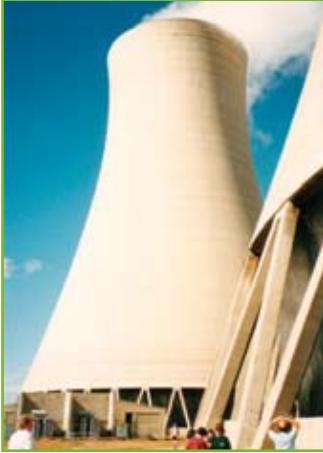


4. Waste Management

What is Waste?

Waste is unwanted materials or products, which are considered to be no longer useful. These materials/products can be solid, liquid and/or gaseous www.emrc.org.au/glossary.asp



Gaseous waste from power station, Hunter Valley NSW, source: OceanWatch Australia



Solid waste, source: OceanWatch Australia



Liquid waste being treated at a sewage treatment plant, source; Bega Valley Shire Council

What are the different categories of waste?

Waste can be divided into different categories based on the source of the waste within a catchment known as the “waste stream”. These waste streams include municipal waste (household wastes), shipping and boating waste, construction and demolition waste and commercial/industrial waste.

What are Household Wastes?

- Solid household wastes are the result of food preparation and other activities in or about the home. These generally solid wastes are dealt with in most areas through regular local government pick up. In the past much of this went directly to landfill but in more recent times as landfill opportunities run out these wastes are now being sorted and where possible being recycled and reused to reduce volumes.
- Liquid household wastes are usually dealt with via a sewerage system that pipes human waste water or effluent (sewage) to a sewage treatment plant (STP). At these locations the waste liquids are treated. Treatment generally consists of “primary treatment” that removes solids, “secondary treatment” that aerates and removes certain microbes that would otherwise remove much of the oxygen from waterways and provides a settlement for removal of fine particulate matter. “Tertiary treatment”, where it occurs, goes well beyond this and endeavours to remove nutrients and viruses. Advanced tertiary treatment often involves extra processes such as carbon filtering and reverse osmosis, these processes endeavour to remove viruses and hormones so that drinking water quality can be produced (this is also the best level of treatment for aquatic health). Most sewage treatment only undergoes secondary treatment in NSW and treated water is then either diverted to a river or stream or to an ocean outfall if near the coast. In some areas trials have been undertaken to use both the sewage sludge and the waste water for fertilising agro forestry and other initiatives.
- Gaseous household wastes include the outputs from burning fuels in or about the home and they also include the emissions family motor vehicles or other small engines such as mowers and trimmers.



Waste in a landfill, South Coast NSW, source: OceanWatch Australia



Household green garden waste, source: OceanWatch Australia



Gaseous waste emissions from a motor vehicle, source: OceanWatch Australia

What are Industrial or Business Wastes?

- Solid industrial waste ranges across a wide range of materials that are the by products, off cuts, spoil, overburden or residue from a variety of activities and processes. They can include building wastes, fabric, metals or plastics, residue or spillage from loading, unloading or processing materials. These materials have to be disposed of or dealt with in some way. The cost of disposing of trade or processing wastes has become considerable and so there is more incentive to investigate recycling or reuse options.
- Liquid industrial wastes are also many and varied types and some so toxic that special safeguards have to be taken to prevent them escaping into the environment where it would be difficult or even impossible to contain them. Different industries deal with liquid wastes in different ways. Some liquid wastes are able to be disposed of into the normal sewerage system and processed at STPs. However others have to be specially containerised and transported to either special sites for storage or reprocessed or recycled into something less toxic or a substance that can be reused.
- Gaseous emissions from industry are also varied and some have to be captured and or processed to reduce toxicity and concentrations of certain substances to safe levels.



Special containers for the disposal of solid industrial waste, source: OceanWatch Australia



Liquid hazardous waste, source: OceanWatch Australia

The NSW Department of Environment and Climate Change is responsible for regulating emissions and wastes from industrial processes and other activities particularly those that have a designated category or schedule. Such industries and activities must be licensed.

<http://www.environment.nsw.gov.au/environmentalissues.htm>

Shipping and Boating Waste

Many living things ranging from fish to micro organisms are known to be spread in the ballast waters of ships arriving in Australia. These creatures can be transferred between regions, countries and continents in this way.

With ships docking at Iluka, Harwood Sugar Mill and Maclean the potential for this to occur is a real one. The ongoing regulation and monitoring of vessels visiting the estuary should be a high priority to avoid this type 'biological' contamination of our marine and estuary environments by exotic organisms.

Boats may also be the source of waste from littering and the inappropriate disposal/treatment of refuse and other wastes by coastal boat users as well as shipping in international waters. Boats also pose a risk to waterway health through the disposal of bilge (i.e. the water that collects inside the bottom of a boat or ships hull) and sullage that includes petroleum products or human effluent. There are strict regulations governing the disposal of wastes by boats. Marinas working on boats and their antifouling methods and paints have serious pollution risks. Some adverse effects of boating include pollution by unburned exhaust gases from power boats, fuel spills and litter. Again water quality is at risk without careful management of these activities.



Marine growth can cause fouling of boats and other structures, source: Tasmanian Fishing Industry Council 2008

<http://www.maritime.nsw.gov.au/hbrclean.html>

<http://www.maritime.nsw.gov.au/garbage.html>

[http://www.amsa.gov.au/Marine Environment Protection/Protection of Pollution from Ships/](http://www.amsa.gov.au/Marine_Environment_Protection/Protection_of_Pollution_from-Ships/)

[http://www.amsa.gov.au/Marine Environment Protection/Protection of Pollution from Ships/Pollution from Fishing Vessels.asp](http://www.amsa.gov.au/Marine_Environment_Protection/Protection_of_Pollution_from-Ships/Pollution_from_Fishing_Vessels.asp)

[http://www.amsa.gov.au/Marine Environment Protection/Protection of Pollution from Ships/Prosecutions for Ship Sourced Pollution/](http://www.amsa.gov.au/Marine_Environment_Protection/Protection_of_Pollution_from-Ships/Prosecutions_for_Ship_Sourced_Pollution/)

<http://www.maritime.nsw.gov.au/sewage.html>

<http://www.bia.org.au/environment/background.html>

<http://www.bia.org.au/environment/boat-users.html>

The inappropriate treatment of boat fouling is a serious issue and can cause pollution of estuaries and have an impact on estuary organisms including oyster leases when undertaken using inappropriate methods such as using toxic tin based paints.

Demolition and construction wastes

Construction and demolition wastes includes asbestos, contaminated soil, concrete products, timber, plasterboard, plastic, textiles, asphalt, glass, clay and garden and vegetation. From 1998 to 2004, around 1 million tones of such waste was disposed to landfill each year in the Sydney Metropolitan Area. In response to this, DECC has conducted studies to see what this waste consists of and what may be recovered.

See www.environment.nsw.gov.au/resources/warr/CnDWasteStream.htm



Construction waste, source: OceanWatch Australia

What are the Issues Caused by Wastes in a Catchment?

The waste streams outlined above are generally manageable but the rate at which they continue to be produced when compared to the levels of certain wastes being reduced, recycled or reused it is uncertain whether it is sustainable.

All levels of government in Australia are trying to get activities of individuals, organisations and communities to become sustainable in all aspects of waste production. Packaging that forms a huge portion of the waste stream is an area being targeted by governments at all levels.

<http://www.environment.gov.au/settlements/waste/>



Wastes entering the catchment can cause many problems. Most obvious is the unsightly visual impact of gross pollutants entering waterways and washing up along the coastline. These solid wastes also have impact on marine life with many species of marine animals ingesting this waste with lethal effect. Most of these wastes originate from the land where people litter or illegally discard wastes and it then finds its way into stormwater flows. However not all solid waste originates from the land. The activities of boats on coastal waterways as well as from ocean going vessels in Commonwealth waters further out to sea are responsible for some of the solid wastes littering our beaches. The discarding of recreational fishing tackle or the gear of commercial fishers can also have impacts on estuary life (tangling of aquatic birds, ghost trapping of non target species). http://www.amsa.gov.au/Marine_Environment_Protection/

Liquid wastes in catchments may be largely treated in sewage treatment plants but these wastes usually only receive secondary treatment. This means that nutrient levels may still be significant when they are released to the environment.

Other impacts of waste (other than water pollution, loss of visual amenity and injury and death caused by entanglement to seabirds, marine mammals and other fauna) include air pollution, contamination of land and loss of land which is used for landfill sites. <http://www.environment.gov.au/soe/2006/index.html>

Some Statistics on Waste in Australia

(source: *State of the Environment Report 2006* www.environment.gov.au/soe/2006/index.html, *CleanUp Australia*: www.cleanup.org.au)

Waste generation in Australia

- Out of all the countries who are members of the Organisation for Economic Co-operation and Development, Australia is the fifth highest generator of waste, just behind Norway, Iceland and the United States.
- For every person in Australia, about 1 tonne of waste goes to landfill each year, with only 4% of waste recycled or re-used.
- Recyclable material makes up almost 80% of total household waste in Australia.
- 80 million plastic bags are dumped in Australia each year, creating a serious threat to our precious marine life.
- An estimated 7 billion cigarette butts end up in Australian waterways, streets and parklands each year.
- Australians use more than 3.5 million tonnes of paper each year. Only 11% of Australia's office paper is currently being recycled. (Source: www.visy.com.au). Nearly 9 out of 10 sheets of office paper are being thrown away. (Source: Planet Ark November Report 2005).

Improvements in how Australian's manage waste

- Recycling of solid wastes has increased to an average of 36% across Australia.
- In Sydney, the amount of municipal waste collected for recycling per person has increased by 67% from 1995-2005 and the amount of waste going to landfill has been reduced by 37% per person.
- NSW DECC's waste reduction policy for construction waste has resulted in only 7% of waste generated being disposed of in landfill, 19% reprocessed into building materials and 74% recycled or re-used.

Interesting facts

- Recycling of paper and containers avoids the generation of 106 kg of carbon dioxide each year in a typical NSW household
- Saving and using organic waste as compost has an environmental value of around \$114 per tonne (accounting for resource savings, environmental benefits of using less chemical fertiliser, less air and water pollution, lower landfill cost etc).

Some Other Ways that Governments, Groups and Individuals Responded to the Waste Issues Affecting the Environment

Australian Government Responses to Waste Issues

<http://www.environment.gov.au/settlements/waste/>

The Australian Government is working with State Governments and Territories as well as businesses to reduce waste through increasing recycling and re-use of waste, reprocessing of waste into useful materials (resource recovery) and reducing the amount of waste produced through a number of voluntary and co-regulatory measures. The government department responsible for this is the Department of Environment, Water, Heritage and the Arts (DEW).

DEW is focussing on the following sectors:

- automotive waste (includes tyres);
- oil recycling;
- plastics industry;
- electrical industry; and
- all industries within the packaging chain.

DEW is working with each sector to develop programs in partnership with industry and other stakeholders. One example is the product stewardship in the oil industry (*Product Stewardship (Oil) Act 2000*), which has resulted in a 37% increase in the amount of oil recycled and reused www.environment.gov.au/soe/2006/index.html, <http://www.environment.gov.au/>



Example of packaging waste, source: OceanWatch Australia

Recycling Guidelines

The Australian Government is also developing guidelines for water recycling through the Environment and Protection Heritage Council, to ensure safe and environmentally sustainable reuse of waste waters across Australia. The Guidelines are being developed in stages, the first looking at reuse and recycling of sewage effluent and grey-water for non drinking purposes including:

- use in industry e.g. water cooling systems;
- fire fighting;
- irrigation of urban recreational and open space, agriculture and horticulture; and
- residential garden watering, car washing, toilet flushing and clothes washing.

For example, care must be taken when treated effluent is reused on golf courses, such that the effluent does not leach into adjacent waterways, contaminating them and potentially putting at risk the health of the aquatic environment and the species and industries that rely on healthy waterways (e.g. oysters).

It will also look treating grey-water (i.e waste water from the kitchen, laundry and bathroom, but not the toilet) on site at residential and office developments.

The second stage focuses on:

- stormwater use in urban areas; and
- aquifer storage of stormwater and large-scale treated grey-water

See www.nepc.gov.au/ephc/water_recycling.html

Antifouling Program

The Australian Government has developed an Antifouling Program under the Oceans Policy of the Natural Heritage Trust. This program was set up to help develop alternatives to environmentally harmful Tributyltin (TBT) based



Marine biofouling, source: Tasmanian Fishing Industry Council 2008

antifouling paints, with TBT based antifouling paints banned for use on all Australian docks in 2006. See (www.environment.gov.au/coasts/pollution/antifouling/index.html) for further information.

MARPOL

The Australian Government has signed up to the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). MARPOL essentially regulates the discharge of waste and other pollutants generated from ships out at sea. This includes oils, harmful packaged substances, air pollution, garbage and sewage. For further information see www.amsa.gov.au

NSW Government Response

The NSW government, along with most other States and Territories have a number of policies and strategies aimed to reduce to amount of waste that goes to municipal landfills. Mostly this has been to:

- reduce the amount of waste produced;
- increase the recovery and recycling of materials, thereby reducing the amount that goes to landfill;
- promote the development of new waste treatment and recycling facilities; and
- reduce the environmental impacts of waste facilities.

The NSW Government's Department of Environment and Climate Change (DECC) is responsible for waste management in NSW, i.e. not only reducing waste production and increase recycling and resource recovery, however also reducing the negative impact of waste on the environment. DECC has produced a Waste Avoidance and Resource Recovery Strategy (DEC 2006) under the Waste Avoidance and Resource Recovery Act 2001. This Strategy aims to:

- avoid and prevent creation of new wastes;
- increase the use of renewable and recovered materials reduce toxicity in products and materials; and
- reduce litter and illegal dumping; and
- increase recycling in each of the waste streams.

One of the subsets of this Strategy is the Industry Partnerships Program. DECC has worked with over 460 organisations through this Program to help them embrace cleaner production practices. Participants involved have range from agriculture, boating, paint and ink manufacturing, engineering, food production, retails to commercial painting and printing.

Legislation, Incentives/disincentives/ education

DECC also regulates waste management in NSW through the Protection of the Environment Operations Act 1997 (POEO Act) and the Waste Avoidance and Resource Recovery Act 2001. Through this Act, DECC regulates the discharge of waste into the environment (point source pollution). For example, an STP much be licensed by DECC to discharge treated sewage into waterways and must be monitored to ensure compliance with the conditions imposed by DECC on the license. (DECC does not regulate non point source pollution, however is developing a Diffuse Waster Pollution Strategy to address this issue).

DECC also uses a number of other ways to manage waste such as education and economic tools to avoid the creation of waste and increase waste recovery. The Waste and Environment Levy is one such economic tool that has been introduced. It aims to discourage disposal of waste in landfill, by making it more expensive to do so, i.e. the cost to dispose of one tonne of waster will increase by \$6 every year. The money raised from this levy will fund waste education and provide rewards or incentives for inventive new waste reduction initiatives.

Education campaigns run by DECC include "Our environment – it's a living thing". Since 2005, DECC has worked with a number of non-government organisations (NGO's) to spread the messages about responsible waste management to a greater audience. These NGOs include the Total Environment Centre, the Australian Conservation Foundation, the NSW Nature Conservation Council and the NSW Council of Social Service.

See www.decc.nsw.gov.au and www.environment.nsw.gov.au/soe/soe2006/index.htm

Snapshot on Fishing Industry Waste

Waste generated by the fishing industry can include:

- plastics
- fishing line and nets,
- offal (left over fish carcass from filleting/processing); and
- fuel emissions.

One of the main issues for this industry is the impact of discarded fishing equipment such as tangled fishing line, torn nets, hooks and ropes etc which pose a threat to aquatic life. It should be noted, however, that the fishing industry is only ONE of the sources of marine debris and other waste impacting on our estuaries and marine ecosystems.

Thus the fishing industry has embarked upon a number of programs and initiatives to address this issue and other waste issues:

For example:

- The East Coast Australian fishing industry has partnered with OceanWatch Australia and Australian Composite Technology as part of their *Fishing For Waste Program*. The Program involves collection of unwanted net and line from the fishing industry in South East Queensland and NSW. This line is collected, and recycled, reducing the amount going to landfill.
- The recreational fishing industry is involved in a program run by OceanWatch Australia called “TAngler Bin” to address the issue of discarded line and the subsequent impacts on the coastal-marine environment. Participating councils have installed bins in hotspot recreational fishing locations in NSW for fishers to discard unwanted and tangled line. This line is then collected and recycled and is thus removed from the environment. See www.oceanwatch.org.au
- Fishers have also taken various actions to reduce waste as part of their Environmental Management Systems (see www.oceanwatch.org.au).

The oyster industry has also embarked upon various initiatives to reduce waste.

These include:

- clean up of derelict leases, replacement of tar coated products from oyster leases with recycled plastic trays and baskets. Clean ups have taken place in areas such as Wallis Lake as part of Great Lakes Councils “Wallis Lake Oyster Lease Clean Up Program”, Camden Haven and Hastings River estuaries. This aims to improve water quality and estuary health.



Waste or discarded fishing equipment such as tangled fishing line, torn nets, hooks and ropes etc also pose a threat to aquatic life, source: OceanWatch Australia



Cleaning up derelict oyster leases, Hawkesbury River NSW, source: Rob Moxham

Local Government Responses to Waste Issues

Each local council differs in its response to waste management, however are guided by a number of the State Government's above mentioned Programs and initiatives.

Local government, through the Local Government and Shires Association of NSW has worked in partnership with the State Government (DECC) to establish a Local Government Buy Recycled Alliance. This involved 58 councils, either joining individually or as parts of their Regional Organisation of Councils or Voluntary Waste Groups. Over a three year period (2002-2005), member councils reduced waste going to landfill by the following amounts:

- ~ 31 tonnes of scrap metal;
- ~ 300 000 cubic metres of garden organics;
- ~ 525 000 agricultural chemical drums;
- ~ 150 tonnes of household chemical waste;
- ~ 1.2 million plastic bags; and
- ~ 45 000 tonnes of construction and demolition waste

Local councils also address waste issues through regional alliances such as Midwaste (8 members councils on the Mid North Coast). MidWaste has developed a "Regional Resource Recovery Strategy" which links in closely with the State Governments Strategy. See www.midwaste.org for further information.



Community Groups/Organisations

Clean Up Australia

Clean Up Australia is a not for profit organisation that works with communities to clean up, fix up and conserve our environment. One way they do this is through their "Clean Up Australia Day" campaign. Anyone can participate in this event by volunteering to either join an existing clean up site or organise a new site to be part of the "Clean Up". To date, Clean Up Australia Day participants have collected over 200,000 tonnes of rubbish – that's 4.7 million household wheelie bins!

See www.cleanup.com.au for further information about this event and other initiatives Clean Up Australia is involved in such as "So No to Plastic Bags" and "Clean Up Mobile Phones".

Planet Ark

Planet Ark has lead the way in reducing the usage of plastic bags in supermarkets. They have developed a reusable shopping bag; that is stronger than the conventional plastic bags. This has helped reduce the number plastic bags going to landfill or ending up in the coastal environment. See www.planetark.com.au for other green solutions to reduce waste.



Planet Ark's "Go Green" re-usable shopping bag, source: OceanWatch Australia

What Can You Do?

Waste and Recycling

- Ask your local council for changes in the local service to incorporate best management practice resource recovery methods.

Recycling

- Ask your local council about what can and cannot be recycled through the kerbside recycling service.
- Separate your recyclables and use the kerbside recycling system.

- Never put plastic bags, light globes or broken glass into recycling bins – the whole bin will be rejected.
- Paper in recycling bins can be ruined by mixing it with other material such as food scraps. At work, separate your bins and educate your workmates about their use.
- Do an audit of your paper usage and disposal at work. Arrange for a company to collect paper for recycling. You'll find them listed in the 'Yellow Pages'.
- Australians throw away more than 18 million cartridges every year. This amounts to over 5,000 tonnes of material, including laser toner cartridges, inkjet cartridges, photocopier toner bottles and drums that will eventually end up in landfill. Find out how you can [recycle your cartridges](#).
- Put glass, cans, plastics and paper into the kerbside recycling system and look for ways to reuse or recycle other goods eg. a garage sale; clothing and furniture to charities.
- Find out about your local councils recycling schemes and put a list on the fridge to make sure your household is aware.
- Littered and lost fishing line harms our wildlife, pollutes our favourite fishing spots and can ruin a great day fishing. Dispose your unwanted fishing line in a TAngler bin and OceanWatch Australia will recycle it.



Waste

- Australians now throw away 3.3 million tonnes of food every year – up to a quarter of the country's food supplies, mainly because we purchase too much. Consider planning your meals and only buy what you need.
- Give unwanted items to charity or your local secondhand shop – or get together with your neighbours and have a garage sale.
- Do an audit on your unwanted items – could any of these have been avoided by buying differently in the first place?
- Always put litter in the bin.
- Cover piles of sand, soil or mulch to stop them washing into the drains when it rains.
- At work, you can save paper by using email instead of the fax. Don't print emails unless really necessary. Set printers and photocopiers to double-sided printing where possible.
- At work you may notice that packaging around office equipment can be a major source of waste. Ask your equipment supplier to take used packaging back for recycling or reuse.
- At work, you can reduce paper wastage by purchasing recycled papers. Ask your supplier about what recycled paper or stationery they stock. If they don't have it ask them to get some in or change suppliers.
- Clean your paths and driveways – but never with the hose.
- An easy way to reduce waste is to compost your food and garden waste at home. It makes great fertiliser for your garden. Anything organic except meat, fish, bones and animal droppings can be composted. Taking organic matter out of the general waste stream reduces the amount of leachate entering waterways and thus maintains healthy waterways.
- If everyone composted and mulched their green waste, we could slash total waste going to landfill by up to a third.
- Do you live in a flat and want to start a composting system? Talk to your body corporate about setting up a shared compost bin. Volunteer to manage the system or set up a roster.
- Reduce waste by purchasing your fruit and vegetables loose instead of pre-packed in plastic.
- Take your own bag when you shop. Refuse plastic bags or ask for a cardboard box.
- Many products now come in re-usable or refillable packs. These include deodorants, skin creams, moisturisers, dishwashing liquid and liquid detergents. Keep an eye out for this next time you shop.
- Use a worm farm to dispose of kitchen scraps. Their castings are an excellent fertiliser!



- Put a notice on your letterbox refusing junk mail.
- Animal droppings should not go into the stormwater system. Please clean up after your pet and dispose the droppings in the special bins provided by some council or take it home and put it in your garden or down the toilet.
- When picnicking in the bush or beach, always take a bag to bring your rubbish out with you or use the bins provided.
- Discarded plastic that makes its way into the ocean kills thousands of marine mammals every year. Make sure you dispose of plastics in the bin or kerbside recycling system (if labelled as recyclable).
- While there is no definitive measure in place, estimates indicate that around 7 of the 24 billion filtered cigarettes sold in Australia every year end up as litter. They are non-biodegradable and may take up to five years to break down. Dispose of butts only in bins or ashtrays.
- Encourage children to drink water from the tap, bubbler or bottle, instead of soft drinks and cordials. Remember they will need to drink more when outdoors in hot weather or when active. If you or your children do have a soft drink, make sure you recycle the plastic bottle or can.
- Recycle electronic waste, known as “e-waste” instead of disposing of them. See <http://www.cleanup.org.au/PDF/au/electronic-recycler-list--230709.pdf> for a list of e-waste recyclers near you.

