MILFORD HAVEN WATERWAY
ENVIRONMENTAL SURVEILLANCE GROUP

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MILFORD HAVEN SEDIMENT HYDROCARBON AND METALS CONTAMINATION: SUPPLEMENTAL REPORT ON RECENT CONTAMINANT TRENDS

Final Report to
Milford Haven Waterway
Environmental Surveillance Group
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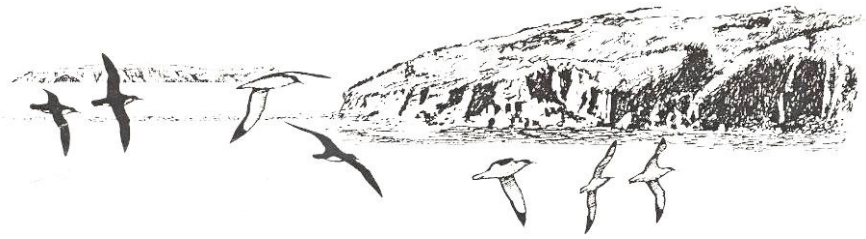

EXECUTIVE SUMMARY

The recent sediment chemistry data for the Milford Haven Waterway (MHW) can be reasonably explained by a combination of new contaminant inputs and the disturbance of sediments historically-contaminated by oil and metals. The following peaks occurred:

- LNG-related construction causing sediment resuspension with likely peaks in activity in 2003-2005, 2008, and 2010-2011
- Port of Milford Haven (PoMH) maintenance dredging mainly using trailing suction hopper dredger (TSHD), with possible hopper spillage during activity in 2006 and 2010
- Neyland Yacht Haven (NYH) dredging using cutter suction dredger (CSD) causing mud suspensions with peak disposals at Neyland in 2005, 2007, 2008, 2009 and 2011.

Not in any doubt is the pronounced yet ephemeral peak in polycyclic aromatic hydrocarbons (PAHs) and six heavy metals concentrations at almost every station in MHW in October 2007. The peak was noted in the Sediment and Contaminant Transport Review submitted to MHWESG in 2009, but its causes could not be ascertained at that time. This supplemental report is intended to rectify this issue in light of the geochemical and potential biological significance of the 2007 peak, across numerous receptors.

In the comparisons made, any changes in the mud and organic content of the sediments were considered small, replicate agreement was good, and usually the same laboratory was used. The 2007 peak was 170% more than the previous peak recorded over a decade earlier, which was only eight months after the *Sea Empress* spill in 1996. The increase in mean PAHs concentrations (ΣPAH 17) over the period 1996 to 2007 was statistically significant (*t*-test, $p<0.01$).

Although 1996 to 2007 was a long gap in MHW-wide monitoring for PAHs, other sources of data have been examined such as the dredging control samples analysed periodically for limited areas by the Centre for Environmental, Fisheries and Aquatic Sciences (CEFAS). Annual sampling data were also examined from the Clean Safe Seas Environmental Monitoring Programme (CSEMP) using the National Laboratory Service (NLS), the same laboratory as for almost all the MHW-wide work. It is known from this time series that the contaminant increases started at Cosheston Point in 2003 with a doubling of both Cu and PAHs concentrations. There was another doubling in PAHs and a trebling in Cu concentrations between 2003 and 2007 at this locality. It is also clear that this steady contaminant build-up was further increased in 2011 at Cosheston Point.

In contrast, between the Octobers of 2007 and 2010, ΣPAH 17 concentrations had fallen by 44% across the MHW-wide survey grid. This was also statistically significant (*t*-test, $p<0.05$), and was far more than could be explained by a reduction in inputs from road runoff in the same period of about 8% (estimated using as a proxy the Office of National Statistics' data on annual retail sales of road fuels in Pembrokeshire). The decrease in ΣPAH 29 between 2007 and 2012 was also statistically significant (*t*-test, $p<0.01$).

Finally, atmospheric inputs also may have contributed PAHs and other contaminants *via* both direct deposition and through the tributary catchments. From preliminary analysis of government air quality data it is thought this was particularly true from late 2005 to 2007. If so, MHW indeed suffered a 'perfect storm' during this period.