Dredging Inland Waterways; The environmental and financial consequences of implementing EU Directives into UK Law

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Abstract: Recent changes to UK legislation, resulting from the implementation of EU Directives, are having a significant impact on inland dredging operations. It is anticipated that these impacts will increase further when the next phase of Regulations come into force during 2004.

The paper:

- explains how the drainage and navigation authorities responded throughout the consultation processes and the scale of lobbying required to ensure that the Government and Regulators were aware of the potential impacts of the proposed changes.
- discusses the major legislative changes and considers the environmental and operational impacts related to the changes.
- considers some of the innovative solutions being developed for the recycling/reuse of dredgings which have been initiated by the legislative changes.

Keywords: NVZ, landfill directive, exemptions, liquid waste, treatment, lobbying.

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British Waterways is a public corporation established under the Transport Act 1962 and is sponsored by the Department for Environment, Food and Rural Affairs (Defra) in conjunction with the Scottish Executive and the Welsh Assembly.

British Waterways is responsible for approximately 3,218km (2000miles) of inland waterways and docks, including 89 reservoirs.

British Waterways duties include:

- Navigation, with statutory duties to maintain the safety and structural integrity of the waterway infrastructure, water supply/discharges and maintain water levels for navigation.

- Stewardship of the historic waterways system (130 schedule monuments, 2,800 listed buildings).

- Protection and safeguarding the natural environment and landscape character of waterways (800 local designated conservation sites, 67 SSSI's, some with international protection, two waterways in AONB's and one within a national park).

- Recreation, encouraging public access to and recreational use of the inland canal and river navigation. In this we promote healthy living, recreation and sport opportunities.

- Statutory consultee on planning applications.

In addition, British Waterways are required by Government to be a transport provider for commercial freight, facilitate regeneration in urban and rural areas and be a developer of innovative business opportunities in partnership with the public and private sectors.

Dredging is an important element in the sustainable management of canal and river navigations. It provides for navigation and helps to maintain wildlife and fishery interest. Some lengths of canal contain sediments which are contaminated by historical industrial activities although the extent of these is reducing through regular maintenance dredging and the ongoing process of waterway restoration.

In 1988 the Collection and Disposal of Waste Regulations were enacted under the Control of Pollution Act 1974 and for the first time the disposal of dredgings became regulated. This was followed by the Environmental Protection Act 1990 which resulted in the Waste Management Licensing Regulation 1994. The consultation period for the 1994 Regulations was lengthy and during this period, British Waterways was involved in protracted lobbying for Regulations which recognised the requirements of the drainage and navigation authorities. It was realised at an early stage in the process that lobbying by British Waterways alone was not going to achieve much and a group made up of navigation and drainage authorities, dredging contractors, consultants and the Regulators was formed. The Group was facilitated independently by CIRIA (Construction Industry Research and Information Association) and the outcome, although not perfect, did result in some favourable changes to the Regulations. After the Regulations were published, the Group, through CIRIA, produced a best practice guidance manual, "Guidance on the disposal of dredged material to land", CIRIA Report 157.

Since the 1994 Regulations, the EU have produced a number of Directives which, when implemented into UK law, are having or will have an affect on the disposal of dredgings. Examples of these Directives are:

- The Council Directive 1999/31/EC on the Landfill of Waste
- The EC Nitrates Directive 91/676/EEC

THE LANDFILL DIRECTIVE

It was somewhat of a disappointment when Defra published their first consultation paper on the implementation of the Landfill Directive in October 2000 (followed by a second consultation paper in August 2001). It was obvious that lobbying would have to start all over again as the draft documents failed to offer a pragmatic approach to the regulation of the disposal of dredged material. Throughout the consultation process British Waterways, along with other organisations involved in drainage and navigation operations, has responded vigorously to all the relevant documents.

European Directives are not always explicit in what they say and, to a certain extent, allow member states to put some of their own interpretation into their local regulations. This, of course, can have both advantages and disadvantages but, at the end of the day, it leads to inconsistent regulation throughout the EU.

In addition to the inconsistent approach across the EU, in the UK the legislation controlling waste disposal at landfill is biased towards the regulation of commercial waste disposal operations. As a result of this, those involved in UK dredging disposal activities find themselves having to comply with legislation that does not easily accommodate their operations.

It has become obvious over the years that the regulators in the UK have a lack of understanding of the operations carried out by drainage and navigation authorities. This is not surprising as the UK inland dredging activities are small scale compared to other European countries and government departments and regulators do not have the same level of experience of dealing with dredging disposal as their European counterparts.

Article 3.2 of The Landfill Directive contains two exclusions which are of particular relevance to dredging disposal activities: -

- *the spreading of sludges, including sewage sludges, and sludges resulting from dredging operations and similar matter on the soil for the purposes of fertilisation or improvement* (first indent of Article 3.2/ Regulation 4(a)); and
- *deposit of non-hazardous dredging sludges alongside small waterways from where they been dredged out and of non-hazardous sludges in surface water including the bed and its subsoil* (third indent of Article 3.2/ Regulation 4(c)).

The second of these exclusions (third indent of Article 3.2/ Regulation 4c) is a very general statement which, within the UK, Defra and Scottish Executive have interpreted very specifically by linking the exclusion to the Paragraph 25 exemption of the Waste Management Licensing Regulations 1994.

Paragraph 25 exemption of the Waste Management Licensing Regulations 1994.

25.—*(1) Subject to sub-paragraphs (2) to (4) below, the deposit of waste arising from dredging inland waters, or from clearing plant matter from inland waters, if either—*

(a) the waste is deposited along the bank or towpath of the waters where the dredging or clearing takes place; or

(b) the waste is deposited along the bank or towpath of any inland waters so as to result in benefit to agriculture or ecological improvement.

(2) The total amount of waste deposited along the bank or towpath under sub-paragraph (1) above on any day must not exceed 50 tonnes for each metre of the bank or towpath along which it is deposited.

(3) Sub-paragraph (1) above does not apply to waste deposited in a container or lagoon.

(4) Sub-paragraph (1)(a) above only applies to an establishment or undertaking where the waste deposited is the establishment or undertaking's own waste.

(5) The treatment by screening or dewatering of such waste as is mentioned in sub-paragraph (1) above—

(a) on the bank or towpath of the waters where either the dredging or clearing takes place or the waste is to be deposited, prior to its being deposited in reliance upon the exemption conferred by the foregoing provisions of this paragraph;

(b) on the bank or towpath of the waters where the dredging or clearing takes place, or at a place where the waste is to be spread, prior to its being spread in reliance upon the exemption conferred by paragraph 7(1) or (2); or

(c) in the case of waste from dredging, on the bank or towpath of the waters where the dredging takes place, or at a place where the waste is to be spread, prior to its being spread in reliance upon the exemption conferred by paragraph 9(1).

The linking of the exclusion to the exemption has been perceived by the industry to be "gold plating" and not in keeping with the spirit of the Directive. It is the view of both British Waterways and the rest of the navigation industry that the exclusion within the Directive would have been more explicit if it had been intended to be as prescriptive as the UK Government's regulations. The narrow interpretation of the exclusion prevents its application to dredging disposal facilities, which are alongside the waterways and which are regulated by Waste Management Licences.

Liquid Waste

The Landfill Directive does not provide a meaningful definition of liquid waste and there is no definition within the UK Landfill Regulations. The second consultation on the implementation of the Landfill Directive included a working definition put forward by DEFRA and it is this definition that is being used by the Regulators. The definition states that liquid waste is any waste that has either of the following characteristics.

- *Any waste that near instantaneously flows into an indentation void in the surface of the waste.*
- *Any waste (load) containing free-draining liquid substance in excess of 250 litres or 10%, whichever represents the lesser amount.*

The significance of this definition lies in the fact that the Landfill Directive requires liquids to be banned from landfill. This ban is effective now for newly permitted sites and for existing landfills accepting hazardous waste. Disposal of non-hazardous liquids at existing non-hazardous sites can currently continue but will also be phased out. UK Government has not yet set a date by which this practice must stop.

The banning of liquid waste at landfill is a principle which is supported, but the two tests being used by the regulators are not considered to be appropriate. Due to the nature of dredged sediments, with the tendency for water to rise to the surface as they settle, they are likely to fail these tests and therefore become classed as a liquid waste.

British Waterways have made Defra, and the Regulators aware, on a number of occasions, that they consider the tests are not suitable for dredged materials and that they should be more scientific. The tests should have a scientific base, be related to the percentage water content and be carried out under laboratory conditions. As it stands, the majority of dredgings require treatment to allow them to be disposed of at landfill, yet materials such as sewage sludge, which can have a water content that is greater than that of dredgings, are able to be landfilled without treatment. To date, the Regulators have not been swayed by the lobbying for fairer tests; they are happy that the existing tests provide adequate characterisation for all other materials. They consider dredgings as a minority waste, therefore they see no reason to consider a scientific alternative.

As indicated above, the liquid waste ban currently only applies to newly permitted sites and existing sites licensed to accept hazardous waste. In practice, few non-hazardous sites will accept "as dredged" sediment and the consequence of this is that almost all dredgings destined for disposal at landfill have to be treated. The minimum level of treatment required is a process which produces a physically stable material. In future the treatment will also have to satisfy the waste acceptance criteria for a particular landfill.

Treatment

As discussed above, inland dredging within the UK has always been a relatively small-scale operation compared with the rest of Europe. Novel solutions to treat dredgings have been trialled over the years, but their success has been limited due to the difficulties of producing small-scale plant which is easily mobilised to the waterway. In addition, the cost of treatment has been high and sometimes excessively so. The processes which have been effective are those which are simple and based on known technologies which have been developed and proved in other industries.

There are a number of options for treating sediments in order to make landfilling an easier or cheaper option. Examples of the types of treatment available are:

1. Physical stabilisation.
2. Volume reduction.
3. Chemical stabilisation.

Historically, the most common method of treatment has been physical stabilisation achieved by mixing the sediment with a product such as lime, cement or pfa. It is a simple process which produces an acceptable material but there are disbenefits:

Environmental – there are energy requirements and production of pollutants resulting from the operation of the treatment plant and the additional transport required to import the mix material.

Volume – the process generally results in an increase, albeit small, in the total volume of material for disposal.

As the legislation controlling the landfilling of wastes becomes more complex, specialist contractors are now looking more seriously at the processing and treatment of dredgings. The additional costs and complications brought about by the legislative changes, along with clients wanting environmental solutions, has resulted in the recent development of small-scale dewatering plant. At the moment the amount of plant available is limited but the complexity of it is variable as different contractors approach the problem from different angles. This new plant does reduce the volume by removal of water, generally by mechanical means, but some plant appears more effective than others. In addition to dewatering, some of the plant will also separate out the various fractions producing a range of materials, some of which can be re-used and the rest sorted into various streams making their disposal easier. The development of mobile dredging dewatering plant in the UK is at an early stage and over time it is expected that it will become more efficient and effective. The difficulty at the moment is the extra cost which, even with the volume reduction and the re-use of material, may still be greater than disposal at landfill. Over time, the cost differential will reduce or disappear as landfill costs rise and the dewatering plants becomes more efficient.

NITRATE VULNERABLE ZONES (NVZs)

As a result of the implementation of the Nitrates Directive into UK law, dredgings have been defined as a Nitrogen fertiliser. When the NVZ Rules were revised in 2002, the area of England designated as an NVZ increased from 8% to 55%. (The details of the NVZ Rules are published by DEFRA in the "Guidelines for Farmers in NVZs – England", revised July 2002). Unfortunately for British Waterways, the bulk of their canal network is within the designated zone as can be seen in Figure 1.

This definition of dredgings as a nitrogen fertiliser has had a serious impact on British Waterways, as it means that the application of dredgings to agricultural land must not exceed the annual crop requirement of fertiliser nitrogen. In determining the application rate, the assessment needs to take account of crop uptake, crop residues and organic manures.

Operationally, this has resulted in the thickness of dredgings spread to land being reduced and, in some instances, the reductions have been significant.

Since the implementation of the new rules, British Waterways have been in discussion with the Environment Agency and Defra to try and persuade them that dredgings should not be considered as a nitrogen fertiliser and for them to consider a more scientific approach for the spreading of dredgings to agricultural land. The current guidelines have been set without an understanding of how the nitrogen in dredgings reacts when removed from a watercourse and spread on land. After long deliberations, it has been agreed that trials can take place to provide evidence of what happens when dredgings are spread to land. British Waterways hope to start these trials shortly and hopefully, the results will be available in time for them to be taken into consideration when UK Government reviews the NVZ Rules in 2005. British Waterways are hoping that the trial will show that the nitrogen in dredgings does not readily release into the environment and therefore the volumes spread should not have to be artificially restricted.

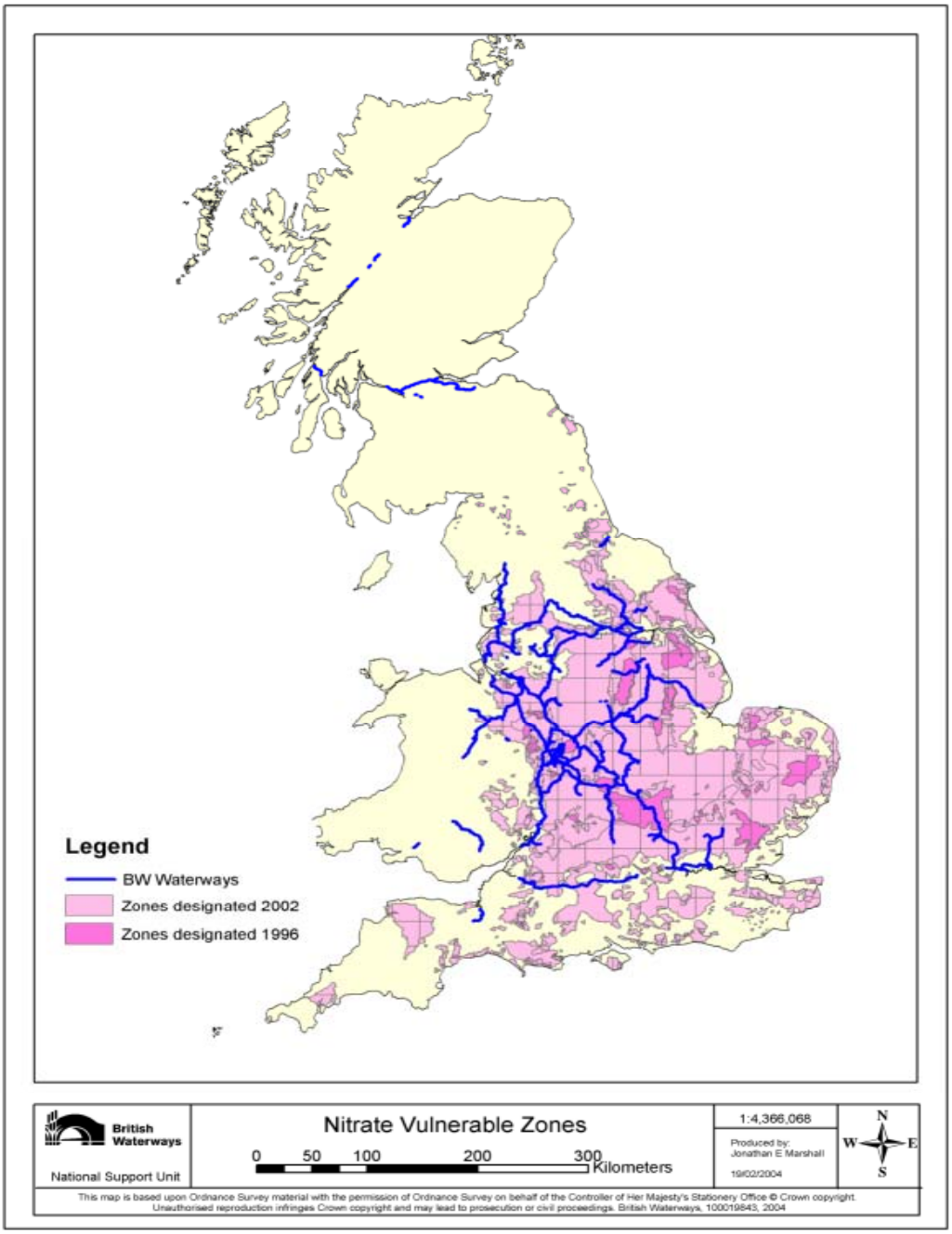

Figure 1. Nitrate Vulnerable Zones in England

Lobbying

At an early stage it was obvious that the consultation responses were not having the desired effect and the subsequent regulations were expected to have major impacts on the operations of navigation authorities. British Waterways and other organisations such as the Broads Authority have lobbied strongly via the consultation process but to no avail. Navigation interest groups such as the Inland Waterways Association also submitted strong representations (Inland Waterways Association, 2001). At this stage, it was decided that the only way forward was to request a meeting with Defra and the Environment Agency to try and raise the awareness of the problems faced and attempt to convince the regulators face to face.

The request was eventually accepted and there followed a series of meetings involving various departments of Defra, the Environment Agency, British Waterways and the Broads Authority. The early meetings failed to

make any impact but following the provision of reports from BW, the Broads Authority and independent lawyers, as well as face to face meetings with Defra and the Agency lawyers, progress began to be made.

As discussed earlier, the inland dredging operations in the UK tend to be small scale and are often carried out in remote locations with poor access. The narrow gauge of the canals limits the amount of material which can be transported economically by water and the problem is further exacerbated when there are locks. In these situations, plant and equipment has to be small scale and easily transportable, which can create difficulties in producing equipment which has a sufficient throughput and can provide a cost-effective solution.

Larger scale treatment plants would be more effective, but would not work in the UK unless they were close to locations where dredging volumes produced could sustain them.

At the moment there is little market for recycled dredged materials and it is difficult to see how this will change significantly in the future. It does have benefits for conditioning agricultural land but this has to be carefully calculated. There are possibilities for use in land reclamation and landscaping works but these tend to be minimal. The regulations and exemptions need to provide as many options as possible to encourage the reuse of dredgings. The alternative is for the un-sustainable approach involving pre-treatment and disposal of landfill.

CURRENT CONCERNS WITH REGARD TO REGULATION

At a recent meeting on sediments attended by practitioners and researchers into sediments; the workshop report stated that there were serious regulatory barriers to effective management of sediments in general and dredgings in particular. Concerns were recorded with regard to inconsistencies and fragmentation in the regulatory process. It was noted that there was a lack of consistency between local and area offices of the Environment Agency regulation staff, which was exacerbated by high staff turn over, problems with fragmented assessment and individual interpretation varying from officer to officer (Apitz *et al*, 2002). There have also been concerns from British Waterways that in the current climate of uncertainty; innovation and research is being hampered by the regulators who are using “the precautionary principle” as a rigid straight jacket. This was experienced to some extent in England over the NVZ trials and in Scotland over innovative dredging disposal for bank protection and construction works.

POTENTIAL IMPACTS

The primary impact on the navigation industry will be an increase in costs for dredging projects. This in turn will cause navigational bodies to restrict the level of dredging to an absolute minimum and increase use of hydrodynamic methods where dredgings are re-suspended and moved within the channel until they are no longer impeding navigation. This technique is limited to those situations where flow aids dispersion of dredgings and the impact is minimised by dispersion into naturally turbid waters.

Elsewhere, avoidance of disposal of dredgings to landfills is likely to result in larger quantities of dredged material being deposited along the banks of the navigation channel. This in turn may impact on uses of riparian property.

In urban settings where there is limited scope for dredging disposal, the impacts may be far reaching. It is in urban settings that the most challenging dredged material is found, resulting from historic activities. The contaminants are often elevated and there is usually a greater occurrence of refuse such as shopping trolleys and traffic cones. The increased costs may mean that navigations with little commercial value and no statutory requirement to maintain navigation may have to be closed while additional funds are raised from outside bodies to carry out the dredging. It would be hoped that this could be avoided by development of new economically efficient processing plant as mentioned above.

Further impacts on dredging activity may be caused by the Water Framework Directive if it can be shown that dredging changes the ecological status class of the water body. For heavily modified waters there is a derogation for physical alterations made for which the artificial characteristics of the body serve “as long as all mitigation measures are put in place to the best approximation to ecological continuum”. This means the Directive recognises the need to dredge for navigation purposes but best practise must be applied. This does mean that further lobbying, research and debate will have to be entered into, to show that further regulation and

alternative techniques of dredging will not have significant ecological benefits that would change the ecological status of the water body.

Concerns have been raised at a Parliamentary level on the impact on authorities responsible for maintaining drainage channels. It was expressed that, "those responsible for watercourse maintenance will be so shackled by bureaucracy that dredging will be severely limited, so resulting in increased flood risk.". In response to a member of parliament asking about the policy regarding the removal of silt from watercourses, the Minister for the Environment (Mr. Elliot Morley) replied that in his experience, it is rare for a drainage board to send dredgings to landfill sites, so that the Landfill and Nitrates Directives should not have an effect (Hansard 2003). This shows how large a task it will be to educate those implementing the Directives.

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