

Action Levels Review

Claire Mason | Cefas



Together we are working for
a sustainable blue future

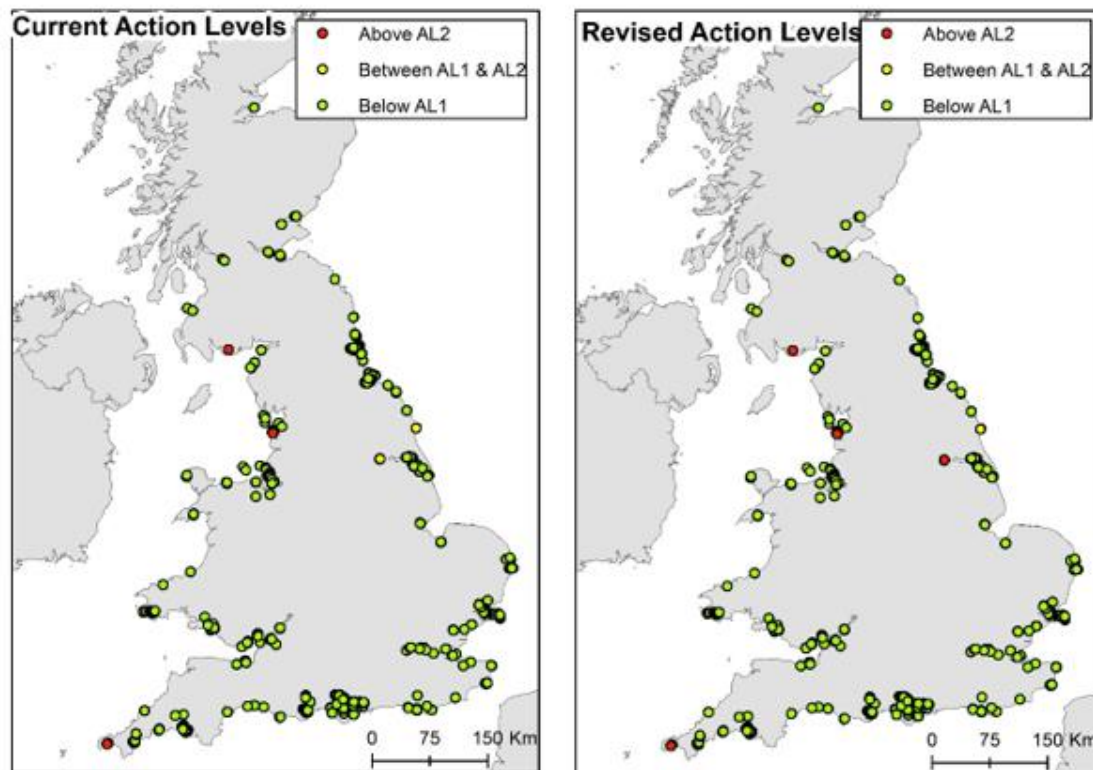


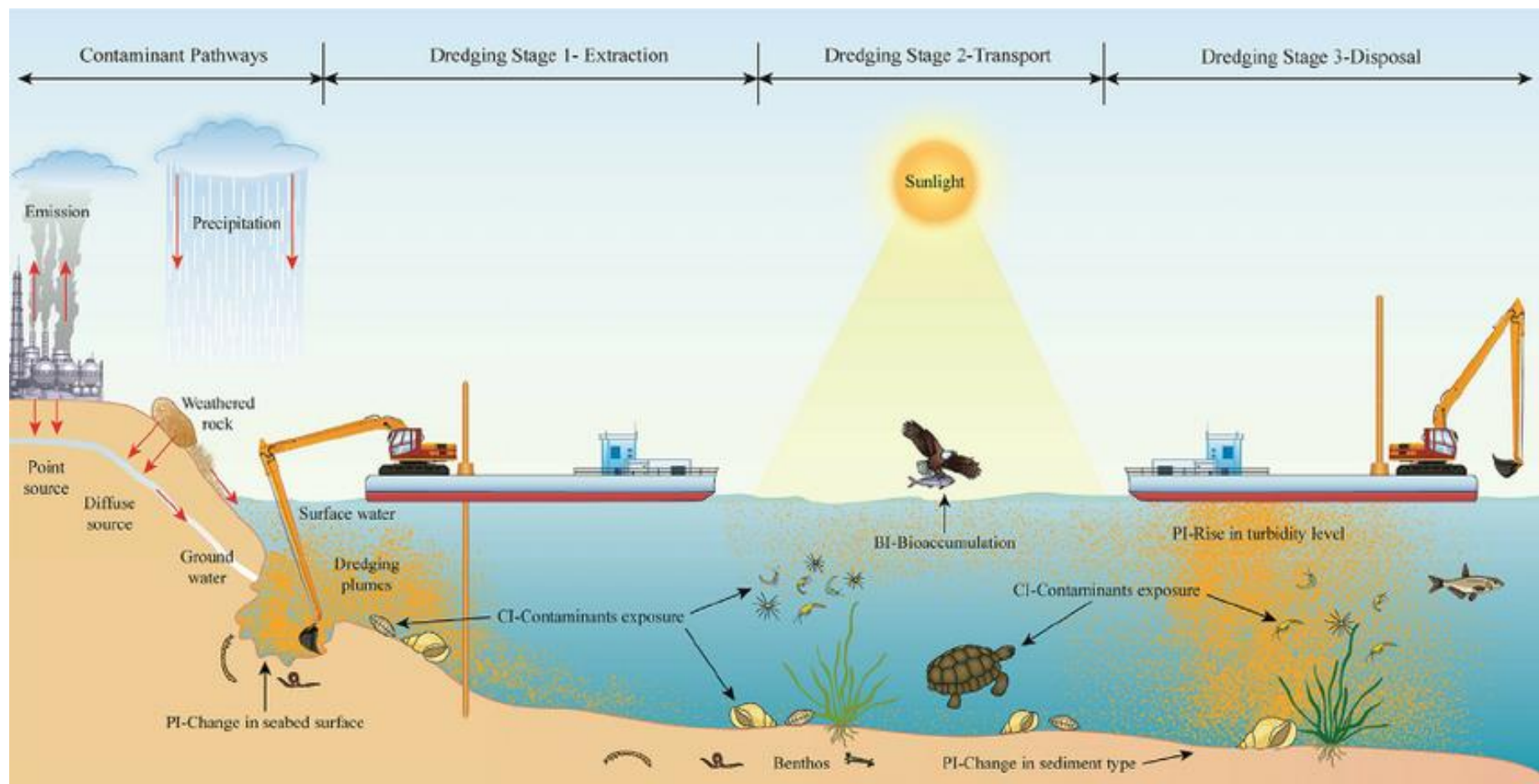
Action Levels Review Report

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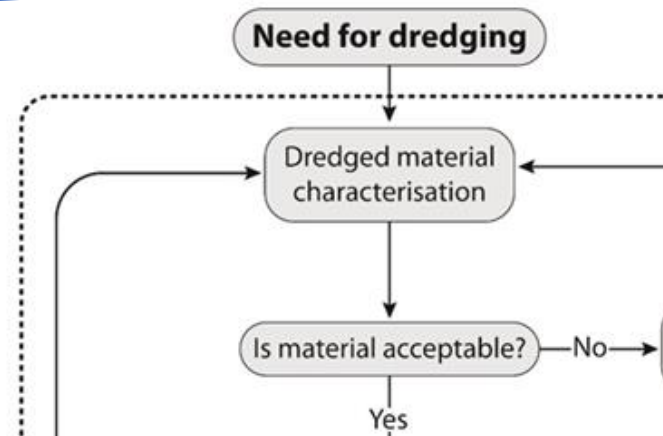
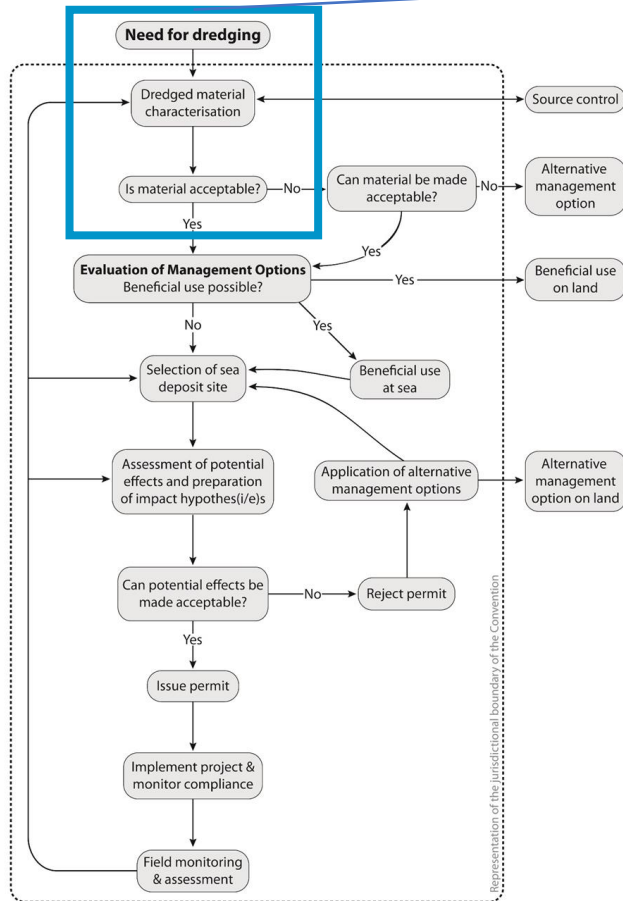


Tributyltin TBT





OSPAR Guidelines for the Management of Dredged Material at Sea (Agreement 2014-06)



International Requirement

the UK is signatory to both the **London Convention/ London Protocol** and **Oslo-Paris Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR)**

These aim to prevent marine pollution from human activities like disposal of dredge material.

The UK reports annually to the OSPAR and London Convention/
London Protocol Secretariats

volume of material disposed of to each designated disposal site

the contaminant loading (based on the concentration of contaminants in samples and tonnages disposed).

These figures then feed into international assessments regarding the amount of contamination potentially being released into the marine environment based on the UK's national action levels.

Requirement to review action levels regularly

ACTION LEVELS		
Contaminant / Compound	Action Level 1	Action Level 2
	mg/kg Dry Weight (ppm)	
As	20	100
Hg	0.3	3
Cd	0.4	5
Cr	40	400
Cu	40	400
Ni	20	200
Pb	50	500
Zn	130	800
Organotins; TBT DBT MBT	0.1	1
PCB's, sum of ICES 7	0.01	none
PCB's, sum of 25 congeners	0.02	0.2
*DDT	*0.001	
*Dieldrin	*0.005	
	*these levels were set in 1994	

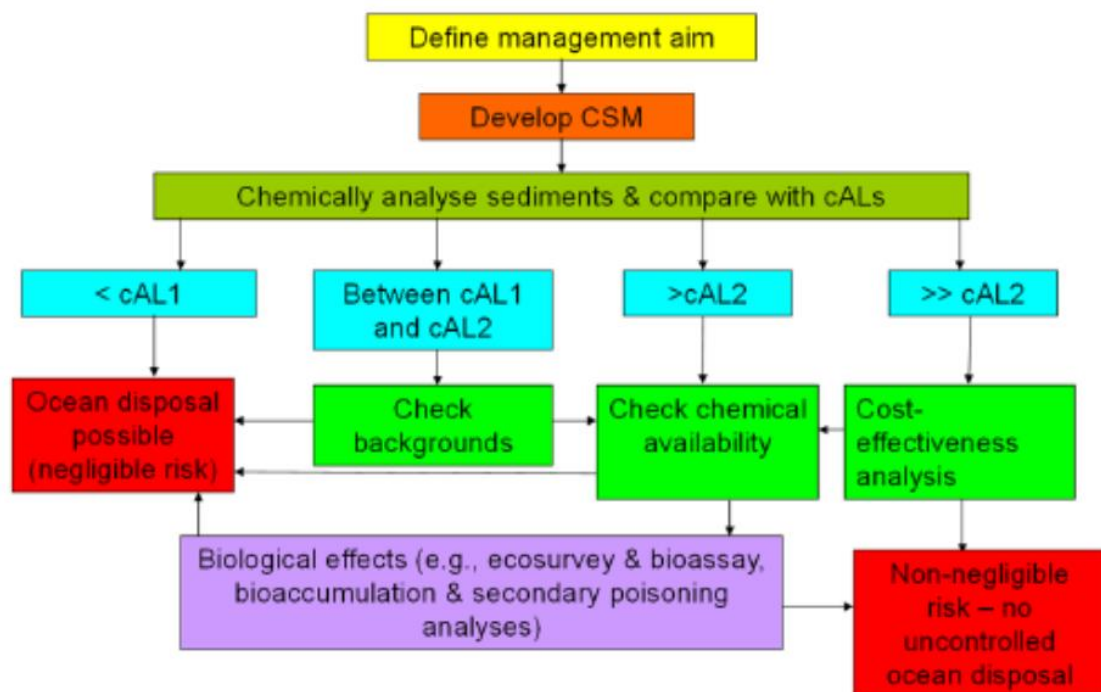
High level Review of Current UK Action Level Guidance Recommendations:

AL2 (and potentially AL1 in parallel) need reviewing in more depth

UK specific sediments (and organisms)

AL list refinement required – emerging contaminants

Framework could be developed



Dredge sample data collated from:
England (CEFAS holdings plus public register)
Scotland (sent from MSLOT)
Wales (Cefas holdings)
NI, IoM, Jersey, Guernsey, no compatible data
Substantive existing dataset from 1998 to 2015
Data added from 2015 to 2018
All data reviewed for accuracy (coordinates, wrong units etc)
All LOD entered as the detection limit

Total of 7026 records from 1998 to 2018
84 different determinands
Decision to restrict data to **2009-2018**
to make sure any differences noted are relevant now

The ten year period covered at least 2 cycles for ongoing
maintenance licences:

- Trace metals ~2720 samples
- Organotins ~2140 samples
- Polycyclic Aromatic Hydrocarbons (PAHs) ~1852 samples
- Polychlorinated biphenyls (PCBs) ~1000 samples
- Organochlorine Pesticides (OCPs) ~ 450 samples
- Polybrominated diphenyl ethers (PBDEs) ~141 samples



	As	Cd	Cr	Cu	Hg	Ni	Pb	Zn	DBT	TBT	Σ25_PCBs	ICES7	DIELDRIN	DDT
C_AL1	20	0.4	40	40	0.3	20	50	130	0.1	0.1	20	10	5	1
C_AL2	100	5	400	400	3	200	500	800	1	1	200	No AL2	No AL2	No AL2

Metrics

Below AL1

Metric descriptor	Colour code
Lower number of samples fall below AL1-more protective	> -10%
Slightly lower number of samples fall below AL1	> -5% to -10%
Neutral	< -5 to <5
Slightly higher number of samples fall below AL1	>5% to 10%
Higher number of samples fall below AL1-more permissive	>10%

Above AL2

Metric descriptor	Colour code
Lower number of samples fall above AL2-more permissive	>-10%
Slightly lower number of samples fall above AL2	>-5% to -10%
Neutral	<-5 to <5
Slightly higher number of samples fall above AL2	>5% to 10%
Higher number of samples fall above AL2-more protective	>10%

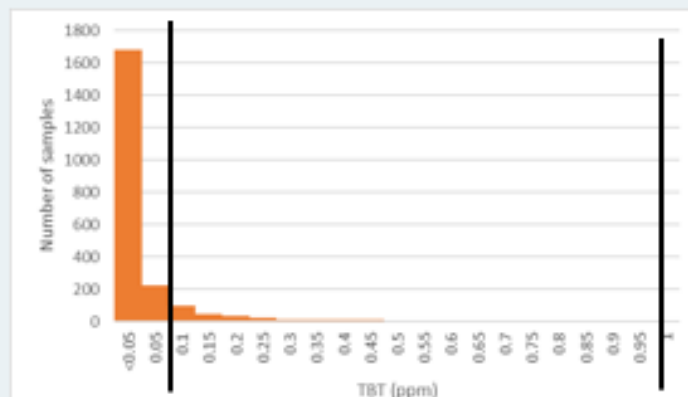
Range

Metric descriptor	Range
Range reduced from current (C_AL)	-
Range unchanged	
Range increased from current (C_AL)	+

Organotins

Revised ALs

	DBT	TBT
Revised AL1	0.1	0.1
Diff – Revised - cAL1	0	0
Revised AL2	0.5	0.5
Diff -Revised -cAL2	-0.5	-0.5
Diff-Range (Revised range – <u>cAL</u> range)	-0.5	-0.5
Diff- % below revised -% below cAL1	0	0
Diff- % above revised AL2 - %above cAL2	0.23	2.10
Total number of samples	2147	2234



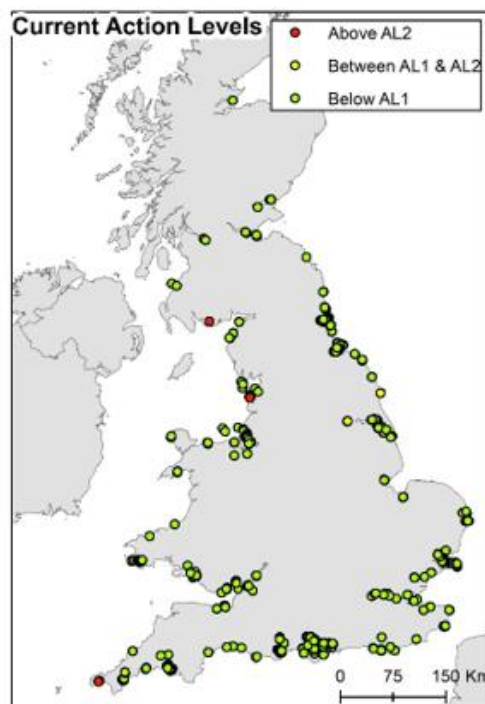
Current
AL1

Current
AL2

85%
<C_AL1

13%
>C_AL1
<C_AL2

2%
>C_AL2

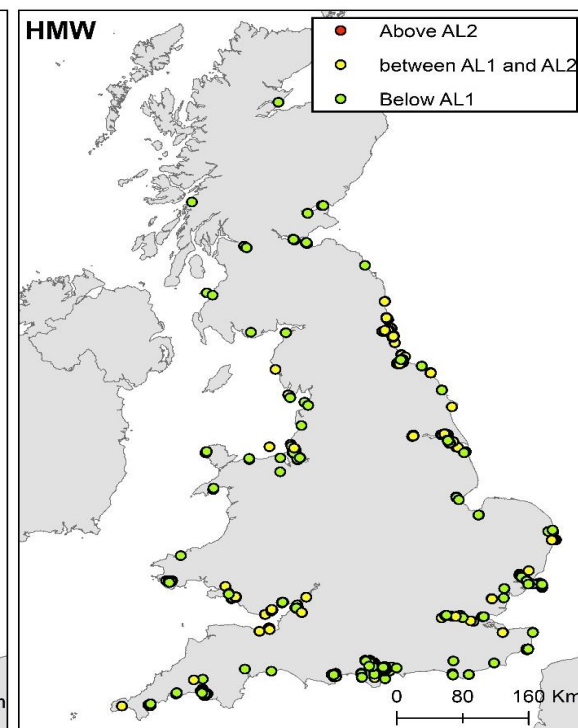
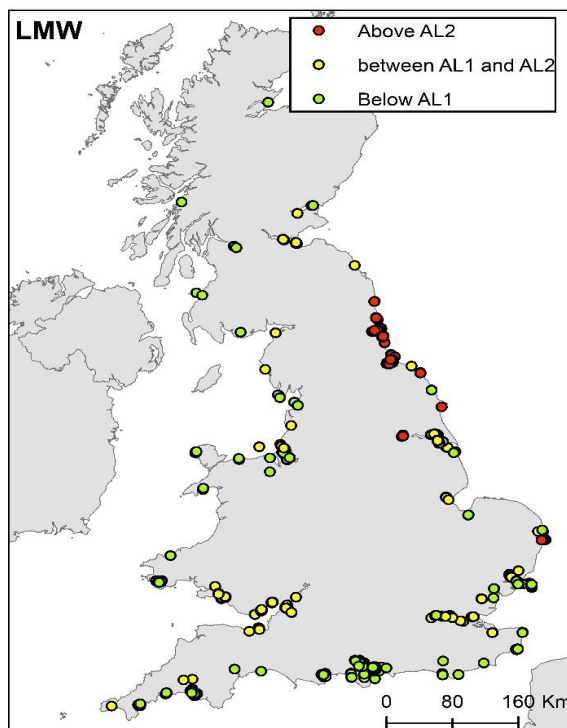


Polycyclic Aromatic Hydrocarbons (PAHs)

	LMW	HMW
ERL_AL1	552	1700
ERM_AL2	3160	9600
% below ERL	40.07	47.25
% below ERL (NE excluded)	53.55	59.25
% difference of all samples below AL1 compared with NE excluded	-13.47	-12.00
% above ERM	24.28	7.73
% above ERM (NE excluded)	5.90	5.82
% difference of all samples above ERM compared with NE excluded	18.38	1.91
Total number of samples	1874	1875
Total number of samples (NE excluded)	1339	1340

Proposed AL1 : Effects Range Low (ERL)
Proposed AL2: Effects Range Median (ERM)

For Σ low molecular weight (LMW) PAHs - 7 PAHs
2-3 ring
Acute toxicity



For Σ high molecular weight (HMW) PAHs - 6 PAHs
4-5 ring
Carcinogenic/ chronic toxicity

Proposed Action Levels

Contaminant	Units (dry weight)	Current Action Level 1	Proposed Action Level 1	Current Action Level 2	Proposed Action Level 2
As	ppm	20	20	100	70
Cd	ppm	0.4	0.4	5	4
Cr	ppm	40	50	400	370
Cu	ppm	40	30	400	300
Hg	ppm	0.3	0.25	3	1.5
Ni	ppm	20	30	200	150
Pb	ppm	50	50	500	400
Zn	ppm	130	130	800	600
<u>Organotins:</u> TBT, DBT	ppm	0.1	0.1	1	0.5

Contaminant	Units (dry weight)	Current Action Level 1	Proposed Action Level 1	Current Action Level 2	Proposed Action Level 2
<u>PAHs THC</u>	ppm	(100)	-	-	-
<u>PAHs LMW</u>	ppb	-	552	-	3160
<u>PAHs HMW</u>	ppb	-	1700	-	9600
Σ25_PCBs	ppb	20	20	200	180
ΣICES7_PCBs	ppb	10	10	-	90
PCB28	ppb	-	0.6	-	1.7
PCB52	ppb	-	0.9	-	2.7
PCB101	ppb	-	1	-	3
PCB118	ppb	-	0.2	-	0.6
PCB138	ppb	-	2.6	-	7.9
PCB153	ppb	-	13	-	40
PCB180	ppb	-	4	-	12
DDT	ppb	1	1	-	-
Dieldrin	ppb	5	5	-	-
BDE28	ppb	-	38	-	110
BDE47	ppb	-	33	-	97.5
BDE66	ppb	-	33	-	97.5
BDE85	ppb	-	0.3	-	1
BDE99	ppb	-	0.3	-	1
BDE100	ppb	-	0.3	-	1
BDE153	ppb	-	367	-	1100
BDE154	ppb	-	367	-	1100
BDE183	ppb	-	4666	-	14000
BDE209	ppb	-	16	-	47.5

Action Levels Review – Next steps

- Economic assessment
- Development of a Framework tool
- Additional elements
 - integration of sediment and water assessments
 - use of ecotox testing
 - open-loop scrubbers



Sustainable and Strategic Management of Dredged Material

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Action Level Review and Sediment Quality
Sustainable Marine Management
Habitat Restoration and Beneficial Use

Background

- In order to maintain safe navigation, on average, ~27.3 M wet tonnes of dredged material (DM) is disposed of across the UK each year (2009 to 2019), ~70% of which is disposed of offshore.
- Classified as a waste, Action Levels (ALs) are used to assess contaminant loading of DM and determine acceptability for disposal at sea.
- Rather than a 'waste', DM should be viewed as a resource, forming an essential component of sedimentary processes.
- Where suitable, beneficial uses such as habitat restoration are considered the most favoured management options (Figure 1), with offshore disposal a last resort. However, only ~0.5% of DM currently supports habitat restoration.

Partners



Photo: Jim Pullen

Figure 1. A vegetated shingle ridge and saltmarsh, Horsey Island, Essex. Created using dredged material. Provides flood defence benefits, protects designated habitats and supported the most successful little tern breeding colony in Essex in 2020 (RSPB, pers. comms.).

Providing the Tools

- Following a Cefas review, new ALs have been proposed to Defra that provide greater environmental protection and transparency in the decision making process.
- To support strategic management and co-ordination of habitat restoration opportunities, Cefas are developing an online framework to help match sources (dredging activity) and sinks/stores (habitat restoration).
- Working with partners, Cefas are producing a handbook providing conceptual, practical and regulatory advice on how to use DM to support the restoration of estuarine and coastal habitats.



For more posters: @CefasGovUK





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