Dorset Marine and Coastal Topic Paper Series 2011

Water Quality and Pollution

Accessible beaches and clean coastal waters are two of the principal attractions of the Dorset coast. The public's health and environmental expectations are increasing and it is therefore important that the quality of the coast and near shore waters is maintained.

Extensive investment by the water companies together with detailed monitoring work undertaken by the Environment Agency has contributed to cleaner water and beaches in Dorset in the past decade. However pollution problems can still occur and continual vigilance is needed to maintain the existing high quality of Dorset's coastal waters.

The severe floods of 2007 and 2008 highlighted the serious health problems that can be associated with flood waters especially when these flood waters reach the sea. The washed away soils, refuse and debris flow into adjacent water-bodies such as lakes and rivers and later are swept away into the sea. Therefore water quality, water pollution and flood waters are completely inter-linked

European Legislation

Bathing Water Quality and the Bathing Waters Directive

Of the 20,000 bathing areas monitored throughout the European Union in 2009, two-thirds were on the coast. Compliance with mandatory values (minimum quality requirements) at coastal sites increased from 80% in 1990 to 96% in 2009.

Bathing waters can be coastal waters or inland waters (rivers, lakes). To be covered by the Directive, swimming must be accepted as permitted, or not prohibited and traditionally practiced by a large number of people. Swimming pools and waters for therapeutic purposes are not covered. The Environment Agency (EA) are responsible for the monitoring of bathing waters in England and Wales and bathing waters here are 'designated' by Defra. In May 1976, the EU set limits for physical, chemical and microbiological parameters and National authorities (such as the EA) must ensure that these limits are not exceeded. In total, 19 quality parameters could be monitored (if deemed necessary) such as transparency, colour, the presence of Phenols, Cyanides, Ammonia tars and mineral oils. In practical terms, most of these substances are only monitored if there is a suspicion that they are present or if there has been a sudden deterioration in water quality. In the case of Dorset waters, it is the microbiological conditions that are of greatest relevance.

Total Coliforms	Faecal Coliforms	Faecal Streptococci	Number of Samples reaching the standard	Grade given
No more than 500	No more than 100	No more than 100	At least 95%	Excellent (= Guideline Standard
No more than 10,000	No more than 2000	Not recorded	At least 95%	Good (= Mandatory Standard)
No more than 10,000	No more than 2000	Not recorded	Fewer than 95%	Poor

Water Quality standards 9all per 100 ml of water) currently used by the Environment Agency

Water quality in the near shore area is assessed by the quantity of specific bacteria within water samples. Microbiological counts are undertaken to verify that water quality meets the EC's Bathing Water Directive parameters. Compliance requires that 95% of at least 20 samples, taken at weekly intervals from May 1st to 30th September each year reach the mandatory performance level. Samples must have no more than 10,000 total coliform bacteria and no more than 2,000 faecal coliforms per 100ml of water to reach the Mandatory standard.

Whilst the 1976 Bathing Water Directive has been an EU success story by improving the

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quality of our bathing waters, knowledge and experience in many fields has progressed since 1976. Therefore the EU revised and updated bathing water quality protection through a new Bathing Water Directive in February 2006, (Directive 2006/7/EC) and repealed the original Directive: 76/160/EEC. The new Directive lays down provisions for more sophisticated monitoring and classification of bathing water. The new rules applied from March 2008 but Member States have until 2015 to implement them fully. The revised Directive uses two parameters to assess water quality; *Escherichia coli* and intestinal enterococci, using a four year data set for each set of results, and sets much tighter standards than the original Directive. Measurement of 'total coliforms' will no longer be required. There will be four classification categories:

- **Excellent** (approximately twice as stringent as the current Guideline standard)
- **Good** (similar to the current Guideline);
- **Sufficient** (approximately twice as stringent as the current Mandatory standard)
- **Poor** for waters which do not comply with the Directive's standards

There will be a new requirement for information about water quality and potential sources of pollution at bathing waters to be provided on signs and via the internet. Regular reviews of the list of bathing waters will be carried out and the public will be encouraged to participate in the review.

Monitoring for *Cyanobacteria* (Algal blooms, mats or scum) is also now a requirement. These changes could affect compliance rates along the Dorset coastline.

Key dates for the introduction of the revised Directive are:

- 2011: The Environment Agency will publish a profile for each bathing water in England and Wales
- 2012: Signs must be in place at all bathing waters by the beginning of the bathing season. The Environment Agency will begin monitoring using the parameters of the revised Directive
- 2014: Final bathing water report using the standards of the current Directive
- 2015: First set of classifications using the new parameters will be published, based on the data set commenced in 2012

It is a common misconception that all bacteria in bathing waters originate from sewage schemes. As discharges to sea from sewer outlets improve, it is becoming increasingly apparent that there is a significant problem from diffuse sources such as agricultural run off (involving livestock faecal waste, pesticides and soluble fertilizers), illegal private discharges, road water runoff in urban areas and discharges from storm water drainage systems where sewers have been illegally connected into them. These combined issues are a real challenge. We are already starting to tackle these problems using initiatives such as Catchment Sensitive Farming and Sustainable Urban Drainage Systems (SUDS).

Dorset Results

Since 1995 records of compliance have been improving in Dorset due to the completion of many coastal investment schemes and other works carried out by Wessex Water, South West Water and the Environment Agency. Between 1987-1996 there were 33 classified Bathing sites in Dorset, and increased to 38 by 2010. In 1993 a total of 28 (84%) sites passed the bathing water tests at the mandatory standard, the remainder failed. The following table shows that the situation today is significantly better:

Excellent (Guideline Standard)	Good (Mandatory Standard)	Poor (Fail)
34 (89.5%)	3 (7.9%)	1 (2.6%)

Summarised Dorset results for 2010 (38 sites)
(The assessments represent the overall summary to September 2010)

The one failed site recorded in 2010 was Church Beach, Lyme Regis. The annual record for this beach (over the past 23 years) shows: 'Poor' 10 times, 'Good' 10 times, 'Excellent' once and 'Closed' twice. It should be noted that flash floods can result in excessive quantities of pollutants entering the catchment and then the sea. This means that individual results can be

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deceptive and so results obtained over time are more indicative of the true health of the water body.

Informing the public about beach and water quality

1. Blue Flag Award:

- This is an international award scheme given to coastal destinations which have achieved the high quality in water cleanliness, shoreline facilities, safety, environmental education and management
- The number of beaches and marinas gaining Blue Flag status increases every year – with 3,450 now displaying the quality indicator in 41 countries
- The Blue Flag Programme is administered in England by the Keep Britain Tidy Group (formerly known as ENCAMS) and is managed internationally by the Foundation for Environmental Education (FEE)
- The beach must have designated bathing water status. The bathing water must be monitored and identified under the Bathing Water Directive 76/160/EEC and comply with both the Mandatory and Guideline microbiological values

2. Quality Coast Awards

- The Quality Coast Award is a national award scheme also administered by Keep Britain tidy
- The bathing water quality must reach mandatory microbiological levels as prescribed under the BWD
- Beach managers are provided with a three year action plan to help identify areas which may require improvement
- There are three categories identified: Resort Bathing Beach, General bathing beach and Non-bathing beach

Dorset beach. Copyright: Dorset Coast Forum

The Water Framework Directive (WFD, 2000) (in relation to the coast)

The EC Water Framework Directive (WFD) (2000/60/EC) is an innovative piece of legislation and is possibly the most significant piece of European water management legislation for a generation. Previously, a range of inconsistent European legal instruments covered different aspects of water management. The Directive aims to introduce a simpler, more coherent approach. It was introduced in December 2000 and was transposed into UK law in December 2003. The Directive provides an opportunity to plan and deliver a better water environment.

The scope of the Directive includes:

- surface freshwater (including lakes, streams and rivers)
- groundwaters and groundwater dependant ecosystems
- estuaries
- coastal waters (out to one mile from low-water).

The overarching theme within the Directive is to achieve "good ecological and good chemical status" (of European waters) by 2015; unless there are grounds for derogation. In these cases the achievement of good status may be delayed until 2021 or 2027. The other stated aims of the Directive are to:

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- prevent further deterioration and protect and enhance the status of aquatic ecosystems and associated wetlands
- promote the sustainable consumption of water to reduce pollution of waters from harmful and hazardous substances
- prevent the deterioration in the status, and to progressively reduce pollution of ground waters
- contribute to mitigating the effects of floods and droughts

Advanced sewage treatments can now prevent pesticides, nitrates and phosphates from re-entering the water cycle. In many regions the water companies are already installing advanced water treatment plants to ensure compliance with the limits set by the Directive.

The Directive introduces three key changes to the way the water environment must be managed across the European Community:

1. An enhanced set of environmental objectives that must be formulated and delivered. That requires reviewed ecological objectives and biological objectives, all designed to protect and where necessary, restore the structure and function of the aquatic ecosystems themselves. The health of the animal and plant groups that live in surface waters will now be a main factor that finally describes the state of those waters.

2. the introduction of a river basin management planning system (see below). This will be the key mechanism for ensuring the integrated management of: groundwater; rivers; canals; lakes; reservoirs; estuaries and other brackish waters and coastal waters.

3. a new, far-reaching classification / assessment scheme is being developed to describe the state of the water environment under the WFD. It is anticipated that when the new classification scheme is fully operational, it will eventually replace the current General Quality Assessment (GQA) methodology. The old classification system concentrated on a small number of chemical and biological indicators.

At least seven earlier water legislation Directives will have to be repealed by 2013 (three were repealed in 2007) but elements will be reincorporated into the new legislation. There will also be changes to planning legislation and Planning Authorities already have a duty to promote the sustainable use of water.

Naturally, these initiatives are going to be expensive and the principle of “let the polluter pay" will be followed and augmented by increased charges levied upon the water customer.

River Basin Management Plan (RBMP) (in relation to the coast)

The WFD requires the identification of River Basin Districts. These defined Districts are used to implement the terms of the WFD. In England and Wales there are 11 River Basin Districts. Dorset is part of the South West District. There is also a requirement under the WFD to investigate and learn more about river catchment processes in order that better management decisions for these water systems may be made. The main points are:

- District liaison panels have been set up and include representatives from business, planning authorities, environmental organisations, navigation, fishing and recreation bodies and central, regional and local government
- The WFD requires that River Basin Management Plans (RBMP's) be produced and the plans for each river basin district have to be updated every six years. The first cycle will end in 2015.
- The Directive requires the introduction of a statutory system of quality classification based upon the typical 'river basin'
- There are five classes for ecological status; 'high', 'good', 'moderate', 'poor' and 'bad'. As noted above, the WFD requires that the overall ecological status of a water body be determined by the results for the biological or physicochemical quality element. For greater detail, see: http://www.wfduk.org/UKCLASSPUB/LibraryPublicDocs/class%20report
- The first classifications were published at the end of 2009
- The typology for estuarine and coastal waters is based on latitude, longitude, salinity and tidal range, wave exposure and depth for estuarine waters

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The SW River Basin Management Plan

Total Water Body numbers in the SW River Basin District

	Rivers, Canals, Surface waters	Lakes and Reservoirs	Estuaries	Coastal	Groundwaters	Totals
Natural Water Bodies	794	7	10	10	-	821
Artificial Water Bodies	30	14	0	0	-	44
Heavily Modifies Water Bodies	114	42	13	15	-	184
Totals	938	63	23	25	44	1093

The Environment Agency issued a consultation entitled 'River Basin Planning: Working Together and Plan of Action' and covers each of the River Basin Districts in England and Wales. The consultation period closed on 22 June 2007 but those documents are available on the Environment Agency website - http://www.environment-agency.gov.uk/research/planning/33150.aspx

The draft RBMP for the South West River Basin District was issued in December 2008 and was finally approved by the Secretary of State in December 2009. It describes the programme required to improve the water environment over the next 20 years. The full document can be seen here - http://wfdconsultation.environment-agency.gov.uk/wfdcms/en/southwest/Intro.aspx

Summary of the main RBMP points:

- the SW District includes all the West Country Counties and is bounded in the east by the Hampshire Avon
- the district has approximately a thousand kilometres of coastline, which supports nearly half of England's commercial fishing operations
- the District includes all the West Country Counties and is bounded in the east by the Hampshire Avon
- 33% of water bodies are at least recorded as (2009) 'good ecological status / potential'. This figure should increase to 42% by 2015
- 51% of assessed water bodies have at least (2009) 'good biological status'. This figure should increase to 65% by 2015

For SW estuaries and coasts, it is unlikely that there will be any major improvements in the number of water bodies achieving 'good' status / potential by 2015. The biological tools and monitoring data needed to classify these types of water bodies are still being developed. This makes it difficult to design cost /effective plans in the short term. Therefore the EA wants these waters to achieve good overall status or potential by 2021 or 2027.

From the perspective of the inshore waters, ports, harbours and marinas in the region have made good progress in helping to improve ecology and water quality. Poole Harbour for example is internationally recognised for migratory birds and is designated as a Ramsar site under the EU Birds Directive).

Proposals to expand existing facilities ones must take sustainable water management goals into account. Physical changes are permitted to waters for navigation but only if certain conditions are met.

The Dorset coast is popular with water sports enthusiasts and there are a significant number of marinas e.g. Christchurch, Poole, Weymouth and Portland. Recreation will be encouraged in river basin / estuarine locations whilst environmental degradations.

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Further links with coastal erosion, flood risk planning and marine planning

There is a separate planning process for flood and coastal erosion risk management being introduced following the new **European Floods Directive (Directive 2007/60/EC)** on the assessment and management of flood risks). This Directive requires that the objectives of the WFD are taken into account when designing flood and coastal erosion plans. Implementation of this Floods Directive has to be co-ordinated with the WFD. The delivery plans and timescales for the two directives will be closely aligned.

Catchment Flood Management Plans (CFMPs) and **Shoreline Management Plans, 2010 (SMPs)** describe long term overarching policies for flood risk management. CFMPs are high-level strategic planning tools and should improve our understanding of what factors influence floods and flood risk at the catchment scale. Shoreline Management Plans perform a similar task for managing the risks related to coastal flooding and erosion.

The Marine Strategy Framework Directive (MSFD) 2008

The Marine Strategy Framework Directive was formally adopted by the European Union in July 2008. It is closely linked with the WFD and their applications overlap in estuaries and coasts. Both have been devised to improve and maintain the quality of our inland and coastal waters.

Summary of the main points:

- the Directive establishes a framework within which Member States will take measures to maintain or achieve 'good environmental status' (GES) in the marine environment by 2020 and a detailed description of what that means by July 2012
- a monitoring programme to measure progress towards GES by July 2014 and a programme of measures to be implemented by July 2016
- an assessment of the current state of UK coastal waters and seas by July 2012
- marine strategies will be implemented that protect and preserve the marine environment, prevent its deterioration, or where practicable, restore marine ecosystems to good health, and prevent and reduce inputs that have a significant damaging impact
- there is a clear link between implementation of the Directive and of the UK Marine and Coastal Access Bill and other measures

Sewage Treatment methods and the EU Urban Waste Water Directive 1991

Sewage treatment	Main points
Preliminary	Screening of raw sewage to remove large particles and grit
Primary	Further screening to remove large solids followed by maceration, producing slurry, which is left to settle in tanks. Then the liquid portion is discharged into the receiving waters. The remaining sludge is disposed off on land by a variety of methods.
Secondary	The process consists of filtering the liquid portion from the primary treatment stage, through bacteria beds which break down organic matter. The settled material (activated sludge) is disposed of on land and the supernatant liquid sent to receiving waters
Tertiary	Liquid derived from secondary treatments is retained in sediment ponds or passed through filters to remove remaining suspended solids. Ultra violet treatment may also be undertaken to kill any remaining bacteria/viruses

This Directive aims to prevent the environment from being adversely affected by the disposal of insufficiently treated urban wastewater. The Directive states that there is a general need for secondary treatment of urban wastewater. It was specified that by the year 2000, a minimum of secondary water treatment systems should be in

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place for all conurbations of >15,000 people. In 1994 an amendment was made, that certain discharges to estuarine or coastal waters could receive a minimum of primary treatment (rather than secondary) as long as the discharge was made into waters identified as High which would need to indicate that the discharge would not adversely affect the environment. Natural Dispersion Areas (HNDA). In addition any scheme would be subject to comprehensive studies.

Wessex Water

YTL Power International of Kuala Lumpur acquired Wessex Water in May 2002. The Water Industry Regulator, OFWAT, recognised Wessex Water as the best Water and Sewerage Company in England and Wales (2009-10). The Company supplies1.3 million people with around 285 million litres of clean water a day from 97 water sources using 110 water treatment works. The Company also treats 481 million litres of sewage a day.

To 31st March 2010, the Company turnover was £438m and operating costs were £222m whilst investment in new capital projects was £103m. Much of this investment was directed towards improving the water and sewerage infrastructure. The Company reported that there were no major or significant pollution incidents for the second year running. The Company plan for 2010 -2015 includes improvements to compliance with the Bathing Water, Urban Waste Water and Shellfish Directives.

Shellfish & Shellfish Water Monitoring

The original EC Shellfish Directive (79/923/EEC) specified quality standards for waters supporting designated shellfish populations. The Environment Agency is responsible for monitoring the water quality in the designated areas and if compliance levels are breached it is required to identify the pollution source and undertake measures to remedy the situation.

79/923/EEC was repealed by the codified Shellfish Waters Directive (2006/113/EC), in December 2006. Codification is a routine procedure that consolidates an existing Directive, with any amendments made since its introduction, into a single, more accessible document. The aim is to protect and, where necessary, improve the quality of waters where shellfish grow and to contribute to the high quality of directly edible shellfish products. Consequently, a variety of parameters are measured including pH, salinity, suspended solids and tests for a variety of heavy metals and bioaccumulating substances referred to earlier.

The Directive will be repealed in 2013 by the Water Framework Directive. When this occurs, the WFD must provide at least the same level of protection to shellfish waters (which the WFD classifies as protected areas) as the Shellfish Waters Directive does.

Also, Directive 91/492/EEC (July 1991) specifies the health conditions for the production and the placing on the market of live bivalve molluscs. This Directive is essentially aimed at protecting consumers. This Directive does not impose any obligation to meet specific eating qualities, but classifies harvesting areas according to the environmental health of shellfish populations. The waters are awarded one of the following classifications:

A- Can be sold direct with no treatment
B- Must be cleaned or relaid until they meet standards in category A.
C- Must be relaid for at least 2 months followed by specific treatment to achieve category A or heat treated by an approved method and harvesting is prohibited in areas, which have a poorer quality than category C.

There are several designated shellfish water sites within Dorset, including Poole Harbour, the Fleet and Portland Harbour. Over the past few years, some areas in Poole Harbour have exceeded the mandatory levels of copper and the Environment Agency has carried out investigations to determine the causes.

National Legislation

The Marine and Coastal Access Act 2009

This is a very wide ranging piece of legislation that introduces some innovative requirements that will help the UK government to achieve the aim of producing *"clean, productive and healthy seas"*. Marine biodiversity and water quality are inextricably linked to each other. Consequently, the Act introduces new tools for conservation of marine wildlife designed to halt the deterioration in marine biodiversity and promote recovery where practicable. This means that

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environmental considerations such as water quality are to be given full weight in all aspects of marine planning and enforcement.

The Flood and Water Management Act 2010

This is the most recent addition to the UK water management portfolio and received Royal Assent on 8th April 2010. The Act aims to improve flood risk management and introduces a clearly defined role for local authorities in managing local flood risk and this includes tidal waters, surface runoff, groundwater, and ordinary watercourses. In an emergency, this will avoid any delay and confusion about who is responsible for what. It will also help to ensure that preventative works carried out by neighbouring authorities is consistent, co-ordinated and synergistic.

The strategic overview role (for all flood risk including those caused by tidal waters) sits with the Environment Agency. The Act requires the Environment Agency to develop a national flood and coastal erosion risk management (FCERM) strategy for England. Following consultation the Environment Agency and Defra will finalise the strategy. The Act is wide ranging but is essentially designed to ensure that we manage our water resources in an efficient way to reduce waste, reduce the environmental risks associated with flooding and coastal erosion.

There has been an accumulation of National legislation concerning the care and protection of our water supplies and the subsequent treatment of wastewater and sewage. The list below gives a short summary of some of the other significant enactments of the last 60 years in chronological order. The web links are indicative and are able to provide greater detail regarding each piece of legislation

Water Act 1945

This brought together previous water legislation and introduced a waterworks code. It encouraged the amalgamation of water companies and boards.

Water Act 1973

The Act created the ten water authorities that were later privatised. They took over from the local authorities and water boards and their role was "to plan and control all users of water in each river catchment area". They had responsibilities for:

- water conservation;
- controlling pollution of inland and tidal waters;
- land drainage and flood control;
- fisheries; and
- supply of water and sewerage services.

The Control of Pollution Act (COPA) 1974

The former water authorities were responsible for issuing consents for discharges of trade and sewage effluent.

The Food and Environment Protection Act 1985

The Food and Environment Protection Act 1985 Part II provides controls for the disposal of waste at sea (as opposed to discharge into the sea via pipelines) under a system of licences.

Water Act 1989 - Privatisation

The Director General of Water Services (the Director) was appointed to be the economic regulator of the industry.

The Environmental Protection Act 1990

This Act introduced two new pollution control systems:

1. Integrated Pollution Control (IPC);
2. Local Authority Air Pollution Control (LAAPC).

The most important system with respect to water quality in the marine environment is IPC. This is intended to promote a more integrated approach to environmental protection by considering releases to all three environmental compartments (air, water and land) together.

Water Industry Act 1991

This brought together sewerage legislation and consolidated the 1989 Act.

The Water Resources Act 1991

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This Act is the key piece of legislation governing discharges to surface waters from non-prescribed processes under Integrated Pollution Control (IPC).

The Environment Act 1995

The Environment Agency assumed various responsibilities of the National Rivers Authority (NRA), the waste regulation and disposal authorities and Her Majesty's Inspectorate of Pollution (HMIP).

The Water Industry Act 1999

The Act made several important amendments to the Water Industry Act 1991. It removed the companies' ability to disconnect household customers for non-payment of charges. It also gives the Director General of Water Services the task of approving companies' charges schemes. It further allows the Secretary of State to issue regulations setting out requirements that should be included in companies' tariff schemes.

Local Strategies

Coastal Litter

Litter on our beaches is unsightly, dangerous to people and to wildlife and costly to clean up. The two constant areas of concern are:

- litter left by tourists
- materials dropped from boats and ships passing by offshore

The only long-term measure to deal with this will be to change public attitudes to litter.

Litter on Osmington Beach. Copyright: Dorset Coast Forum

Unfortunately, over the last 10 years, the picture has been erratic in both the volumes of litter found on Dorset beaches or the ‘mix’ of materials found. Each April, the ‘Great Dorset Beach Clean’ takes place. In 2010, 793 volunteers (120 of which were children) took part on the day and collected 802 bags from 25 beaches along the Dorset Coast.

- Under the Environmental Protection Act 1990, it is the responsibility of the local authority to remove litter on amenity beaches above the high water mark
- The two principal items that litter these beaches were plastic and polystyrene
- volunteer numbers fluctuate between 700 and 1000 annually
- In 2009, a post-collection sample survey revealed that 3870 pieces of plastic were collected, out of which 2181 were bits of rope and 680 were plastic caps or lids. Significantly 3773 plastic bottles were collected from 26 beaches
- The MCS Beachwatch Big Weekend 2009 (Dorset) report states that there were 3,269 items per km compared to 4,784 items per km in 2008, a reduction of 31.6%
- Nationally, the MCS 2009 survey for Britain revealed that litter on our beaches is still "unacceptably high", with more plastic rubbish washed up than ever before.
- It also found that while total litter had increased by 77% since the first ‘Beachwatch’ in 1994, plastic litter had increased by 121%.

Autumn collections sometimes help to identify where items of litter have originated. Examples identified included: France, Turkey and the Middle East. The results collected from these surveys contribute to the Marine Conservation

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Society's national campaign to reduce the littering of our oceans.

2010 Dorset Beach Clean data can be found here - http://www.dorsetforyou.com/media.jsp?mediaid=152454&filetype=pdf

In April 2009, the Dorset Coast Forum organised a Marine Litter Summit and the conference papers and outcomes can be viewed here - http://www.dorsetforyou.com/marinelittersummit09

Annex V of the IMO International Convention for the Prevention of Pollution from Ships1973 (MARPOL Convention) applies to all ships and prohibits the discharge into the sea of all plastics, synthetic fishing nets, rubbish bags and other materials and is enacted in UK waters through various Merchant Shipping Regulations. It applies to all ships in UK territorial waters and if oil or other substances are spilled at sea, the Maritime Coastguard Agency (MCA) is responsible for dealing with them.

In July 2006, the Convention was amended to include 'cargo residues' as a garbage category defined as 'residues of paper, rags, glass, metal, bottles, crockery etc.' and can only be disposed of outside special areas and at a distance greater than 12 nautical miles offshore. In terms of floating, non-degradable materials, 12 miles is insignificant and means that ships can evade detection but still dispose of materials that quickly reach our beaches.

Emergency Response to Oil spills

In the event of an oil or chemical spill the MCA Marine Pollution Control Unit are responsible for the clean-up and containment of a spill at sea. In addition, Dorset County Council's Emergency Planning Department have a series of oil spill contingency plans designed for rapid deployment. The plans are designed to minimise the potential for oil to actually come ashore.

The Discharge arrangements and pollutant materials:

Almost any solid, liquid or gaseous substance (biological or non-biological) entering surface waters or groundwater can cause direct or diffuse pollution. The list includes:

- Industrial and farm chemicals (pesticides, animal medicines, nitrogen and phosphorous from fertilisers)
- Slurries, sewage sludge and manures, faecal pathogens from livestock
- Silt and dust from mining and quarrying
- Fly-tipped materials
- Salt
- Heavy metals
- Wash waters and discharges from old waste tips
- Leaked sewage effluent
- Trade effluents
- Detergents, paints, oils, greases and fuel products

Dumping of the most toxic materials was banned by the London Dumping Convention in 1972, and an amended treaty in 1996 (the London Convention) further restricted what could be dumped at sea. However, there are still the problems of already-dumped toxic material, and even the disposal of permitted substances at sea can be a substantial environmental hazard. Under the North Sea Conference, agreements (1987/1990), the UK Government made a commitment to reduce the disposal of all toxic, persistent and bioaccumulating (substances that gradually build up in animal tissues) into the sea by the year 2000 and this has been largely achieved.

The Water Act (2003), Groundwater Regulations (1998)and the Water Resources Act 1991 (as amended by the Environment Act 1995) are all relevant to the Environment Agency's discharge consenting process and pollution prevention i.e. the overall water quality and pollution control within the 3 nautical mile limit lies with the EA. Through the Environmental Permitting Regulations 2007, the EA are responsible for monitoring for harmful substances.

Also relevant, **the Shellfish Waters Directive (79/923/EEC)** aims to protect shellfish beds by setting water quality standards in areas where shellfish grow and reproduce. The Directive requires that certain substances toxic to shellfish are monitored in those areas and that particularly applies to the Fleet, Portland Harbour and Poole Harbour.

The EA Diffuse Water Pollution Report for England and Wales (2007) gives comprehensive details regarding this topic.

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Comprehensive pollution incident details for Dorset can be found here.

Nutrient Enrichment

Algal blooms which occur as a result of the nutrient enrichment (especially Nitrogen and Phosphorus) of the water can directly affect the ecology of any water body. In Lyme Bay the annual appearance of an algal bloom appears usually in late April or early May and is known locally as 'Maywater'. Of the thousands of marine phytoplankton that exist worldwide, about 2% are known to be harmful or toxic. Blooms of harmful algae (e.g. *Prorocentrum spp or* the toxic Dinoflagellate, *Alexandrium spp*) can have large and varied impacts on marine ecosystems, depending on the species involved, the environment where they are found, and the mechanism by which they exert negative effects. These toxic algae have been recorded off the Dorset coast in the past but not in recent years although in September 2000, the Fleet Lagoon experienced a massive Dinoflagellate bloom.

Disposal at Sea

The disposal of spoil waste at sea is carried out under licence under the Food & Environmental Protection Act 1985 (FEPA, -part II). From mid-2010, all licence applications are handled by the new Marine Management Organisation (MMO) based in Newcastle. A licence and fee payment is required for the deposit of substances or articles in the sea or under the sea bed including disposal at sea of dredged material or other substances. The fee is £4350 for quantities in excess of 100,000 tonnes.

There are 5 spoil sites off the Dorset coast (Lyme Bay, two near Weymouth and Portland and two near Swanage). At present, licences are only issued for one site situated in Swanage Bay. The site is 0.5 nautical miles in diameter. Several marine based organisations, including Poole Harbour Commissioners, are licensed to dispose of maintenance dredgings at this site. In 2005/6, almost 2,000,000m^3 of sand and silt were dredged from the channels both inside the harbour and in the approaches. Of this, over 1,100,000m^3 was made available to the local Coast Protection Authorities (Poole, Bournemouth and Purbeck District Councils) for beach replenishment. The remainder was dumped in the prescribed area.

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