Federal Research Institute for Rural Areas, Forestry and Fisheries

Thünen-Institute of Sea Fisheries

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Survey Report
FRV Walther Herwig III, WH 468
18 July to 3 August 2023

IBTS and GSBTS

Chief scientist: Dr. Anne Sell

Summary

Survey WH 468 covered fisheries research representing the German contribution to the International Bottom Trawl Survey (IBTS) in the annual quarter 3, as well as biodiversity data in two selected research areas within the German Small-scale Bottom Trawl Survey (GSBTS).

The IBTS is a multi-national programme, coordinated by the International Council for the Exploration of the Sea (ICES), in order to provide information on fish populations for stock assessment of various commercially relevant species, as well as accompanying hydrographic and biological data. The GSBTS is a national program to monitor small-scale variability and long-term changes in demersal fish assemblages in relation to physical and biological habitat characteristics.

As the principal fishing method, both IBTS and GSBTS sampling used a GOV (Grande Ouverture Verticale) otter board trawl, but applied in different survey designs. A large subset of the fishing hauls was accompanied by hydrographic measurements and investigations of benthic epifauna, infauna and sediments. Bycatch of marine litter in the GOV was reported in all hauls.

The survey vessel departed on 18 July 2023 from Bremerhaven, starting fishing operations on 19 July. The *Walther Herwig III* returned to Bremerhaven on August 2nd and was disembarked on August 3rd.

Verteiler:
Schiffsführung FFS „Solea" „Walther Herwig III"
BA für Landwirtschaft und Ernährung (BLE)
Fischereiforschung
BM für Ernährung und Landwirtschaft (BMEL),
BA für Seeschifffahrt und Hydrographie (BSH), Hamburg
Deutscher Angelfischerverband e.V.
Deutsche Fischfang-Union, Cuxhaven
Deutscher Fischereiverband Hamburg
Doggerbank Seefischerei GmbH, Bremerhaven
Erzeugergemeinschaft der Deutschen Krabbenfischer GmbH
Euro-Baltic Mukran
GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel
Kutter- und Küstenfisch Sassnitz
LA für Landwirtschaft, Lebensmittels. und Fischerei (LALLF)
LFA für Landwirtschaft und Fischerei MV (LFA)
Landesverband der Kutter- u. Küstenfischer MV e.V.
Leibniz-Institut für Ostseeforschung Warnemünde
Thünen-Institut - Institut für Fischereiökologie
Thünen-Institut - Institut für Seefischerei
Thünen-Institut - Institut für Ostseefischerei
Thünen-Institut - Pressestelle
Thünen-Institut - Präsidialbüro
Thünen-Institut - Reiseplanung Forschungsschiffe, Dr. Rohlf
Fahrtteilnehmer*innen

Number of stations sampled during WH 468

	Hauls GOV	CTD casts	Hauls 2-m beam trawl	van Veen sediment grab**
IBTS	31*	31	31	91
Box A	21	16	9	18
Box C	19	14	9	18
total	**69**	**59**	**46**	**120**

*) Includes hauls in the wider German Bight, and one each in "Boxes" A and C. GSBTS Boxes B, D/D', L and M were not sampled in 2023, due to constraints in ship time.
**) Sediments were analysed from all stations in this column, infauna from selected stations, only.

Methods

1. Demersal and pelagic fishes (Thünen Institute of Sea Fisheries, TI-SF)

The qualitative and quantitative composition of the bottom fish fauna was analysed from a total of 69 GOV hauls for the IBTS and the GSBTS, respectively (survey track, see Fig. 1). Larger invertebrates of commercial interest were quantified as specified in the IBTS manual. In addition, other benthic macro-invertebrates from the by-catch of the GOV otter board trawl were analysed for IBTS stations, and for selected additional GSBTS stations. During all hauls, the GOV was equipped with sensors to monitor net geometry as required for the IBTS and GSBTS surveys. Data from the IBTS hauls taken in the wider German Bight are to be combined with international data covering the entire North Sea for the assessment of groundfish stocks and for analyses on the non-commercial fish species. IBTS data have been uploaded to the ICES DATRAS system.

2. Hydrography (TI-SF)

A total of 59 hydrographic casts were performed with a Seabird CTD to record vertical profiles of temperature, salinity and oxygen concentration at the fishing stations. For a subset of stations, water samples for calibration of the oxygen probe were processed aboard through Winkler titration, and another subset of samples was taken to shore for calibration of the salinity probe.

3. Epibenthos (Senckenberg Research Institute)

Epibenthos was sampled within ICES rectangles of the wider German Bight, as well as in the Boxes A and C, applying a 2m-beam trawl. Samples were sieved over 5-mm and 2-mm mesh. The 5-mm fraction was analysed aboard, the 2-mm fraction was preserved in 4-% formaldehyde for analysis in the laboratory ashore.

4. Sediments, benthic infauna (Senckenberg Research Institute)

Investigations of epibenthos were accompanied by sampling of sediments using a 0.1-m² van Veen-grab. Additional grabs were taken to sample benthic infauna in the Boxes as well as in the ICES rectangles.

5. Marine litter (TI-SF)

Marine litter bycatch from the GOV hauls was reported according to the ICES standards on all fishing stations. Data have been prepared for uploading to the ICES database.

Survey schedule

The FRV 'Walther Herwig III' departed on 18 July 2023 from Bremerhaven, Germany. On 19 July, the scientific program started with sampling for the IBTS. Fishing for the two GSBTS Boxes A and C was interspersed between the IBTS hauls in the German Bight in order to optimise ship time and weather conditions. Because sampling in GSBTS Box C was not possible during consecutive days, it started on 23 July and was completed during July 30-31. The GSBTS sampling in Box A was performed within four consecutive days from July 26-29. Fishing was completed on August 1st, the vessel returned to Bremerhaven on August 2nd and was disembarked after final sample and data preparation on August 3rd, 2023.

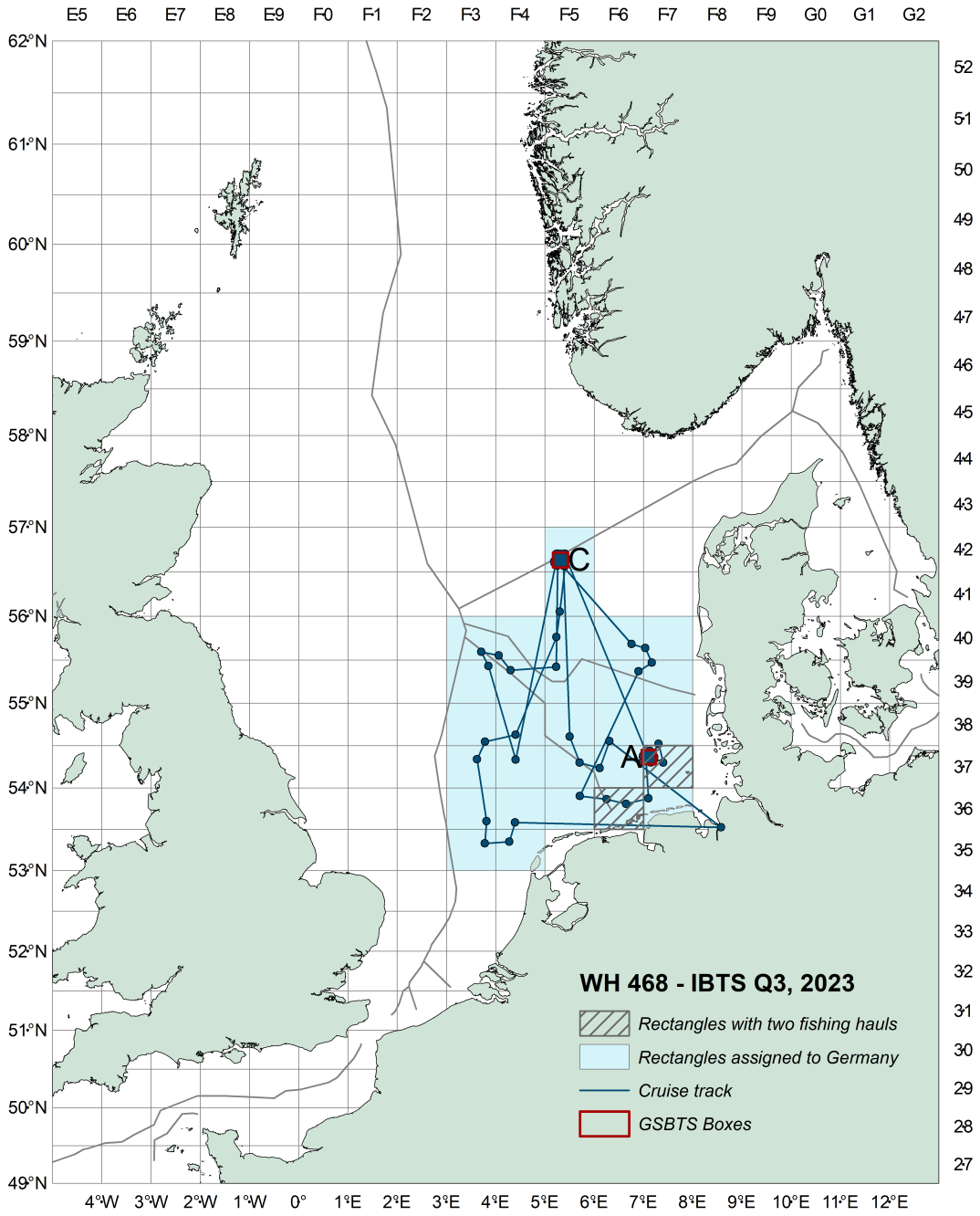

Fig. 1: Survey track of WH 468, IBTS and GSBTS, 18 July to 03 August 2023 (line). Blue points: Fishing hauls for IBTS and GSBTS.

Preliminary Results

Fish fauna in bottom trawls (Thünen Institute of Sea Fisheries)

IBTS samples

47 fish species were recorded in the IBTS hauls overall, of which the five most abundant ones were sprat (*Sprattus sprattus*), herring (*Clupea harengus*), whiting (*Merlangius merlangus*), dab (*Limanda limanda*) and haddock (*Melanogrammus aegelfinus*). Biological samples were taken on board as required according to the ICES IBTS manual. After the survey, the IBTS data set has been quality-checked, supplemented with age readings, and uploaded to the ICES database DATRAS, where they are publicly available.

GSBTS samples

Box A (German Bight)

Mean catch biomass in Box A (299 kg/ 30 min haul) was in the range of values reported since 2015, but considerably lower than values typical for the period before 2015 (long-term mean 1987-2014: 671 kg/30 min). In 2023, the biomass of the catches was dominated by sprat (mean of 175 kg/ 30 min), followed by dab (49 kg/ 30 min), mackerel (45 kg/ 30 min) and herring (14 kg/ 30 min).

Box C (Central North Sea)

Catches in Box C contained with a mean of 482 kg considerably more biomass than in the long-term mean (mean until 2020 176 kg/ 30 min haul, yet with occasional larger catches). Herring dominated with an average of 340 kg per 30-min haul, followed by sprat (58 kg) and Dab (45 kg). As in 2019 and 2020, haddock occurred again at rather high biomass (averaging 15 kg/haul), whereas only few specimens were caught during most years of the time series.

Epibenthos (Senckenberg Research Institute)

IBTS rectangles

Generally, abundance and biomass of epibenthic species was high towards the coast and decreased towards offshore areas within the German Bight. The most common epifauna species were the starfish *Astropecten irregularis,* the brittle star *Ophiura ophiura* and the hermit crab *Pagurus bernhardus.* Common juvenile demersal fishes caught in the 2-m beamtrawl were plaice *Pleuronectes platessa*, dab *Limanda limanda* and solenette *Buglossidium luteum.* The angular crab *Goneplax rhomboides* showed a shift in distribution compared to earlier years and was primarily found in more coastal areas in the south-eastern North Sea (37F7, 37F6, 37F5 and 36F4) (Fig. 2).

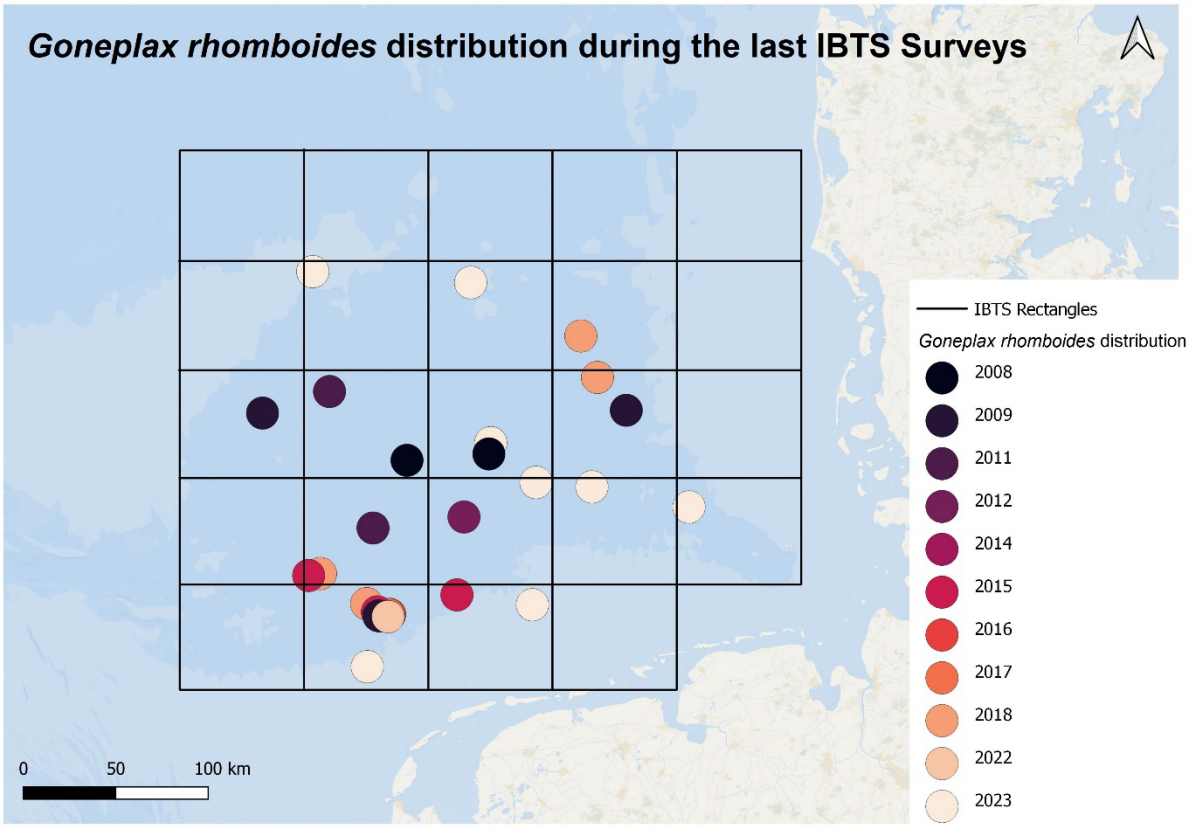

Figure 2: Distribution of the angular crab *Goneplax rhomboides* in the sampling area of the International Bottom Trawl Survey (IBTS) from 2008 until 2023.

GSBTS samples (Box A + Box C)

The abundance of epibenthic species was higher in the southern German Bight in Box A than in Box C, while the biomass was not different between both areas. In Box A, the abundances of the juveniles of demersal fishes caught in the 2-m beam trawl were higher than in Box C, but more species from the phylum Mollusca were found in Box C than in Box A.

Survey participants

1	Dr. Anne Sell	TI-SF	Cruise leader Fisheries biology, Datadis
2	Andriy Martynenko	TI-SF	Oceanography
3	Samira Peter	TI-SF	Fisheries biology
4	Marcellus Rödiger	TI-SF	Fisheries biology
5	Finn Werner	TI-SF	Fisheries biology
6	Pauline Wagner	TI-SF	Fisheries biology
7	Felix Bügler	TI-SF	Fisheries biology
8	David Benkel	TI-SF	Fisheries biology
9	Arc'hantael Labrière	TI-SF	Fisheries biology
10	Sylvan Rentel	TI-SF	Data entry, fisheries biology
11	Ramona Ohde	Senckenberg am Meer	Benthos
12	Anna Wiemers	Senckenberg am Meer	Benthos

Acknowledgements

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Dr. Anne Sell, Chief scientist