

Impacts on the marine environment by long term use of a deposit site in the German Bight

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1. Introduction

2. Framework conditions

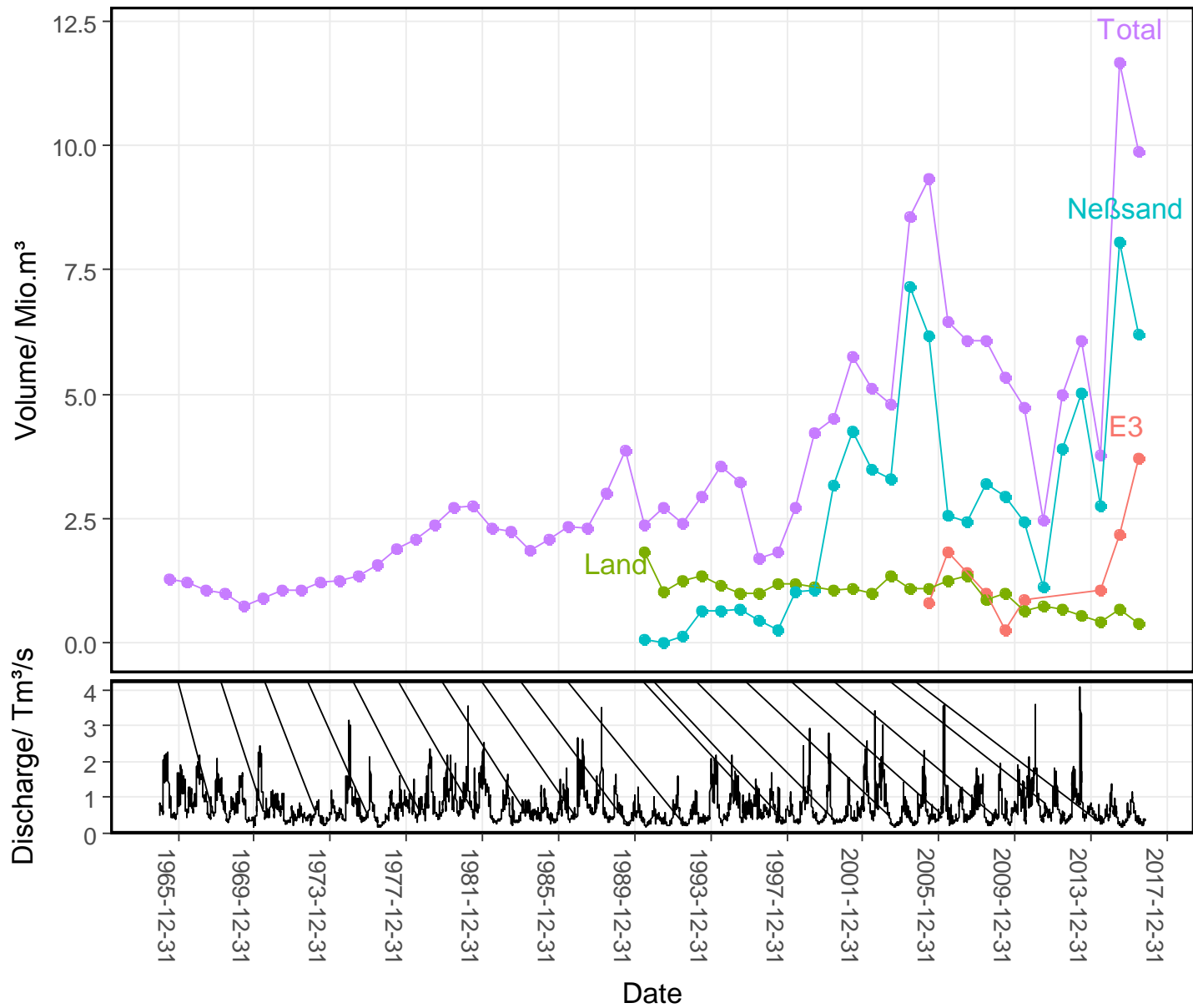
3. Open questions:

- Contamination of dredged material?
- Influence on natural reserves?
- Significant bioaccumulation outside of the disposal site?
- Does the monitoring results meet the agreement?
- Nautical depth >25m?
- The dredged material has to be disposed so that it remains largely in the intended application zone

4. Results

5. Summary







Measures to reduce dredging quantities

- River engineering measures
 - redesign of Elbe side arms
 - creation of flooding areas
 - underwater deposition areas
- Sediment traps
- Reduction of sedimentation
 - current deflecting walls (CDF)
 - **Removal of sediment out of the system**



Framework

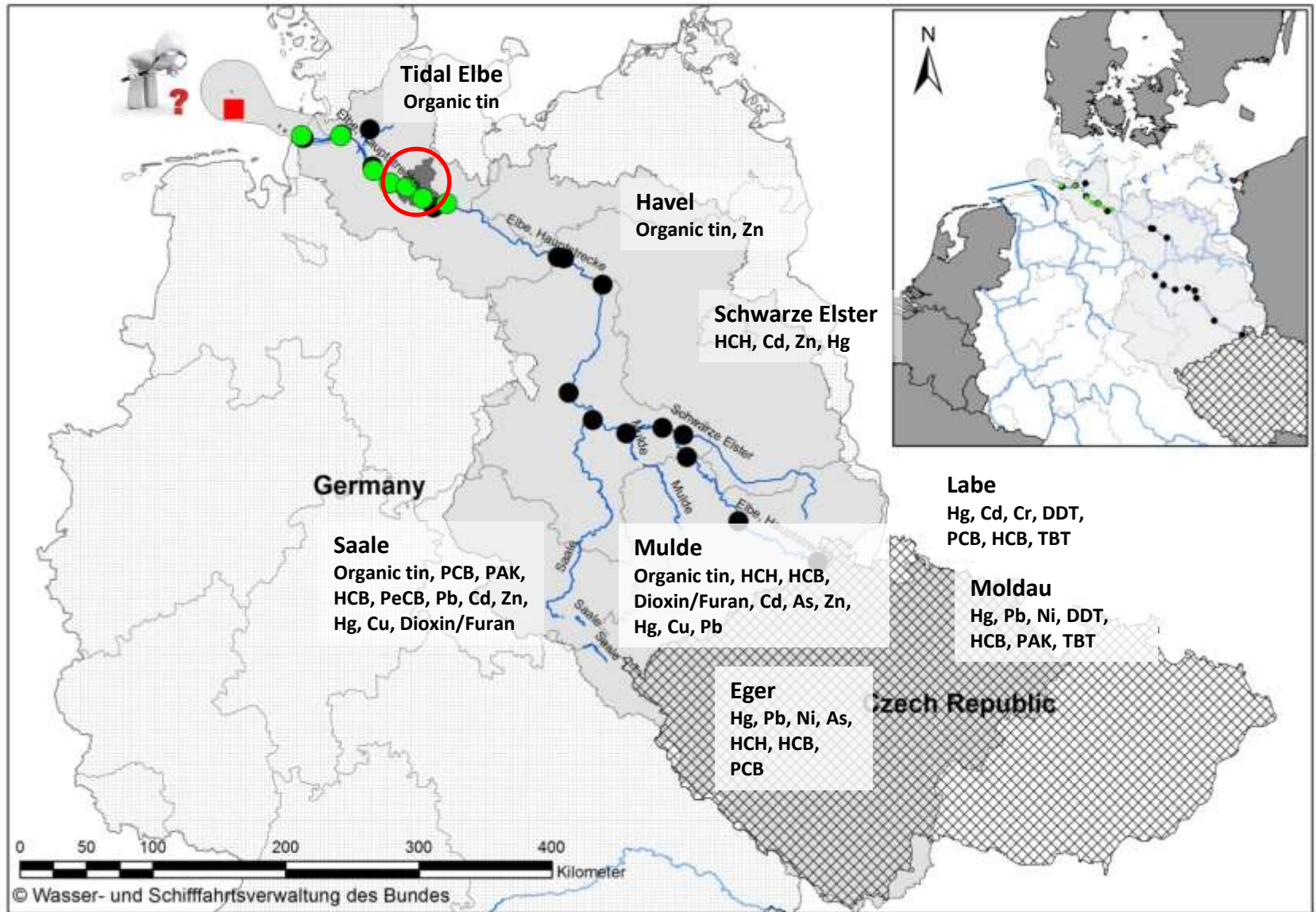
- **GÜBAK:** Joint Transitional Arrangements for the Handling of Dredged Material in German Federal Coastal Waterways

National implementation of OSPAR convention

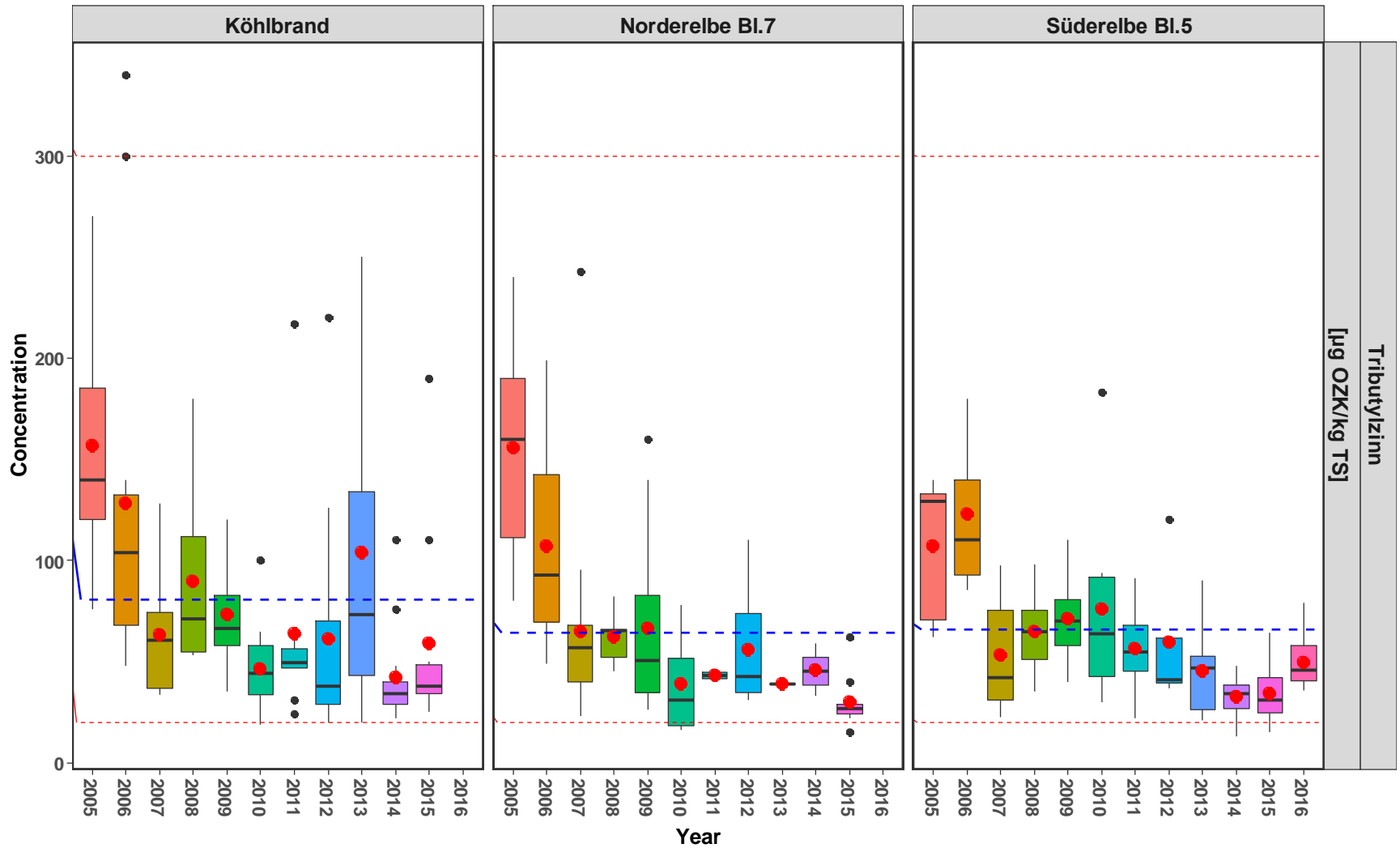
- **Mutual agreement** (2016) between Hamburg Port Authority and the Federal State of Schleswig-Holstein

35 subjects for permitting the disposals

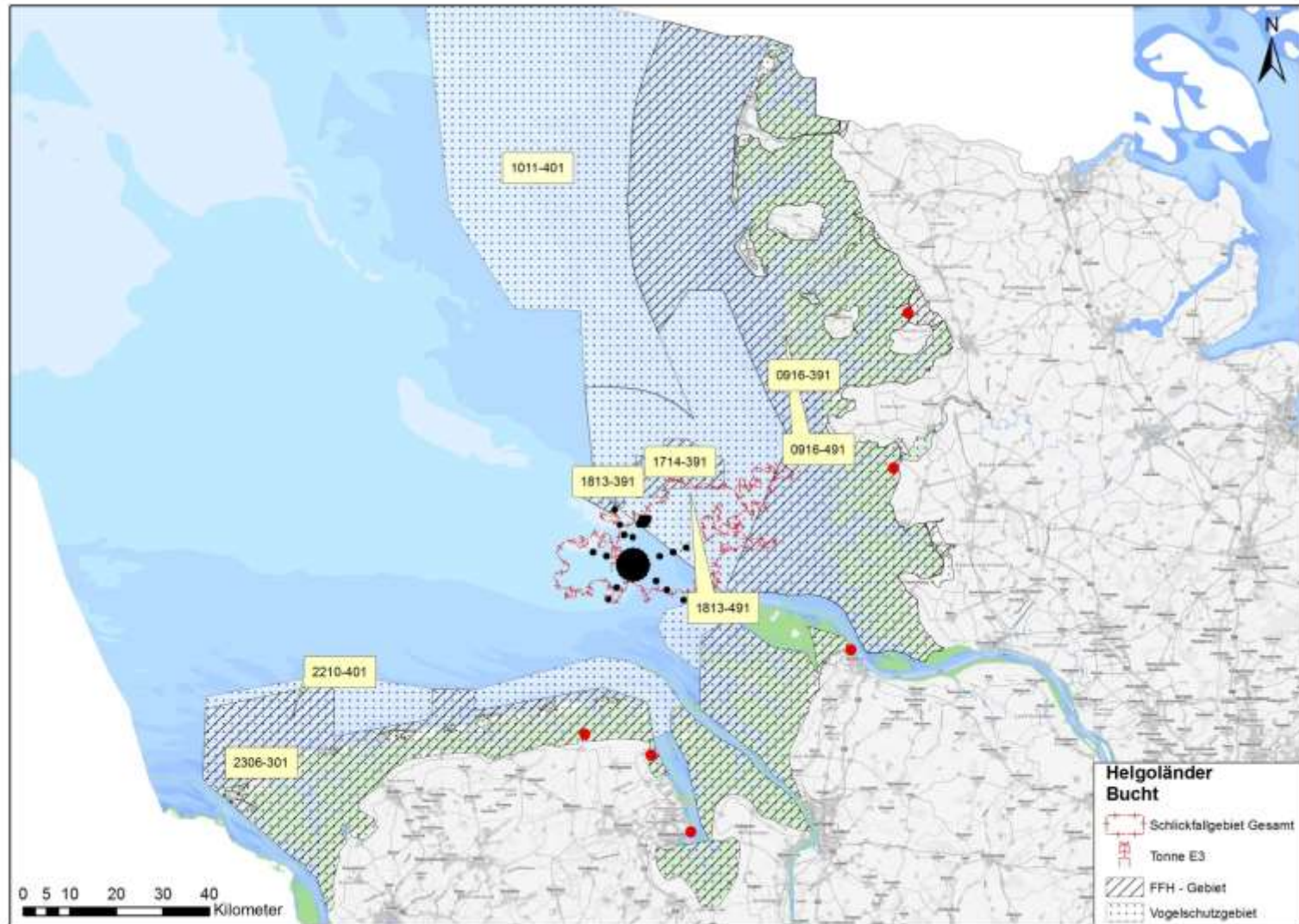
- Establishment of a **monitoring concept**
- Assessment according to national regulations
- Assessment according to EAC
- No disposal of material
 - characterized by high ecotoxicities (5 or 6)
 - expecting bioaccumulation effects
 - significant higher polluted in comparison to reference period

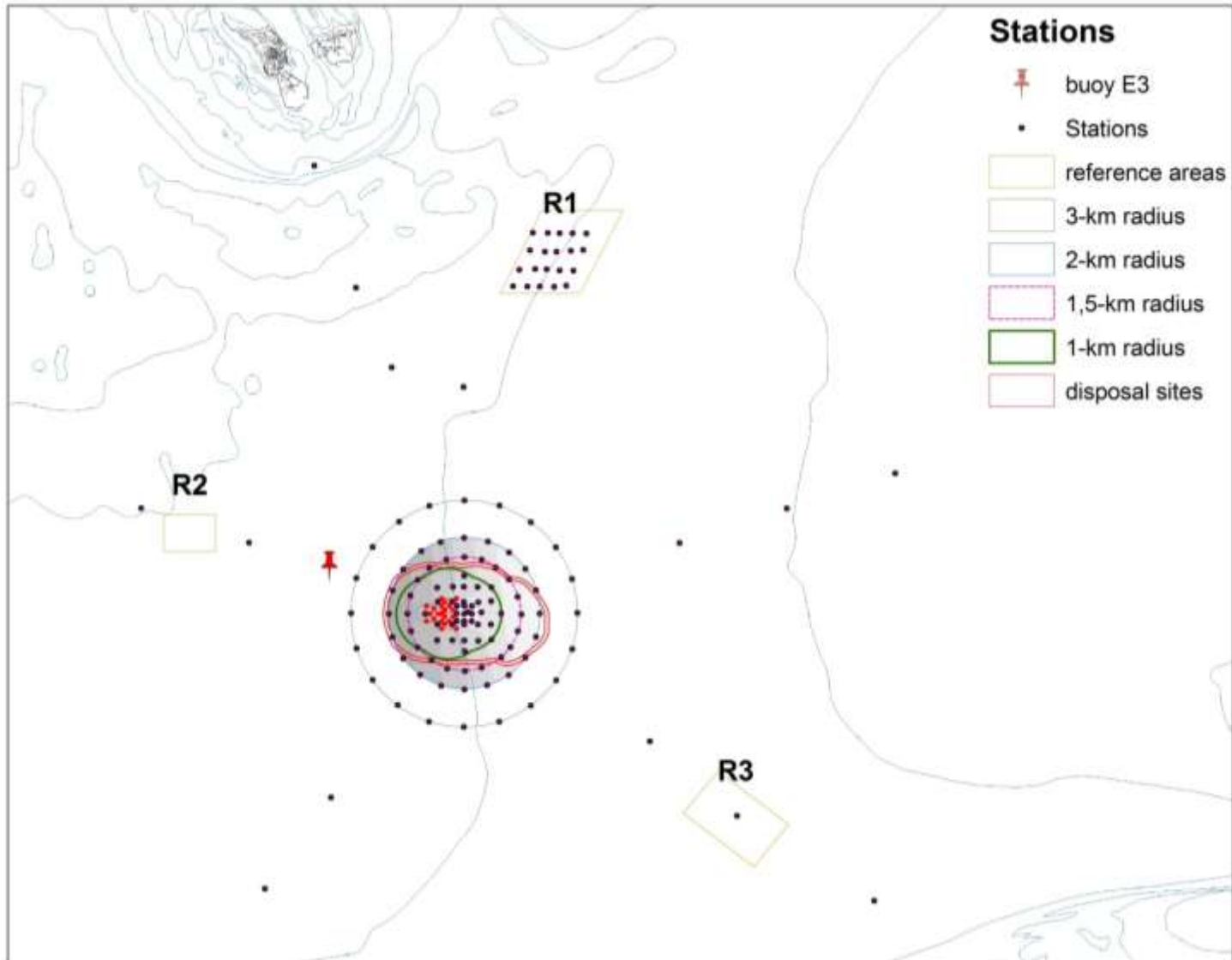


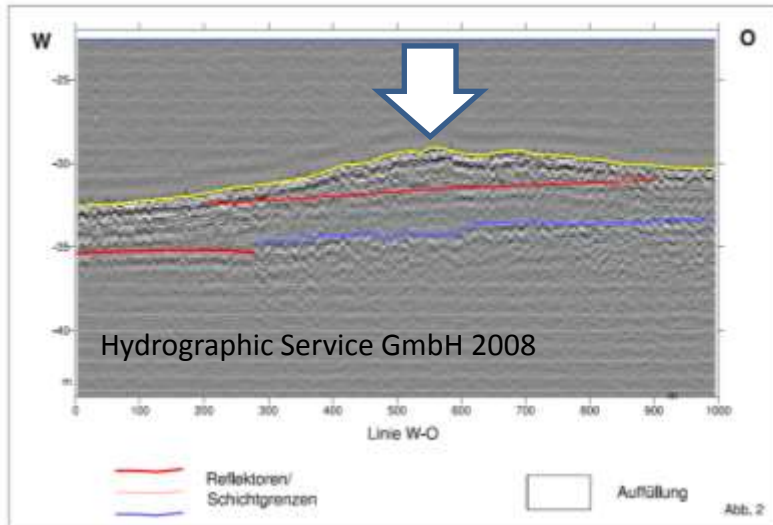
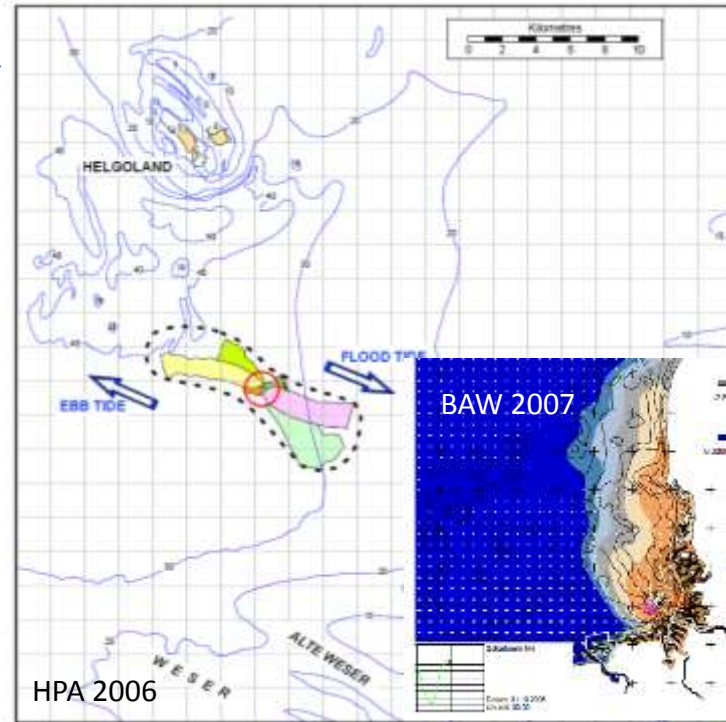
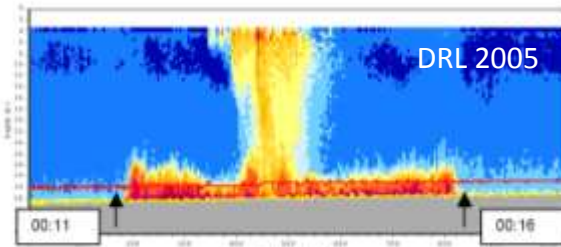
- Contamination of dredged material?



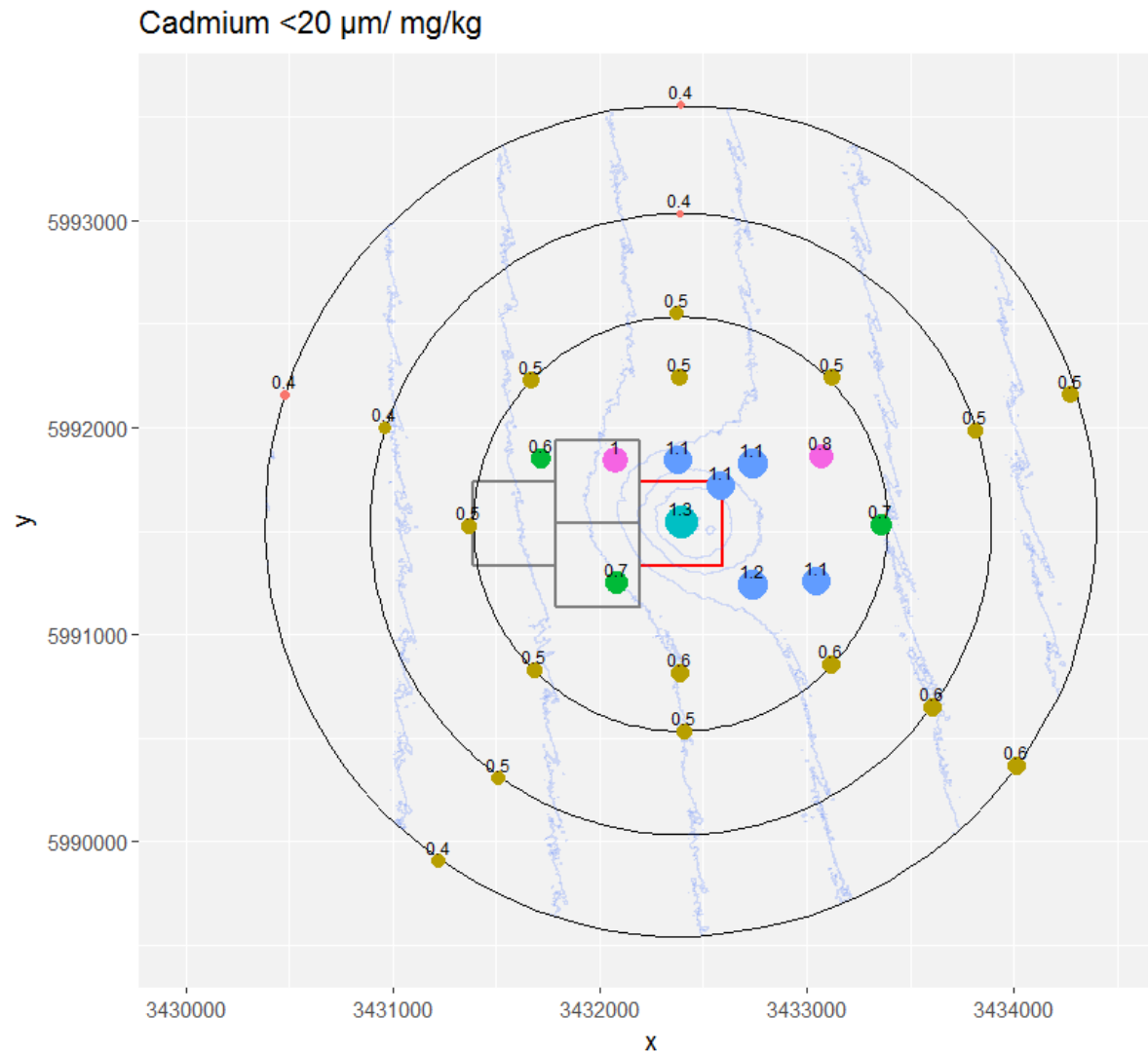
- Influence on natural reserves?







- The dredged material has to be disposed so that it remains largely in the intended application zone



No. of replicates *Abra alba*



2014	1 km	1,5-km	AU2	6-km	R1
July	5	4	5	5	3
September	5	5	5	5	4

No. of replicates *Buccinum undatum*



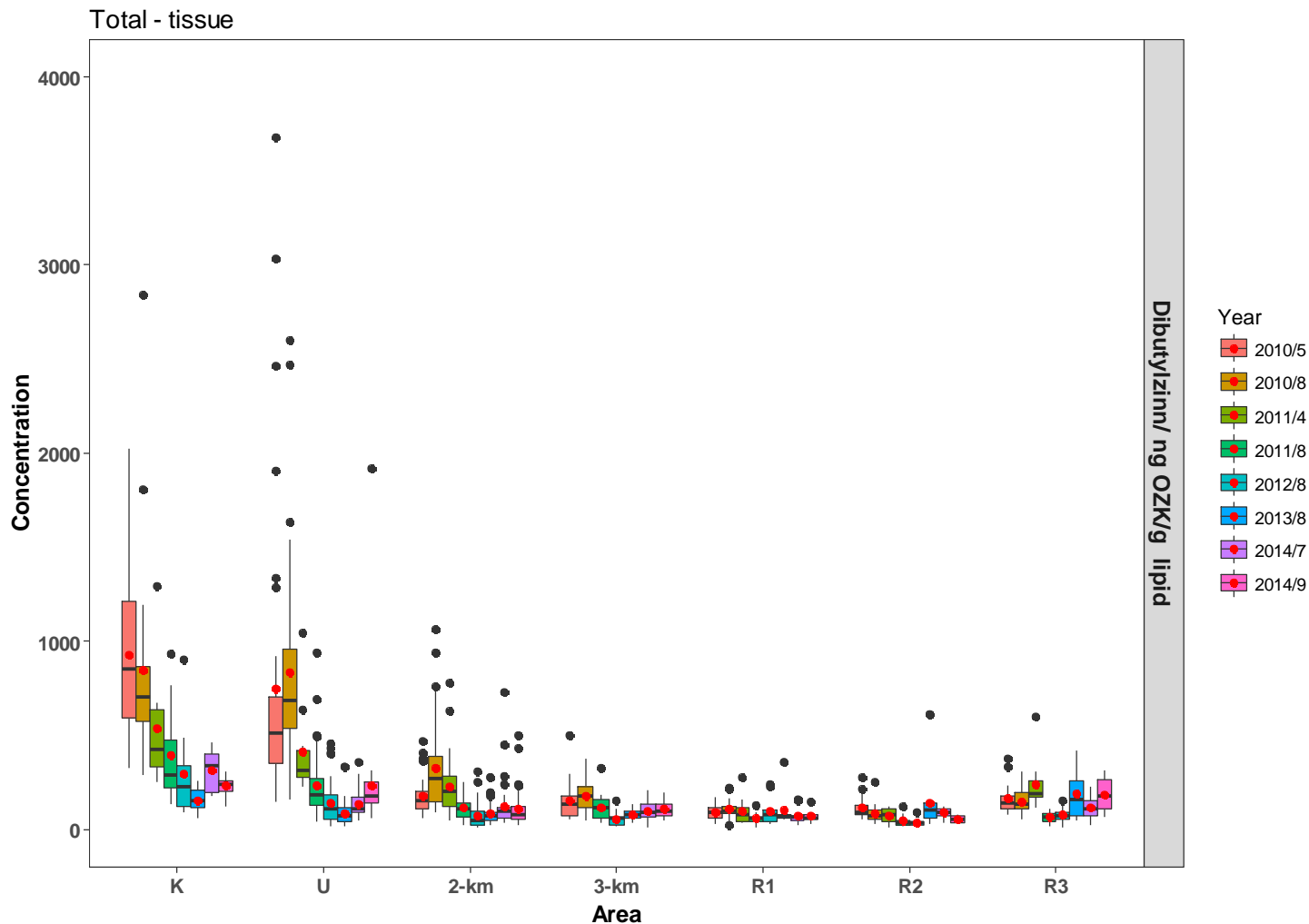
2014	Center	1 km	2 km	3 km	R1	R2	R3	Sum
July	10	40	40	20	10	10	10	140
September	10	40	40	20	10	10	10	140



No. of replicates *Limanda limanda*
liver/muscle

2014	1 km	3 km	R1	R3	Sum
July	15/5	15/5	15/5	15/5	60/20
September	15/5	15/5	15/5	15/5	60/20

- Significant bioaccumulation outside of the disposal site?



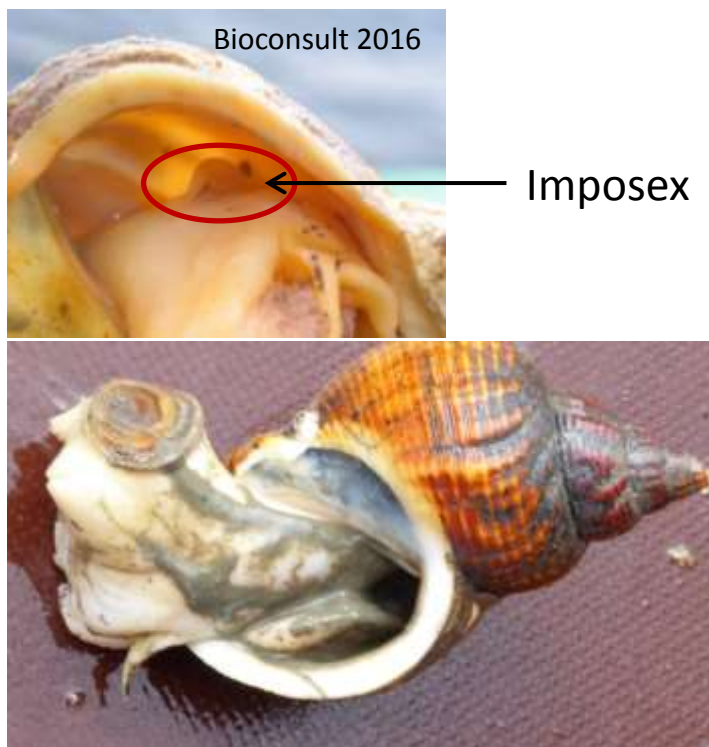
DBT	2014/7	Kruskal-Wallis rank sum test	Nemenyi-test
		$p < 0,001$	K > 2-km 3-km R1, R2
	2014/9	Kruskal-Wallis rank sum test	Nemenyi-test
		$p < 0,001$	K, U > 3-km R1, R2

- Significant bioaccumulation outside of the disposal site?
- PCI Penis Classification Index-

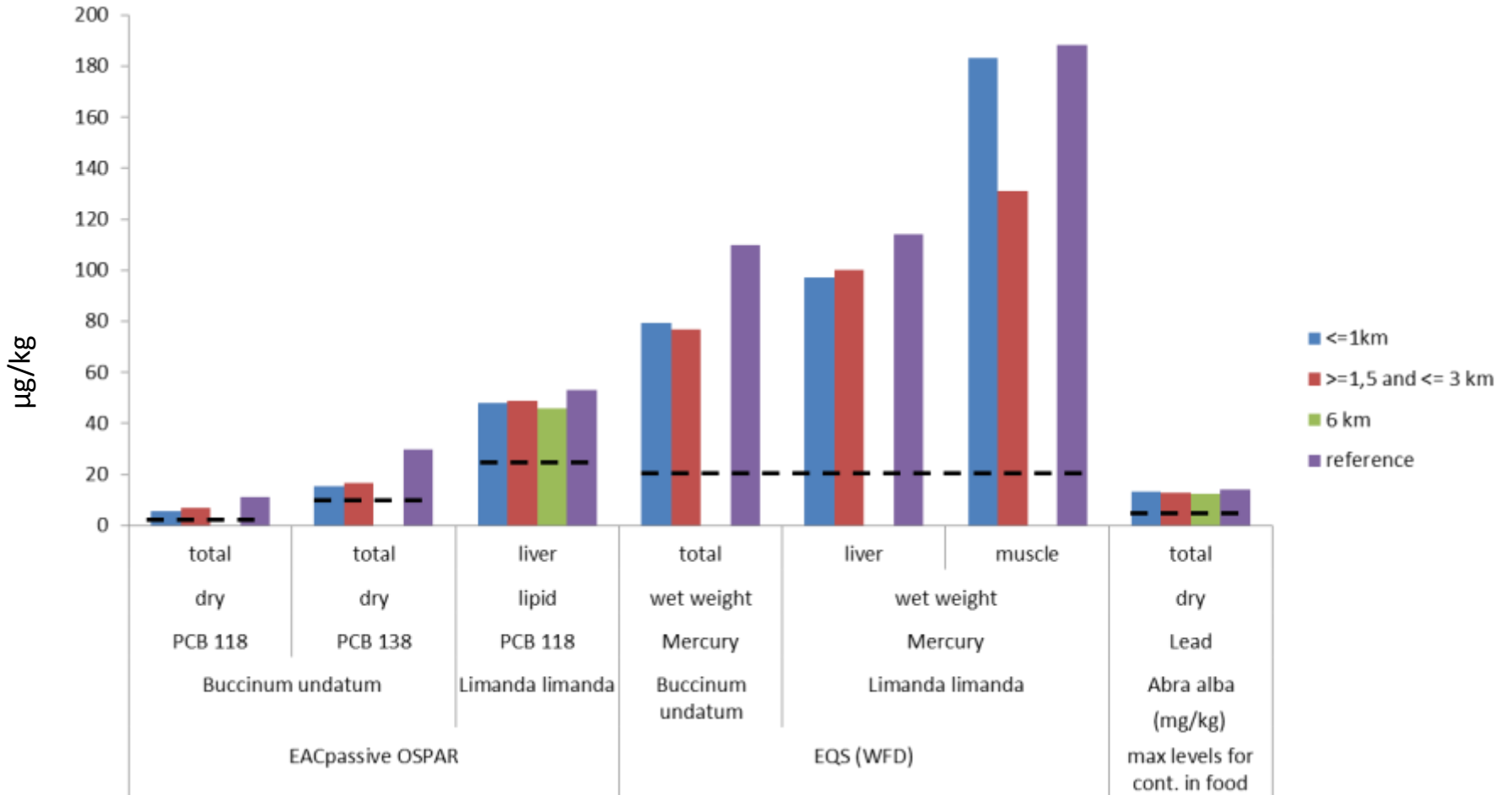
Date	K	J	AU	R1	R2
2014/9	0	0	0.08	0.08	0.4
2014/6	0.04	0.08	0.04	0.04	0
2013/8	0.03	0	0	0	0.04
2012/9	0	0.04	0	0	0
2011/8	0.05	0.36	0.19	0.3	0.4
2011/5	0.04	0.24	0	0.06	0.2
2010/9	0.3	0.06	0.62	0.52	0.4
2010/5	0.26	0.13	0.21	1.08	0.16
2009/7	0.21	0.16	0.52	0.5	0.73
2009/3	0.71	1	0.61	0.63	0.52
2008/7	0.04	0.52	0.38	0.5	0.64
2008/4	0.3	0.21	0.33	0.17	0.83
2007/8	0.48	0.43	0.43	0.75	0.55
2007/4	0.11	0.72	0.44	1.13	0.35

Area

Class ■ B ■ C



• Assessment according to EAC and environmental quality standards





Summary

- Dredged material keeps the standards of the agreement
- Effects on sediment/biota are restricted locally
- Natural reserve areas are not influenced
- EQS standards are failed on a larger scale

Continuation of disposals:

- Effects will spread out but will remain restricted to the extended disposal site (1,5 km)
- Adverse effects in biota as a result of disposals are unlikely
- A good chemical status (WFD) will not be achieved, irrespective from the disposals

