Acoustic class	Grid 1	Grid 2
Sandeel	129	25
Clupeids	31	105
Unknown	4	259

Table 1. Number of schools recorded in the water column during daytime

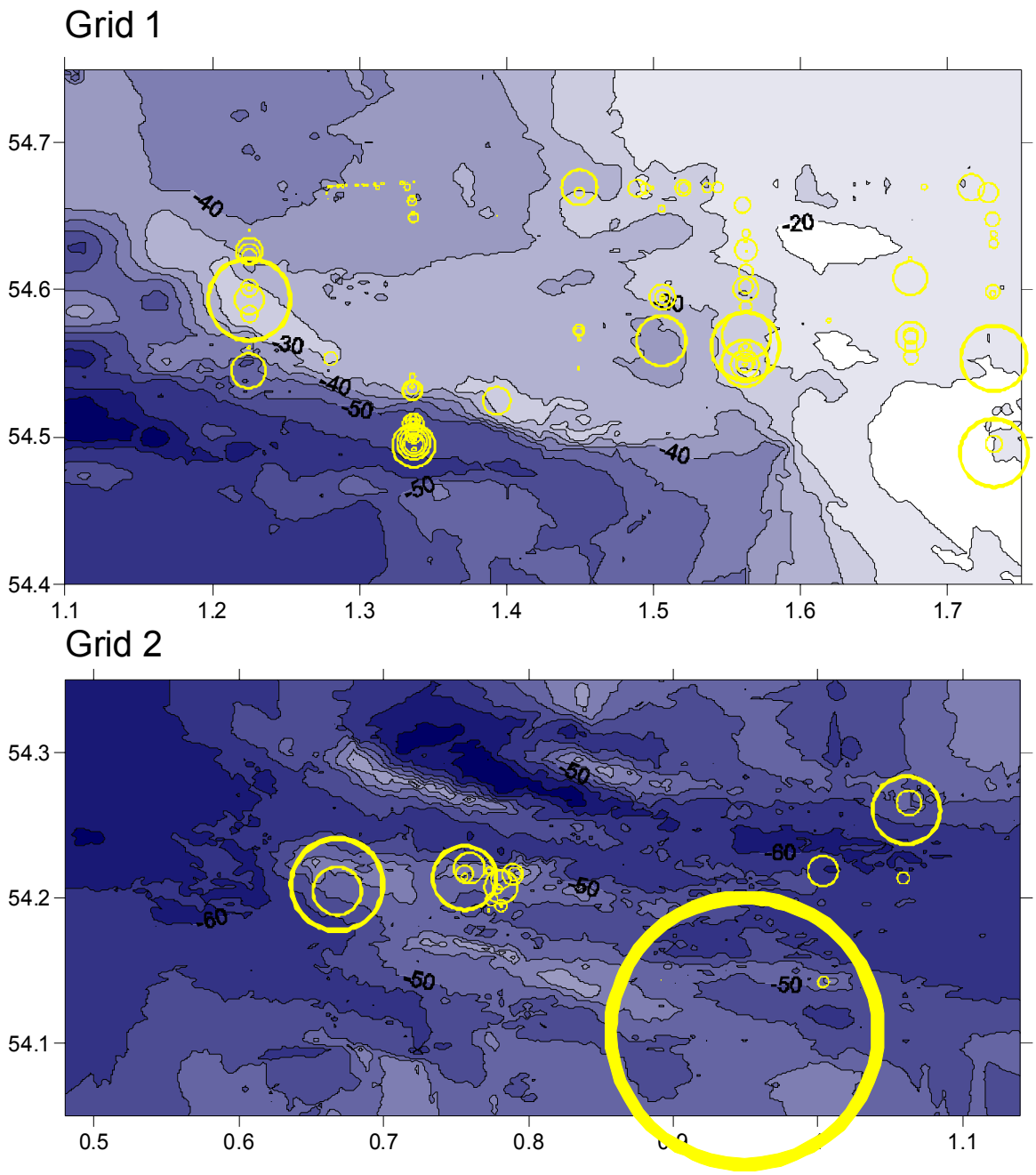


Figure 1. Sandeel schools overlayed on bathymetry. Size proportional to acoustic backscatter.

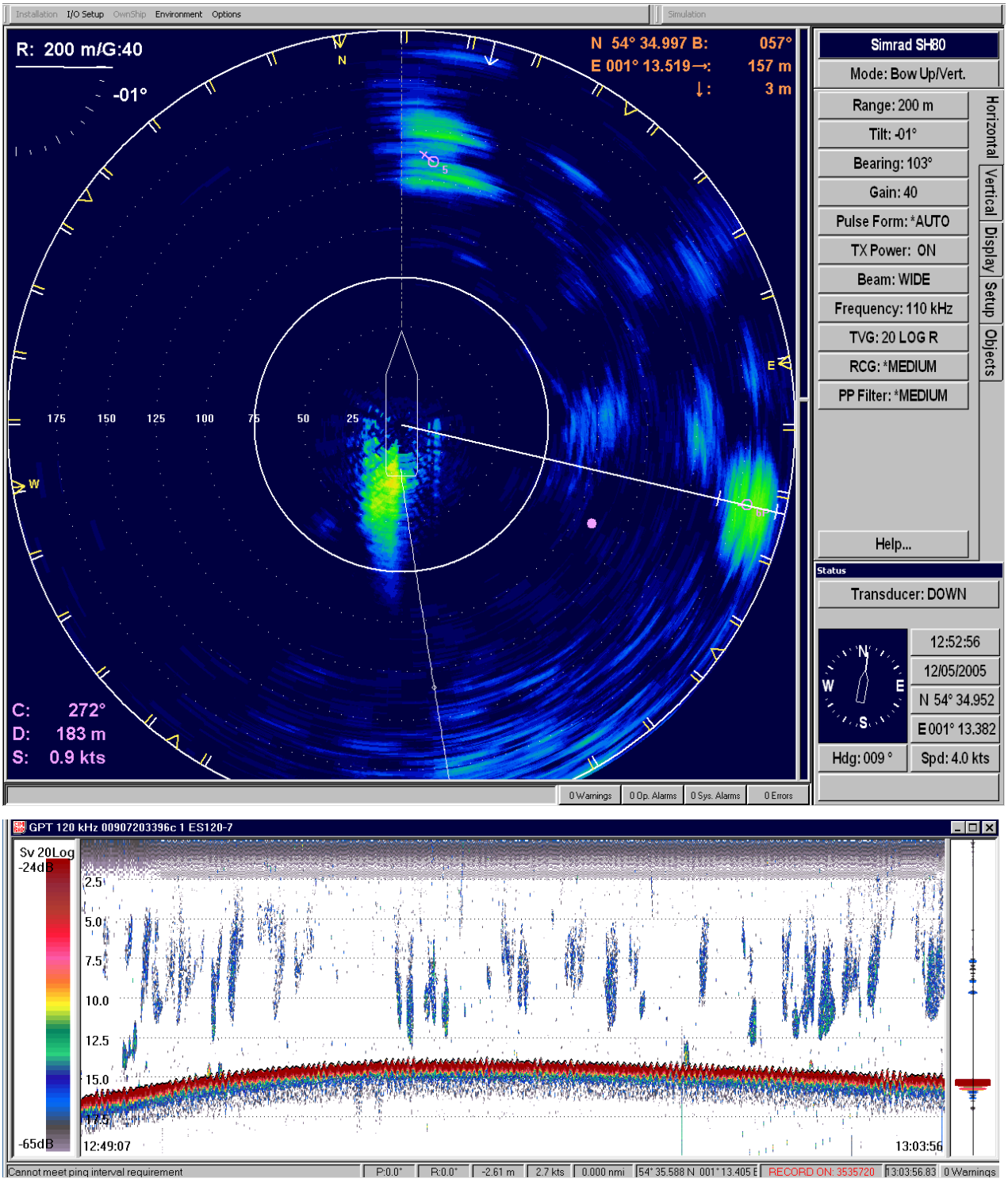


Figure 2. Sandeel schools being tracked using SH80 sonar. Bottom panel shows sand eel schools in the vicinity detected by the EK60 echo-sounder.

b) Dredge methods

Dredging for sandeels took place at 63 stations (three were repeats of stations at which it was suspected that the dredge was not fishing properly because of excessive heave). Sandeels were caught at 59 of the 63 stations, with a maximum catch of 440. Relative catch numbers and distribution is shown in Figure 3. Each night, otoliths were taken from up to five fish of each 0.5 cm length class. In total, 722 otolith samples were taken (approximately 60 pairs per night). The length-frequency of sandeels on the different survey grids is shown in Figure 4.

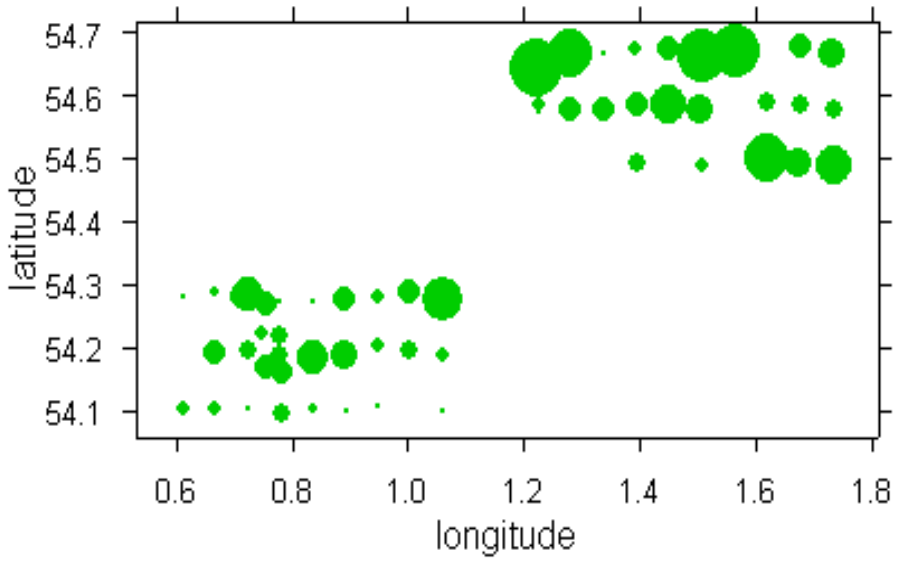


Figure 3. Plot of sandeel distribution (numbers)

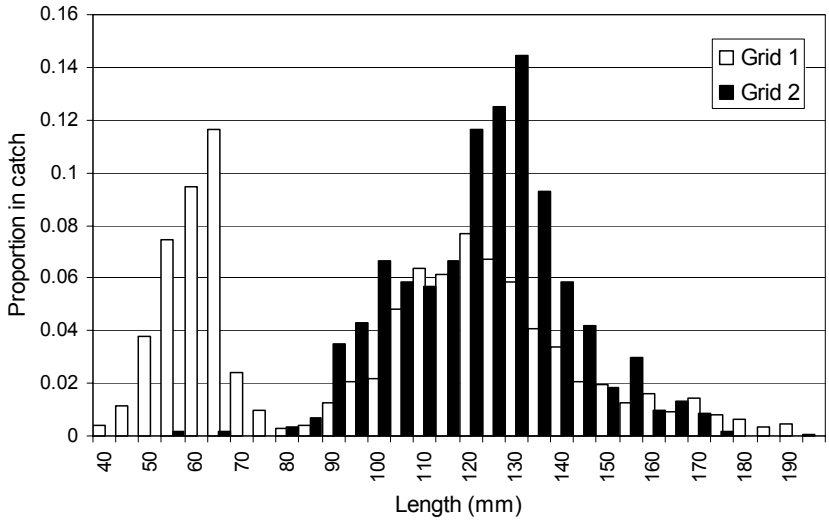


Figure 4 Plot of sandeel length frequencies.

2. To use fishing survey methods to estimate the abundance and distribution of predatory fish on the sandeel fishing grounds on the North West Riff & The Hills.

Trawl surveying for predatory fish was undertaken successfully at 60 stations. Over 40,000 fish were caught, weighing approximately 2.7 metric tonnes. Most abundant by number was dab (Limanda limanda), constituting over a third of the catch. By weight, whiting (Merlangius merlangus) constituted approximately 40% of the catch.

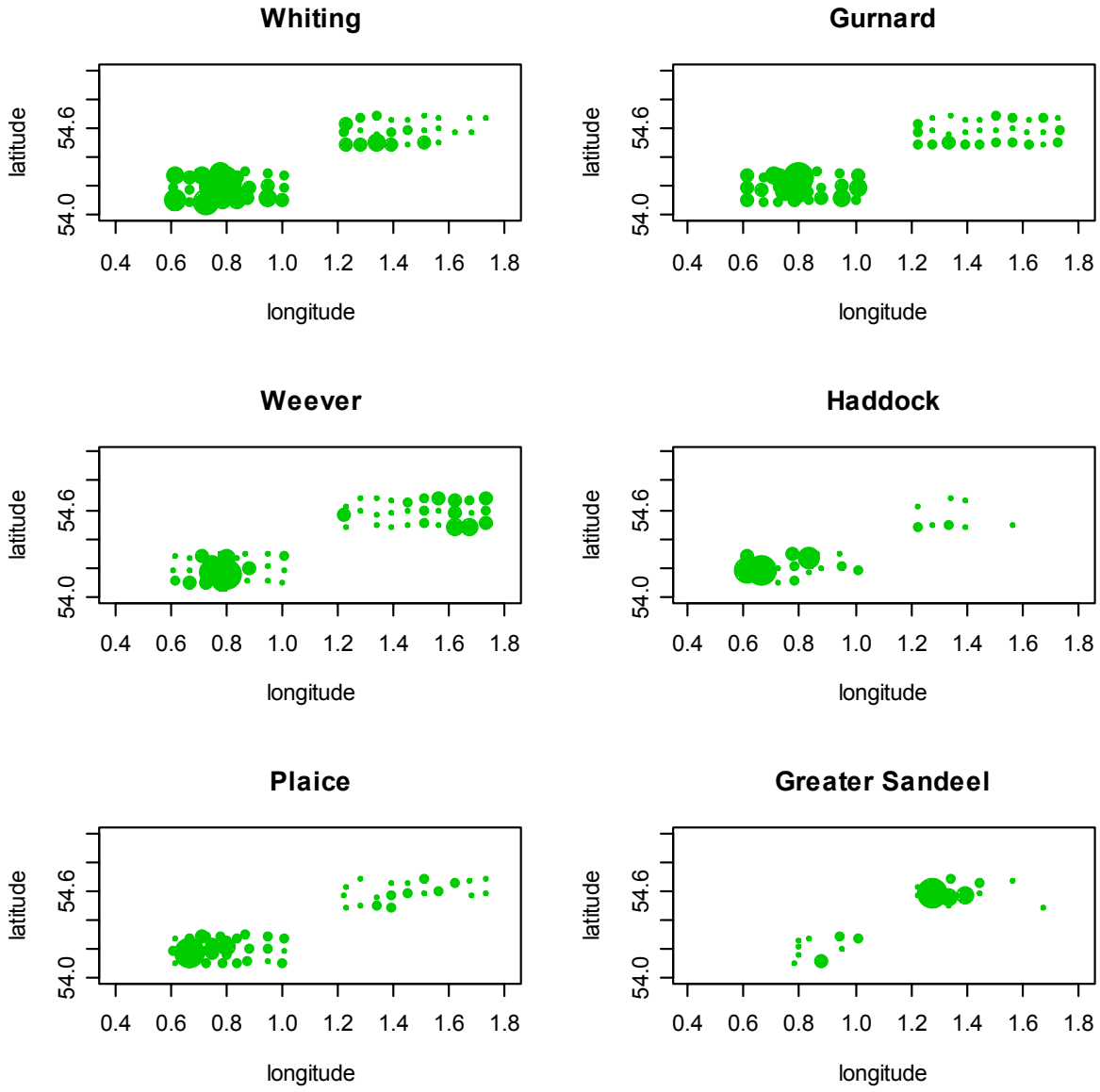


Figure 5. The relative abundance and distribution of the eight most common predatory fish species.

In addition to the stations on the survey grid, two additional trawls were performed along lines 1-C and 1-E. The trawls were 2hr duration, with the aim of testing the hypothesis that longer tow lengths would enable the capture of larger fish. To avoid unnecessarily large catches of small fish, the blinder was removed from the trawl; mesh size was then 100mm. Despite the length of the trawls, few fish were caught, suggesting that large fish are not abundant in the study area.

Analysis of the gut contents of predatory fish revealed that a greater proportion of predation on fish occurred on grid 1 (Figure 6 & 7; Table 3), where the majority of sandeels were found in the water column and in the sediment. Other significant prey items in the diets of the predatory fish sampled were pelagic and benthic crustaceans (gurnards and mackerel), bivalves (plaice) and echinoids (haddock). 389 muscle samples were taken from predatory fish for later isotopic analysis (Table 4)

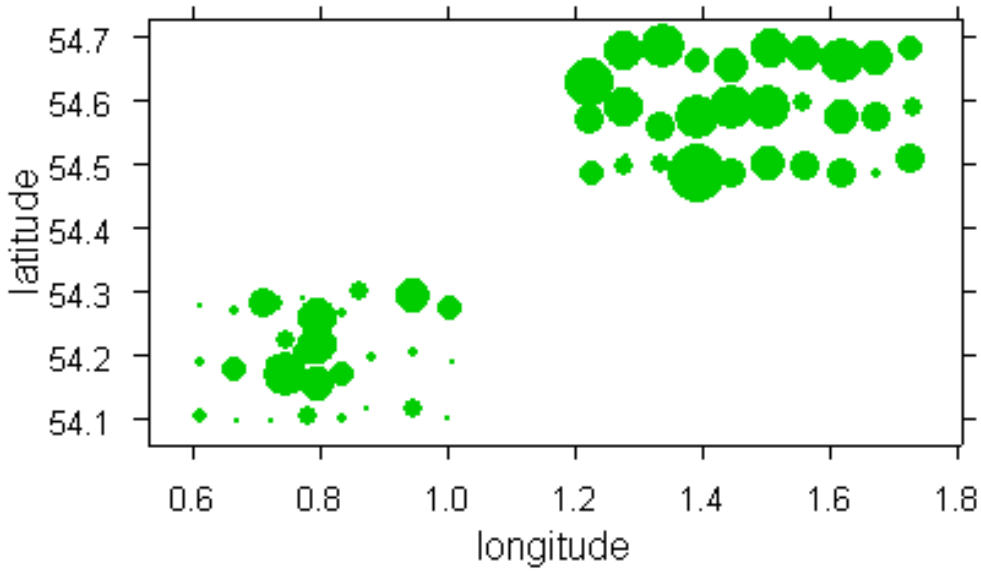
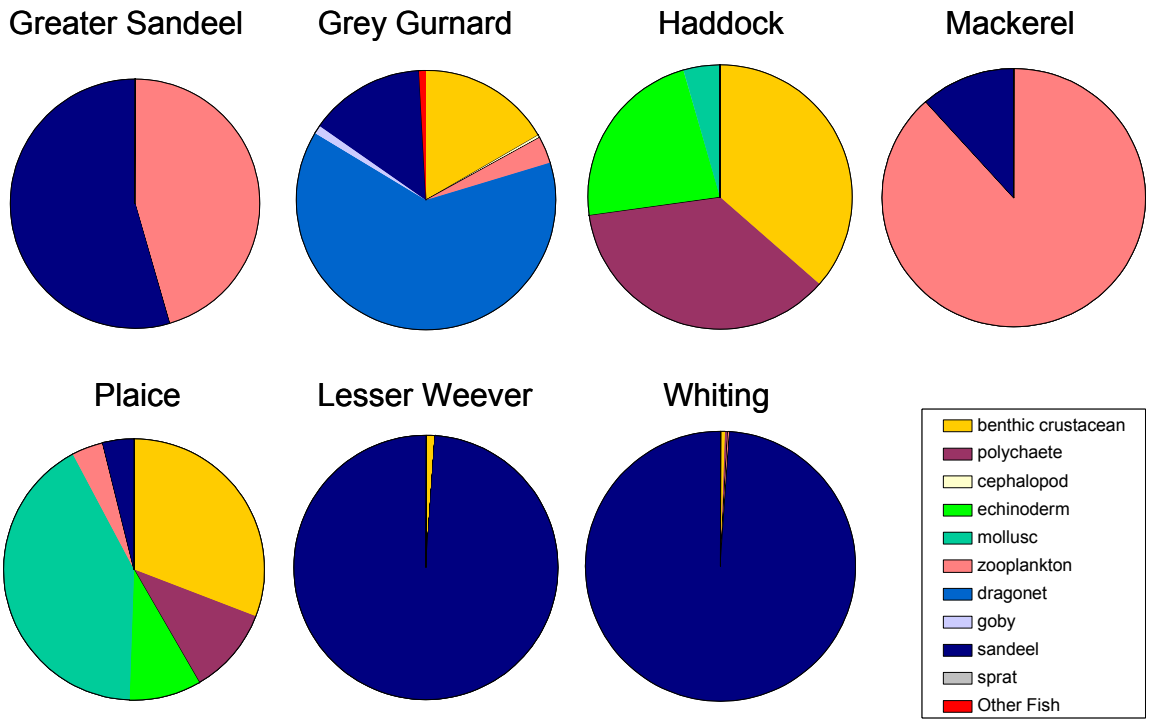


Figure 6. Incidence of predation on sandeels.

a. Grid 1 (% identifiable prey)



b. Grid 2 (% identifiable prey)

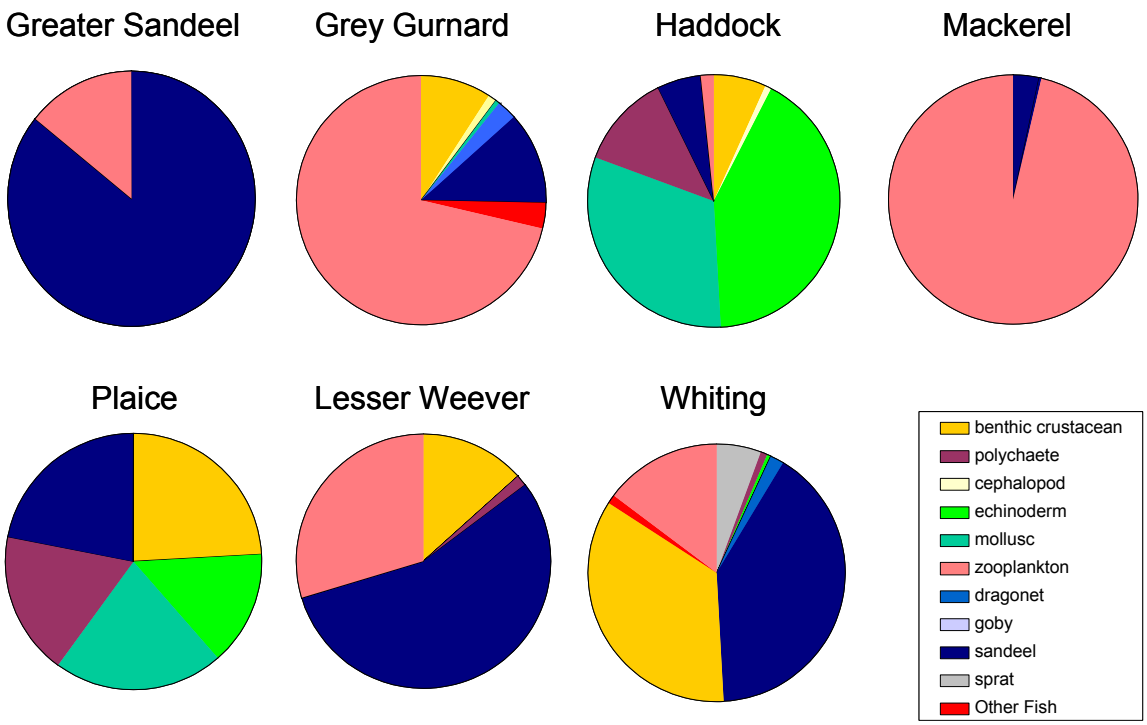


Figure 6. Proportion of prey in the diet of predatory fish in survey grids 1 & 2.

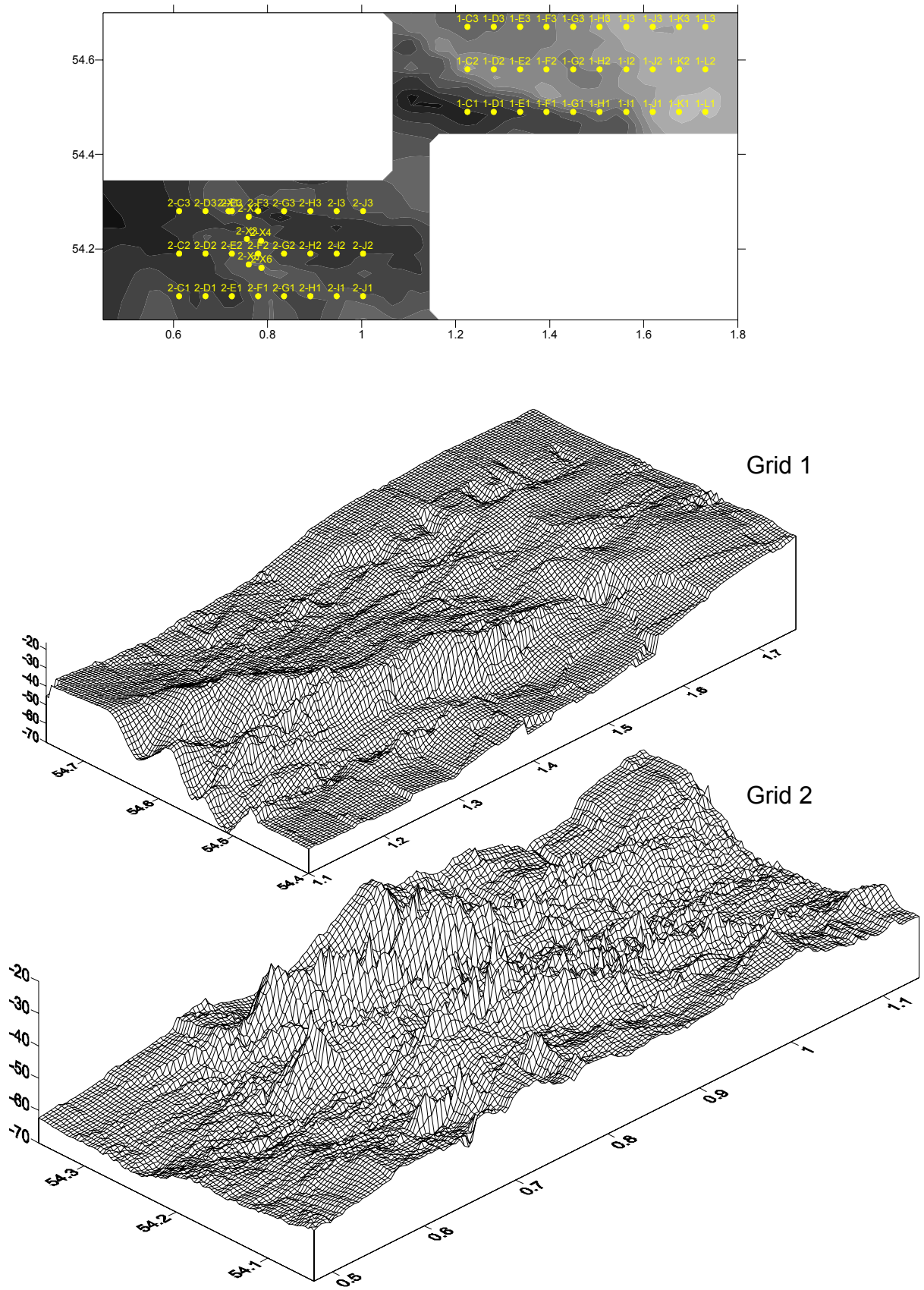


Figure A. The survey area, showing the location of the survey grids and their bathymetry.