

Action Level Review for dredge material management

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Introduction: Action Levels (ALs) are thresholds of a range of chemical contaminants which are used to determine whether dredged material is suitable for disposal at sea. They provide a proxy risk assessment for potential impacts to biological features such as fish and benthic fauna. Respectively, AL1 is the lower contaminant threshold and AL2 is the upper value. Sediments with contaminant concentrations lower than AL1 are generally considered acceptable for disposal at sea, pending other considerations such as physical suitability for the disposal site and potential beneficial uses. Sediments with concentrations above AL2 are considered unacceptable for uncontrolled disposal at sea without special handling and containment [1]. Sediments with concentrations between AL1 and AL2 are currently evaluated using a weight of evidence approach to assess the risk they may pose. The reason for reviewing ALs now relates to recommendations from the High Level Review completed in 2015 [1].

Methods: Approximately 3,000 sample data records from 2009 to the present were collated for trace metals, organotins, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), organochlorine pesticides (OCs) and polybrominated diphenyl ethers (PBDEs). Initially, these data were assessed using current ALs to determine the percentages of samples with levels <AL1, between AL1 and AL2, and >AL2. Percentage values were then determined by applying proposed new AL scenarios. This was tested using three metrics which are described as:

- difference in percentage of samples <AL1 (%scenario - %<AL1);
- difference in percentage >AL2 (%scenario - %>AL2);
- difference in range of concentrations (scenario range – AL range).

Scenarios tested include the revised ALs produced in 2003[1], that have already been adopted in Scotland, and a variety of further scenarios for each contaminant type derived from literature reviews and historic data. Maps showing spatial distribution of ALs for organotin are presented in Fig.1.

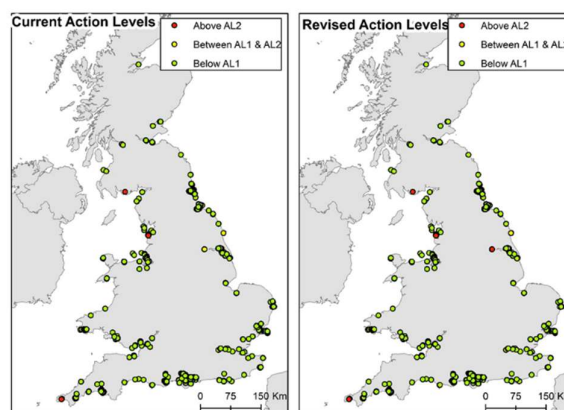


Fig. 1: Distribution of current and revised ALs for organotin.

Results: Results indicate that there are changes to the ALs which could be made such as updating ALs with the revised ALs [1], introduction of ALs where there are currently none set, and the introduction of regional trace metal background concentrations.

Discussion: Benefits of implementing revised ALs, include reducing contaminant disposal to the marine environment. In some areas, this may add increased burden, for example, where new ALs are proposed for contaminants that did not have them previously. However, this is expected to be minimal and may reduce burden in other areas. New and proposed AL scenarios will need to be phased-in carefully and with full engagement with stakeholders. It is recommended that a user-friendly and accessible framework should be developed which is adaptable as contaminants of emerging concern (i.e., pharmaceuticals, personal care products, pesticides, flame retardants and plasticisers, per- and polyfluoroalkyl substances, nano- and micro-sized plastics/materials) detectable in dredge material may require future assessments.

Reference : [1] MMO. (2015). High Level Review of Current UK Action Level Guidance. A report produced for the Marine Management Organisation, pp 73. MMO Project No: 1053. ISBN: 978-1-909452-350.