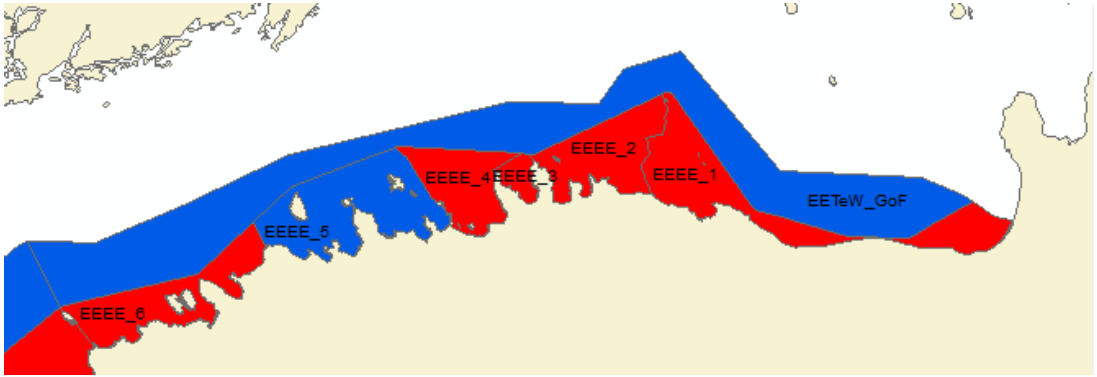
Baltic BOOST

Co-funded by the European Union



The CHASE Tool

Ciarán Murray, NIVA Denmark

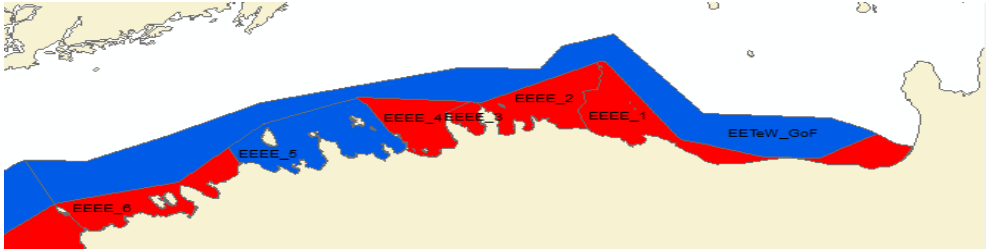
Second HELCOM BalticBOOST Workshop on the HOLAS II hazardous substance assessment

Copenhagen, 13-14 Sep. 2016

NIVA Denmark

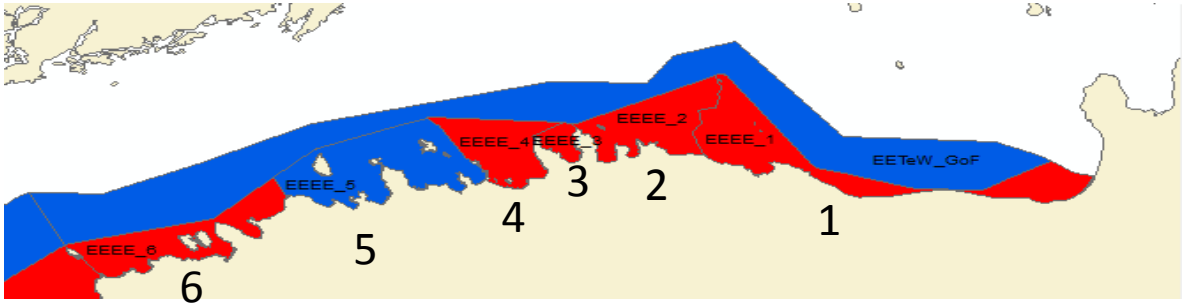
Case Studies

Estonian WFD Assessment Data



Open Sea sub-basins
Combine Data

Estonian Case Study

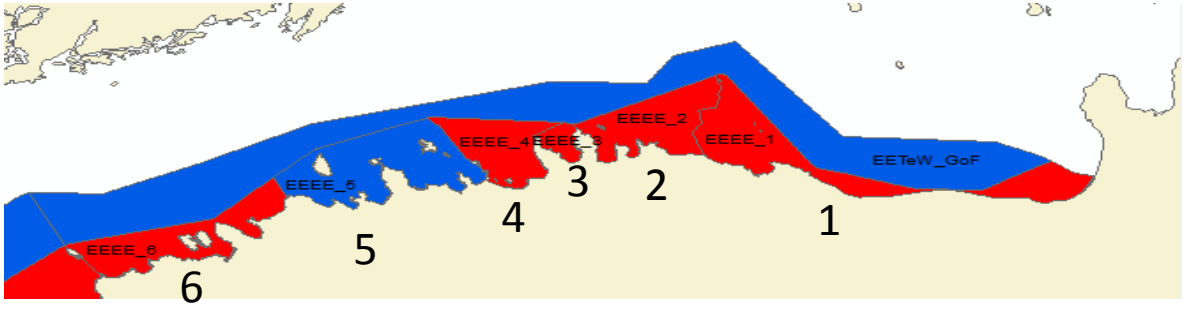


Comparison:

- WFD (OOAO)
- CHASE (WFD indicator set)
- CHASE (Core indicator set)
- CHASE ("Core +3")
  HCB, DDE, Cu

Waterbody ID	Waterbody name	Count
EEEE_1	Coastal water of Narva-Kunda Bay	34
EEEE_3	Coastal water of Hara Bay	8
EEEE_4	Coastal water of Kolga Bay	8
EEEE_5	Coastal water of Muuga-Tallinna-Kakumäe Bay	38
EETeW_GoF	Territorial waters of Estonia (Gulf of Finland)	8

Estonian Case Study – WFD vs CHASE



Waterbody ID	Waterbody name	WFD Chemical Status	CHASE	
			ConSum	Status
EEEE_1	Coastal water of Narva-Kunda Bay	Failed	1.97	GES
EEEE_3	Coastal water of Hara Bay	Failed	1.87	sub-GES
EEEE_4	Coastal water of Kolga Bay	Failed	1.33	sub-GES
EEEE_5	Coastal water of Muuga-Tallinna-Kakumäe Bay	Good	0.87	GES
EETeW_GoF	Territorial waters of Estonia (Gulf of Finland)	Good	0.81	GES

Estonian Case Study

Problem: observations below detection limits

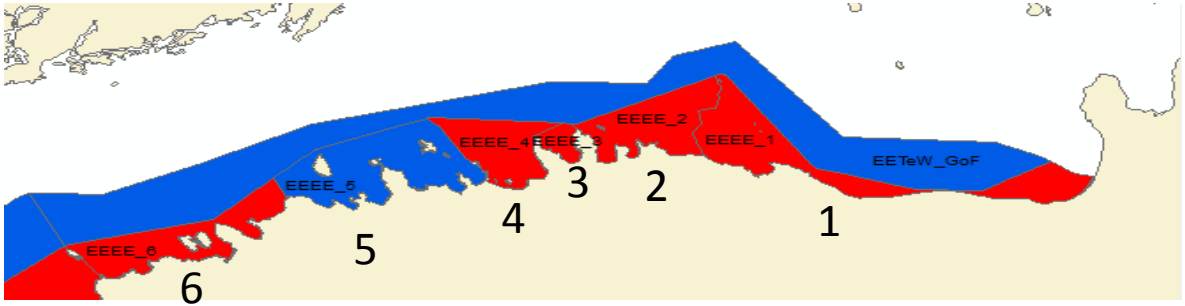
Observed value < X µg/l
How do we treat this?

Test with different fractions of X:

Waterbody	0	0.5	0.8	1
EEEE_1	1.97	1.97	2.01	2.46
EEEE_3	1.87	1.87	1.87	1.87
EEEE_4	1.33	1.33	1.33	1.33
EEEE_5	0.87	0.87	0.94	1.17
EETeW_GoF	0.81	0.81	0.81	0.81

Estonian Case Study – WFD vs CHASE

Problem substances



EEEE_1	Cd
EEEE_3	Hg
EEEE_4	Hg
EEEE_5	Cd
EETeW_GoF	[Cd]

Estonian Case Study – Indicator Sets

Waterbody	WFD Indicators			Core Indicators			Core +3		
	Count	ConSum	Status	Count	ConSum	Status	Count	ConSum	Status
EEEE_1	34	1.97	sub-GES	12	2.83	sub-GES	17	0.84	GES
EEEE_3	8	1.87	sub-GES	3	2.85	sub-GES	5	2.21	sub-GES
EEEE_4	8	1.33	sub-GES	3	1.91	sub-GES	5	1.49	sub-GES
EEEE_5	38	0.87	GES	12	1.07	sub-GES	16	0.6	GES
EETeW_GoF	8	0.81	GES	3	1.07	sub-GES	5	0.83	GES

Cd

Open Sea Case Study

Waterbody	Matrix	(Core) Indicator Count	
		Incl. RN	Excl. RN
Kiel Bay (SEA-004)	Biota	4	2
	Water	3	2
	Sediment	5	5
Arkona Basin (SEA-006)	Biota	15	12
	Water	3	2
	Sediment	5	5
East Gotland Basin (SEA-009)	Biota	9	7
	Water	3	2
	Sediment	4	4

2 methods compared:

- OOAO per substance
- CHASE aggregation

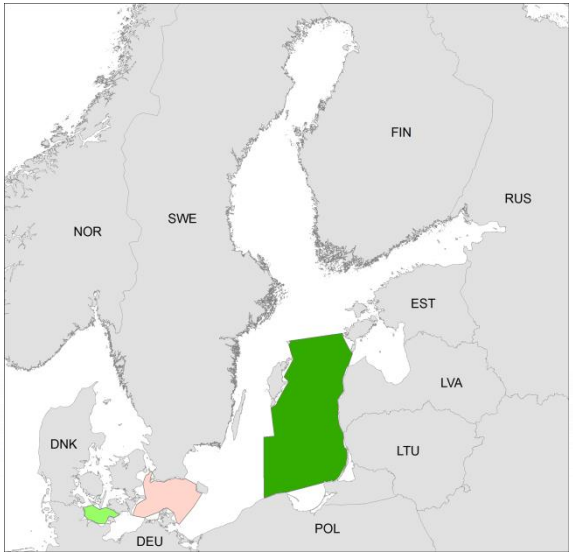
Data sources

- ICES Combine
- HELCOM (radionuclides – CS137)

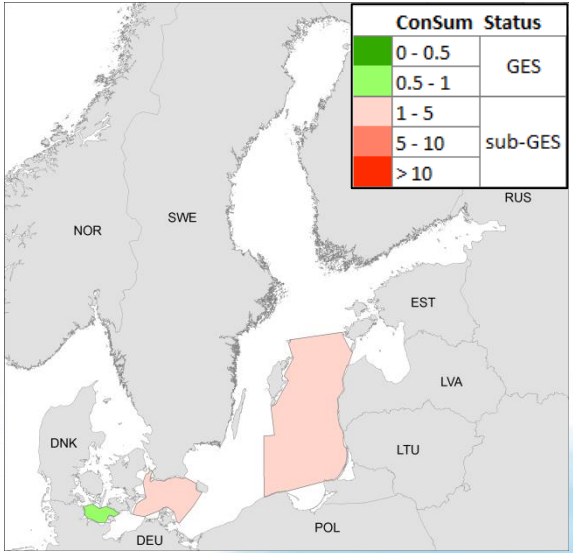
Open Sea Results

Biota

Sediment



Water



Open Sea – Problem substances

Biota

Kiel Bay
- Hg

Arkona Basin
- Hg, Pb, Cd
- Cesium 137

E.Gotland Basin
- Hg, Cd
- Cesium 137

Sed.

Arkona Basin
- TBT (CR = 1.05)

Water

Kiel Bay
- Cesium 137

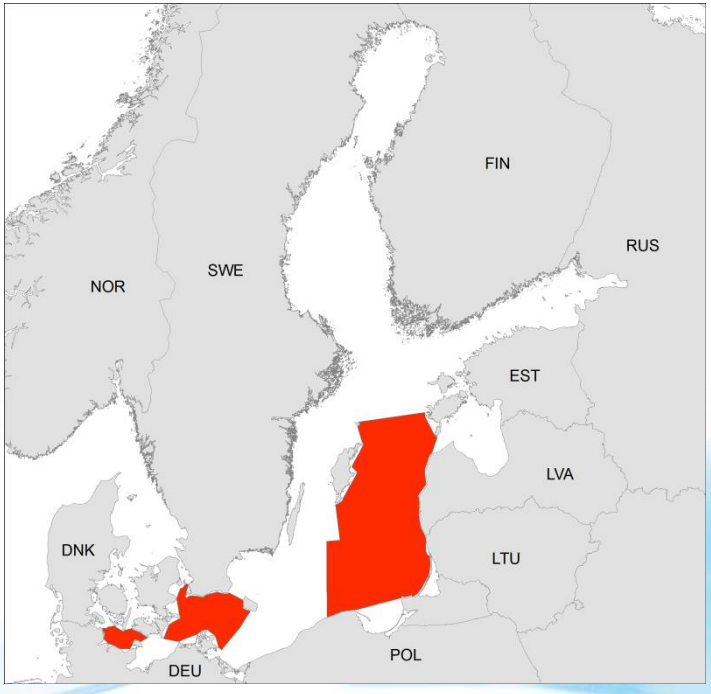
Arkona Basin
- Cesium 137

E.Gotland Basin
- Cesium 137
- [Pb CR = 0.92]

Open Sea Results

CHASE Overall

Substance OOAO



Open Sea Results - Radionuclides

Waterbody	Matrix	Incl. Radionucleide indicators			Excl. Radionucleide indicators		
		Ind. Count	CHASE Result	Status	Ind. Count	CHASE Result	Status
Kiel Bay (SEA-004)	Biota	4	1.47	sub-GES	2	1.34	sub-GES
	Water	3	0.89	GES	2	0.11	GES
	Sediment	5	0.69	GES	5	0.69	GES
Arkona Basin (SEA-006)	Biota	15	4.58	sub-GES	12	4.35	sub-GES
	Water	3	1.23	sub-GES	2	0.24	GES
	Sediment	5	1.20	sub-GES	5	1.20	sub-GES
East Gotland Basin (SEA-009)	Biota	9	6.99	sub-GES	7	6.90	sub-GES
	Water	3	1.98	sub-GES	2	1.02	sub-GES
	Sediment	4	0.14	GES	4	0.14	GES

Case Study Conclusions

These are preliminary results

- CHASE gives similar results to OOAO / WFD.
- Metals are controlling the status in many cases.
- Radionuclides are not controlling status in the open sea study areas.