

**FRV Walther Herwig III  
Cruise 492  
19.08. - 15.09.2025**

**Studies on Biological Effects of Contaminants  
in the North Sea and Baltic Sea**

Scientist in Charge: Dr. Pedro Miguel Agostinho Nogueira

**Summary**

As part of the integrated monitoring programme of the Thünen Institute of Fisheries Ecology (FI) on contaminants and biological effects, studies were carried out in seven areas in the North Sea and four areas in the Baltic Sea. A large range of fish samples were taken for subsequent analysis of radioactive contaminants and in addition Water samples were taken for quantification of the amount of adsorbed chemicals, more specifically TNT. In the Baltic Sea video recordings of the seabed were made with an epibenthic video sledge.

A new BlueRov2 equipped with a Gammaspectrometer was tested.

In all areas sediment samples were collected for PFAS, anthropogenic radionuclides measurements, microbiota. Furthermore, hydrographical measurements were carried out (water temperature, salinity, oxygen content and turbidity).

As in the previous FI research survey an IMIS exercise was performed.

**Objectives of the Cruise**

1. Collection of fish samples for the analysis of radioactive substances, heavy metals, and organic pollutants (within the framework of BLMP, the Radiation Protection Act, OSPAR, HELCOM, and research projects);
2. Sampling of fish livers and other organs for subsequent histological and biochemical examinations;
3. Collection of water samples and use of probes for hydrographic determination of salinity, temperature, and oxygen;
4. Taking water samples for analysis of environmental DNA (eDNA);
5. Sediment sampling;
6. Direct measurements of contamination of various matrices using an ROV-supported gamma spectrometer;
7. Video recordings of trash/waste on the seabed with an epibenthic sled.
8. IMIS exercise

## **Dates of the Cruise**

The RV Walther Herwig III departed from Bremerhaven on 19 August 2025, heading towards the reference area GB1, where operations began with fisheries sampling using the GOV fishing gear.

Subsequently, the work program continued in the North Sea areas GB1, GB3, and GB4. After collecting the required samples for monitoring purposes and the associated projects, the vessel proceeded towards the Baltic Sea via the Skagerrak. However, due to a malfunction in the vessel's engine cooling system, an unscheduled stop in Hirtshals was necessary for repairs. Following the completion of the repair work, the survey resumed in area SK2, where water and fish samples were collected.

On the morning of 26 August, work in the Baltic Sea commenced in area B01 using the 140' trawl. Shortly thereafter, further technical issues required an additional stop in the port of Kiel for repairs.

The work program resumed on 2 September in area B01 with a new haul using the 140' gear. This was followed by sediment sampling, deployment of the epibenthos sledge, and testing of the ROV equipped with a gamma spectrometer. The survey then continued in areas B10 and B09. In B09, strong signal interference—likely originating from Kaliningrad—resulted in a loss of GPS signal. Due to this limitation, CTD rosette deployments and trawling with the 140' gear were not possible, particularly given the presence of pipelines. As an alternative, fishing rods were used to collect the required cod samples for the MUNIMAP project.

Sampling was subsequently conducted in areas B23, B25, and B26. On 8 September, the vessel entered Tallinn (Estonia), where Ms Reyelt, Mr Wilczyński, Mr Piekarski, and Mr Romaniuk disembarked, and the 140' trawl was replaced with the pelagic net PSN.

Following this short stop, operations continued in Gälve, Kaskinen, B31, and B32. In these areas, the focus was primarily on the collection of water and sediment samples, as well as video recordings using the video sledge. The final station was located in area B13, where pelagic fishing was conducted and the required number of cod samples was collected.

The survey (cruise WHIII 492) concluded on 15 September 2025 with the return of Walther Herwig III to Bremerhaven.

The locations of the study areas and the exact cruise track are shown in Fig. 1 and Tables 1 and 2. Across the 15 study areas (Fig. 1), a total of 16 fishing hauls (typically with a trawling duration of one hour) were conducted (Table 2). The GOV gear was used in the North Sea, while the 140' trawl was deployed in the Baltic Sea. Hydrographic measurements were carried out at 17 stations (Table 2). Preliminary results for anthropogenic caesium-137 (Cs-137) and natural potassium-40 (K-40) in fish samples are presented in Table 8.

## **Participants:**

1. Dr. Pedro Miguel Agostinho Nogueira (Scientist in Charge), TI-FI Bremerhaven
2. Sarah-Jane Reyelt, TI-FI Bremerhaven
3. Raika Himmelsbach, TI-FI Bremerhaven
4. Maike Siegmund, TI-FI Bremerhaven
5. Murielle Muesfeldt (Student)
6. Denise Grillwitzer (Student)
7. Anika Gücker (Student)
8. Wojciech Wilczyński (Polen Observer) , IOPAS
9. Karol Piekarski, IOPAS
10. Filip Romaniuk, IOPAS

## Preliminary results:

The preliminary results of this cruise show that in agreement with the past survey's results and values reported by HELCOM, the Baltic Sea continues to be more contaminated with Cs-137 than the North Sea. It was also observed that the Cs-137 activity is strongly dependent of the fish species.

## Acknowledgements

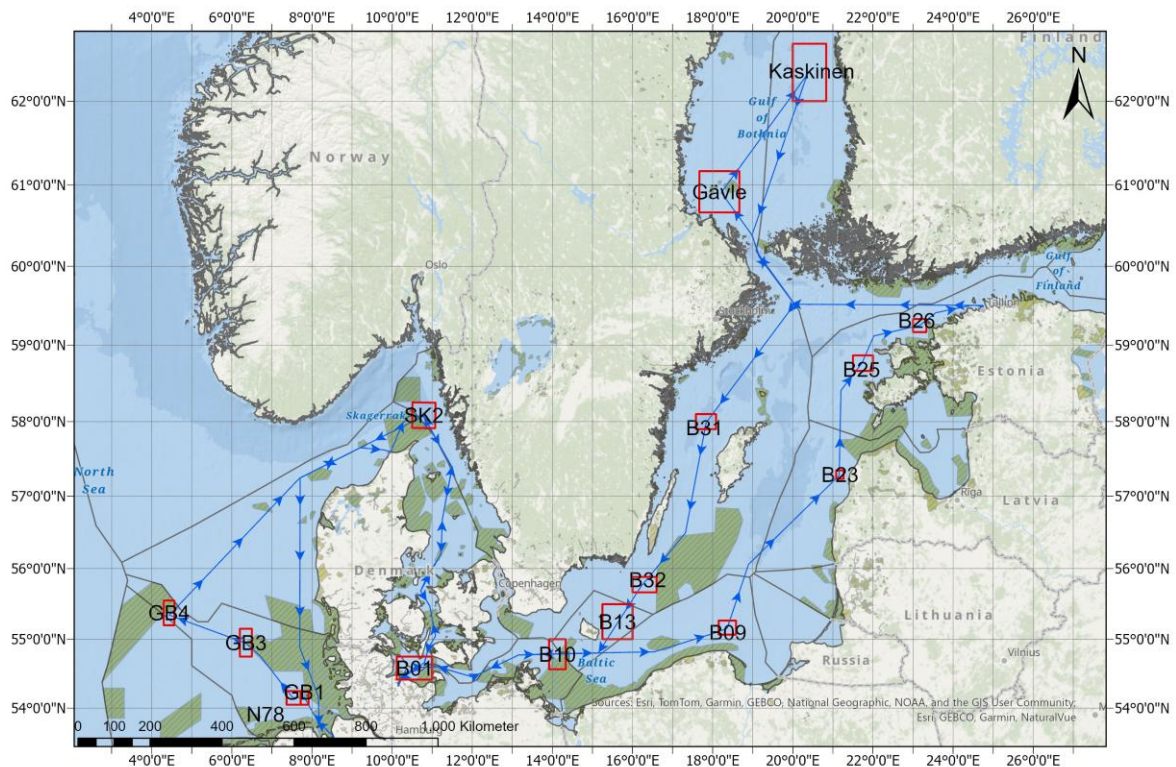
Thanks are due to Captain Schwegmann and his crew and to the scientific staff for constructive and hard work and a very good atmosphere on board.

Dr. Pedro Miguel Agostinho Nogueira

(Scientist in Charge)

## Appendix: 1 Figure and 8 Tables

**Fig. 1:** Cruise 492 RV 'Walther Herwig III', 19.08. – 15.09.2025: Location of sampling sites and travel route in the North Sea and Baltic Sea



**Tab. 1:** Cruise 492 RV 'Walther Herwig III', 19.08. – 15.09.2025: Geographical coordinates of trawling stations in the North Sea and Baltic Sea

Date	LOG-Station	Station	Area	Latitude	Longitude	Duration (min)	Net
19.08.25	481	1	GB 1	54°04,332N	007°52,724E	60	GOV, 50m Stander
20.08.25	484	2	N 78	54°11,563N	007°39,686E	60	GOV, 50m Stander
20.08.25	486	3	GB3	54°56,058N	006°16,375E	60	GOV, 50m Stander
21.08.25	488	4	GB4	55°23,062N	004°33,184E	45	GOV, 50m Stander
24.08.25	489	5	SK 2	58°05,512N	010°43,290E	45	140 Fuß-Netz
24.08.25	491	6	SK 2	58°06,852N	010°44,144E	40	140 Fuß-Netz
26.08.25	492	7	B01	54°32,435N	010°41,925E	25	140 Fuß-Netz
02.09.25	493	8	B01	54°36,226N	010°24,716E	60	140 Fuß-Netz
03.09.25	500	9	B10	54°34,176N	013°57,154E	60	140 Fuß-Netz
04.09.25	-	10	B09	-	-	-	Fishing Rod
05.09.25	510	11	B23	57°15,050N	021°07,270E	30	140 Fuß-Netz
06.09.25	518	12	B25	58°42,667N	021°40,525E	30	140 Fuß-Netz
11.09.25	536	13	Kaskinen	62°08,568N	020°37,963E	60	PSN 205
13.09.25	548	14	B 13	55°27,980N	015°59,026E	60	PSN 205
13.09.25	549	15	B 13	55°24,322N	015°53,514E	60	PSN 205

**Tab. 2:** Cruise 492 RV 'Walther Herwig III', 19.08. – 15.09.2025: Geographical coordinates of hydrography stations in the North Sea and Baltic Sea

Date	LOG Station	Trawling Station	Area	Latitude	Longitude	Depth (m)
19.08.25	481	1	GB1	54°03,578N	007°53,750E	38.30
19.08.25	483	-	N78	54°10,976N	007°40,881E	39.20
20.08.25	484	2	N78	54°11,240N	007°41,055E	39.90
20.08.25	486	3	GB3	54°55,656N	006°15,744E	42.40
21.08.25	488	4	GB4	55°23,014N	004°34,676E	46.50
24.08.25	489	5	SK2	58°04,185N	010°42,921E	226.30
24.08.25	491	6	SK2	58°08,141N	010°45,166E	236.50
26.08.25	492	7	B01	54°32,260N	010°40,896E	23.70
02.09.25	493	8	B01	54°36,271N	010°23,811E	19.10
03.09.25	500	9	B10	54°34,020N	013°57,280E	20.80
04.09.25	-	10	B09	-	-	-
05.09.25	510	11	B23	57°15,050N	021°07,270E	54.50
06.09.25	518	12	B25	58°42,594N	021°41,813E	55.60
07.09.25	526	-	B26	59°14,304N	023°03,035E	60.70
10.09.25	532	-	Gävle	60°46,137N	018°34,481E	53.80
11.09.25	536	14	Kaskinen	62°09,056N	020°36,566E	77.10
12.09.25	541	-	B31	58°04,652N	018°03,364E	131.20
13.09.25	543	-	B32	55°41,799N	016°23,693E	71.10

**Tab. 3:** Cruise 492 RV 'Walther Herwig III', 19.08. – 15.09.2025: Mean catches of selected abundant fish species in the North and Baltic Sea (weight (kg) per 1 h trawling)

Area	Hol	Cod	Dab	Plaice	Herring	Sprat	Flounder	Whiting	Mackerel
GB1	1	0.00	7.61	0.97	2.70	1.39	6.37	12.51	0.00
N78	2	0.00	2.42	0.00	32.34	17.58	0.00	0.62	1.05
GB3	3	0.22	15.41	7.91	127.51	1834.27	0.00	315.29	33.17
GB4	4	0.00	90.16	0.00	82.40	862.91	0.00	0.36	0.00
SK2	5	15.91	0.00	1.15	0.00	0.00	0.00	0.00	0.00
SK2	6	2.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B01	7	0.00	5.25	0.68	0.04	0.10	0.00	0.00	0.00
B01	8	0.01	17.22	19.42	0.00	0.00	1.82	0.00	0.68
B10	9	56.00	0.20	6.23	0.83	0.06	12.68	0.45	0.48
B09	10	-	-	-	-	-	-	-	-
B23	11	1.86	0.00	0.00	5.51	0.08	9.12	0.00	0.00
B25	12	0.11	0.00	0.00	0.92	0.01	0.81	0.00	0.00
Kaskinen	13	0.00	0.00	0.00	6.88	0.00	0.00	0.00	0.00
B13	14	17.18	0.00	0.00	47.14	2.87	0.00	0.00	0.00
B13	15	12.92	0.00	0.00	66.78	1.71	0.00	0.00	0.00

**Tab. 4:** Cruise 492 RV 'Walther Herwig III', 19.08. – 15.09.2025: Mean catches of selected abundant fish species in the North Sea and Baltic Sea (number per 1 h trawling)

Area	Station	Cod	Dab	Plaice	Herring	Sprat	Flounder	Whiting	Mackerel
GB1	1	0	117	10	580	300	58	367	0
N78	2	0	32	0	1895	5255	0	23	5
GB3	3	1	208	44	342	4021	0	5425	10
GB4	4	0	1507	0	2747	50470	0	5	0
SK2	5	2	0	0	0	0	0	0	0
SK2	6	1	0	0	0	0	0	0	0
B01	7	0	65	5	1	7	0	0	0
B01	8	1	368	252	0	0	10	0	4
B10	9	174	3	13	6	2	20	2	2
B09	10	-	-	-	-	-	-	-	-
B23	11	11	0	0	50	5	86	0	0
B25	12	1	0	0	29	1	6	0	0
Kaskinen	13	0	0	0	230	0	0	0	0
B13	14	84	0	0	1043	207	0	0	0
B13	15	62	0	0	1404	95	0	0	0

**Tab. 3:** Cruise 492 RV 'Walther Herwig III', 19.08. – 15.09.2025: Water depth, temperature (T), salinity (S), O<sub>2</sub> in mg/l and O<sub>2</sub> saturation (%) in Baltic Sea and North Sea

Date	LOG-Station	Hol	Area	Depth (m)	T (°C)	S (PSU)	O <sub>2</sub> (mg/l)	O <sub>2</sub> Saturation (%)
19.08.2025	481	1	GB1	3	19.838	30.383	4.88	91.49
				34	18.814	32.285	3.15	58.65
19.08.2025	483	-	N78	2	19.194	31.903	4.49	83.96
				35	18.218	32.427	3.68	67.79
20.08.2025	484	2	N78	2	18.938	31.928	4.07	75.79
				35	18.231	32.491	3.74	68.94
20.08.2025	485	3	GB3	3	18.134	33.792	4.41	81.79
				38	16.763	34.518	3.65	66.24
21.08.2025	488	4	GB4	3	17.073	34.797	4.47	81.68
				41	10.43	34.567	3.76	59.9
24.08.2025	489	5	SK2	2	16.698	32.81	4.48	80.28
				223	8.543	35.198	4.39	67.46
24.08.2025	490	6	SK2	3	16.73	32.789	4.55	81.65
				233	8.54	35.198	4.43	68.06
26.08.2025	492	7	B01	2	18.023	15.423	4.91	81.26
				17	16.607	20.916	1.45	24.06
02.09.2025	493	8	B01	2	18.631	15.093	4.98	83.39
				12	17.767	16.788	4.6	76.42
03.09.2025	500	9	B10	2	18.847	7.989	5.13	82.69
				14	18.812	8.03	5.04	81.16
05.09.2025	510	11	B23	4	16.853	7.034	5.42	83.32
				48	5.86	7.623	4.49	54.04
06.09.2025	518	12	B25	2	16.812	6.352	5.6	85.7
				49	5.095	8.01	3.4	40.24
07.09.2025	526	-	B26	2	16.702	6.026	5.48	83.5
				54	4.843	7.628	4.21	49.34
10.09.2025	531	-	Gälve	2	15.27	5.315	5.79	85.31
				47	4.596	5.825	6.24	71.82
11.09.2025	536	14	Kaskinen	2	15.236	4.879	5.67	83.14
				69	3.793	6.192	5.21	58.91
12.09.2025	541	-	B31	2	17.605	6.664	5.18	80.67
				122	6.114	10.191	-	-
13.09.2025	543	-	B32	2	18.385	7.577	5.07	80.66
				62	7.152	13.574	2.11	27.22

**Tab. 6:** Cruise 492 RV 'Walther Herwig III', 19.08. – 15.09.2025: Geographical coordinates of TNT water samples in the North Sea and Baltic Sea

Date	LOG Station	Area	Latitude	Longitude	Depth (m)
19.08.2025	481	GB1	54°03.5387N	07°53.628E	33
20.08.2025	484	GB3	54°11.24N	07°41.0551E	34.92
21.08.2025	488	GB4	55°23.0026N	04°34.691E	40.47
24.08.2025	489	SK2	58°04.2056N	10°42.8996E	221
26.08.2025	492	B01	54°32.2809N	10°40.9420E	17.2
03.09.2025	500	B10	54°34.0388N	13°57.2430E	14.2
05.09.2025	510	B23	57°14.4126N	21°06.3564N	47.7
06.09.2025	518	B25	58°425126N	21°41.7220	48.3
07.09.2025	526	B26	59°14.2939N	23°03.0417E	53.27
10.09.2025	531	Gävle	60°46.0381N	18°34.5280E	46.5
11.09.2025	536	Kaskinen	62°09.0753N	20°36.4085E	67.9
12.09.2025	541	B31	58°04.7121N	17°03.3282	120
13.09.2025	543	B32	55°417789N	16°23.6358	61.2

**Tab. 7:** Cruise 492 RV 'Walther Herwig III', 19.08. – 15.09.2025: Geographical coordinates of the epibenthos sledge stations in the North Sea and Baltic Sea

Date	LOG-Station	Station	Area	Latitude	Longitude	Depth (m)
02.09.25	494	14	B01	54°35,245N	010°28,268E	18.90
02.09.25	496	16	B01	54°35,184N	010°28,175E	18.80
02.09.25	499	19	B01	54°35,689N	010°26,364E	20.40
03.09.25	502	22	B10	54°35,527N	014°04,187E	21.60
03.09.25	503	23	B10	54°35,500N	014°06,404E	22.40
03.09.25	505	25	B10	54°35,151N	014°11,065E	21.80
03.09.25	506	26	B10	54°35,269N	014°13,446E	22.80
03.09.25	506	26	B10	54°35,273N	014°15,959E	23.10
05.09.25	511	31	B23	57°17,356N	021°10,553E	46.50
05.09.25	512	32	B23	57°18,272N	021°12,303E	37.80
05.09.25	513	33	B23	57°19,345N	021°13,922E	51.50
05.09.25	516	36	B23	57°18,013N	021°09,406E	53.40
05.09.25	517	37	B23	57°19,468N	021°11,562E	51.90
05.09.25	517	37	B23	57°19,306N	021°11,032E	52.40
06.09.25	519	39	B25	58°43,142N	021°31,413E	63.60
06.09.25	520	40	B25	58°43,687N	021°33,543E	58.10
06.09.25	521	41	B25	58°44,220N	021°35,943E	62.10
06.09.25	524	44	B25	58°44,827N	021°38,411E	58.70
06.09.25	525	45	B25	58°45,649N	021°39,928E	47.10
06.09.25	525	45	B25	58°46,539N	021°41,574E	53.30
07.09.25	528	48	B26	59°14,710N	023°03,495E	69.30
07.09.25	530	50	B26	59°14,829N	023°04,751E	73.50
07.09.25	530	50	B26	59°14,622N	023°06,900E	67.10

10.09.25	533	53	Gävle	60°46,474N	018°34,009E	54.30
10.09.25	535	55	Gävle	60°45,737N	018°35,293E	55.80
10.09.25	535	55	Gävle	60°45,731N	018°35,354E	56.50
11.09.25	538	58	Kaskinen	62°04,974N	020°44,112E	66.00
11.09.25	539	59	Kaskinen	62°04,670N	020°41,660E	73.70
11.09.25	540	60	Kaskinen	62°06,166N	020°42,343E	72.80
13.09.25	545	65	B32	55°42,029N	016°24,391E	67.90
13.09.25	546	66	B32	55°42,388N	016°25,690E	68.10
13.09.25	547	67	B32	55°42,954N	016°27,375E	66.60

**Tab. 8:** Cruise 492 RV 'Walther Herwig III', 19.08. – 15.09.2025: Anthropogenic Cs-137 and natural K-40 activities measured in the monitoring areas from the Baltic Sea, in Bq per Kg

Sample Number	Sea	Area	Species	Tissue	Cs-137		K-40	
					Activity (Bq/kg)	Uncert. (%)	Activity (Bq/kg)	Uncert. (%)
18688	North Sea	GB1	Whiting	Whole Fish	0.039	6.781	107.509	3.167
18690	North Sea	GB1	Lobster	Fillet	0.028	8.728	63.424	3.252
18691	North Sea	GB3	Sprat	Whole Fish	0.072	7.694	109.870	5.783
18692	North Sea	GB3	Plaice	Whole Fish	0.050	7.231	97.501	3.252
18694	Baltic Sea	B01	Plaice	Whole Fish	0.365	3.433	81.655	3.169
18695	Baltic Sea	B10	Cod	Whole Fish	1.488	3.274	101.478	3.251
18696	Baltic Sea	B10	Flounder	Whole Fish	1.531	3.283	83.935	3.254
18697	Baltic Sea	B23	Flounder	Whole Fish	1.663	5.786	71.374	5.790
18699	Baltic Sea	B23	Cod	Whole Fish	1.982	5.784	93.078	5.788
18702	Baltic Sea	B25	Flounder	Whole Fish	1.512	5.800	64.585	5.797
18703	Baltic Sea	B25	Herring	Whole Fish	1.728	5.797	104.443	5.789
18704	Baltic Sea	Kaskinen	Herring	Whole Fish	2.038	3.264	112.185	3.250