

Cruise Report
FRV Walther Herwig, WH 324
2009/07/14 - 08/10

IBTS and GSBTS

Cruise Leader: Dr. Anne Sell

1. Summary

This cruise covered fisheries research representing the German contribution to the International Bottom Trawl Survey (IBTS) in quarter III, as well as one component of the two-ship operation in the German Small-scale Bottom Trawl Survey (GSBTS). Both surveys use the same principle fishing methods but at different spatial scales, applying a GOV bottom trawl, accompanied by hydrographic measurements, investigations of benthic epifauna and sediments.

The cruise lost the first day of the scheduled time period due to engine problems. A total of 150 stations were sampled in the wider German Bight, and in the central and northern North Sea. Besides the regular survey tasks, sampling was performed for two projects to investigate feeding habits of demersal fish.

2. Number of stations sampled during WH 324

	Hauls GOV	CTD casts (total)	CTD casts with nutrient samples	Hauls 2-m beamtrawl	Van Veen sediment grab
IBTS	30*	30*	30*	30*	30*
Box A	21	16	10	9	9
Box B	21	16	9	10	10
Box C	21	16	10	9	9
Box D	21	15	9	9	9
Box L	21	15	9	9	9
Box L	21	16	9	10	8
total	150	118	80	80	78

*) IBTS: 25 hauls in rectangles in the wider German Bight (inkl. Box A) and one each in the remaining 5 Boxes.

2.1 Groundfish (vTI-SF)

(Institute of Sea Fisheries, Johann Heinrich von Thünen-Institute, vTI-SF)

The qualitative and quantitative composition of the bottom fish fauna was analyzed from a total of 150 GOV haul for the IBTS and the GSBTS, respectively. All 30 ICES rectangles allocated for IBTS sampling during WH 324 could be covered (1 GOV haul and accompanying investigations, each). Within the GSBTS, six areas of investigation ('Boxes') were sampled, each with 21 hauls during 3 consecutive days (Fig. 1).

Data from the IBTS hauls taken in the wider German Bight will be combined with international data covering the entire North Sea for the assessment of groundfish stocks and for analyses on the non-commercial species.

In all GSBTS-"Boxes", specimens of cod, grey gurnard, mackerel and horse mackerel were dissected for the analysis of stomach contents (vTI-SF/ University of Aberdeen and University of Hamburg). In Box A, stomach contents of flatfish were taken for analysis of prey preference on benthic epi- and infauna (Senckenberg Research Inst.)

From the GOV hauls, larger invertebrates were quantified as specified in the IBTS manual. All cephalopods were collected for identification and quantitative analysis by the IfM Geomar (D. Oesterwind).

2.2 Hydrography (vTI-SF)

A total of 118 hydrographic casts were performed with a Seabird CTD to record vertical profiles of temperature and salinity within the Boxes. At 80 of the stations, water samples for nutrient analyses were taken.

2.3 Epibenthos (Senckenberg Res. Inst.)

Epibenthos was sampled within ICES rectangles of the wider German Bight (IBTS stations), as well as in the Boxes A, B, C, D, L and M, applying a 2m-beamtrawl. Samples were sieved over 5mm 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.

2.4 Sediments, benthic infauna (Senckenberg Res. Inst.)

Investigations of epibenthos were accompanied by sampling of sediments using van Veen grabs. Duplicate hauls with the grab were used to obtain samples of benthic infauna from stations in the Boxes D, L and M.

2.5 Seabirds (Research and Technology Centre, FTZ)

Investigations on seabirds were conducted during the fishing operations and also while the ship was steaming, using three different methods: During the fishing hauls, maxima in the numbers of ship-following birds were recorded. Secondly, discard feeding experiments were performed to document which fish species would be taken by which bird species, and at which size of prey fish. For these feeding trials, individual fish from a representative subsample of the preceding GOV catch were fed while another fishing haul was being conducted. Finally, during steaming transects and at ship speeds > 9 kn, counts of ship-independent seabirds were obtained for the international Seabirds at Sea (SAS) monitoring program.

3. Cruise schedule

All planned stations of cruise WH 324 were sampled, despite initial technical problems and constraints due to illness of a crew member. Overall, weather conditions did not affect the program in terms of the number of stations fished, but only lead to minor adjustments in allocation of stations to individual days.

FRV Walther Herwig was scheduled to depart in the afternoon of July 13 from Bremerhaven, Germany, which had to be postponed to the July 14 (19:00 MESZ) due to engine problems. The scientific program started the next morning with IBTS sampling in

ICES rectangle 38F7, followed by 7 further rectangles throughout July 15 and 16 (Fig. 1). During the subsequent night, the ship had to steam toward the island of Helgoland to deliver a sick crew member for examination to the hospital. The planned order of stations was changed and Box A was sampled during the following 3 days in order to stay in reach of Helgoland, in case of a possible return or replacement of the crew member. Sampling for the IBTS (two days) and in Box C/ GSBTS (3 days) followed before a 2-day port stop in Bergen Norway (WHIII docked from noon of July 25 until late afternoon of July 26). From July 27 onward, the Walther Herwig completed fishing for the GSBTS during three days each in the Boxes M, L, D and B, before the remaining IBTS rectangles were sampled on August 7 to 9. The ship returned to Bremerhaven on August 9, where it docked at 14:00, and was unloaded and disembarked the following morning.

4. Preliminary Results

Groundfish (SF - vTI)

IBTS samples (ICES rectangles in the wider German Bight)

Data from the IBTS stations were transmitted to ICES, where data from all participating nations are collated and analysed with respect to groundfish stock conditions and abundance of non-commercial species.

Box A (German Bight)

Mean total catches in Box A were exceptionally high (1570 kg/ 30-min haul), which was mainly due to large numbers of sprat (equivalent to 1350 kg/ haul; Fig. 2a). Possibly, these were the result of the altered cruise track, leading to earlier sampling in Box A than during other years. However, a similarly high abundance of sprat was also recorded in 2002 when sampling occurred in August. Catch rates of all other species (except herring) were low. Horse mackerel, which had been a regular and often abundant component of the Box A assemblage between 1987 and 2005, has only occurred in very low numbers since (mean of 2.5 ind/haul in 2009).

Box C (Central North Sea)

Mean total catches in Box C were 82 kg/haul, with 42 kg of dab, *Limanda limanda*. Within the remaining portion of the catch, long rough dab (*Hippoglossoides platessoides*), whiting and herring had the greatest share (Fig. 2b).

Box M (Northern North Sea)

Total biomass in Box M was low (mean of 113 kg/ haul) in comparison to the long-term mean, but similar to other years after 2003. Saithe, which was very abundant in 2001 and particularly 2002, was almost absent from the catches (mean of 0.8 ind/ haul). Mackerel constituted 50% of the catch, followed in biomass by Norway pout and haddock (Fig. 2c).

Box L (Northern North Sea)

Within the average total catch of 400 kg/haul (which is in the range of the 10-yr mean), mackerel made up nearly 50%. As in Box L, Norway pout and haddock were the next dominant species. Herring were low in abundance (Fig 2d).

Box D (Western North Sea)

Total average catch rates (~ 900 kg/ haul) were similar to the long-term mean. About 50% consisted of haddock, followed in biomass by mackerel (25%), herring, whiting and Norway pout (Fig. 2e).

Box B (Western North Sea)

Catches in Box B were with ~ 180 kg/haul unusually small, and were to almost 50% made up by whiting. Particularly numbers of herring and haddock were low in comparison to earlier years of the survey (Fig. 2f).

Epibenthos (Senckenberg Res. Inst.)

The species composition varied between the ICES rectangles sampled within the IBTS (Fig. 1). Within the German Bight, the epibenthic assemblage was dominated by the starfishes *Asterias rubens*, *Astropecten irregularis*, the swimming crab *Liocarcinus holsatus* and small fish species like *Buglossidium luteum* and *Arnoglossus laterna*. In contrast, in the southern Oyster Ground high numbers of the snail *Turritella communis* and the bivalves *Nucula nitidosa* and *Corbula gibba* were found. In the northern rectangles sampled, the starfish *Astropecten irregularis*, the sea urchins *Echinocardium cordatum* und *E. flavescens* and the swimming crabs *L. holsatus* and the masked crab *Corystes cassivelaunus* dominated.

Epifauna in Box A was dominated by *Asterias rubens* and fishes such as *Buglossidium luteum* and *Arnoglossus laterna*. Furthermore, high numbers of *Corystes cassivelaunus* were recorded. Boxes B and D near the British coast had low numbers and diversity of benthic species, with regular occurrence of hermit crabs *Pagurus bernhardus* and *P. pubescens*, as well as *Anapagurus laevis*. Hydrozoen, bryozoans and Anthozoans were also relatively common. The assemblage in Box C was dominated by the gastropods *Buccinum undatum*, *Colus gracilis*, *Neptunea antiqua* and *Aporrhais pespelicani*, the latter with markedly higher numbers than during the preceding years. In Box L, a high abundance of the sea urchin *Echinus elegans* was found, accompanied by larger numbers of the hermit crabs *Pagurus bernhardus*, *P. pubescens*, *P. prideauxi* and *Anapagurus laevis*. Box M epibenthos was dominated by the echinoderms *Spartangus purpureus*, *Echinocardium flavescens* and *Echinus elegans* as well as several species of hermit crabs.

Seabirds (FTZ Büsum)

Within the ship-following seabird species, Lesser Black-backed Gulls (*Larus fuscus*) were the most abundant in Box A and reached maximum numbers of 2700 at any one time of observation. In Box L, up to 2000 Northern Fulmars (*Fulmarus glacialis*) were counted and in Box D between 500-600 Northern Gannets (*Morus bassanus*). Other, only moderately numerous to rare species included: various species of Shearwaters, Storm petrel (*Hydrobates pelagicus*), European Shag (*Phalacrocorax aristotelis*), Great Skua (*Stercorarius skua*), and Arctic Skua (*Stercorarius parasiticus*).

Recorded migratory species included: Eurasian Wigeon (*Anas penelope*), Ruddy Turnstone (*Arenaria interpres*), Common Greenshank (*Tringa nebularia*), Northern House Martin (*Delichon urbicum*), Common Swift (*Apus apus*), Greater Whitethroat (*Sylvia communis*), and Willow Warbler (*Phylloscopus trochilus*).

Transects with seabird counts for the SAS program are indicated in Fig. 3.

5. Cruise participants

Name	Institution	Tasks
1. Dr. Anne Sell	SF - vTI	Cruise leader, hydrography
2. Dr. Ingrid Kröncke	Senckenberg Res.	Benthos
3. Dr. Hermann Neumann	Senckenberg Res.	Benthos
4. Ingo Willhelms	SF - vTI	Fisheries biology, databases
5. Thomas Groß	SF - vTI	Fisheries biology
6. Daniel Oesterwind	IfM Geomar	Fisheries biology
7. Sascha Bednarz	SF - vTI	Fisheries biology
8. Jan Messerschmidt	SF - vTI	Fisheries biology
9. Sabine Schückel	Senckenberg Res.	Fisheries biology
10. Tim Dudeck	vTI-SF/Aberdeen Univ.	Fisheries biology

First leg:

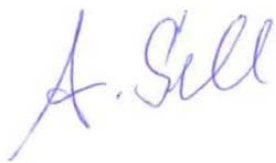
11. Almut Schlaich	FTZ Büsum	Seabirds
12. Hilger Lemke	FTZ Büsum	Seabirds

Second leg:

11. Henning Volmer	FTZ Büsum	Seabirds
12. Malte Bickel	FTZ Büsum	Seabirds

6. Acknowledgements

We have been impressed and grateful that, due to the versatility and commitment of the entire ship's crew, fishing on all stations of both surveys could be completed – despite initial problems with the ship's engine and an unintended return to Helgoland.



(Dr. Anne Sell, Cruise leader)

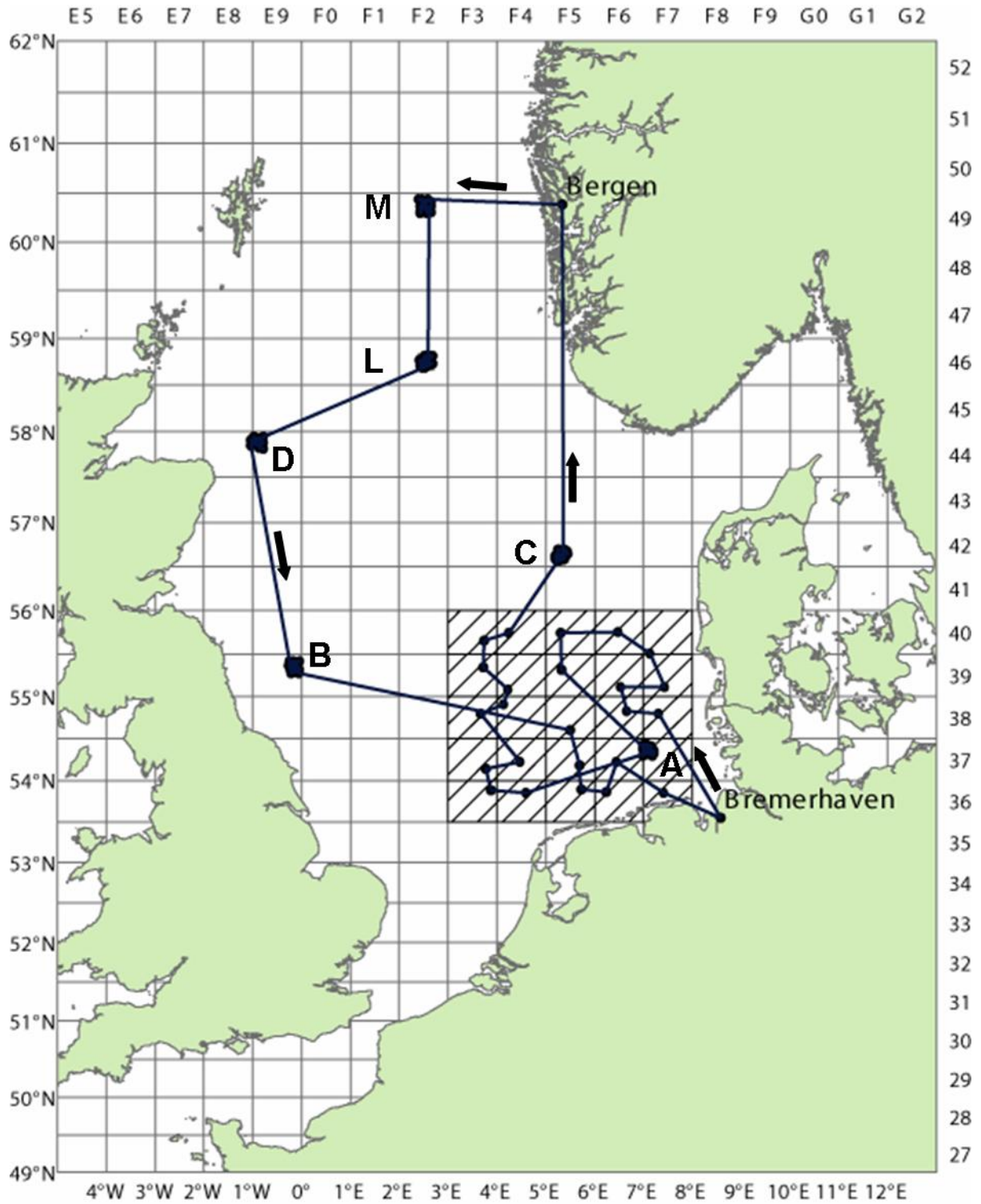


Fig. 1: Cruise track of WH 324, GSBTS and IBTS, 07/14-08/10/2009. Hatched area: ICES rectangles sampled within the IBTS, letters: areas of investigation (Boxes) within the GSBTS.

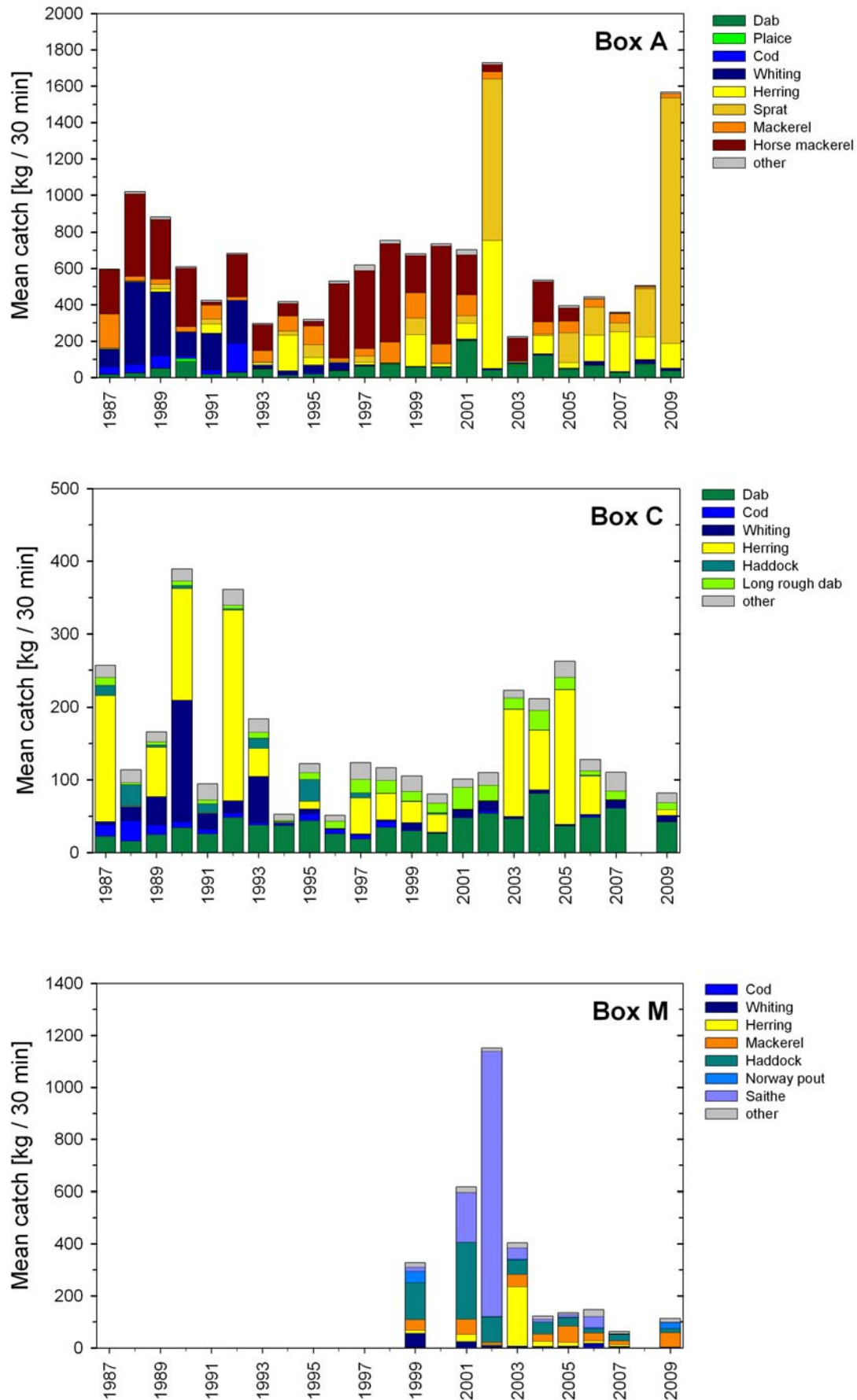


Fig. 2 (a-c), mean catch in 21 GOV hauls during cruise WH324 (2009) and preceding years since the beginning of the GSBTS.

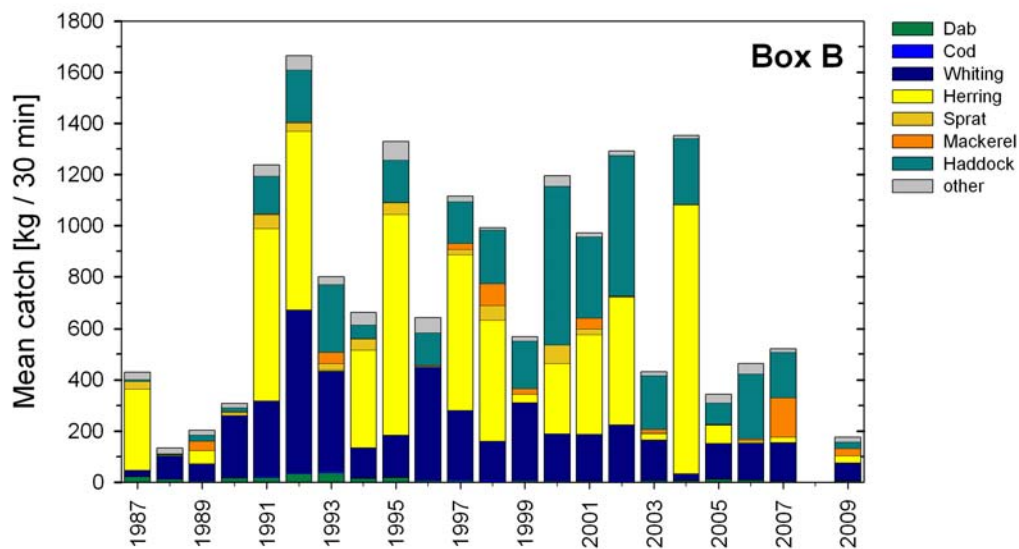
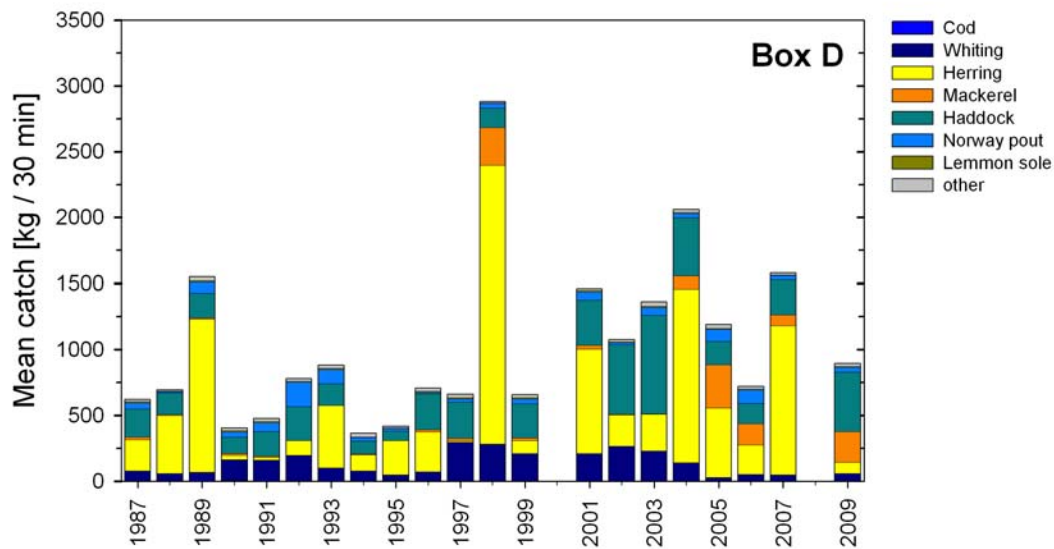
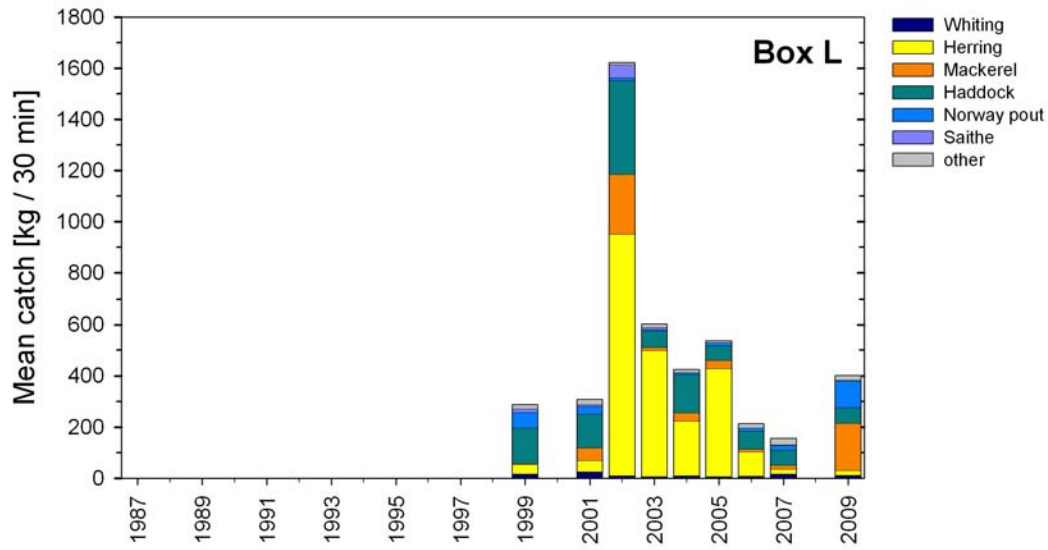


Fig. 2 (d-f), mean catch in 21 GOV hauls during cruise WH324 (2009) and preceding years since the beginning of the GSBTS.

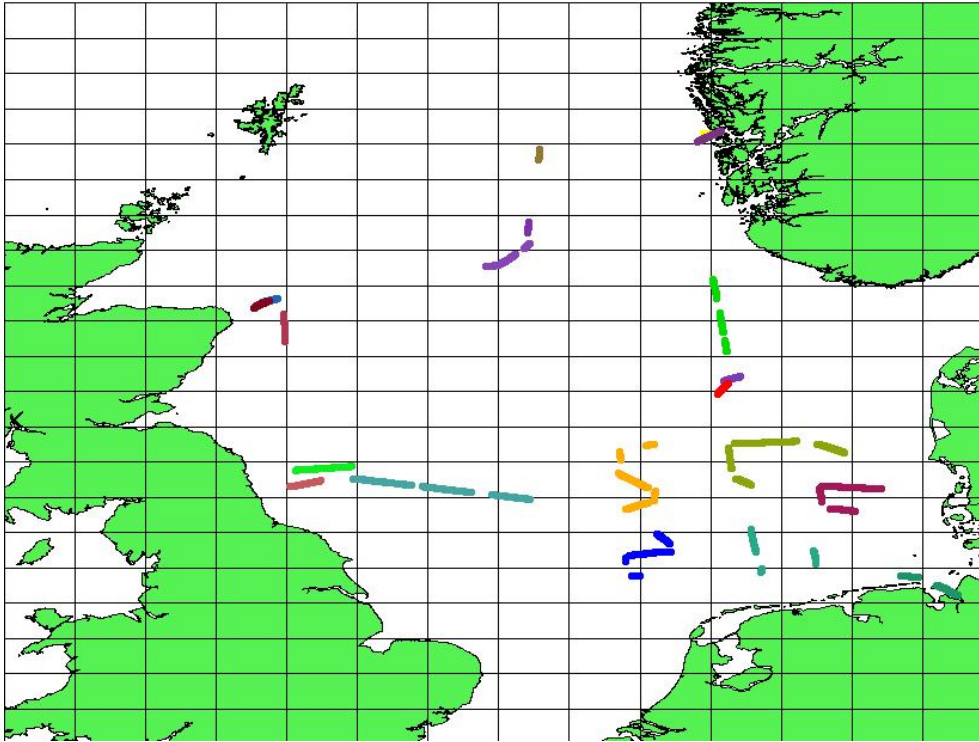


Fig 3: Transects with seabird counts for the SAS program during WH 324.