



BRISTOL FLOATING HARBOUR'S 'GET ON BOARD' CAMPAIGN

Bristol Harbour is home to a thriving boating community who use the harbour as a place to live, work or simply relax. The harbour provides shelter for over 500 boats and sustains a variety of wildlife who cohabit peacefully within the lock gates of the harbour. In recent years, the harbour has witnessed major redevelopments around its quaysides. As the number of people using the harbour has grown, so have the environmental pressures.

In 2007, Bristol's Living Rivers Project formed a multi-partnership campaign to improve water quality within the Harbour. Bristol Harbour Authority, Wessex Water, the Environment Agency and Bristol Marina worked together to launch the 'Get On Board' campaign. With support from The Green Blue they provided four new pump-out facilities within the

Harbour. The 'Get On Board' campaign also provided information to local users, including boat owners, to encourage them to use the new pump-out facilities for grey and black water discharges.

Boat owners using the Floating Harbour



are being asked to review their wastewater disposal techniques to make sure they are environmentally acceptable and legally compliant. Where they fall short, they are being encouraged to work towards a solution by 2009.

BEST PRACTICE ADVICE

Empty holding tanks more than three miles offshore, in the open sea, where waste will be quickly diluted and dispersed by wave actions and currents.

In marinas, use shore side facilities and brief your crew to do likewise.

Use holding tanks or a portable toilet if you regularly sail in areas of poor flushing such as estuaries, inland waterways and inlets, and when visiting crowded anchorages.

Chemical toilets use toxic substances and must be emptied ashore into the regular sewage system. Plan ahead as they can be difficult to carry and few pump out (sanitation) facilities

will accept chemical toilet waste. When visiting new sites, give consideration to the environmental sensitivity of the area before using your sea toilet.

Ask your marina operator to install pump-out facilities if they are not available.

ADVICE ON GREYWATER DISCHARGES
Choose more environmentally sensitive products avoiding chlorine and bleach which can be toxic to flora and fauna, and phosphates which encourage algal growth.

Keep oils and other food waste onboard and dispose of with non recyclable rubbish.

Minimise use of soaps and detergents used in onboard sinks, showers and washing machines. The sink onboard your boat needs to be treated differently to those in your home.

If using a washing machine on board, switch to a detergent-free washball, or use less ecologically damaging washing powders – a must in inland waterways.

Consider replumbing your wastewater system so that all sewage, grey and black water, including that from dishwashers and washing machines is diverted to a holding tank, especially if you keep your boat in enclosed waters such as inland waterways and marinas.

WHAT WE KNOW ABOUT...

SEWAGE AND WASTE WATER DISCHARGES FROM BOATS

The impact of grey and black water discharged from recreational craft on water quality is explored in this fact sheet.

INTRODUCTION

Many vessels have toilets on board, there are three main types:

- A sea toilet where the sewage is pumped directly out into the water.
- Chemical toilets which must be emptied into the main sewage system onshore.
- Toilets with holding tanks where sewage is stored on board then discharged into a suitable shore side facility or disposed of well out to sea.

Black water (raw sewage) discharges are likely to become less common as, since 2006, the Recreational Craft Directive (RCD) has required the new vessels have provision for a holding tank to be fitted. In the majority of cases, the waste water from onboard sinks and showers (known as grey water discharges) empties directly into the water. In some parts of Europe boats are strongly encouraged not to discharge grey water.



IDENTIFYING THE IMPACTS

Levels of sewage input from recreational craft are thought to be small compared to direct inputs from sewage treatment works. However, the effects are serious and sewage and grey water discharges from recreational vessels can potentially affect water quality in the following ways:

- Raw sewage introduces microbial pathogens into the environment, posing a potential health threat for immersion sports (e.g. swimming, diving).
- Microbial pathogens pose a risk to shellfish. Pathogens taken up through filter feeding can lead to diseases such as Paralytic Shellfish Poisoning (PSP) if ingested by humans.
- Sewage reduces the oxygen available

to aquatic species by locally reducing the biochemical oxygen demand (BOD).

- Grey water discharges contain phosphates and nitrates which can potentially lead to nutrient enrichment (and algal blooms) if introduced in sufficient quantities. Algal blooms reduce light penetration, further reducing dissolved oxygen levels.
- Black water may contain suspended solids that, in large quantities, could blanket species or reduce light penetration within the receiving waters. Some additives used in chemical toilets to disinfect, breakdown and deodorise waste are toxic to marine life if discharged into the water in sufficient quantities. These chemicals include

chlorine, formaldehyde, ammonium and zinc compounds. The most likely cause would be accidental spillage as chemical toilets are normally discharged only on shore into the sewerage system.

Whilst the scenarios outlined above are potentially serious, the impact will depend on the volume discharged and the type of receiving body. Boat sewage discharged into coastal waters where it is quickly dispersed by wave action, has not been found to adversely affect water quality. The same applies to grey water discharges. Some navigation authorities on inland waterways have bylaws to prohibit the overboard discharge of sewage from sanitary appliances.



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THE GREEN BLUE is the environmental awareness initiative for the marine industry, and for sailors, boaters and watersports enthusiasts. It is run by British Marine Federation and the Royal Yachting Association with support from Defra, The Crown Estate and Marina Developments Ltd.

Details of the papers referenced in this fact sheet are available in The Green Blue's online database of scientific and regulatory papers which can be found at: www.thegreenblue.org.uk/research/database.asp

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EFFECTS FROM SEA TOILETS

Recreational boating contributes a very small percentage of the total sewage load disposed into the marine environment (Cole et al, 1999)¹. Not all recreational vessels have toilet facilities on board and for those that do the volume of waste produced will depend upon the number of passengers and the time spent at sea. Recreational craft that use marinas and moorings often take advantage of shore side facilities. However sewage discharges from recreational boats direct to the sea in coastal areas is common practice. Harbour authorities report that few vessels having holding tanks use them regularly. To consider the relevance of such inputs it is important to consider the impact of sewage and grey water discharge in terms of quantity, sensitivity of location and the content of the discharge.

Cole reports that the effect of raw and treated sewage discharged from boats in fast flushing coastal areas is negligible in comparison to discharges from sewage treatment works on land. However, the report also recognises that discharges into areas with low flushing rates, e.g. confined estuaries, can have a significant localised effect.

In 2002, Geertz-Hansen² published a

report estimating the load of nitrogen and phosphorus from pleasure craft, in comparison with other sources of pollution into the Baltic Sea. The study used various assumptions, such as the number and types of boat, time spent on board (particularly overnight stays), number of people and sanitary facilities. A number of scenarios were presented, including worst case to realistic, with or without on-board toilets. The realistic scenario for all craft types estimated that nitrogen and phosphorus from recreational craft represented 0.017% and 0.05% respectively of the land based total. The report concluded that the significance of such discharges to the overall effect was likely to be larger than the percentage level indicated but still considered insignificant in the overall picture.

LeBreton³ published a study investigating bacterial levels in Georgian Bay, concluding that bacterial levels (E Coli) rarely or never exceeded the relevant water quality objectives for surface waters, although total coliforms were higher on Mondays than Thursdays, which was attributed to weekend recreational discharges.

Estuaries are subject to many pressures



including agricultural, industrial and urban run-off and discharges, making it difficult to quantify the exact impact from recreational vessels⁴. Large populations of water birds and wild fowl (particularly geese) can also cause a significant adverse effect on water quality in localised areas.

It is also important to remember that discharging sewage from boats in inshore areas can be anti-social, for example when visiting crowded anchorages where swimming and watersports take place. In these circumstances, a holding tank or chemical toilet should be used.

EFFECTS FROM SINKS AND SHOWERS

As discussed, grey water discharges from sinks and showers adds nutrients to the receiving water body. When taken in comparison to inputs from other



sources, the contribution from boats is very small. Glennie et al (2002)⁵ identifies the two main sources of phosphates entering surface water as municipal wastewater and agriculture. Phosphorus is a naturally occurring mineral and an estimated 10% of the mineral in European surface waters is estimated to come from bedrock.

LeBreton's report, cited above, examined grey water discharges from power boats in Ontario. On average, 21.7 litres per person per day of grey

water was discharged, with the mean phosphorous, total solids and suspended solids levels being similar or slightly above that found in water from urban water treatment facilities. The author concluded that due to the low volume of discharges from recreational craft, the actual impact on the environment was small. The report cited

above by Cole et al¹ also concludes that grey water discharges typically occur in a very dilute form and that any impacts from this source are likely to be negligible in coastal areas.

Researchers from the University of Portsmouth⁶ tested the toxicity of some well known cleaning products on marine algae. The author concluded that the washing up liquid and toilet cleaners tested were safe to discharge into marina waters.

The Green Blue website has a list of natural alternatives to strong cleaning products. As good practice, boat owners should avoid using cleaning products that contain these chemicals:

Phosphates, E.D.T.A. (ethylene-diamine-tetra-acetic acid), sodium tripolyphosphate (STPP), enzymes, optical brighteners, chlorine bleaches, chemical plasticisers, formaldehyde, sodium tallowate, synthetic dyes and perfumes, triclosan and titanium di-oxide⁷.

THE LEGAL FRAMEWORK

Coastal Waters

Discharge of boat sewage to coastal waters is regulated through the International Convention on the Prevention of Pollution by Ships (MARPOL⁷ 3/78). This does not apply to small craft carrying less than 15 passengers. Disposal at sea is therefore a value judgement but accepted convention is that holding tanks should not be emptied less than three miles offshore.

Legislation, through implementation of local byelaws can impose restrictions on disposal of wastewaters. Marina operators can also prohibit the use of sea toilets within a marina. Since 2006, The Recreational Craft Directive has applied to newly built vessels and requires provision to be made for a holding tank to be fitted.

There are no current restrictions on

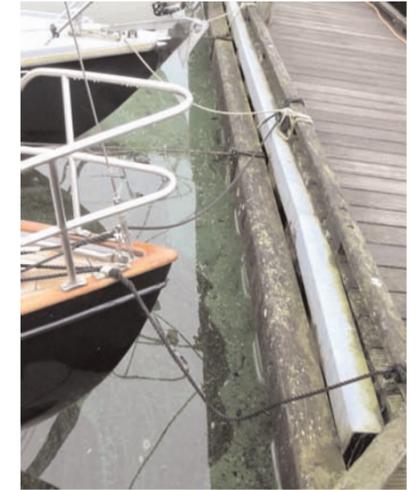
discharging grey water from sinks or showers.

Inland Waters

Sewage discharges from vessels in rivers, canals and lakes are regulated by many navigation authorities through byelaws and the Environment Agency has overarching powers of regulation. Discharges from sanitation systems are not generally permitted. Chemical or closed toilet systems using holding tanks must be used and sea toilets are required to be sealed on entering most inland waterways. This is enforced through the Boat Safety Scheme on many inland waterways (including those run by British Waterways and the Environment Agency) who inspect boats on a four yearly cycle. Navigation authorities and marinas provide sanitary stations at key locations.

Grey water from sinks and showers may

be discharged but guidance by the Environment Agency states that care should be taken to avoid the release of polluting materials such as strong cleaning agents and cooking oil (Environment Agency, 2004)⁸.



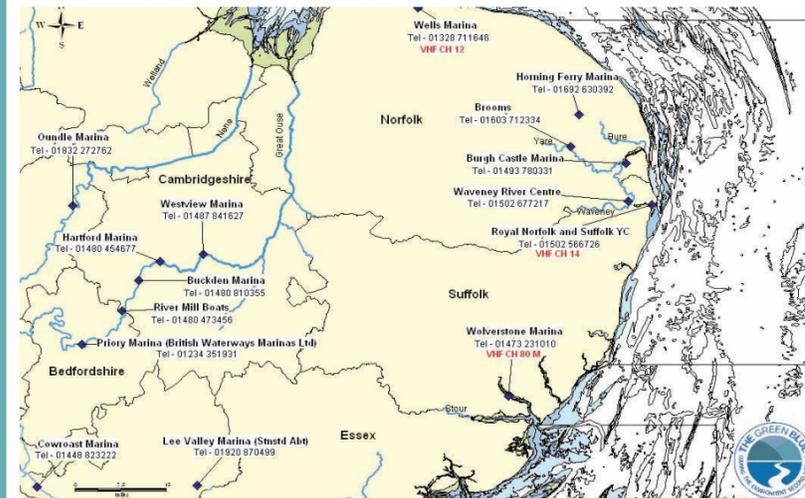
CONCLUSIONS

The Green Blue has found little quantifiable evidence demonstrating damage to habitats caused by black or grey water discharges from boats. In fact, recent 'spot checks' of water quality in marinas in the South East showed that water quality in the marinas

sampled during the off-season was generally very good. It would therefore appear that, on balance, current controls are sufficient. Nevertheless, with the number of vessels afloat on the increase and the leisure marine sector continuing to grow by 8% a year⁹, The

Green Blue would urge boat users to adhere to best practice and minimise all discharges from their vessels.

PUMP OUT FACILITY LOCATIONS IN EASTERN ENGLAND



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The Green Blue has published a directory of pump out (sanitation) facilities online at: www.thegreenblue.org.uk