centre by using multi-function devices. Work units can use a single machine for printing, photocopying and facsimile, reducing electronic waste generation and improving energy efficiency by having a single machine running instead of three.

Energy Savings Action Plan
Council developed an Energy Savings Action Plan (ESAP) in 2005 to manage operational energy consumption and associated energy efficiency initiatives. Implementation of the ESAP is ongoing and includes energy efficiency initiatives listed above.

Staff Workstations
In 2004, the energy efficiency of computer monitors in staff workstations was improved by 200 per cent by replacing cathode ray tube (CRT) monitors with liquid crystal display (LCD) monitors. This achieved annual electricity savings of more than 24,000 kWh and annual greenhouse gas savings of nearly 25 tonnes of CO$_2$.

Office Lighting Retrofit
In 2001, lighting efficiency at the Murwillumbah Administration Centre was improved by more than 50 per cent through removing lamps and replacing them with energy-efficient tubes. This resulted in annual electricity savings of more than 50,000 kWh and annual greenhouse gas savings of close to 50 tonnes of CO$_2$.

Revolving Energy Fund
In 2000, Council established a process to set aside monetary savings achieved through energy efficiency initiatives, to help fund future energy-efficiency measures. Most of Council’s energy-efficiency retrofits are implemented through this fund.
WATER MANAGEMENT

Rainwater Tanks
In 2005, Council started installing rainwater tanks on public facilities and community infrastructure, on a case-by-case basis.

Three years later, Council developed a set of design guidelines for new Council facilities, recommending rainwater tanks on all new constructions. This includes rainwater tanks on Council's Sustainable Living Centre and the Mechanical and Electrical Depot at Chinderah.

Waterless Urinals
Council started installing waterless urinals in public toilets and community facilities in 2003.

In 2008, Council developed a set of design guidelines for new Council facilities, recommending waterless urinals on all new constructions. This includes the public toilets at Casuarina and Uki, and the community centres at South Tweed Heads and Chillingham.

It is important to note the installation of waterless urinals requires water input upstream of these fixtures, to flush scale build-up in the buildings’ waste-water plumbing. This is commonly achieved by installing hand basins, toilets and showers upstream of the waterless urinals.

Recycled Water
Refer to the Waste Water Management for details of recycled water initiatives.

Water Efficient Beach Showers
All beach showers in Tweed Shire have been three-star water efficient since 2001, using less than nine litres per minute. Beach showers are also 'press button' activated, automatically turning off after approximately 10 seconds.

Irrigation Practices
Since 2000, irrigation practices in parks and gardens have been progressively improved in a number of ways including:

- Timing irrigation to occur predominantly in the evening, to reduce evaporation loss.
- Active monitoring of grass growth and weather conditions to minimise water use.
- Increased use of low-water-use plants and grass species.
- Investigating alternative supplies of water for irrigation purposes, such as recycled water.

WASTE MANAGEMENT AND GREEN PROCUREMENT

Tweed Link
Since July 2009, Council’s weekly community newsletter, the Tweed Link, has been printed on 100 per cent post consumer recycled paper. More than 38,000 copies of the Tweed Link is distributed to residents each week, so the shift to recycled paper has significantly reduced the environmental impact of Council’s paper usage. Benefits of using recycled paper include:

- **Energy savings** - Producing paper from recovered fibre uses about 50 per cent less energy than manufacturing paper from raw pulp.
- **Water conservation** - Producing paper from recovered fibre uses up to 60 per cent less water than manufacturing paper from raw pulp.
- **Bushland conservation** - Buying paper with a recycled content saves trees and helps reduce land degradation.
- **Diversion of materials from landfill** - Buying recycled products closes the loop on recycling and ensures valuable resources are not sent to landfill.

**Paper Savings**

In 2008, Council’s Executive Management Team endorsed a proposal to reduce the environmental impact of administration activities by:

- Purchasing office paper made from 50 per cent recycled stock and 50 per cent plantation stock.
- Making double-sided printed the default print function throughout the organisation.

These actions helped reduce Council’s office paper consumption by approximately 40 per cent, while greatly reducing the environmental impact of administration activities.

**Recycled Plastic Products**

In 2007, Council’s Asset Management Section developed a standard procurement list that includes park benches, picnic settings, bollards and boardwalk planks made from recycled plastic. The use of recycled plastic reduces maintenance costs, particularly in coastal environments, while demonstrating community leadership in green purchasing.

**Office Waste Minimisation / Green Procurement**

In 2006, Council’s Executive Management Team adopted an Office Waste Minimisation Protocol to reduce the environmental impact of administration activities. The protocol identifies all the waste streams in the office environment and nominates a range of sustainable purchasing and waste management actions to reduce the environmental footprint of administration activities.

**Toner Cartridge Recycling**

Toner cartridge recycling was established in the Murwillumbah Administration Centre in 2003. The system has since been expanded to all office facilities, including the Banora Point laboratory, Tweed office and Murwillumbah works depot.

A small amount of revenue is generated, approximately $300 per year, through the recycling program and this is donated to Landcare Australia as part of the Cartridges for Planet Ark Campaign.

In 2009, toner cartridge recycling was suspended to allow for investigations into suitable OHS procedures concerning spilt toner dust.

**Landfill Gas Management**

A methane gas extraction system was constructed at Stotts Creek Resource Recovery Centre in 2003. The system captures methane produced by rotting vegetative matter buried in the landfill (e.g. food scraps) and uses it to generate electricity. Four hundred kilowatts is supplied into the national electricity grid every hour, which is enough to power about 300 homes.

More significantly for the environment, it prevents methane emissions to the atmosphere. As a greenhouse gas, methane is 24 times more harmful than CO₂ and capturing it for electricity production...
generation prevents an average of 10,000 tonnes of CO\textsubscript{2} (equivalent) from entering the atmosphere each year. This is equivalent to taking 2000 cars off the road.

A total of 2051763m\textsuperscript{3} in landfill gas was combusted in 2008/09. On average, methane comprises around 53 per cent of landfill gas, which indicates around 108743439m\textsuperscript{3} of methane is combusted annually.

**Paper Recycling**

Paper recycling was established in the Murwillumbah Administration Centre in 1996. Work to reduce the environmental impact of paper consumption has been ongoing since then, focussing on technology and behaviour change.

**Lunch Room Recycling**

Recycling bins have been provided in Council’s tea rooms and staff lunch room since 2005. The bins collect co-mingled recyclables generated from staff lunches and tea breaks, such as milk bottles and drink cans, to help demonstrate Council’s commitment to resource recovery.

**Metal Recycling**

In 2006, metal recycling bins were set up at the Murwillumbah Works Depot to collect copper, brass, steel and other metals. When full, the bins are collected by a local waste contractor. Staff are required to return recyclable materials to the depot when working off-site.

**BIODIVERSITY CONSERVATION**

**Perch Creek Bridge Replacement**

The wooden bridge over Perch Creek, west of Uki, was replaced with a concrete bridge in 2009. A number of controls were implemented to minimise the environmental impact of construction activities, with a particular emphasis on mitigating the impacts on:

- Insectivorous bats that roost under the wooden bridge.
- The threatened giant barred frog in the stream habitat.
- Endangered vegetation next the worksite.


**Roadside Vegetation Management**

In 2007, Council resolved to work with the National Parks and Wildlife Service to identify rare and endangered tree species within road reserves, to ensure normal road activities do not cause undue damage to these species.

Under the *Roads Act 1993*, Council is responsible for maintaining the local road network. This includes controlling roadside vegetation, to provide adequate site distances for the safe movement of vehicles and pedestrians. However, in many parts of Tweed Shire, the road reserve contains important remnants of native vegetation.
Effective roadside vegetation management aims to maintain adequate site distances along roadsides without causing unnecessary damage to native vegetation. Council strives to achieve this goal through:

- Appropriate procedures.
- Staff training.
- Communication with local communities.
- A commitment to continual improvement.

**Roadside Vegetation Management ‘Wick Wipe’ Trial**

Between 2000 and 2002, Council conducted a trial project to improve the management of roadside vegetation. The trial assessed the cost and performance effectiveness of a ‘wick wipe’ process, compared to traditional method of slashing the roadsides using tractors.

Wick wiping reduces the quantity of taller undesirable vegetation species and encourages the growth of shorter ground-cover species that do not require the same level of maintenance (i.e. not as much slashing is required).

While the cost effectiveness of the wick wipe process was not proven, Council learnt some valuable lessons in roadside vegetation management that contributed to improvements in management practices and procedures.

**Project Management Plans**

In 1995, Council established a Project Management Plan (PMP) process to collate documents held by the project overseer, containing all information relevant to the site and activity to be undertaken. This includes:

- Planning assessment documents and consent/approval conditions.
- Relevant management plans including environmental management requirements.
- Relevant Standard Operating Procedures and Work Method Statements.

Through the PMP process, Council can identify, prioritise and manage environmental impacts associated with its construction activities.

**FLEET MANAGEMENT**

**Bicycle Fleet**

Council introduced a bicycle fleet into its operations in 2008 to:

- Reduce greenhouse gas emissions.
- Provide leadership to the community.
- Demonstrate the benefits of bikes for corporate travel.
- Increase staff opportunities for healthy active transport.

Fourteen bicycles are available for use at various locations including depots, offices and waste water treatment plants.

Refer below for staff participation rates.
Passenger Vehicle Fleet

In 2006, Council amended its lease-back agreement for passenger vehicles to encourage vehicle downsizing to smaller, more fuel-efficient cars. Small and mid-sized vehicle options were improved and cheaper lease fees were established for these cars, compared to the traditional ‘company car’.

This initiative has been very successful, with more than 90 per cent of staff with lease-back vehicles choosing to downsize their vehicle.

In 2009, an internal report was submitted to Council highlighting key outcomes of the initiative, including 97,000 litres of fuel savings and greenhouse gas reductions of 120 tonnes of CO$_2$.

Executive Management Vehicles

In 2007, Council’s executive staff traded their luxury six-cylinder vehicles for more fuel-efficient cars, to lead by example and encourage staff with lease-back vehicles to choose smaller, more fuel-efficient cars.

Diesel Vehicles

In 2006, Council listed diesel-powered passenger vehicles as an option for lease-back passenger vehicles, to reduce fuel consumption and associated greenhouse gas emissions.

Hybrid Vehicles

Since 2005, Council has strived to introduce hybrid-fuel vehicles to its lease-back fleet.

Contracts and Tenders

Council regularly seeks tenders for services including:

- Civil works design and project management.
- Product supply (as a preferred supplier).
- Site works and site restoration.
- Manufacture, supply and delivery of specific goods and services.

Council has sought to improve the environmental outcomes associated with contracts and tenders by implementing:

- General environmental protection controls included in tender specifications.
- A requirement for submission of Environmental Management Plans for works in or near environmentally sensitive areas.
- The inclusion of development application conditions for tender specifications, to allow tenderers to familiarise themselves with the conditions of consent.
- A requirement for tender evaluations to consider the environmental ‘track record’ of a company.

Environmental Design Guidelines for Council Facilities

Refer to Policies and Procedures.


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Website Acknowledgements

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