



KIAMA
MUNICIPAL
COUNCIL

State of the
Environment
Report 2012-16

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CHAPTER 1: STATE OF THE ENVIRONMENT

This State of the Environment (SoE) report is for the period from 1 July 2012 to 30 June 2016. The broad aims and objectives of the State of the Environment Report are to:

- Educate and inform the community, Council, Government and industry about the condition of our environment;
- Assess the progress towards achieving environmental goals and standards;
- Identify important environmental issues.

The key strategies of our State of the Environment Report fit into Objective 2 of our Community Strategic Plan, **Well planned and managed spaces, places and environment**.

The relevant actions for the state of the environment from Objective 2 are:

- 2.1 Maintain the separation and distinct nature of the towns and villages of our local area
- 2.2 Encourage our community to adopt sustainable lifestyle practices that support the environment
- 2.3 Ensure our natural and built environments are adaptive to climate change impacts
- 2.4 Protect and maintain environmentally significant natural areas on public and private land in a sustainable manner
- 2.5 Maintain and enhance biodiversity on public and private land
- 2.6 Promote sustainable land use and diversification of agricultural activity
- 2.7 Recognise and protect our heritage
- 2.8 Provide supportive environments that encourage a healthy and sustainable lifestyle
- 2.9 Ensure the principles of sustainable development and legislative compliance underpin our land uses and the design of our buildings and subdivisions.
- 2.10 Effectively manage the transport network of roads, footpaths and cycleways to cater for current and future generations

- 2.11 Effectively manage the drainage network to cater for current and future generations
- 2.12 Effectively manage recreation and open space infrastructure to cater for current and future generations
- 2.13 Effectively manage other assets to cater for current and future generations (including car parks, community buildings, cemeteries and dams)
- 2.14 Minimise waste and manage it in an efficient and environmentally sensitive manner
- 2.15 Ensure the maximum multi-purpose use of our community's buildings and facilities
- 2.16 Ensure public spaces reflect the cultural and artistic diversity of the local community

This report includes chapters which address each of the following environmental themes, as previously required under the *Local Government Act 1993*.

- Land;
- Water;
- Noise;
- Biodiversity;
- Waste;
- Air; and
- Heritage (Aboriginal and Non-Aboriginal)

Each of these themes report on environmental conditions using State - Pressures - Responses framework.

Chapter 9 (Sustainability) details the strategies and actions Council has taken to address sustainability in our municipality and our organisation.

CHAPTER 2: LAND

2.1 STATE

2.1.1 LAND USE PLANNING

The existing Kiama *Local Environmental Plan (LEP) 2011* is the main instrument used by council for land-use planning and development decisions. The LEP indicates what is permitted or prohibited land use within zoned land. Kiama Development Control Plan 2012 (DCP 2012) also includes development controls and considerations that apply to development applications submitted to Council for approval.

Environmental Zones, which carry certain development restrictions, are designed to manage and protect environmental assets such as scenic areas, important vegetation, foreshores and wetlands.

The Kiama LEP 2011 (Sections 6.4 and 6.5) identifies 'Terrestrial Biodiversity', and 'Riparian Lands and Watercourses' on separate maps. Special provisions to protect these environmentally sensitive lands and areas apply. Environmental protection zones (excluding national parks and nature reserves) cover approximately 38% of the Kiama Local Government Area (LGA). Other major land zoning is rural zoned land and this covers approximately 35% of the LGA.

There are three National Parks/Nature Reserves within the Municipality; Seven Mile Beach National Park; Budderoo National Park; and Barren Grounds Nature Reserve.

Kiama Local Environment Plan 2011 Zones

Zone	Area (Ha)	Percentage
Industrial Zones		
IN2 Light Industrial	3.579	0.014%
IN4 Working Waterfront	1.113	0.004%
Business Zones		
B1 Neighbourhood Centre	2.472	0.01%
B2 Local Centre	33.16	0.13%
B7 Business Park	16.417	0.06%
Deferred Material		
DM	0.525	0.002%
Environmental Protection Zones		
E1 National Parks and Nature Reserves	5385.628	20.8%
E2 Environmental Conservation	5460.986	21.1%
E3 Environmental Management	4140.96	16%
Residential Zones		
R2 Low Density Residential	724.292	2.8%
R3 Medium Density Residential	71.924	0.28%
R5 Large Lot Residential	37.519	0.14%
Recreation Zones		
RE1 Public Recreation	342.252	1.32%
RE2 Private Recreation	27.379	0.11%
Rural Zones		
RU1 Primary Production	2382.318	9.20%
RU2 Rural Landscape	6808.039	26.3%
Special Purposes Zones		
SP2 Infrastructure	446.862	1.73%
Total	25885.425	

2.2 PRESSURE

2.2.1 DEVELOPMENT

Development contributes to a region's ability to provide economic and social benefits but can also place demands on urban and rural infrastructure, services, and natural resources. Unless carefully managed, development can also pose threats to the environment.

In October 2014 the NSW Department of Planning and Environment released a 'Draft Regional Growth and Infrastructure Plan for the Illawarra-Shoalhaven Region'. In 2015 the NSW Government adopted the *Illawarra-Shoalhaven Regional Plan* for 2016-36. This plan applies to the Local Government Area of Kiama, Shellharbour, Shoalhaven and Wollongong.

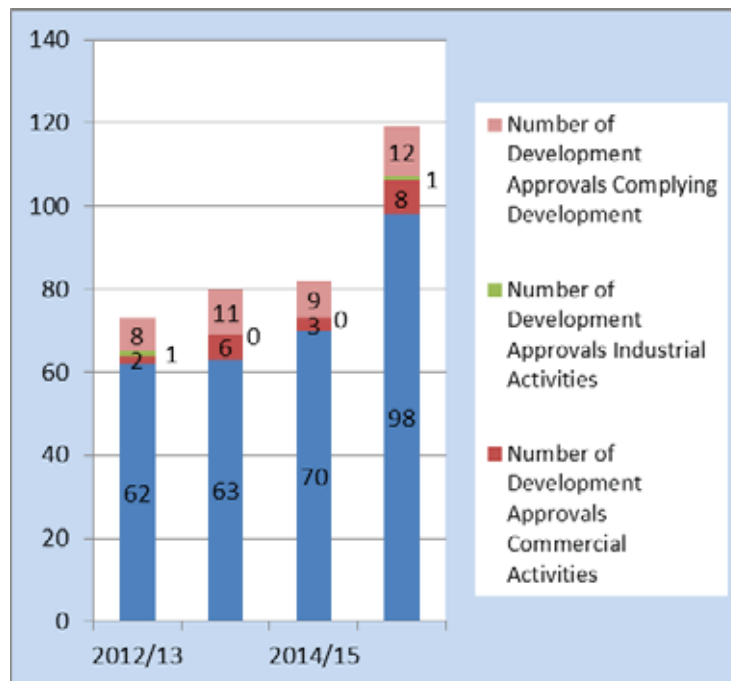
The Plan sets goals and actions to achieve the vision for Illawarra- Shoalhaven region for a sustainable future and a resilient community, capable of adapting to changing economic, social and environmental circumstance.

It focuses on sustainable built environment development that requires urban areas to be designed, planned and management to improve their environmental performance. In doing so, it will make efficient use of urban lands, promote energy efficiency and support healthy and vital communities.

Council's role in local planning is guided by this plan and we are working with the NSW Department of Planning and Environment to achieve the plan's actions. The *Illawarra-Shoalhaven Regional Plan* identified projected housing needs for Kiama between 2016 -36 to be 2850.

Figure 1 shows the number of development approvals that Council granted for residential dwellings, commercial and industrial activities between 2012-13 and 2015-16.

Development Approvals for Residential Dwellings, Commercial and Industrial Activities



2.2.2 CONTAMINATED LAND

When land previously used for industrial, commercial or rural purposes is reclaimed for more sensitive uses, such as housing, there is the risk that the land may be contaminated. The degree to which the land may be contaminated must be determined and any necessary remediation carried out. Activities that have the potential to cause land contamination are listed in Chapter 10–Kiama Development Control Plan 2012 – Contaminated Land.

There is currently no 'significantly contaminated' land identified by the NSW EPA in the Kiama LGA. However there are many sites which have information recorded in Part 5 of their Section 149 Planning Certificates that contamination or potential contamination at the site.

2.3 RESPONSE

2.3.1 LAND USE PLANNING INITIATIVES

The *Kiama Urban Strategy 2011* is Council's response to meeting dwelling targets set in the NSW Government's *Illawarra Regional Strategy*. Council was set a target of 812 detached dwelling lots, 1040 medium density and 38 high density dwellings over a 15-year period from 2006 to 2021. The Urban Strategy aims to ensure that rural and environmental planning maintains and protects our agricultural land and ecologically sensitive natural environment, and identifies urban infill/expansion options to cater for future population and their housing needs.

Working alongside the *Kiama LEP 2011* is the *Kiama Development Control Plan 2012*. It aims to:

- provide detailed development controls which support the Kiama Local Environment Plan 2011
- ensure future development responds positively to the qualities of the site and character of the surrounding locality
- ensure that development does not detract from the natural, cultural and agricultural values of the Kiama Local Government Area
- promote development that is sustainable, appropriately designed for climate and adaptable
- promote development that is accessible and adaptable to meet the existing and future needs of all residents
- ensure appropriate information is submitted with Development Applications
- ensure that development contributes to the quality of the natural and built environments
- ensure development is of a high design standard and energy efficient
- promote development that encourages liveable, safe and sustainable living and working environments
- promote development that adds to the character of Kiama and assists in promoting a liveable, sustainable environment.

2.3.2 BASIX CERTIFICATION

The NSW Department of Planning's Building Sustainability Index (BASIX) means that all Development Applications for new dwellings require the submission of a BASIX certificate. The BASIX Certificate assesses the potential performance of a new development against a set of sustainability indices, including energy conservation and water conservation.

From 1 October 2006, BASIX was also applied to residential alterations and additions valued at \$100,000 or more (from 1 July 2007, the value dropped to \$50,000) and where a swimming pool (or pool and spa) with a capacity greater than 40,000 litres is being installed.

BASIX ratings can be achieved through design choices such as:

- rainwater tanks connected to toilet, laundry and/or garden irrigation systems;
- 3A -5A rated showerheads, toilets, taps & fittings;
- floor and ceiling insulation;
- using compact fluorescent light globes;

- native vegetation to landscape areas;
- shading to windows;
- solar, heat pump or high efficiency gas hot water systems;
- appropriate aspect for suitable solar access;
- alternative energy systems such as photovoltaic;
- performance glazing to large glazed areas / poorly oriented areas;
- ceiling fans, evaporative coolers or high efficiency air conditioning; and
- efficient pool pumps.

BASIX certificates for Kiama LGA

BASIX certificates issued in Kiama LGA for 2012/13 - 2015/16			
2012/13	2013/14	2014/15	2015/16
116	150	152	189

2.3.3 CONTAMINATED LAND MANAGEMENT

The NSW EPA recently updated policies relating to contaminated land, regarding the duty to report contamination guidelines and new requirements for reporting to the EPA under the *Contaminated Land Management Act 1997 (CLM Act)*.

From 1 July 2017, the NSW EPA will require all reports submitted to the EPA, to comply with the requirements of the *CLM Act* which are to be prepared, or reviewed and approved by a certified consultant from one of the two currently recognized contaminated land consultant certification schemes.

2.3.4 WASTE CONTAINING ASBESTOS

An emerging issue in the Illawarra region, as well as throughout NSW is waste containing asbestos, illegally disposed of or incorrectly dealt with from demolition activities. The recent boom in the housing market, and zoning changes to encourage in-fill development have encouraged building and construction activity and seen an increase in the likelihood of encountering materials containing asbestos.

The EPA introduced requirements in 2014 for transporters of asbestos waste greater than 100 kilograms or 10 square metres. Asbestos transporters and facilities receiving asbestos waste must report the movement of asbestos waste to the EPA. The EPA has developed an online tool (WasteLocate) to assist industry to meet their legal obligations.

Kiama Council's Demolition of Buildings Containing Asbestos Policy and information relating to asbestos waste can be found at www.kiama.nsw.gov.au/environment/a-z-of-waste---recycling/asbestos.

2.3.5 NSW COASTAL MANAGEMENT REFORMS

In November 2015, the NSW Government released for public consultation a draft framework for coastal management.

The state government's reforms include a legislative and regulatory framework to provide guidelines and legislation for local and state government authorities for coastal management. They also include a coastal management manual to provide better support for decision making and a tool kit for identifying and assessing coastal hazards and risks and prioritising the funding of affordable coastal management programs.

Consultation for the draft Coastal Management Bill, explanation of intended effects for a proposed Coastal State Environmental Planning Policy and Coastal Management Manual closed on 29 February 2016. The Coastal State Environmental Planning Policy (SEPP) and corresponding maps of the coastal use areas defined in the SEPP will be exhibited for public comment in the second half of 2016.

The coastal management reforms will produce maps of the 'coastal management areas' defined in the proposed SEPP, into four areas:

- **Coastal wetlands and Littoral Rainforests** Areas where SEPP 14 coastal wetlands and SEPP 26 Littoral Rainforests have been identified
- **Coastal Vulnerability Areas** Land exposed to coastal hazards such as beach erosion, tidal inundation and cliff instability
- **Coastal Environment Areas** Key features of the coast such as estuaries, lagoons and coastal lakes and critical areas of land adjacent to these features
- **Coastal Use Areas** land with important coastal values.

These maps will then be used to inform the decisions of local and state government agencies to complete further assessment and studies relating to coastal risks and hazards including beach erosion / recession and tidal inundation studies due to sea level rise and the effects of climate change.

CHAPTER 3: WATER

3.1 STATE

The Kiama Municipality has three major catchments; Minnamurra River, Crooked River, and Werri Lagoon. A number of smaller creeks and streams which drain into larger catchments exist including the Shoalhaven River, Kangaroo River and Macquarie Rivulet, or directly into the ocean such as Spring Creek.

3.1.1 WATER MONITORING

Rehabilitated landfill water monitoring

Council completes quarterly groundwater and surface water monitoring in and around its waste disposal depots at Minnamurra and Gerroa in accordance with the NSW Environmental Protection Authority (EPA) license requirement.

Both are currently closed as landfill sites and remediated in accordance with NSW EPA authorized closure plans.

Monitoring of the sites allows us to identify any impacts the facilities may have on surrounding waterways so action can be taken if necessary.

In the 2015-16 sampling period, the total ammonia levels in sampling bore 9C at the rehabilitated Minnamurra landfill had exceeded the trigger value of 100mg/L on more than three consecutive sampling occasions. This required Council to respond by preparing a groundwater remediation plan in consultation with the NSW EPA and Department Primary Industries (DPI) Water. In March 2016 Council installed an initial test bore to assess the groundwater yield and parameters for irrigation onto the surface of the landfill mound. This method is successfully used at the Gerroa landfill site, where total ammonia levels in the groundwater have reduced over time to almost background levels.

Work is ongoing to implement a groundwater remediation management plan to reduce the risk of impact of the high ammonia levels on the surrounding Minnamurra River and Rocklow Creek.

Ground and surface water monitoring reports for the Minnamurra and Gerroa landfill sites are available on Council's website: www.kiama.nsw.gov.au/environment/environmental-management/environmental-management.

River and estuary water monitoring

From October to March 2013-14 and 2014-15, estuary health water sampling was conducted in the Crooked River estuary (13-14 and 14-15), and the Minnamurra River estuary (14-15 only). *Chlorophylla* and Turbidity were sampled for use as indicators of estuary health, consistent with the NSW Office of Environment and Heritage–Monitoring, Evaluation and Reporting Program (MER Program).

These monitoring results were associated with the review of the Crooked River Estuary Management Plan and the Minnamurra River Estuary Management Plan, and will assist in the development of estuary health report cards based on the results.

Water quality data analysis for the Crooked River Coastal Zone Management Plan and Minnamurra River Coastal Zone Management Plan is available on council's website: www.kiama.nsw.gov.au/environment/our-environment/water/coastal---estuary-management

Beachwatch water monitoring

As part of Sydney Water Corporation's license conditions for the operation of the Bombo Headland Sewage Treatment Plant, it conducts monitoring of beach water quality at four municipal beaches; Jones Beach, Bombo Beach, Surf Beach and Werri Beach.

In October 2011, Council added a Beachwatch testing site at Seven Mile Beach to be included in the State of the Beaches Reporting. Sampling is undertaken by Sydney Water on behalf of Council between October and April every year since 2011, and results are

published in the State of the Beaches Report annually by the NSW Office of Environment and Heritage. The Beach Suitability Grades can either be Very Good, Good, Fair, Poor or Very Poor. Definitions for these classifications can be found at www.environment.nsw.gov.au/beach/beachclassification.htm



Jones Beach, Kiama

Kiama LGA Beach Suitability Grades 2012-13 to 2015-16*

Swimming Sites	Beach Suitability Grades			
	2012/13	2013/14	2014/15	2015/16
Boyds/Jones Beach	Very Good	Very Good	Good	Good
Bombo Beach	Good	Good	Good	Good
Surf Beach	Good	Good	Good	Good
Werri Beach	Very Good	Very Good	Very Good	Very Good
Seven Mile Beach	Very Good	Very Good	Good	Good

*Beachwatch, 'State of the Beaches Report' 2016

All Kiama ocean beaches were classified as Very Good or Good for the reporting period. Beaches classified as Very Good means they generally have excellent microbial water quality and very few potential sources of faecal pollution. Water is considered suitable for swimming almost all of the time. Beaches classified as Good means they generally have good water quality and are considered safe for swimming most of the time. These sites have some potential pollution sources which are generally triggered after rainfall.

The Office of Environment and Heritage publishes Beachwatch Program daily alerts on its website. These show beach conditions as well as warnings of potential pollution. It is available at www.environment.nsw.gov.au/beachapp/lllawarraBulletin.aspx

Beachwatch daily pollution forecast example

6 Werri Beach

Today's beach conditions
 Pollution is **unlikely**. Enjoy your swim!
 Ocean temperature is 19° C

Patrol information: Patrolled weekends and public holidays from 19 September 2015 until 25 April 2016. Patrolled Monday - Friday between 19 December 2015 until 26 January 2016.

Annual beach suitability grade **Very Good**
 Water quality is suitable for swimming almost all of the time, with very few potential sources of faecal contamination.

Star rating	Address
★★★★	Access via Bridges St,
From 27/06/2016	Gerringong (zoom in)

*Office of Environment and Heritage website, accessed 12 July 2016

3.1.2 WATER CONSUMPTION

The Kiama Municipality is part of the Sydney Water supply network and subject to its 'Water Wise Rules'. These include rules for using water on your garden, looking after your pool and cleaning. For a list of the water wise rules and any current restrictions visit: www.sydneywater.com.au.

The following table shows the dam storage levels for the Sydney Water Catchment. Dam levels during the reporting period have been close to capacity, compared with levels down around 53% in 2007.

Dam storage levels

Date	Dam Water Storage Levels
30 June 2007	53.1%
30 June 2013	97.6%
30 June 2014	81.9%
30 June 2015	92.4%
30 June 2016	98.3%

Source: Water NSW 2016

The following table shows water use in the Kiama LGA by property type.

Water consumption by property type for the Kiama Municipality

Property Type	12-13 (kL)	13-14 (kL)	14-15 (kL)	15-16 (kL)
Commercial	356,173	386,420	373,886	382,339
Houses	1,115,441	1,128,702	1,097,473	1,149,890
Units/flats	153,602	145,958	143,777	148,205
Industrial	8,016	9,196	9,204	10,349
Other	83,114	84,377	85,418	80,103
Total	1,716,347	1,754,653	1,709,759	1,770,885

Sydney Water Corporation, 2016

Council water consumption

Water consumption by Council's operations has decreased dramatically since baseline recording in 2002-03 of 163,840 kL (average 448kL per day). This is due to a combination of mandatory water restrictions and proactive management to implement initiatives recommended in our Water Savings Action Plans (WSAP) for the top water consuming facilities and analysis of water consumption data on a site by site basis to determine where leaks are occurring. Council's total water consumption for the last four financial years is outlined in the table below. The trend for water usage has been above the previous four-year reporting period, which was trending annually between 90-105,000kL.

Kiama Council water consumption

	12/13 (kL)	13/14 (kL)	14/15 (kL)	15/16 (kL)
Water consumption for KMC	113,115	116,819	117,346	119,794

(*note annual statistic differ from previously reported consumption due to identification of issues with billing data supplied to Council's data analysis provider Planet Footprint)

Chapter 9 contains a comparison of water consumption of our top 11 water consuming facilities in 2002-03 compared with current usage. These facilities account for around 70% of Council's total water consumption, so we focus most of our water saving and monitoring efforts on them. A number of leakages have been detected using data loggers installed at the holiday parks and leisure centre, as well as through consumption analysis and anomaly reports sourced from Council's billing data analysis service provider, Planet Footprint. Ageing service infrastructure in a coastal environment means that ongoing analysis of consumption anomalies is required to try to identify when and where leaks are occurring.

3.2 PRESSURE

Water consumption and demand by industrial, commercial, agricultural and residential areas puts pressure on water supply and water supply infrastructure. The demand for potable water can also create pressures on natural systems through the need for water supply catchments, as well as issues in disposing of effluent laden water from residential, rural, industrial and commercial areas.

Water quality can be affected by various natural and anthropogenic factors including drought, stormwater runoff from roads, residential, industrial, commercial and agricultural activities as well as sewerage overflows/bypasses and on-site sewerage management systems.

3.2.1 SEWERAGE TREATMENT PLANTS

Discharge and equivalent estimated populations for the two sewerage treatment plants located within the Kiama Municipality.

Sewerage overflows or bypasses of one or more process units in the sewerage system can occur during wet weather, caused by flows that exceed the capacity of the system. Overflows can result in partially treated effluent being discharged into waterways or the ocean.

Sewerage Treatment Plants in Kiama Municipality

Treatment Plant	Treatment Level	Discharge (ML/day)	Equiv. Population
Gerringong Gerroa	Advanced tertiary (additional Phosphorus removal & ozonation, microfiltration, activated carbon & disinfection)	0.7	5,600
Bombo	Secondary and denitrification & disinfection	3.6	14,700

Sydney Water Corporation's 'Growth System Strategy' for Bombo STP has accounted for an equivalent population of 28,700. According to their projections, Bombo will be within capacity to beyond 2036.

Average dry weather flows and equivalent persons for Bombo STP (C Heitmann, 2015)

Year		2011	2020	2031	2036
Residential Population	Persons	15,200	17,100	18,900	19,700
Non-Residential Population	Equivalent Persons	6,100	6,900	7,000	7,000
Total Population	Equivalent Persons	21,300	24,000	25,900	26,700
Average Dry Weather Flow	ML/d	3.5	3.9	4.2	4.3

Dry weather overflows can also occur, usually due to blockages and/or damage to the sewerage infrastructure by tree roots, debris, pump failure at a pumping station or power failure at a treatment plant (Sydney Water Corporation).

Sydney Water Corporation is required to notify the NSW EPA when any dry or wet weather overflows or bypasses of the STP occur, leading to the discharge of untreated or partially treated effluent.

Sewerage Overflows/Bypasses at Bombo STP

Year		2012/13	2013/14	2014/15	2015/16
Wet Weather Bypass		9	8	11	0
Dry Weather Bypass		0	0	0	0
Total		9	8	11	0

C Heitmann, 2016

No dry weather overflows have occurred at the Gerringong Gerroa Wastewater Recycling Plant since it was commissioned in 2002. There were two rising main breakages in 2015-16 which resulted in discharges to the environment of approximately 400kL and 2ML. These events were reported to the NSW EPA as required under the environmental protection license for the Gerringong Gerroa Wastewater Recycling Plant. Clean up and monitoring of contamination levels in receiving water was conducted.

Sewerage Overflows / Bypasses at Gerringong Gerroa Wastewater Recycling Plant

Year	2012/13	2013/14	2014/15	2015/16
Wet Weather Overflow	0	1	2	0
Dry Weather Overflow	0	0	0	0
Other	-	-	-	2
Total	0	1	2	2

J Kidd, 2016

3.2.2 ON-SITE SEWERAGE MANAGEMENT SYSTEMS (OSSMS)

There is the potential for effluent to enter the waterways from on-site sewerage management systems (OSSMS) that still operate within the Municipality. These systems are used to treat and dispose of 'black water' and/or 'grey water' in areas where a sewage service is not available.

There are 147 high risk and 726 low risk registered and operating OSSM systems in our municipality. If systems are not maintained or operated correctly it can result in untreated effluent entering drains and waterways. Council has implemented a program of OSSMS inspections to determine if each system is operating correctly and identify any possible risks to human health and the environment

3.3 RESPONSE

3.3.1 WATER POLLUTION ENFORCEMENT

Kiama Council Environmental Health Officers and Rangers Services Officers investigate complaints relating to water pollution and the Office of Environment and Heritage (OEH), investigates complaints regarding water pollution from scheduled premises and activities.

Water pollution complaints to Council and OEH

Type of complaint	2012/2013	2013/2014	2014/2015	2015/16
Water pollution complaint to OEH	18	13	9	15
Spill complaint to OEH	1	1	1	0
Water pollution complaint to Council	14	22	30	29
Total	33	36	40	44

Roy, L, OEH, 2011

Clean-up notices, prevention notices or penalty infringement notices for water pollution offences may be issued by these officers under the *Protection of the Environment Operations Act 1997*.

3.3.2 DEVELOPMENT OF COASTAL ZONE MANAGEMENT PLANS FOR CROOKED RIVER ESTUARY AND MINNAMURRA RIVER ESTUARY

Kiama Council obtained grant funding from the NSW Office of Environment and Heritage Estuary Management Program to complete reviews of the Crooked River Estuary Management Plan and the Minnamurra River Estuary Management Plan. In recent years, evidence and awareness of the potential impacts of climate change on physical and ecological processes within estuaries had increased and new state government policies were released to guide councils in their preparations for climate change impacts. Our two plans were reviewed in line with requirements of the NSW Government '*Guidelines for Preparing Coastal Zone Management Plans*'. Preparation of the Crooked River and Minnamurra River Coastal Zone Management Plans (CZMP) involved consultation with the local community, landholders and both public agency and private industry stakeholders.

Crooked River CZMP

Key management issues for the Crooked River were identified in the CZMP including:

- Management of faecal and nutrient input into the Crooked River and its tributaries
- Management of acid sulphate soils and mitigation of runoff events which occur periodically
- Management of identified bank erosion and sources of sediment
- Management of riparian areas in the estuary and its tributaries
- Management of terrestrial and aquatic biodiversity
- Research into the potential climate change impacts on estuary health and agricultural productivity
- Ensuring strategic implementation of on-ground works throughout the catchment
- Ensuring the community can access information relating to the Crooked River estuary
- Providing a coordinated approach to delivery of management programs through establishment of an estuary management committee and to seek funding assistance and cooperation with other agencies for a specific estuary health officer

Minnamurra River CZMP

Key management issues for the Minnamurra River were identified in the CZMP including:

- Providing a coordinated approach to delivery of management programs through establishment of an estuary management committee and to seek funding assistance and cooperation with other agencies for a specific estuary health officer
- Continuation of the NSW Monitoring Evaluation and Reporting water quality monitoring program in the Minnamurra River estuary
- Priority water quality research projects at Jamberoo, Gainsborough stormwater ponds and Rocklow Creek
- Continue monitoring of ground and surface water around Minnamurra and Dunmore waste depots and development of remedial actions to treat contaminated groundwater
- Assessment of potential future sea level rise impacts on the Minnamurra and Dunmore landfill sites
- Supporting agricultural extension services and assistance to landholders to facilitate sustainable agriculture initiatives
- Control of bank erosion and maintenance of bank stabilization works
- Protection of estuarine and foreshore habitat
- Assessment of foreshore reserve usage and infrastructure requirements
- Future research projects into the impacts of sea level rise on estuarine vegetation and productive agricultural lands

Council will work with state government agencies and landholders to attempt to achieve the management actions identified in the plans.

3.3.3 ON-SITE SEWERAGE MANAGEMENT SYSTEMS INSPECTIONS

The management of domestic waste water and sewage is important for the health of the community and for the natural environment. All on-site sewage management systems that operate in the Municipality have been risk classified based on their proximity to waterways, soil types, slope, hydraulic loading and flood risk.

Council inspects high risk on-site sewage management facilities on an annual basis, and low risk OSSMs on a four-year basis, to ensure they are operating effectively and have no adverse impacts on human health or the environment.

OSSM inspection statistics for Kiama LGA

Low Risk	2012/13	2013/14	2014/15	2015/16
Satisfactory	145	168	207	228
Defective	14	13	15	49
% Defective	10%	8%	7%	21%
Initial inspection	4	11	24	26
High Risk	2012/13	2013/14	2014/15	2015/16
Satisfactory	100	105	109	134
Defective	0	5	3	13
% Defective	0%	5%	3%	10%
Initial inspection	0	8	4	6

CHAPTER 4: NOISE

4.1 STATE

Kiama Council has a regulatory role in preventing unwanted and offensive noise through the development approval process and by enforcing development consent conditions and noise pollution regulations under the *Protection of the Environment Operations Act 1997*.

Noise is the most common environmental issue Council is contacted about. The main noise pollution complain Council is contacted for is animal noise.

Noise complaints to Kiama Council and NSW EPA

Type of Complaint	2012-13	2013-14	2014-15	2015-16
Noise complaints to OEH Enviroline	5	3	1	0
Industrial noise complaints to Council	1	2	5	5
Commercial noise complaints to Council	8	11	24	20
Residential noise complaints to Council	13	25	29	14
Construction noise complaints to Council	3	14	3	1
Council plant vehicle noise complaints to Council	0	0	0	1
Animal noise complaints to Council	62	84	85	54
Total noise complaints	92	139	147	95

4.2 PRESSURE

The pressures on the environment relating to noise generally centre around the impact of humans on each other in an urban environment, such as residential and industrial/commercial and traffic/transport noise.

The Kiama Municipality does not have a large area devoted to industrial activities, however where residential areas adjoin industrial and commercial areas there is a potential for impacts from the operations.

Business and commercial areas constitute only a small portion of the Kiama Municipality. However, they can be a source of noise mainly from equipment such as air conditioners, operational noise and deliveries during early hours.

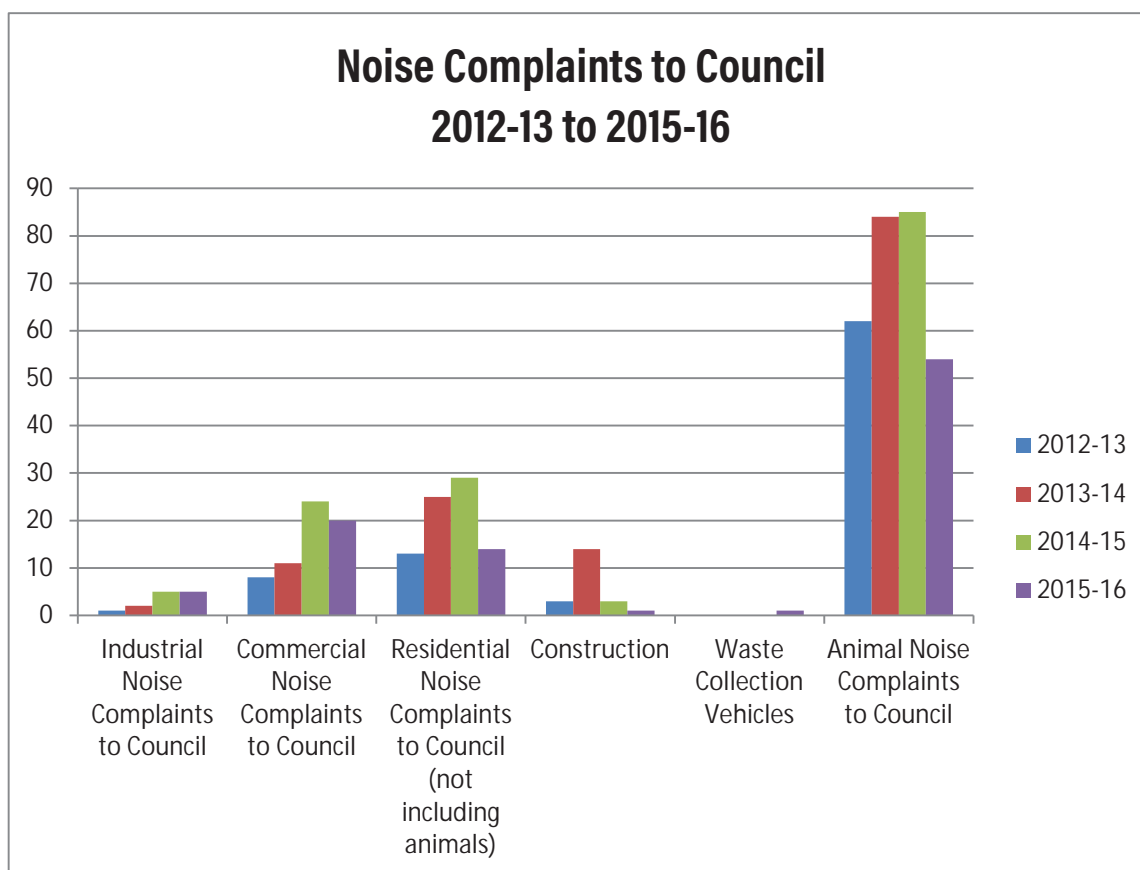


Figure 3 Noise complaints within the Kiama Municipality 2012/13-2015/16

4.3 RESPONSE

4.3.1 DEVELOPMENT CONTROL

Development conditions of consent can be placed on development approvals for residential, industrial and commercial activities to ensure noise pollution is minimized or prevented. For industrial premises the *NSW Industrial Noise Policy* applies, providing guidelines for large industrial developments, including guidelines on measuring and assessing noise from small commercial and industrial premises regulated by Councils.

4.3.2 ENFORCEMENT

Council's Environmental Health Officers and Rangers investigate complaints received by Council relating to noise pollution and the Office of Environment and Heritage (OEH) investigates complaints regarding noise pollution from scheduled premises under the *Protection of the Environment Operations Act (1997)* and the *Protection of the Environment Operations (Noise Control) Regulation 2007*.

Within residential areas, restrictions on some domestic noise sources exist, such as power tools, swimming pool pumps, musical instruments, amplified sound equipment, domestic air conditioners, heat pump hot water systems and vehicles.

These noise sources have restricted hours of operation. Outside the restricted hours, additional restrictions can be placed on their use if they cause offensive noise. Information on such restrictions can be found at www.environment.nsw.gov.au/questions/times-residential-noise-restrictions. Nuisance Dog Orders may also be issued under the *Companion Animals Act 1998* when the noise is the result of a dog, and this requires the owner to prevent the behavior causing the issue.

The NSW EPA has produced a number of resources to assist local government in day to day management of local noise problems.

The 'Noise Guide for Local Government' (updated in 2013) gives Councils important advice and technical information to assist in dealing with noise complaints in their day to day roles. It can be viewed at www.epa.nsw.gov.au/noise/nlg.htm.

A 'Dealing with neighbourhood noise' brochure assists residents in understanding noise regulations and how different neighbourhood noise complaints can be dealt with. It is available from Council and at www.epa.nsw.gov.au/resources/noise/130196NNoise.pdf.

The following is from the 'Dealing with neighbourhood noise' brochure and shows the time restrictions on the type of noise.



Noise source – from residential premises	Time restrictions when noise should not be heard in a habitable room* in a neighbour's residence	Contact
Power tools and equipment (powered garden tools – e.g. lawn mowers and leaf blowers – electric or pneumatic tools, chainsaws, circular saws, gas or air compressors and swimming pool or spa pumps)	Before 8 am and after 8 pm on Sundays and public holidays Before 7 am and after 8 pm on any other day	Local council or police
Musical instruments and electrically amplified sound equipment (e.g. radios, TVs, tape recorders, CD and DVD players, and home theatre systems)	Before 8 am and after midnight on any Friday, Saturday or the day immediately before a public holiday Before 8 am and after 10 pm on any other day	Local council or police
Air conditioners and heat pump water heaters	Before 8 am and after 10 pm on weekends and public holidays Before 7 am and after 10 pm on any other day	Local council or police
Motor vehicles (except when entering or leaving residential premises)	Before 8 am and after 8 pm on weekends and public holidays Before 7 am and after 8 pm on any other day	Local council or police
Refrigeration units fitted to motor vehicles**	Before 8 am and after 8 pm on weekends and public holidays Before 7 am and after 8 pm on any other day	Local council or police

Where noise from commercial/industrial properties, or noise emitted from residential premises continues to affect surrounding properties, council officers work with the complainants and generators of the noise to try to achieve an amenable outcome without the need for regulatory intervention.

This can either be through council acting as a mediator or referral to the Community Justice Centre (CJC) for professional mediation. The CJC is a free service set up by the NSW Government to provide mediation between parties to solve disagreements without going to court. You can find out more about the CJC at <http://www.cjc.justice.nsw.gov.au/>. If negotiated outcomes or mediation fail to

provide a resolution, Council officers will measure or observe the noise to determine if there is a potential breach of the legislation or conditions of consent. This can then be dealt with under the relevant legislation, including:

- notices and orders under the *Environmental Planning and Assessment Act 1979* and *Local Government Act 1993*,
- noise control notice, prevention notice, noise abatement direction or noise abatement order under the *Protection of the Environment Operations Act 1997*, or
- through the compliance arm of the Office of Liquor and Gaming under the *Liquor Act 2007* when related to licensed premises.

CHAPTER 5: BIODIVERSITY

5.1 STATE

Biodiversity as a definition refers to the variety of all life forms – the different plants, animals and microorganisms, the genes they contain and the ecosystems of which they form a part.

5.1.1 ENDANGERED ECOLOGICAL COMMUNITIES

Twelve Endangered Ecological Communities (EECs) exist within the Kiama Municipality and are listed under the *NSW Threatened Species Conservation Act 1995*. Maps of the endangered ecological communities are available in the 2008-09 State of the Environment Report. In early 2016, the EEC-Illawarra and South Coast lowland grassy woodland ecological community was proposed for listing as critically endangered under the *Environment Protection and Biodiversity Conservation Act 1999*. Kiama Council provided a submission to the Federal Environment Department, to support the listing of the EEC as critically endangered.

Wollongong, Shellharbour and Kiama Councils developed a brochure 'Endangered Ecological Communities of the Illawarra', produced with funding assistance from the NSW Environmental Trust funded Illawarra Biodiversity and Local Food Strategy for Climate Change. It is available at each Council in hard copy and in electronic format.

5.1.2 SPECIES DIVERSITY – FLORA

According to the Atlas of NSW Wildlife (OEH, 2016), there are 933 recorded native flora species in the Kiama LGA. The Atlas of NSW Wildlife indicates that 47 threatened species listed in Schedule 1 and 2 of the *NSW Threatened Species Conservation Act 1995 (TSC Act 1995)*, have been recorded in the Kiama LGA.

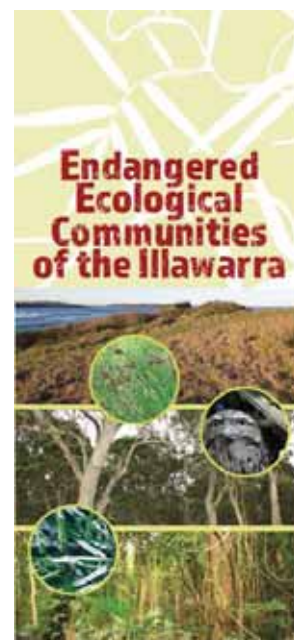
For a list of the threatened flora species identified in the Kiama LGA, and their listing in the *TSC Act 1995* and the *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999)* please refer to the Atlas of NSW Wildlife at www.bionet.nsw.gov.au

5.1.3 SPECIES DIVERSITY – FAUNA

According to the report 'The fauna of Kiama Municipality, South Coast NSW' (Kevin Mills & Associates, 2006), which compiled a report from a variety of sources, there are 496 species occurring in the Municipality. The list included mammals, birds, frogs, reptiles, freshwater and estuarine fish species.

The Atlas of NSW Wildlife indicates that 102 animal species actually recorded in the Kiama Municipality are listed as in Schedule 1 and 2 of the *NSW TSC Act 1995*. Some of these species are also listed as threatened under the Commonwealth *EPBC Act 1999*. For a full list of threatened species including the Mills and Associates report and the Atlas of NSW Wildlife at <http://www.bionet.nsw.gov.au/>.

The Kevin Mills and Associates reports (2006), '*The Natural Vegetation of the Municipality of Kiama NSW*' and '*The Fauna of the Municipality of Kiama, South Coast NSW Final Report*', are available on Council's website.



5.2 PRESSURE

The main pressures on biodiversity in the Kiama Municipality are habitat loss and fragmentation due to vegetation clearing and urban expansion, fire, predation by feral and domestic animals, overgrazing of habitat areas by stock, stream bank disturbance, pollution and invasion of weed species.

The *NSW TSC Act 1995* defines a threatening process as 'a process that threatened, or may have the capability to threaten the survival or evolutionary development of species, populations or ecological communities'. There was one new listing for key threatening processes in the *NSW TSC Act 1995* during the reporting period:

'Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners (Manorina melanocephala)

5.2.1 REVIEW AND REFORM OF NSW BIODIVERSITY LEGISLATION

During 2013-14 the NSW Government undertook an independent review of the Biodiversity Legislation in NSW. The final report was delivered to the NSW Government in December 2014, with 43 recommendations, which the NSW Government has adopted in full. The review included the *Native Vegetation Act 2003*, *Threatened Species Conservation Act 1995*, *Nature Conservation Trust Act 2001* and parts of the *National Parks and Wildlife Act 1974*.

In late 2016, the NSW Government released a suite of draft bills and amendments to legislation as based on the recommendations in the independent review panel final report. This will result in a repeal of the NSW *Threatened Species Act 1995*, *Threatened Species Regulation 2010*, *Threatened Species (Biodiversity Banking) Regulation 2008*, *Native Vegetation Act 2003* and the *Nature Conservation Trust Act 2001*. These will be replaced with the *Biodiversity Conservation Act 2016* and amendments to the *NSW Local Land Services Act 2013*.

The current list of draft bills and documentation relating to the NSW Biodiversity Legislation reforms is available at www.environment.nsw.gov.au/biodiversitylegislation/review.htm. At the end of the reporting period it was difficult to pinpoint the potential effect of the new legislation, as there are still key pieces of the proposed reforms to be released for public comment. These include the Native Vegetation Regulatory Map, the regulations which accompany the *Biodiversity Conservation Act 2016* and the amended *Local Land Services Act 2013*, and the proposed State Environmental Planning Policy (SEPP) - Urban Tree Removal, which are expected to be exhibited in late 2016.

5.2.2 WEEDS

Under the *NSW Noxious Weeds Act 1993*, weeds can be declared noxious. Many plants can be classed as weeds, however only those plants that have a detrimental effect or cause serious economic loss to agriculture or the environment, and providing there is a reasonable and enforceable means of control are considered as candidates for declaration as noxious weeds. There is a legal requirement on landowners to control these weeds once declared. For a full list of weeds declared noxious in the Illawarra District Noxious Weeds Authority (IDNWA) control area, please refer the IDNWA website, accessed at www.idnwa.com.au. Information on common south coast weeds is available in the 'Grow me Instead' booklet available at Council and online.



'Grow Me Instead! And Illawarra District Noxious Weed Authority' brochures available from Council and the Illawarra District Noxious Weed Authority

5.2.3 TREE LOPPING OR REMOVAL

Removal of trees, or major portions of trees, can have major impacts on biodiversity. Chapter 3 of Council's DCP-Preservation and Management of Trees and Vegetation, outlines Council's requirements for the preservation and management of trees and other vegetation within the urban areas. The DCP supports Clause 5.9 of the Kiama LEP 2011 by defining prescribed vegetation and outlines Council's requirements for the submission, assessment and determination of applications for pruning and removal of trees. Clause 5.9, section 3 states, 'A person must not ring bark, cut down, top or lop, remove, injure or willfully destroy any tree or vegetation to which any such development control plan applies without the authority conferred by (a) a development consent, or (b) a permit granted by Council. The tree permits processed by Council for private land over the reporting period are depicted in Table 14.

Tree removal and pruning permits 2012-13 to 2015-16

Application Type	2012/13 (kL)	2013/14 (kL)	2014/15 (kL)	2015/16 (kL)
Prune	48	59	39	33
Combination Prune & Remove	70	65	45	38
Remove	218	205	175	167
Refused	44	49	49	39

5.3 RESPONSE

5.3.1 – THREATENED SPECIES OR POPULATION LISTINGS

The NSW Scientific Committee was established under the *Threatened Species Conservation Act*, as an independent body for determination of applications to list species or populations as vulnerable, endangered, critically endangered or extinct in the relevant schedules of the *TSC Act*. The committee also decides on listing of key threatening processes under the Act.

During the reporting period, the population of *Gossia acmenoides* in the Sydney Basin Bioregion south of the Georges River was listed as an endangered population under the *Threatened Species Conservation Act 1995*. The population is found in the local government area of Kiama. There are estimated to be less than 100 mature *G.acmenoides* plants in the population (Fuller 2011). There are currently 30 sites where *G.acmenoides* is found, often as single individual plants or as a small group of up to four individuals, and sites are generally widely separated.

5.3.2 WEEDS

The Illawarra District Noxious Weeds Authority has continued to develop and implement an active noxious weed control program throughout the Kiama Municipal Council area including:

- Local weed control programs for private landholders and government agencies with 459 property inspections for the 2012/13 – 2015/16 reporting period. Thirty one high risk sites including all nurseries, aquaria outlets and other identified priority sites were also inspected
- All infestations of Class 2 and emerging Class 3 noxious weeds (Water hyacinth, St Johns Wort, Mysore thorn) on private lands were inspected and control treatments implemented by 30 June each year
- Established Class 3 noxious weeds (Gorse, Giant Parramatta Grass, Serrated Tussock) on private land were inspected and control treatments implemented every second year
- All Class 4 noxious weeds on private land were strategically targeted for control within the Kiama LGA according to local action plan guidelines. These class of noxious weeds pose a threat to primary production, the environment or human health
- Five Section 18 Notice to Control Noxious Weeds were issued requiring occupiers/owners to treat and remove noxious weeds and two Section 20 Noxious weed control by a local authority after a notice was not complied notices were issued and enforced
- All Council lands with infestations of Class 2 and Class 3 noxious weeds were inspected and treated at least once by 30 June each year
- All Bitou bush on Council controlled lands was inspected and treated by 1 November each year. A total of 13 ha was aerially sprayed every second year over the 2012-2016 period
- Three alert weeds – Glory lily, Spiny Burr grass and Sea Spurge, were identified and controlled through the Kiama LGA. Two new notifiable weed outbreaks were recorded at Jamberoo (Cats Claw Creeper) and in Ruth Devenney Reserve, Dunmore (Alligator Weed)
- Two major water catchments, namely Crooked River and Minnamurra River were inspected along their length to ensure there were no new aquatic weed incursions
- 1,623km of rural roads and 390 ha of public reserves were inspected and treated for one or more noxious weeds for the period 2012-2016
- Education and publicity activities have continued to be given high priority through ongoing utilization of the media and participation in community events. At least one display and one field presentation was held annually. The IDNWA website was established at www.idnwa.com.au
- Southern Rivers Catchment Management Authority (now NSW South East Local Land Services), Regional Weed Strategy finalized and endorsed. Rapid Response and New Incursion Plans developed. Pesticide Notification Plan updated and endorsed for 2012-2017
- Kiama Council funding of \$132,726 was supported by NSW Government funding (NSW DPI) of \$103,553 for noxious weed control in the Kiama LGA over the past 4 years
- Additional grant funding was of \$132,494 obtained across five grant programs for the region 2012-2016

5.3.3 BIODIVERSITY INVESTMENT OPPORTUNITIES MAP FOR THE ILLAWARRA

The Illawarra biodiversity investment opportunities map (BIO map) developed by the NSW Office of Environment and Heritage aims to achieve better biodiversity outcomes by directing biodiversity investment funding to areas that will achieve the greatest benefit. BIO map identifies land that may have increased opportunities to access a range of conservation funding programs.

The priority investment areas comprise of biodiversity core areas and a network of state and regional biodiversity corridors within the Illawarra region. The BIO map data is available at the OEH website at www.environment.nsw.gov.au/conservationprograms/biomap-illawarra.htm, to give both public and private land owners information relating to identified priority areas for investment to support funding applications for biodiversity management.

5.3.4 COUNCIL REHABILITATION PROJECTS

Council has continued to implement rehabilitation and revegetation projects within its parks, reserves and beaches within the Municipality. During the reporting period the following projects were undertaken:

National Tree Day

National Tree Day is an annual event which Council has participated in for over 20 years, providing sites for Kiama High School Year 7 students to plant trees, shrubs and ground covers in the local municipality. In the last four financial years, Council has provided site preparation, trees, shrubs, grasses and staff resources at 3 or 4 sites per year, as well as a BBQ for the entire Kiama High School year level participating in the tree planting activities.

Annual tree planting sites include Seven Mile Beach Reserve, Bombo Headland, Spring Creek Wetlands and at the Hillside Landcare site at Kiama Leisure Centre sports fields. Tree planting activities are heavily supported by local Landcare groups who provide site coordination and volunteer resources to assist with the planting activities. Other sites within the municipality are provided by private and public land managers. Approximately 1,000 trees, shrubs and ground covers are planted every year between 7 and 8 sites in the Municipality by the Kiama High School Year 7 students.



Kiama Leisure Centre sports field Hillside Landcare site National Tree Day planting 2015

Seven Mile Beach Reserve

Kiama Council received grant funding through the 'Contain and Connect – Protecting coastal ecosystems in southern NSW' program through NSW Local Land Services. Bush regeneration contractors have been working in the Seven Mile Beach Reserve in Gerroa since 2013. The objectives of the program are:

- to improve 37.5 hectares of bush reserve, including 28.7 ha of Littoral Rainforest / Coastal Vine Thicket and Bangalay Sand Forest and restore the biodiversity of the Endangered Ecological Communities
- the removal of Weeds of National Significance (WONs), keystone and successional invasive weed species
- to monitor and evaluate progress to allow for the improvements to works assisting the regeneration of the Seven Mile Beach Reserve

Major outcomes from the end of the third year of the project are:

- Reduction in weeds in the reserve by >90%
- Reduction in weed 'hotspot' areas by >50%. 25 weed hotspots have been reduced to 9 still requiring more treatment
- Reduction in the number of weeds germinating in the reserve. Currently 23 weed species germinating throughout the reserve
- Increase in the number of native species germinating in the reserve. Currently >100 native species germinating throughout the reserve
- The actual size of the work area has increased with the dune systems being included, so the final work area will increase from 37.5 ha to 38.2 ha
- Weeds such as Asparagus fern and cestrum have greatly reduced in area and number but are still germinating throughout the reserve. There is still a soil seed bank, mature plants in surrounding areas and in pockets within the reserve
- Regeneration is continuing in all areas, noticeably rainforest species such as the Giant Stinging Tree, Strangler Figs, Red Cedars and Flame Trees are germinating in the Banksia and Tea Tree forests.



Red Cedar seedling regenerating in Seven Mile Beach Reserve



Work area for Seven Mile Beach Reserve weed control and bush regeneration project

Minnamurra Wetlands

Council received funding through the NSW Local Land Service project 'Realising the Potential of Wetlands Program', to conduct weed control to protect Endangered Ecological Communities in the Minnamurra wetlands complex. The site is located in the Minnamurra River wetlands complex at the northern end of Charles Avenue, Minnamurra. The wetlands area located at the site is made up of mangrove, salt marsh and swamp oak forest of approximately 9.7 ha.



Weed control program area-Minnamurra River priority wetlands complex

We are working with Conservation Volunteers Australia (CVA) to control and eradicate pest weed species which are invading the patches of the coastal salt marsh and swamp oak forest on the banks of the Minnamurra River. Work commenced in July 2015, targeting dense infestations of asparagus fern and scattered weeds including moth vine, cape ivy and the Norfolk Island hibiscus over an area of approximately 3.5 ha.

CVA bush regeneration teams will be working two days per month until June 2017 to undertake primary weed removal and control and secondary and follow up weeding. This project builds on Council's relationship with CVA in the area, complementing the wetlands weeding undertaken every second month in Trevethan Reserve, adjacent to the Charles Avenue site.



Weed control site in Minnamurra River wetlands, showing dense infestation of asparagus fern and some Norfolk Island hibiscus- June 2015



Weed control site showing major weed control outcomes in the Minnamurra River wetlands-June 2016

Jerrara Dam decommissioning

In April 2011, a study for the Dam Safety Commission looked at the flood handling capacity of Jerrara Dam. The report highlighted the concerns relating to the dam's severe flood capacity deficiency and requested the Council to investigate options to upgrade the dam to meet the requirements of the relevant flood consequence category dam.

In July 2011, Council engaged the NSW Public Works and Civil to carry out an options study for the upgrade of Jerrara Dam, provided to Council in February 2012. Council considered the options and cost estimates and subsequently decided to decommission the dam.

NSW Public Works and Civil were again engaged to undertake a concept design and report which was given to Council in September 2013. The recommendations were to breach the existing embankment to allow passage of the updated 1 in 100,000 Annual Exceedance Probability (AEP) without compromising the integrity of the remaining embankment. Provision for a fish passage was incorporated into the concept design plan to provide for the migratory species such as the Australian Bass free passage up and downstream of the existing dam wall. The dam was successfully decommissioned between June and November 2015. Council is currently considering the future use of the Jerrara Dam site following an options review and consultation process.



Jerrara Dam pre decommissioning (above) and post de-commissioning (below)



Green Army project-Jerrara Dam

In 2014, Kiama Council successfully applied for a Green Army Project to extend the Jerrara Dam Arboretum and bushland walk. The project aimed to improve the condition, extent and resilience of the rainforest and vine thicket at the Jerrara Dam Arboretum site, as well as promoting the site as an arboretum by establishing signage describing tree species. During 2015 a Green Army team, managed by the Conservation Volunteers Australia, worked successfully with Council at the arboretum site and finished the project in early 2016. The project completed 1.6 hectares of revegetation, putting in 3,000 plants and 100 species labels



Green Army volunteers at Jerrara Dam arboretum

5.3.5 COMMUNITY, VOLUNTEER & LANDCARE ACTIVITIES

Landcare, Conservation Volunteers Australia and other community organisations play an important role in rehabilitation and revegetation activities and capacity building and awareness of natural resource management issues in the community within not only the Kiama LGA, but across all of Australia.

The Kiama Municipality has 13 active Landcare groups including:

Bombo Headland Landcare

Little Blowhole Landcare

Werri Beach Dunecare

Upper Minnamurra Rivercare

Jamberoo Mountain Landcare

Cedar Ridge Landcare

Seven Mile Beach Landcare

Byrnes Run Landcare

Bombo outlook Landcare

Kaleula Headland Landcare

Foxground Landcare

Hillside Native Food Forest Landcare

Jubilee Grove Landcare

If you are interested in participating in Landcare activities or finding out more information you can visit the Landcare Illawarra website at www.landcareillawarra.org.au.

Illawarra Birders – Birds in Backyards Workshop and Bird Surveys of Council Reserves and Public Land

The Illawarra Birders have been active in fostering a close relationship with the Councils of the Illawarra, assisting with producing the Birds of the Illawarra brochures, and running birds in backyards workshops and guided walks across the Illawarra.

They have also undertaken bi-annual bird surveys of some council reserves and public land. Surveys have been undertaken in 2014 and 2015 at a number of locations throughout the Municipality including:

- Jerrara Creek and Dam
- Gainsborough Kiama Downs cycleway
- Spring Creek Wetland
- Bombo Headland / Boneyard
- Bonaira Native Gardens

For information relating to previous and proposed activities, programs and bird lists which have been developed for specific sites in the Illawarra you can visit the Illawarra Birders website at <http://www.illawarrabirders.org>.

Conservation Volunteers Australia – Workshops and Activities in Kiama LGA or Open to LGA Residents

Council has worked with Conservation Volunteers Australia on a number of projects over many years, developing an important relationship to implement natural resource management projects, which otherwise may not have happened. As well as on-ground weed control and planting activities, CVA also organises and runs workshops for interested members of the public and land

managers. In the 2012/13 – 2015/16 reporting period, a number of workshops and activities were undertaken and promoted to interested residents in the Kiama LGA by CVA including:

Fauna and wetlands workshop at Puckeys Estate–June 2014

Fish habitat workshop at CVA headquarters Fairy Meadow–September 2014

Saltmarsh and Mangrove workshop at Minnamurra River–March 2015

Wetland Carers grant to undertake weeding of the saltmarsh and perched casuarina forest in the Minnamurra River. The project has achieved success in controlling a number of weeds in the Swamp Oak Forest and adjoining saltmarsh areas including mother of millions, asparagus fern and moth vine. An arboreal orchid, *Dendrobium teretefolium* (right), was also observed flowering in the swamp oaks present on the site which is a really positive sign of the health of the ecosystem.

Green Army teams have also completed weed control activities on a number of council sites including Gainsborough Chase Kiama Downs wetlands and Werri Beach.



Arboreal orchid *Dendrobium teretefolium*
Source: Conservation Volunteers Australia, M. Andrews

CHAPTER 6: WASTE

6.1 STATE

In the past Kiama Council operated two landfill sites within the local government area, at Minnamurra and Gerroa. Both sites are now closed and in the process of remediation and rehabilitation. A Materials Recovery Facility at the Minnamurra Waste Depot also closed (in April 2008), and now all recycling is transported to processing facilities for sorting and recycling.

Council trialed a new food and organics waste collection service, OK Organics Kiama, in November 2012 in Zone 5–Kiama Downs. It included a weekly combined food and organics collection, weekly recycling collection and fortnightly garbage collection.

The trial was so successful in diverting waste from landfill that Council elected to roll the service out to the entire municipality. We introduced the service zone by zone from November 2014, with all 10 zones receiving the OK Organics Kiama service as of 30 June 2016.



Council entered into a contract with a local composting facility to receive and process the combined food and garden organics from the Kiama LGA, into a compost product to Australian Standard 4454 (2012) Compost, soil conditioners and mulches.

The NSW Waste Avoidance and Resource Recovery Strategy 2003 was reviewed and updated for the period 2014-21. The updated target for diversion from landfill is 75% by 2021. Kiama Council is well positioned to meet this target with our current diversion percentage at 66.29% in the 2015-16 financial year. This diversion rate will increase next financial year, due to all collection zones having the new waste service which includes the combined food and garden organics collection service.

Domestic waste stream tonnages and diversion rates 2012-13 to 2015-16

	Tonnes 12-13	Tonnes 13-14	Tonnes 14-15	Tonnes 15-16
Waste landfill total*	4693.64	4818.50	4738.36	4466.82
Recycling total**	3304.74	3283.91	3135.17	3629.23
Garden and food organics waste total	3996.49	3977.79	4694.2	5154.5
Diversion rate %	60.87%	60.11%	62.3%	66.29%

6.2 PRESSURE

6.2.1 PRESSURES FROM WASTE GENERATION

Both population growth and consumer behaviour are key contributors to volumes and types of waste entering landfill. Population growth in Kiama LGA is fairly stable however surrounding areas are growing at a more rapid rate, putting pressure on regional landfill sites and processing facilities. The breakdown of materials collected by Kiama Council's waste services are below.

Waste collection figures for the period 2012-13 to 2015-16

WASTE	2012-13	2013-14	2014-15	2015-16
*Urban garbage collection service	3691.77	3774.24	3760.69	3424.62
*Rural garbage collection service	183.68	202.24	216.06	229.47
*Streets/Parks/Reserves waste (50%)	521.97	493.26	469.55	443.11
Commercial waste (50%)	521.97	493.26	469.55	443.11
*Litter Footpaths/ Parks/Reserves	50.71	56.67	48.5	45.67
*Urban Kerbside Clean Up	211.56	254.96	110.24	181.93
*Household Bulky Waste drop off waste			75.5	75.02
*Illegal dumping	11.95	19.13	29.82	35
*Street sweeper waste	22	18	28	32
Total Waste	5215.61	5311.76	5207.91	4909.93

Recycling figures for the period 2012-13 to 2015-16

RECYCLING	2012-13	2013-14	2014-15	2015-16
Commercial Recycling	304.2	317.56	317.33	289.76
**Streets/Parks/Reserves recycling	33.8	35.28	35.26	32.19
**Drop of centre recycling	46.64	60.28	62.45	147.5
Commercial Drop off recycling	46.64	60.28	62.45	147.5
**Urban recycling collection	2304.45	2301.38	2351.38	2476.64
**Rural recycling collection	116.65	124.8	134.21	229.47
**Steel	111	95	114.86	183.13
**Garden Waste drop off	1383	1136.23	1397.52	1395.56
**Garden and food organic waste urban collection	2613.49	2841.56	3296.68	3758.94
**Kerbside Clean Up Steel	92.48	91.26	86.06	92.28
**Household Bulky waste drop off recycled / reused			79.6	101.91
**Street sweeper waste	475	519.91	250.15	357.11
**E-waste	93.57	48	18.2	
**Recycled Oil	3	3	3	3.5
**Batteries	3.5	3		2.5
**Gas bottles	1	2		3
Illegal dumping	23.65			
Total Recycling	7652.07	7639.54	8209.15	9220.99

*Waste figures which make up the diversion from landfill calculations

**Recycling figures which make up the diversion from landfill calculations

Emerging issues in waste include e-waste, and the proliferation of this type of waste, removing organics from the domestic and commercial waste streams, disposal of fluorescent lamps, and disposal of batteries and diversion of mattresses from landfill. At the end of the reporting period Council was finalizing the construction of a Community Recycling Centre (CRC) at its Minnamurra Waste and Recycling Facility for the disposal of household hazardous wastes.

The CRC will enable residents to dispose of these common household problem wastes such as gas bottles, fire extinguishers, paint, light globes and tubes, domestic and car batteries, polystyrene, motor and cooking oils, smoke detectors, computers and televisions, textiles, metal, cardboard and paper, mixed recyclables, agricultural cleaning and chemical drums, silage wrap and baling twine. The CRC is expected to be opened in November 2016.



The new Minnamurra Community Recycling Centre

6.2.2 ILLEGAL WASTE DISPOSAL

Illegal dumping of waste such as building and demolition waste, garden waste, household items and rubbish, abandoned cars and general littering have an impact on both visual amenity and the natural environment. Data collected by Council relating to illegal dumping incidents reported to Council and investigated by Council's Ranger Services.

Litter and Illegal dumping statistics 2012-16

	2012-13	2013-14	2014-15	2015-16
General littering	8	17	8	19
Builders Waste	16	4	19	10
Commercial Waste	6	9	17	8
Hazardous material	8	20	14	14
Illegal dumping household waste	180	182	229	214
Litter from vehicle	2	4	1	
Abandoned vehicle	13	46	27	47

6.3 RESPONSE

6.3.1 DEVELOPMENT CONTROLS

Development applications must include a Waste Minimisation and Management Plan, and a Waste Compliance Certificate is required to be submitted as a condition of consent outlining quantities of materials re-used, recycled or disposed of.

During the reporting period, statistics were recorded regarding building and construction waste from the 401 finalised development applications that were required to submit Waste Minimisation and Management Plans. The total estimated tonnage of waste

disposed of, recycled or reused on or off the construction sites was 5,251.98 tonnes. Of this 3,272.51 (78%) was recycled or re-used on site, and 5,251.98 (22%) was disposed of to landfill. These figures only cover developments over \$5,000 and do not include exempt development.

6.3.2 WASTE INITIATIVES 2012-13 TO 2015-16

Council implements a number of programs, projects and educational initiatives to work towards increasing diversion of waste from landfill, and to reduce instances of illegal dumping and littering. The following information details these initiatives:

- Electronic waste drop off collection held in February 2013 and April 2014. A total of 141.57 tonnes was recycled with approximately 4,286 individual drop offs. The newly constructed Community Recycling Centre at the Minnamurra Waste and Recycling Facility will accept E-Waste once operational.
- Planet Ark 'Cartridges for Planet Ark' program at Council resulted in 322.9kg of cartridges recycled.
- Eight Second Hand Saturday events have been held with a total of 785 stallholders participating and approximately 15,000 attendees
- Agsafe Ltd. DrumMuster program resulted in 1,575 drums being collected and recycled.
- Fridge buyback program resulted in 426 fridges collected in the Kiama LGA. Kiama was ranked 14th out of the 51 participating Council areas in NSW for numbers of fridges collected.
- Fluorescent tube and CFL lamp recycling program resulted in 266.5 kgs of globes being collected and recycled.
- Silage wrap and bailing twine drop off program was started in 2012 and has resulted in 10.62 tonnes of silage wrap and bailing twine being recycled.
- Household Bulky Waste Drop-off event was trialed in September 2014 and September 2015, with 2,219 residents participating, 331.94 tonnes of material dropped off with 54.3% of all materials collected recycled or re-used.
- Three NSW EPA Household Chemical Clean-out events collected a total of 48.52 tonnes of chemicals with 706 attendees.
- Council supported Clean Up Australia Day, with 32 sites registered and approximately 200 volunteers participating. A total reported volume of 4 tonnes of waste and 1.5 tonnes of recyclable materials collected.
- Grant funding received from the NSW EPA Waste Less Recycle More Program in 2014 including:
 - Organics collection systems (OK Organics Kiama Implementation Program) \$211,230
 - Kiama Community Recycling Centre - \$198,460 for construction of shed which was constructed in May 2016 and expected to open in August 2016
 - Kiama Litter hot spots - \$124,430, funded the installation of 7 double bin enclosures, purchase of a footpath street sweeper and two 'litter blitz' education initiatives at Kiama Blowhole Point and Terralong Street
 - Home Composting workshops - \$26,977, for delivery of home composting workshops, once a month for a period of 2 years. To date there have been 9 workshops with 167 attendees
- OK Organics Kiama-Kitchen to Compost Revolution 12 month trial was conducted in Waste Zone 5 between November 2012 and November 2013. The success of the trial led to Council adopting the new collection service across the rest of the waste

collection zones. The new waste collection service was rolled out across the remaining waste collection zones between November 2014 and June 2016. Results as at 30 June 2016 show a 40% reduction in waste to landfill, 20% increase in recycling tonnages and a 56% increase in organic waste tonnages. Council is now achieving a 77% resource recovery rate in the OK Organics collection zones. The new waste service includes a weekly combined food and garden organics collection, weekly recycling collection and fortnightly residual garbage collection service. Tables 19 and 20 show the tonnages of collected food and garden organics and CO₂ equivalents diverted from landfill by the program over the reporting period.



Tonnages for 2012-13 to 2015-16 OK Organics collection service rollout

	2012-13	2013-14	2014-15	2015-16
Garden waste drop off	1,383	1,136.23	1,397.52	1,395.56
Garden Waste urban collection	2,613.49	2,249.04	2,324.92	1,602.63
OK Organics (Food & Garden)	-	592.52	971.76	2,156.31

CO₂ (tonnes) equivalents diverted from landfill by OK Organics program using the National Greenhouse Accounts Factors (August 2015)

	2012-13	2013-14	2014-15	2015-16
Garden Waste	5,595	4,739.4	5,211.4	4,197.5
Food & Garden Organics		888.8	1,457.6	3,234.5
Recycling	4,891	4,860.2	4,640	5,371.2
Total	10,486	10,488.4	11,309	12,803.2

- Trialed 'Enviro-lock' bin locking system aimed at preventing waste spillage from bins being tipped over in windy weather or by animals. Initial trials of the system were successful and Council plans to promote the system to areas where bin spillage is a problem, and provide the 'Enviro-locks' on a cost recovery basis to interested residents.



Envirolock bin locking system

- Appointed a Regional Illegal Dumping (RID) compliance officer in June 2014 from \$53,000 sourced through the Illawarra Pilot Joint Organisation RID grant
- Regional Waste and Illegal Dumping Strategies developed and adopted in partnership with the Illawarra Pilot Joint Organisation
- Scheduled litter collections were conducted and collected 201.55 tonnes of waste
- Council is investigating options for processing of residual waste from the urban and rural collection services using alternative waste technology facilities rather than traditional landfill disposal.

6.3.3 ILLEGAL DUMPING INVESTIGATION AND COMPLIANCE OFFICER

Council has employed a permanent part-time Illegal Dumping Investigations Officer. The position is partly funded by the NSW EPA via grant funding provided as part of the Regional Illegal Dumping (RID) Program. The officer is responsible for investigation and compliance action relating to illegal dumping across the LGA, providing a more intense focus to detect, investigate and prosecute illegal dumping offenders.

As part of the RID program, Council was required to identify 'hot spot' illegal dumping locations in the Municipality and keep statistics relating to these locations. In 2015/16, 22% of illegal dumping reports to Council involved these identified 'hot spots', and in 2014/15, 33% of reports occurred in these locations.

There were 61 pro-active patrols of the illegal dumping 'hot spots' in the 2015/16 reporting period, compared with 167 pro-active patrols for 2014/15. The reason for the decrease in pro-active patrols in the 2015/16 reporting period is due to the officer spending

more time on investigating, evidence gathering and preparation for legal and court action as a result of the illegal dumping incidents. It highlights the importance of a specialist illegal dumping compliance officer as part of the Council ranger services team.

As part of the investigative and compliance actions carried out by the officer, 39 notices were issued to individuals under the *Protection of the Environment Operations Act 1997* in 2015/16, compared with 110 notices in the 2014/15 period. The majority of the notices relate to targeted investigations focusing on illegal dumping of domestic and commercial waste into public place bins.

Prior to employment of the part time Illegal Dumping Investigations Officer, Council was unable to devote sufficient resources to effectively investigate and prosecute offenders that illegally dump waste.

CHAPTER 7: AIR

7.1 STATE

There are a number of sources of air pollution that have an impact on local and regional air quality. The Office of Environment and Heritage (OEH) monitors the air quality throughout the Greater Metropolitan Region from Newcastle to Albion Park. There are currently no monitoring stations within the Kiama Municipality. There are three monitoring stations within the Illawarra Region at Albion Park, Kembla Grange and Wollongong.

The Illawarra Regional Air Quality Index (RAQI) combines data from the three regional air quality stations and uses the highest reading for the calculations. An Air Quality Index (AQI) of 100 corresponds to the relevant National Environment Protection Measure (NEPM) standard criteria for pollutants or the relevant NSW standard for visibility.

The RAQI count exceeded 100 on 12 occasions in the Illawarra region during the 2015/16 reporting period. Table 21 shows a comparison of the number of days in the year which fitted within each NEPM category over the period 2012/13 – 2015/16.

The data below shows a generally stable trend of days with Very Good and Good air quality. The 7 days in the hazardous RAQI category correspond with the Blue Mountains bush fires in October 2013.

NEPM Category	No. of days 2012/13	No. of days 2013/14	No. of days 2014/15	No of days 2015/16
Very Good	43	30	55	43
Good	269	287	276	267
Fair	45	32	33	44
Poor	4	6	1	8
Very Poor	0	3	0	3
Hazardous	4	7	0	1

Table 21 - Air pollution indicator RAQI readings for Illawarra region 2012/13-2015/16

7.2 PRESSURE

The air quality in the Kiama Municipality is under pressure from a number of sources both local and regional. Pressures include motor vehicles, solid fuel heaters, burning of household refuse, vegetation clearing, waste disposal, dust from construction sites, direct emissions of pollutants and odours from industrial and rural activities and bush fires.

Complaints relating to air pollution in the Kiama

Type of complaint	2012/13	2013/14	2014/15	2015/16
Burning complaint to Council	13	1	15	13
Commercial complaint to Council	0	5	2	2
Dust complaint to Council	6	9	3	3
Odour complaint to Council	7	11	1	6
Air complaint to OEH	2	2	4	1
TOTAL AIR COMPLAINTS	28	28	25	25

7.3 RESPONSE

7.3.1 NO BURN POLICY

Council adopted a no burn policy within the Kiama Municipality under Part 2, Schedule 8 of the *Protection of the Environment Operations* (Clean Air) regulation 2002. Through delegated authority from the OEH, Kiama Council is required to regulate outdoor burning in the Municipality.

During the reporting period there were 414 permits issued to create smoke pollution.

2012-13	2013-14	2014-15	2015-16
99	138	91	86

Table 23 - Permits to create smoke pollution 2012/13 – 2015/16

7.3.2 CYCLEWAYS

Cycleways promote physical activity as well as improved air quality through providing alternative transport options for residents and visitors. Stages 1 and 2 of the Jamberoo Cycleway were completed during the 2010/11 financial year. The section of cycleway from Gainsborough to Swamp Road was completed in the 2011/12 financial year. Work continued on the sections of the cycleway from Swamp Road to Jamberoo in the reporting period. There were minor issues with the original cycleway route, which was planned for following the Minnamurra River across Terragong Swamp, however consultation with the landowners led to a decision for the cycleway to follow Swamp Road across Terragong Swamp. The major achievements for the reporting period included:

- 1km extension to Jamberoo Valley Cycleway in 2013-14
- Completion of Stage 5 of Jamberoo Valley Cycleway 2014-15
- 500 metre extension to Jamberoo Valley Cycleway 2015-16



Section of the new Jamberoo Cycleway

CHAPTER 8: HERITAGE

8.1 STATE

8.1.1 ABORIGINAL HERITAGE

In New South Wales, Aboriginal places are administered under the *National Parks and Wildlife Act 1974*, the *Heritage Act 1977* and the *Environmental Planning and Assessment Act 1979*.

There are 108 known Aboriginal sites currently recorded on the Office of Environment and Heritage's register (Aboriginal Heritage Information Management System (AHIMS)) in the Kiama Municipality. Within these sites, 144 features are recorded as shown in the table below.

These records are significantly different from the 2012 figures of 60 sites and 97 features. This increase is likely to be associated with the studies undertaken as part of the upgrade of the Princes Highway-Gerringong to Berry bypass.

AHIMS record for the Kiama Municipality

Site feature	Number within Kiama Municipality
Aboriginal Ceremony and Dreaming	1
Art (Pigment or Engraved)	7
Artefact	63
Burial	1
Conflict	2
Earth Mound	0
Grinding Groove	4
Potential Archaeological Deposit	42
Shell	20
Stone Arrangement	2
Modified Tree (Carved or Scarred)	2
TOTAL	144

D, Gordon, OEH 2016

The NSW Heritage Council is required under the Heritage Act 1977 to keep a register, known as the State Heritage Register (SHR), of both Aboriginal and Non-Aboriginal places of significance. Listing on the SHR means that a place is protected under the Heritage Act and that the approval of the Heritage Council is required for any changes or demolitions.

8.1.2 NON-ABORIGINAL HERITAGE

Non-Aboriginal Heritage inventories have been conducted in the Kiama Municipality in 1987, 1994 and 2000-2002.

Heritage items of local significance are listed in Schedule 5 - Parts 1 and 2 of the Kiama LEP 2011. This schedule includes both heritage items and archaeological items. A full list of these items can be viewed in Kiama's LEP 2011 at www.legislation.nsw.gov.au.

8.2 PRESSURE

Aboriginal heritage sites can potentially come under threat from activities such as land clearing and housing development, lack of management strategies for assessing the potential impacts of such activities and the lack of identification of sites.

Non-Aboriginal heritage items can become degraded through redevelopment, weather conditions, vandalism, general poor maintenance and lack of understanding.

8.3 RESPONSE

8.3.1 HERITAGE ADVISER

Council uses the services of a consultant Heritage Adviser who promotes heritage conservation, educates and advises the community with regard to heritage conservation and provides specialist support and advice to Council on heritage planning and development control activities.

8.3.2 DEVELOPMENT APPROVAL PROCESS

Council has statutory responsibilities under *the Environmental Planning & Assessment Act 1979*, the *Heritage Act 1977* and the *National Parks & Wildlife Act 1979* to consider the potential impacts of any development or planning proposal on items of natural and cultural heritage which includes Aboriginal and European cultural heritage.

During the reporting period no Aboriginal Heritage Studies have been conducted.

Recent studies were carried out for:

- Draft heritage assessment for listing of the Pheasant Point Heritage Precinct as a heritage conservation area in Part 5 of the Kiama LEP

8.3.3 HERITAGE PROJECTS

In 2012/13, the three Illawarra Councils (Wollongong, Shellharbour, Kiama) developed an 'Aboriginal Cultural Heritage Management Development Assessment Toolkit'. The toolkit was prepared with grant funding from the NSW Department of Family and Community Services, with in-kind support provided by the three Illawarra councils. Kiama Council adopted the toolkit at its May meeting in 2013.

The purpose of the toolkit is to establish a process, and accompanying guidelines to assist the three Illawarra councils in identifying and applying the most appropriate type and level of consideration of Aboriginal cultural heritage values during the assessment of development applications.

Implementation of the toolkit's assessment pathway, for both external development applications and internal Council's works, will ensure that Aboriginal cultural heritage values are better recognized and more comprehensively addressed in the development or works assessment processes, and consequently afford greater protection of these important sites and values.

Council's DCP Chapter 30, was updated to include the guidance provided by the development of the 'Aboriginal Cultural Heritage Management Development Assessment Toolkit'. This chapter identifies situations where Council will require a preliminary Aboriginal Cultural Heritage Investigation to be undertaken for a development proposal, and situations where an Aboriginal Cultural Heritage Assessment will need to be undertaken for a development proposal.

CHAPTER 9: SUSTAINABILITY

A focus on sustainability both within Council's operations and within the community has become more apparent in recent years. Sustainability at its core is aimed at reducing consumption of non-renewable resources and use our energy and water as efficiently as possible, as well as preserving the natural and cultural assets of our environment for future generations.

Kiama Council has implemented many initiatives to not only identify strategies and potential future actions, but also make proactive changes to its operations and provide the community with educational and participatory events to help the Kiama Municipality become a more sustainable society.

9.1 KIAMA COUNCIL TOP 11 WATER AND ENERGY CONSUMING FACILITIES

Kiama Council collates its energy and water data through service provider Planet Footprint. Top energy consuming facilities are ranked for the current year and the water consumption is ranked compared to the baseline year of 2002-03.

There has been an increase of 5.7% in overall energy consumption for the top 11 facilities between 2012-13 and 2015-16.

This data is being used to benchmark performance of the sites and show trends in consumption from year to year.

Electricity consumption for the Top 11 consuming facilities

Facility	2012/13 Consumption (kWh)	2013/14 Consumption (kWh)	2014/15 Consumption (kWh)	2015/16 Consumption (kWh)
Kiama Leisure Centre	308,407	370,034	443,433	449,673
Blue Haven Independent Living	310,820	303,018	293,920	304,078
Kiama Council Chambers	336,890	300,300	314,804	340,208
Werri Beach HP	306,039	287,308	304,541	312,365
7 Mile Beach HP	352,640	351,967	323,921	321,984
Blue Haven Nursing Home/Hostel	307,016	287,444	311,291	313,906
Surf Beach HP	231,511	218,155	221,623	246,741
Kiama Library	175,600	176,560	180,969	193,335
Kendalls Beach HP	166,986	159,223	164,684	168,272
Kiama Showground Pavilion	151,680	155,680	161,806	167,702
Kiama Harbour Cabins	113,200	104,800	110,280	99,940
TOTAL	2,760,789	2,714,489	2,831,272	2,918,204

Water consumption for Top 11 consuming facilities from 2002-03 financial year

Facility	2002-03 Consumption (kL)	2012-13 Consumption (kL)	2013-14 Consumption (kL)	2014-15 Consumption (kL)	2015-16 Consumption (kL)
Seven Mile Beach Holiday Park	22,468	12,772	14,675	13,828	18,991
Werri Beach Holiday Park	15,856	9,516	9,004	8,974	7,464
Blue Haven Retirement Village (Nursing home and hostel)	11,158	10,114	12,445	14,660	9,658
Kiama Leisure Centre	11,121	7,644	9,700	9,812	11,448
Surf Beach Holiday Park	11,092	8,138	8,296	7,669	8,301
Kiama Sports Complex	8,815	1,023	1,474	1,544	2,412
Kiama Harbour Holiday Cabins	8,231	3,824	3,189	3,300	3,128
Blue Haven Retirement Village	8,028	15,689	18,052	15,395	16,321
Kendall's Holiday Park	7,911	7,618	7,357	6,311	5,875
Kiama Showground	7,088	4,088	3,290	2,788	4,540
Kiama Council Works Depot	3,938	1,021	1,219	1,802	1,831
TOTAL	115,706	81,447	88,701	86,083	89,969

As can be seen from the water consumption for the top 11 consuming sites in 2002-2003, the majority of sites have decreased their water consumption significantly. There are some anomalies to this trend, such as the Blue Haven Independent Living Units, which have expanded significantly since 2002-2003, and the Blue Haven Nursing Home/Hostel, which has recently had an issue with ongoing leaks occurring underneath the slab at the site.

These leaks have been difficult to find and fix, however a major leak was detected and rectified in 2015-16, as can be seen in the 2015-16 reduction in usage figures for the site. Two sites which have also trended back to higher annual water usage are the Kiama Leisure Centre and the Seven Mile Beach Holiday Park. Seven Mile Beach Holiday Park has had ongoing issues with electrolysis causing pin hole leaks in the copper piping water supply network. These leaks are fixed as they are identified, but are sometimes difficult to locate due to the sandy soil on the site, with water leaks rarely coming to the surface.

9.2 SUSTAINABILITY PROGRAMS AND INITIATIVES

World Environment Day activities

In 2015, World Environment Day was recognized by Council with a workshop series held over the month of June, including a Solar power and LED lighting workshop, keeping chooks workshop, garden design workshop, home composting workshop and native bee workshop. These events were held at the Kiama Community Garden site to assist in promotion of the facility to the community.

In 2014, World Environment Day activities included the screening of the film 'Trashed', with a presentation by Tim Silverwood, founder of the 'Take 3' program. Over 150 people attended the film night, and Council collected names of interested residents who wanted to be involved with any litter reduction programs in the future. These residents are now being engaged with the regional 'Pic it up' program.

Tim Silverwood also attended 2 primary schools with Council staff to present information to students on the impact of plastic rubbish on the planet, and in particular the marine environment. Tim's 'Take 3' program has a simple message at its core, to 'take 3 pieces of rubbish with you when you leave the beach, waterway or anywhere and you have made a difference'.

In 2013, World Environment Day was celebrated by Council by holding a Sustainable Living Expo at the Pavilion in Kiama. This was the third year in a row that 'Sustainable Living Expo' had been run by Council with the assistance of community members and support of the stallholders. There were a total of 27 exhibitors at the expo, with attendance slightly down on previous years.

Sustainable Living Workshops

Around 20 members of the public attended the solar power and LED lighting workshop held at the Kiama Community Centre in March 2015. The presentation covered emerging solar technology, selecting solar power systems to get the most value for individual situations and circumstances, common pitfalls and other basic facts regarding the technology. The LED lighting information covered the range of LED lighting available, the basics of working out how much light you require and the situations where LED will be economical in reducing your lighting costs.

'Chook keeping', 'how to grow backyard veggies' and 'successful pruning' workshops were conducted during the reporting period, utilizing the Kiama Community Garden site adjoining Stage 5 of the Blue Haven Independent Living Units. These workshops aim to foster sustainable living skills and connect community members with similar interests across the LGA. The Kiama Community Garden was officially incorporated as a group in 2012 and now manages the community garden site. The community garden is a shared garden and meets every Wednesday at 4pm and working bees are run on Wednesday and Saturday mornings.

As well as hosting Council initiated workshops, the community garden site often holds workshop for members of the garden including native bee keeping, composting and other sustainable living and garden related topics. You can find information on the garden and how to get in involved and any interesting workshops and events at the group's Facebook site www.facebook.com/KiamaCommunityGarden.

Grant funded initiatives

Solar hot water systems were installed at Kiama Council Works Depot and SES building in Kiama. Funded with assistance of the Local Government Energy Efficiency Program through the Department of Industry, Innovation and Science. The solar hot water systems replaced electric storage hot water systems.

A Gas and Electricity audit of the Kiama Leisure Centre was completed, to identify potential electricity and gas saving projects. The audit was completed with funding assistance from the NSW Office of Environment and Heritage – Energy Saver Program. Council will look to undertake the installation of solar photovoltaic panels on the Leisure Centre roof when capital funding becomes available and subject to structural engineering assessments. This should produce approximately 130-140 MWh of electricity per year, with 90% of the electricity being consumed within the facility. Other recommendations contained within the audit will be implemented as funds become available and equipment is identified for replacement.

Council Administration Building 10kW photovoltaic system

The 10kW photovoltaic system on the Council administration building was commissioned on 1 August 2011. The system is sized so as not to export electricity to the grid, and all electricity produced by the system is utilized within the building. Up until the 30 June 2016 the photovoltaic system has produced 74,170 kWh, which is equivalent to approximately 5% of annual electricity consumption at the site.



Biodiesel and fuel usage for Council's fleet and operational vehicles

Kiama Council installed a self banded above ground fuel tank, which it uses for B20 and B50 biodiesel blends to run its operational vehicles and plant. The proportion of B50 biodiesel has dropped off in the recent financial year due to biodiesel shortages from Council's supplier. It is currently unclear how much if any biodiesel will be available to

Council to utilize in their plant and operational vehicles into the future. The table below lists the last four financial year's fuel usage data.

Fuel usage data for 2012-13 to 2015-16

	2012-13	2013-14	2014-15	2015-16
ULP	145,835	51,158	65,433	55,455
E10		82,093	63,991	66,869
Diesel		57,234	51,011	172,207
B20 Biodiesel		283,000	288,578	399,853
B50 Biodiesel		128,522	140,429	24,000
B20 & B50 Biodiesel	420,143			