

## Chapter 6 Water Quality and Pollution

### Guiding Principles:

Chapter 4 details all the guiding principles relevant to the overall management of the Harbour. Whilst all should be given some consideration the following are of particular relevance to water quality and pollution.

**Key Guiding Principle numbers: 1, 5, 6 and 7.**

### 6.1 Current Overview

Poole Harbour's poor flushing characteristics make it very vulnerable to pollution. A particular concern is the level of nitrates in the Harbour. Pollution of water, sediment and air can come from many sources and as a result of a range of activities such as agriculture, industry and recreation. Many different EU Directives set standards for environmental quality and requirements for monitoring, while local plans recognise the need to address pollution from existing sources as well as proposed developments.

Appendix 6 details much of the relevant guidance, legislation and monitoring that relates to the environmental quality of the Harbour.

### 6.2 Agriculture

Diffuse pollution refers to contamination of watercourses by surface water runoff and leaching of nutrients and chemicals from soil. The rivers Frome, Piddle, Corfe and Sherford which discharge into the Harbour are subject to hypereutrophication from nitrates and phosphates from agricultural sources. Increased nutrient levels from fertilisers and slurry can result in algal blooms in the rivers and macroalgal (seaweed) blooms in the marine environment. This anthropogenic eutrophication can lead to deoxygenation of the water, which can result in fish and shellfish mortality while macroalgal blooms can result in a depletion of prey items and interfere with bird foraging behaviour. Soil loss from agricultural fields is also of concern as it can increase sediment levels in rivers and the Harbour hampering fish spawning grounds and shellfish beds.

In order to address the issues of pollution from agriculture DEFRA are funding a Catchment Sensitive Farming initiative, which will encourage the use of best practice farm operations to reduce water pollution. The catchments of the Frome, Piddle, Sherford and Corfe Rivers are designated Nitrate Vulnerable Zones (since 2002). This means that farmers in the catchment are restricted in their management of and application of organic manure and inorganic fertilizer. These controls have been introduced to reduce inputs of nitrogen to the Harbour. Natural England, the Environment Agency and Wessex Water are developing a management plan to focus on what measures are required to reduce nitrate inputs into the Harbour.

### 6.3 Urban Development

The Government's Planning Policy Guidance Note 12 identifies pollution and water quality as issues for development plans, whilst Planning Policy Statement 23 on planning and pollution control, contains guidance on pollution matters, including the relationship between controls over development under planning law and under pollution control legislation.

Urban developments create diffuse pollution through increased surface run-off, which has the potential to contaminate watercourses with oil, silt and chemicals. Sustainable drainage is the practice of controlling surface water runoff as close to its origin as possible before it is discharged to a watercourse. The Borough of Poole has produced Supplementary Planning Guidance on Sustainable Drainage Systems to give further guidance on the appropriate use of sustainable drainage in new developments. Local plans however recognise that surface water flows should not be allowed to be discharged into the public foul sewers since this would cause overloading and premature operation of storm overflows to the detriment of the water quality of Poole Harbour.

New urban developments also put pressure on existing sewage treatment works and associated water service facilities. Local plans encourage the responsible use of existing facilities when capacity allows, but under the Water Industry Act 1991, developers are required to contribute towards providing the necessary infrastructure to meet the increased demands imposed by development.

The Planning Policy Guidance Note 24 on Planning and Noise recognises housing as a noise sensitive development. Within the Harbour urban development is primarily centred around the north shore and disturbance from noise is not considered as a major environmental concern, however any future development in more sensitive areas would need to take into account the impact of noise pollution on both human and bird populations.

## **6.4 Industrial and Commercial Activities**

Industrial activities during the twentieth century have led to significant contamination of some of the north shore. Toxic discharges of industrial waste have left much of Holes Bay contaminated with heavy metals which have accumulated in the bed sediment. These metals can then accumulate in the organisms that live within the sediment and may be passed up the food chain, a process known as bioaccumulation. Many different metals have been identified but those of particular concern are: cadmium, mercury, copper and zinc. Discharges of these metals have largely been eliminated but they persist in the environment and their natural breakdown is slow. As well as bioaccumulation there is also the concern that heavy metals could remobilise when disturbed by activities such as dredging and this is given due consideration by regulatory authorities when work and disposal licences are applied for. However heavy metals can also be remobilised as a result of natural erosion of saltmarsh and this is an area that requires further research especially in light of rising sea levels.

Local councils continuously monitor air quality around the Harbour with particular focus placed on levels of Nitrogen Dioxide (NO<sub>2</sub>) and Carbon Monoxide (CO). Information on air quality in the area is sent to DEFRA annually, with a comprehensive report submitted every three years. There is currently no monitoring of emissions from ships, but some port based industries require permits which regulate air pollution by such things as dust and solvent emissions. Another possible source of pollution is the discharge of waste water from shellfish transshipping vehicles which may introduce pathogens and alien species into the aquatic environment.

One significant industry located in the south of the Harbour is the onshore oil field. However there are no effluent outputs from the operation as discharges from the site are collected and returned to the oil bearing strata to aid extraction.

## **6.5 Sewage Treatment Works (STWs)**

In 2002 Poole Harbour was designated as a Sensitive Area (Eutrophic) and Polluted Waters (Eutrophic) under the Urban Wastewater and Nitrate Directives respectively. This was due to elevated levels of nitrates and phosphates leading to problems of eutrophication in certain areas. Some nutrients were derived from agricultural sources and STWs were identified as a source.

Poole Harbour receives treated sewage discharges from three main STWs which serve the communities of Poole, Lytchett Minster and Wareham. These sites have all provided secondary treatment for many years and treat sewage to a high standard before discharge. Wessex Water Services Ltd run these STWs and are also responsible for maintaining sewers and outfalls. They have a statutory duty to treat and discharge sewage, under consent from the Environment Agency, and to ensure that discharges do not adversely affect the waters of the Harbour in complying with EC Directive standards, such as those for Bathing and Shellfish Waters.

Recent improvements have seen all three STWs fitted with Ultra Violet (UV) disinfection to reduce the bacteriological impact of the discharges to receiving waters. Improvement schemes will also provide additional storm storage and settlement tank capacity to significantly reduce any discharges of storm sewage at times of heavy rainfall. Wessex Water have a programme of improvements known as AMP 4 which details work from 2005 – 2010 and includes the building of a nitrogen removal plant at the Poole STW site to reduce nitrate discharges to the Harbour. Natural England, the Environment Agency and Wessex Water are developing a management plan to focus on what other measures are required to reduce nitrate inputs into the Harbour.

## 6.6 Port and Shipping

Port operations and commercial shipping, including fishing, all have the potential to impact the Harbour in terms of disturbance, contamination from surface water runoff and diffuse pollution such as from antifouling paints, sacrificial anodes and oil. Sediment of the north shore contains elevated levels of Tributyltin (TBT) which was heavily used in antifouling paints up until 1987 when it was banned for use on vessels under 25 metres. TBT was found to be having a severely damaging effect on marine organisms, particularly some shellfish and although it is now rarely used even on larger vessels, it still persists in the environment. The use of TBT antifouling on any ship in an EU port is to be banned from 2008. Contemporary alternatives often contain copper which itself has some detrimental effects, but not in the magnitude of older tin based products.



Sacrificial zinc anodes are used on sheet piling and commercial and recreational craft to counter the effects of electrolysis. Their true environmental effects are currently not fully understood but their use may be linked to occasional elevated levels of zinc contamination at points around the Harbour.

Disposal of sewage, garbage and contaminated bilge water from ships within the Harbour also has a detrimental effect on the environment. There is a complete ban imposed on the dumping into the sea of all forms of plastic, while contaminated ballast water discharged from commercial ships can cause chemical pollution as well as having the potential to introduce alien species and pathogens into the Harbour. Port facilities provide appropriate disposal routes for all forms of waste that legislation requires commercial cargo vessels and ferries to land; details of which are contained in the Port Waste Management Plan.

## 6.7 Recreation

Pollution as a result of recreational activities may not have the potential to be as great as from other sources but the number of recreational users in the Harbour mean that cumulative effects may be significant.

Diffuse pollution from antifouling paint and sacrificial anodes on yachts is similar to commercial operations as discussed above and although TBT based paints are no longer used by recreational craft the effects of copper based alternatives needs further investigation. Discharge of untreated sewage from marine toilets within the Harbour has the potential to cause problems both in terms of meeting water quality standards and the dangers it presents to public health and to marine species including shellfish. Sewage introduces harmful microbial pathogens to the water as well as lowering the amount of oxygen available to marine life. There are currently no national regulations concerning such discharges although a local byelaw prohibits the emptying of marine toilets and holding tanks into Harbour waters. Also best practice recommends that marine toilets should not be discharged where doing so would affect the water quality or harm the amenity value of local waters. The fitting of holding tanks is encouraged and these should be discharged at least three miles offshore or ideally through pump out facilities onshore. It is important that local marina and boatyard operators provide facilities for sewage disposal in order to discourage discharge within or just outside the Harbour. They also need to provide adequate facilities for the disposal of other waste such as oil and garbage.

Marine litter not only reduces the amenity value of the Harbour but can also be potentially harmful to sea life such as birds, mammals and fish. Each year the Marine Conservation Society carries out a national survey of litter, which includes the shores of Poole Harbour. The litter is collected and the quantities and categories noted. In 2005 the survey indicated that over 33% of all litter found along our coastline was from beach visitors, with fishing accounting for 15% and commercial shipping just over 2%.



Under Harbour byelaws it is an offence to deposit any form of waste or garbage into Harbour waters.

Powered recreational craft particularly powerboats and personal watercraft also have the capacity to cause considerable noise pollution. This can be a nuisance to other Harbour users and local residents but can also cause considerable disturbance to wildlife. To some degree the problem has been addressed with the introduction of the speed limit, the zoning of motorised activities and the quiet zone, but users of all craft need to be aware of the impact of their activities on other users and the wildlife of the Harbour.

## **6.8 Monitoring**

The Environment Agency is the competent authority for routine monitoring of water bodies such as the waters of Poole Harbour, its freshwater inputs and coastal waters. This monitoring is undertaken according to frequencies outlined in various EU Directives, currently including Bathing Waters, Dangerous Substances, Shellfish Waters and Freshwater Fisheries, (see Appendix 6). The data collected is passed to DEFRA, who routinely submit this with other relevant data to the EU for consideration. Some sampling however, such as that for Bathing Waters, does not occur all year and with increasing recreational activity throughout the winter months there is a growing need to fill current public information gaps about water quality.

## **6.9 Water Framework Directive (WFD)**

The EU Water Framework Directive came into force in 2000. Its timetable for implementation extends over 15 years, requiring “good ecological and chemical status” or the equivalent for designated water bodies to be achieved by 2015.

The aim of the WFD is to:

“establish a Community framework for the protection of groundwater, inland surface waters, transitional waters and coastal waters, in order to prevent and reduce pollution, promote sustainable water use, protect the aquatic environment, improve the status of aquatic ecosystems and mitigate the effects of floods and droughts.”

It updates and consolidates some of the existing piecemeal EU water legislation (see Appendix 6), whilst establishing a new, integrated, ecosystem based, approach to water protection, improvement and sustainable use.

The WFD is being implemented in a series of stages that started in 2004. By 2009 a River Basin Management Plan (RBMP) must have been prepared. These are statutory plans, which will define the measures required to meet environmental objectives and will provide the mechanism whereby future water use and activities affecting water will be managed. Poole Harbour is included within a River Basin District, which covers most of the south west of England but for planning purposes this region will be subdivided into smaller catchment areas. Protection and improvement measures must be in place by 2012 and water quality targets should be achieved by 2015 unless alternative objectives are sought.

Commercial shipping, agricultural practices and other industrial and recreational activities all have the potential to impact on water quality and future management needs to focus on initiatives aimed at meeting standards that will be set by the Water Framework Directive.

The WFD will undoubtedly have implications for all activities that have the potential to affect the water quality of the Harbour but current monitoring and initiatives mean that it is in a good position to meet all future standards.

## Management Objectives:

The following is a list of the management objectives identified. Whilst some are specific to the management of water quality and pollution, others may relate to activities and issues discussed in other chapters of this plan. All management objectives can be found in the matrix contained within Section 2, which also lists proposed management actions.

- To understand the potential effects of the transfer of ballast water to the marine environment.
- To ensure best practice is followed to minimise the impact of antifouling paints on marine fauna & flora.
- To ensure air quality in and around the Harbour meets agreed emission standards.
- To ensure discharges from industry meet emission standards.
- To ensure discharges from vessels are regulated and comply with legal requirements.
- To investigate the potential effects of sacrificial anodes.
- To ensure discharges of treated effluent meet emission standards.
- To undertake planned improvements to storm sewage and emergency overflows.
- To ensure litter does not affect the interest features of the EMS.
- To seek to encourage the use of more environmentally sensitive farming techniques.