



## **Sustainable Boating Group Position Paper – The Environmental Impact of Dredging**

### **Introduction**

The IWA Sustainable Boating Group published its Vision Paper in 2020 identifying ways in which Inland Waterways Boating could be made more sustainable. Part of this work is to find ways in which existing craft and boaters can use less energy and hence produce less CO<sub>2</sub>.

To this end, the Group have been looking at dredging and what contribution it might make towards reducing the environmental impact of craft navigating the canal system.

This paper sets out the broad conclusions it has reached so far and the work it would like to carry forward, probably in partnership with others. It looks exclusively at dredging of canals, dredging of other waterways, such as rivers, estuaries and ports has very different drivers.

### **Background**

Craft navigating our inland waterways need to use energy to propel themselves. It is recognised by all boaters that the shallower the canal, the more energy they need to use to maintain a given speed. Put simply, if canals were deeper, we would use less fuel.

Most of our narrow canals were designed and built with a depth of about five feet and working boats were built with this in mind. As commercial traffic declined, canals silted up and when the canals were revived for leisure use much less depth was available and most modern leisure craft are built with a draft of generally between 22" and 24".

Without external intervention, canals normally silt up to about the draft of craft using them with additional silting in specific areas which need to be addressed by 'spot dredging'. Canals today also tend to be shallower at either side where craft do not routinely cruise, particularly on the non-towpath side where bank erosion protection is usually poorer.

The Sustainable Boating Group recognise that, whilst there would be an environmental benefit in dredging canals deeper in terms of fuel use, there is an environmental (and financial!) cost in doing so.

The Group would like to understand and quantify both the increased fuel usage and the environmental cost of dredging.

### **Work Done to Date**

With the increasing availability of electric narrowboats, it is now reasonably easy to measure the energy required to propel a boat through the water. The Group have figures for the energy needed to propel a typical narrowboat through open water at various speeds. They now wish to extend this data onto the canal to evaluate the effect of various water depths.

The Group have also carried out some preliminary theoretical work, based on the above data, to estimate the additional energy required to propel a boat in various dredged situations, based on a 'blockage factor', being the extent to which the boat 'fills' the available water cross section. This suggests that inadequate dredging can easily increase the power requirement by 50% or more. This needs to be validated, as above.

The Group are aware of extensive work that has been carried out by the Inland Waterways Association of Ireland where cheap and readily available depth sounders, mounted on Members' boats, have been used to gather extensive canal depth data. Many electric narrowboats are now equipped with GPS systems and use of these and propulsion power data gathering would allow more sophisticated data sets to be acquired.

The Group are also co-operating with Strathclyde University on a project to understand better the hydrodynamics of boats moving along a constrained channel ('a canal') and another to estimate the depth of a canal using data acquired via a mobile phone 'App'. Scottish Canals and the Lowland Canals Association are also involved with these projects.

### **Future Work**

- The Group would like to conduct further trials with a suitably equipped electric boat in a canal or canals where the cross section is known, or can be measured, to gather propulsion energy data for a variety of 'blockage factors'. This should enable the environmental benefit that can be achieved by dredging to various depths to be calculated.
- The Group would like to work with the CRT and other navigation authorities to understand the issues associated with dredging to various depths, and with various methods, to enable an estimate of the environmental costs of dredging to be arrived at, recognising that this will vary dramatically with how the arisings have to be disposed of.
- If both sets of data were available, they could then be compared to evaluate the environmental benefit, or otherwise, of dredging to various depths, in canals with various levels of traffic.
- The Group will continue to co-operate with Strathclyde University to assist their research in this area.

### **Outcomes**

Dredging is very (financially) expensive. The amount of dredging that a canal navigation authority can do will be limited by available funds and has to be focussed on keeping the waterways navigable. This is recognised.

The outcome of this work might be to show that there is an environmental benefit in dredging beyond that necessary to maintain navigation. It may conclude that there is not. A more likely outcome is that it is worth doing on well used canals, but not on less popular ones.

If environmental benefit can be demonstrated, it may open the way to navigation authorities accessing additional funds, to the benefit of the environment and users.

It also should not be forgotten that deeper canals will help to reduce bank erosion and reduce adverse effects on flora and fauna.

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