NOT TO BE CITED WITHOUT PERMISSION OF SCIENTIST-IN-CHARGE

DEPARTMENT OF AGRICULTURE FOR N. IRELAND
AQUATIC SCIENCES RESEARCH DIVISION

CRUISE REPORT: CRUISE LF/23/93: PELAGIC FISH ACOUSTIC SURVEY

VESSEL: R.V. *Lough Foyle* (DANI)

DATES: 16 August - 20 August 1993

AREA OF OPERATION: Irish Sea (North); ICES Division VIIa

TYPE OF SURVEY: Acoustics / midwater trawling

PERSONNEL:

M. Armstrong	SSO	(S.I.C.)
W. Clarke	SSO	
W. McCurdy	SSO	
M. Collas	HSO	
C. Burns	ASO	
J. Peel	ASO	
K. Walker	Student (University of Ulster)	

OBJECTIVES

1. To estimate the biomass and age-compósition of the mixed Manx and Mourne stocks of herring in the northern Irish Sea;

2. To investigate the occurrence of herring off the coast of North Wales;

3. To determine the distribution and biomass of sprat.

4. To further improve acoustic survey methods on *Lough Foyle*.

METHODS

A sphere-calibrated EY-200 echosounder and a 38-kHz transducer mounted in a towed body were employed to carry out echo integrations along transects in the Northern Irish Sea (see Fig. 1 for survey grid). The grid was stratified to allow increased sampling intensity in areas where highest densities of adult herring were expected, e.g. inshore around the Isle of Man and along the Mull of Galloway. These regions were surveyed during the hours of darkness, when the fish rise off the seabed, and resurveyed in daylight where possible. Offshore areas and the region off the Irish Coast were mostly surveyed during daylight. Acoustic targets were identified by means of aimed tows of a midwater trawl fitted with a 10-mm sprat brailer and a Furuno netsonde.

Acoustic data was digitized and stored using the Hadas echo-integration software. Data were stored on 40 MB cartridges. Sphere calibrations were carried out at the commencement of the cruise.

Species compositions and length-frequencies were recorded from all trawl catches. Subsamples of up to 50 herring were taken from each catch for recording of age and other biological parameters.

CRUISE NARRATIVE

Sunday 15 August

Lough Foyle departed Belfast at 22h.00 and proceeded during the night towards Dundrum Bay. A safety demonstration was given by the Mate.

Monday 16 August

Calibration of the acoustic system was carried out during the morning. The survey commenced at approx. 14h.00. Three transects off the Co. Down coast were completed. One trawl was carried out on sprat targets off Ardglass (Trawl 1, Table 1). During the night the vessel surveyed along the Mull of Galloway. Herring aggregations were recorded in very shallow water off Port Patrick. An emergency drill took place in the afternoon.

Tuesday 17 August

The Mull of Galloway grid was completed at approx. 03h.00 after which a grid of 6 transects was surveyed in a 3X3 mile box over the "Peaks" to the south of the Mull. Three transects over the deep central region between the Isle of Man and N. Ireland and two transects to the south of Dundrum Bay were surveyed in daylight. The IOM inshore grid commenced at dusk.

Wednesday 18 August

The inshore region along the west coast of the Isle of Man, from Port Erin to Peel, was surveyed before dawn. The vessel then proceeded southwards and commenced surveying transects 5-10 miles off the Isle of Man. The remainder of the inshore grid was then surveyed after dark, the vessel reaching the Targets off the N coast of the IOM before midnight.

Thursday 19 August

The survey proceeded southwards from the Targets, finishing the night-time inshore grid at Peel. Additional inshore transects were then surveyed between the night-time ones to examine the day-time distribution and abundance of herring and sprat. Shortly after 15h.00 the vessel collided with the shore between Contrary Head and Peel Castle, in conditions of heavy mist and very poor visibility. The vessel suffered a split in the hull at the fore-peak, which flooded a watertight compartment. The Fishing Master received an injury to his thumb and was taken ashore by an IOM lifeboat for treatment. *Lough Foyle* was then anchored off Peel Breakwater for inspection of the damage. A surveyor boarded the *Lough Foyle* in the evening together with the Fishing Master, and the vessel departed for Belfast at 21h.30, arriving at 04h.30 the next morning.

WORK COMPLETED

Calibration

Transducer TR22317 was calibrated in Dundrum Bay on 16 August. Details are given in Table 2. The instrument factor *k* was estimated to be much lower than obtained in 1992 although the peak voltage of the sphere echo (just over 8 volts) was very similar to that recorded in previous calibrations. Although conditions were not perfect, with slight swell and presence of multiple echoes around the sphere, it is not thought that this was responsible for the large discrepancy. The time-series of calibration exercises will have to be reviewed to determine the source of the variation.

Echo integration

All acoustic data was captured and digitized using the Hadas software, and stored on 40 MB disks. Some analysis was carried out on board.

Target identification

Twelve midwater trawl tows were completed for identification of acoustic targets. The trawl positions are shown on Figure 1. Details of the tows are given in Table 1.

RESULTS

The distribution of herring was similar to that encountered in previous years, with high densities of adults close inshore along the west coast of the Isle of Man and mixtures of sprat and juvenile herring in the offshore waters. High densities of adult herring were also encountered along the east coast of the IOM in 1992, but this area could not be covered in the present survey.

ACKNOWLEDGEMENTS

The Ship's Master, Officers, Fishing Master, Engineers, Catering Staff and Crew are thanked for their cooperation and service during this cruise. The scientific staff are also acknowledged for their dedicated hard work. Best wishes for a speedy recovery are extended to the Fishing Master, Mr. Scott, who was injured during the collision. Mr Scott is also particularly thanked for his skillful deployment of the midwater trawl.

Signed:

Scientist in charge..... date 20/8/93

Ships master..... date 20.8.93

Division Head..... date 23.8.93

(in kg) and mean lengths are given.

	Shooting posn.		Sounding	Herring		Sprat		Mackerel		Gadoids	
Tow No.	Lat.	Long.	(m)	Kg.	L (cm)	Kg.	L (cm)	Kg.	L (cm)	Kg.	L (cm)
1	54 14.1	5 23.2	45	+	9.5	74	9.4	7	27.7	0	
2	54 45.0	5 02.4	34	17	18.5	+	10.3	14	26.5	1	8.9
3	54 23.2	5 20.0	79	3	9.2	59	6.6	2	26.6	+	9.1
4	54 11.4	5 09.5	132	4	9.3	5	7.2	0		3	10.8
5	54 00.5	5 02.0	63	21	17.4	11	6.8	5	27.6	4	14.1
6	54 03.8	4 53.3	44	60	15.0	54	7.0	+	26.5	3	7.7
7	54 10.5	4 46.1	27	765	23.9	0		0		0	
8	54 08.2	4 55.1	71	173	10.2	243	7.3	5	26.8	+	8.9
9	54 28.3	4 55.2	78	720	24.4	0		0		5	29.0
10	54 19.6	4 37.5	14	179	23.4	0		0	26.5	4	9.7
11	54 15.1	4 44.5	16	41	23.9	0		2	27.1	1	10.2
12	54 14.8	4 50.2	49	0		1500	10.3	0	.0	0	

\+ Catch < 1 kg

Table 2. Calibration details: EY200 echosounder. (16 August 1993)

Instrument details and settings:

Echo sounder	Simrad EY200
Transducer Serial No.	22317
Half beam angle	7.78 degrees
Calibration sphere TS	-33.6 dB
Pulse duration	1.0 ms
Receiver gain	3
Attenuator	-15 dB
Power	1/1

Calibration results:

Peak voltage of sphere echo	8360 mV
Instrument factor	3.8 x 10-7

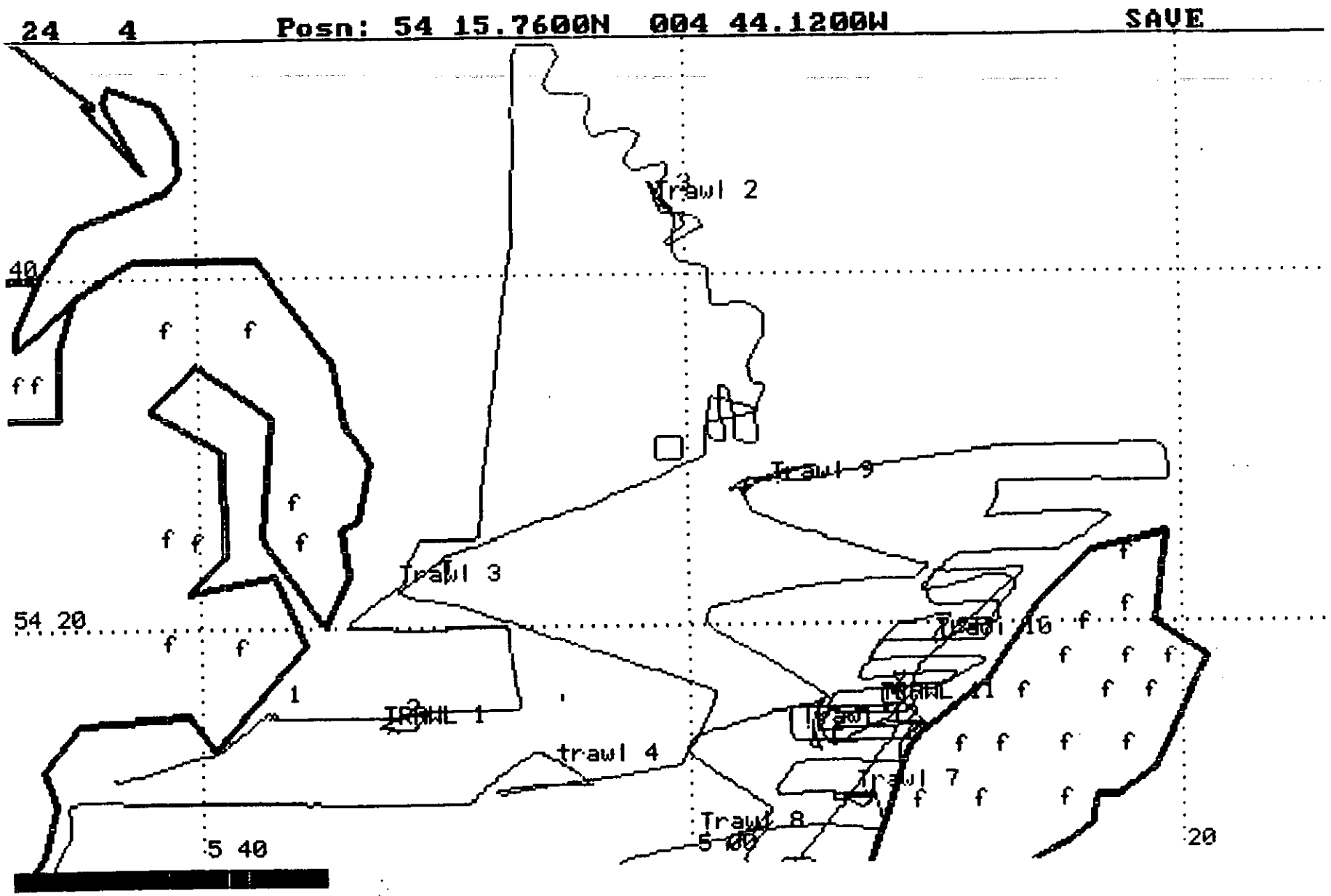
24 4
Posn: 54 15.7600N 004 44.1200W
SAVE
Trawl 2
40
Trawl 9
Trawl 3
54 20
Trawl 10
1
TRAWL 1
trawl 4
Trawl 7
Trawl 8
5 40
20

FIG 1

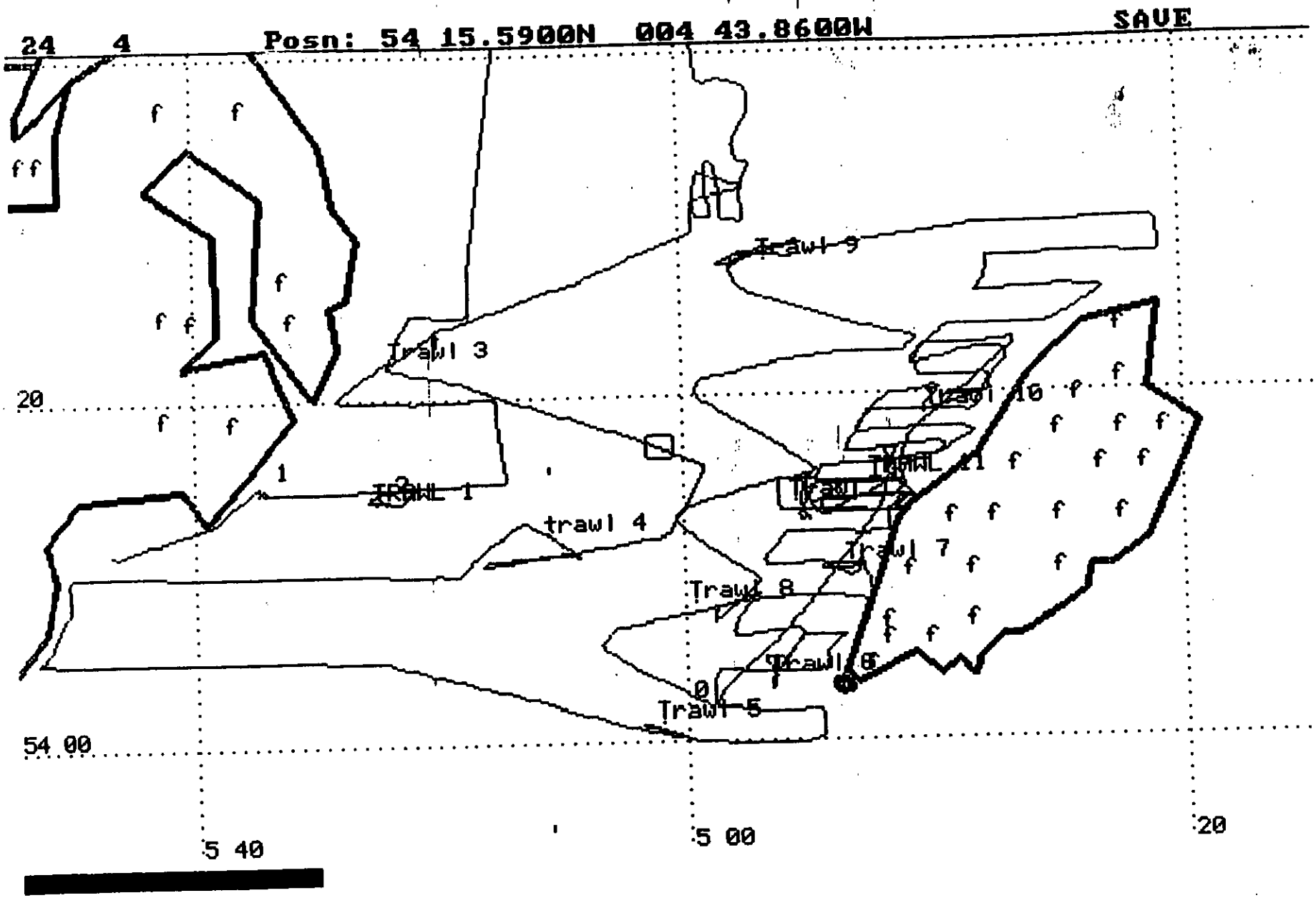
24 4
Posn: 54 15.5900N 004 43.8600W
SAVE
Trawl 9
Trawl 3
20
Trawl 10
1
TRAWL 1
trawl 4
Trawl 8
Trawl 6
Trawl 5
54 00
5 40
5 00
20

FIG 1 cont'd

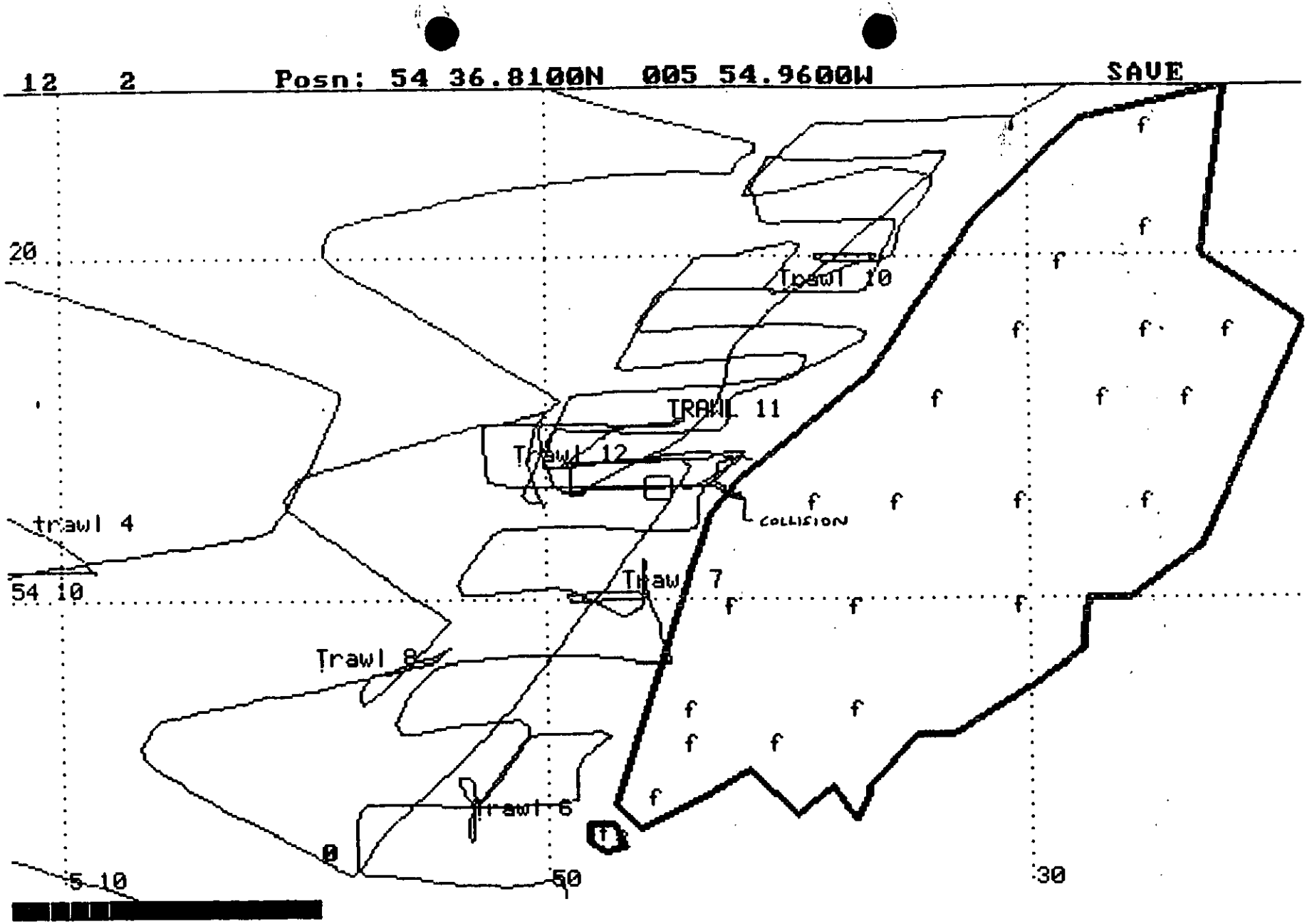
12 2
Posn: 54 36.8100N 005 54.9600W
SAVE
20
Trawl 10
TRAWL 11
Trawl 12
COLLISION
trawl 4
54 10
Trawl 7
Trawl 8
Trawl 6
0
5 10
50
30

Fig 1 contd