

Cruise name

D9-2010

Research Vessel

R/s Dröfn

Cruise dates

18-22 July, 2010

Location(s)

Lónsdjúp trough

Chief Scientist

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Institute

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Cruise background & objectives

The objective of the cruise was to perform long-line experimental fishing on and off coral habitats and assess fish abundance and species composition.

Preliminary information

The survey was carried out in the Lónsdjúp trough, off south eastern Iceland (centred at 63°52' latitude, -14°29' longitude). Exploration of the Lónsdjúp trough was carried out during two cruises in June 2009 and June 2010. Possible coral locations were identified from high resolution bathymetry maps and split-beam echosounder data. Locations were groundtruthed with video and still photographs obtained with a remote operated vehicle (ROV) in 2009, and with a Campod in 2010. ROV and Campod dives were also carried out in locations where corals were unlikely to be found, for comparison purposes.

Explored sites were classified as having high, low and no coral cover, using the following criteria:

- 1) High coral cover area: Evidence or high probability of high density of corals, including reefs or large coral structures.
- 2) Low coral cover area: Evidence or high probability that density of corals was low. In these locations, individual coral heads were observed scattered over the seabed.
- 3) No coral area: No evidence of live coral.

Experimental longline fishing was carried out during a survey in July, 2010. A total of 20 longlines were deployed in seven sites (1-2 longlines per site).

Sampling design and methods

A total of ten 1km x 1km plots were located in two coral areas, in four low coral areas and in four non-coral areas. Two long lines were deployed at random in each box. To avoid interference between lines, lines within each box were not deployed in the same day.

Each long-line consisted of three tubs of 9 mm line, with 240 hooks (spaced at 1.4 m distance) per tub, with total length of \approx 1 km long. DST tags were attached to the long-line to obtain information on bottom temperature and depth. Hooks were baited with herring (*Clupea harengus*), squid (*Todarodes sagittatus*), and Pacific Saury (*Cololabis saira*). Catch was registered for each tub. Each long-line was divided into \sim 110 m sections (80 hooks), and for each section, number of hooks, baited hooks,

fish, invertebrate and bird bycatch was registered. All invertebrate bycatch (including dead stony corals) were identified, weighed and sometimes photographed. Samples of live specimens of *Lophelia pertusa* and *Primnoa resedaeformis* were collected for genetic analyses. Various other information was recorded during deployment and hauling such as geographical position, drift and weather conditions.

All captured fish were identified to species and measured. Fish that had not everted their stomach (n=1303) were weighed and stomachs were examined. Prey items were identified to the lowest taxonomic level possible. A small number of stomachs (150) were frozen for more detailed content analysis.

Survey Map

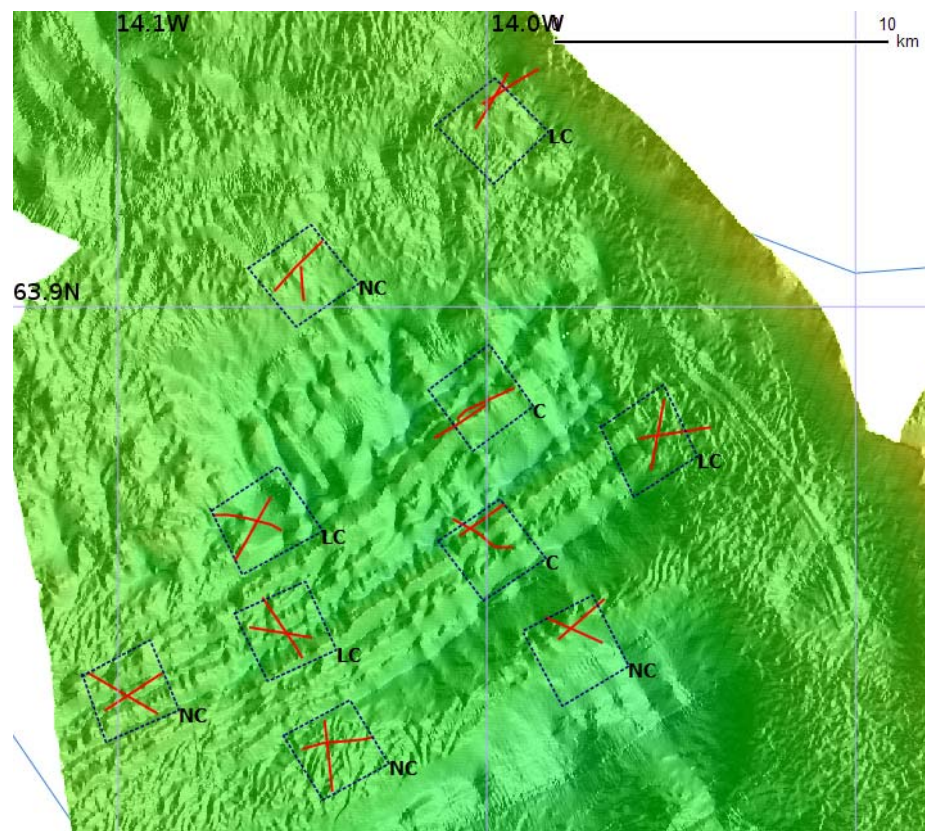


Figure 1. Location of the ten sampling areas (1 km x 1 km boxes) and the 20 long-lines deployed in the Lónsdjúp trough. Areas are labelled as C (high coral cover area), LC (low coral cover area) and NC (no coral area).

Preliminary results

A total of 1833 fish were captured. Catch per unit effort (CPUE) of fish was 175.0, 124.5 and 106.3 per 1000 hooks in high coral and low coral coverage and no coral areas respectively. The most commonly caught species were tusk (*Brosme brosme*, n=1378), ling (*Molva molva*, n=217), starry ray (*Amblyraja radiata*, n=74), haddock (*Melanogrammus aeglefinus*, n=69), Atlantic cod (*Gadus morhua*, n=35), and blue ling (*Molva dypterygia*, n=32). CPUE of tusk was significantly greater in high coral locations than in low and no coral areas (one-way ANOVA, p-value=0.01, Fig. 2). Abundance of ling was qualitatively lower in high coral locations compared to low and no coral areas but this difference was not significant (one-way ANOVA, p-value=0.34, Fig. 3). CPUE for the remaining common species are shown in Figures 4 and 5.

Comparisons of size distributions among coral cover levels were only possible for tusk (Fig. 6) as catch of other species was too low. No significant differences were observed in fish length between areas of high coral density, low coral density and no coral areas (ANOVA, p-value=0.73).

Bird and invertebrate bycatch

A total of 12 northern fulmars (*Fulmarus glacialis*) were captured by the long-lines of which half came from a single station. By-catch rate of invertebrates was 0.8% of which fragments of dead coral accounted to half of these. These were caught both in high, low and non-coral areas (Table 1). In total of 6 (4 kg) and 2 (2.6 kg) colonies *Primnoa resedaeformis* and *Lophelia pertusa* were caught respectively in the high and low coral areas only.

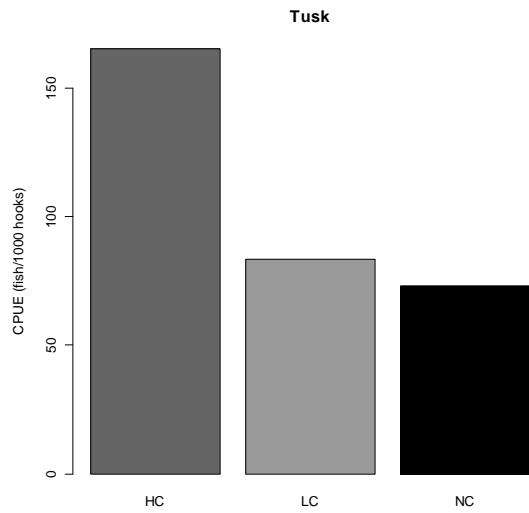


Figure 2. Catch per unit effort (number of fish per 1000 hooks) of tusk (*Brosme brosme*) in areas of high (HC), low (LC) and no coral cover (NC).

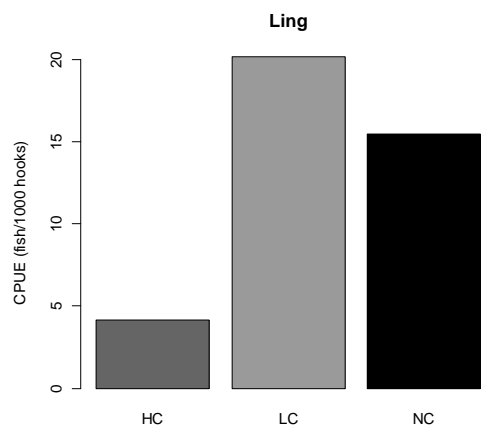


Figure 3. Catch per unit effort of ling (*Molva molva*) in areas of high (HC), low (LC) and no coral cover (NC).

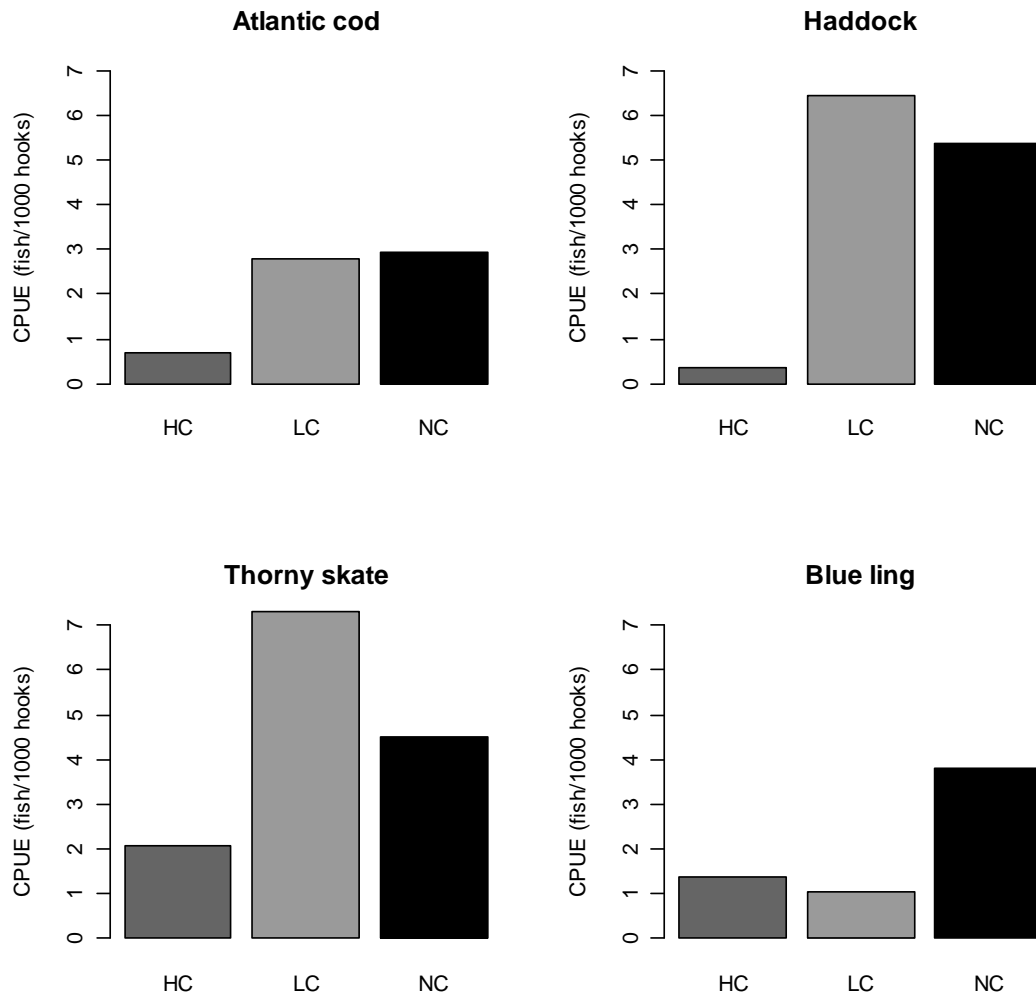


Figure 4. Catch per unit effort of Atlantic cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), thorny skate (*Amblyraja radiata*), and blue ling (*Molva dypterygia*) in areas of high (HC), low (LC) and no coral cover (NC).

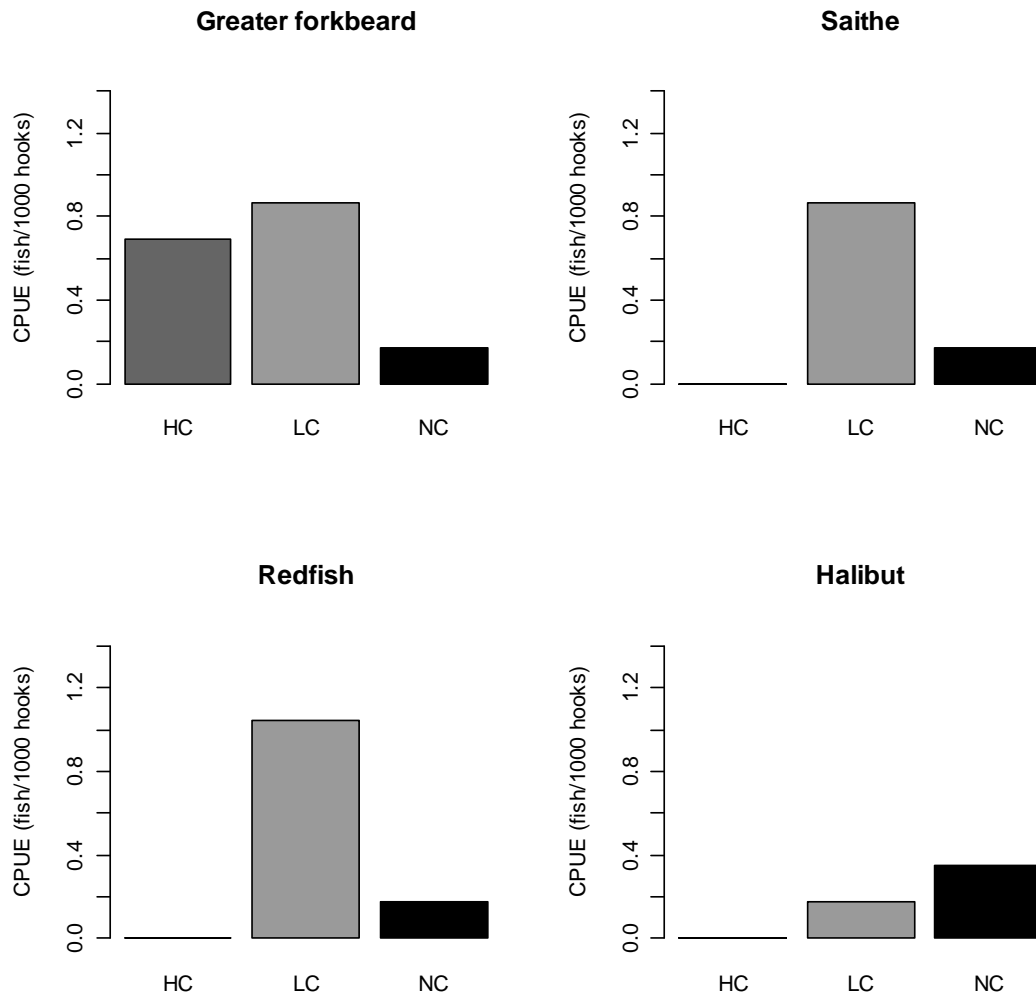


Figure 5. Catch per unit effort of greater forkbeard (*Phycis blennoides*), saithe (*Pollachius virens*), red fish (*Sebastes marinus*), and halibut (*Hippoglossus hippoglossus*), in areas of high (HC), low (LC) and no coral cover (NC).

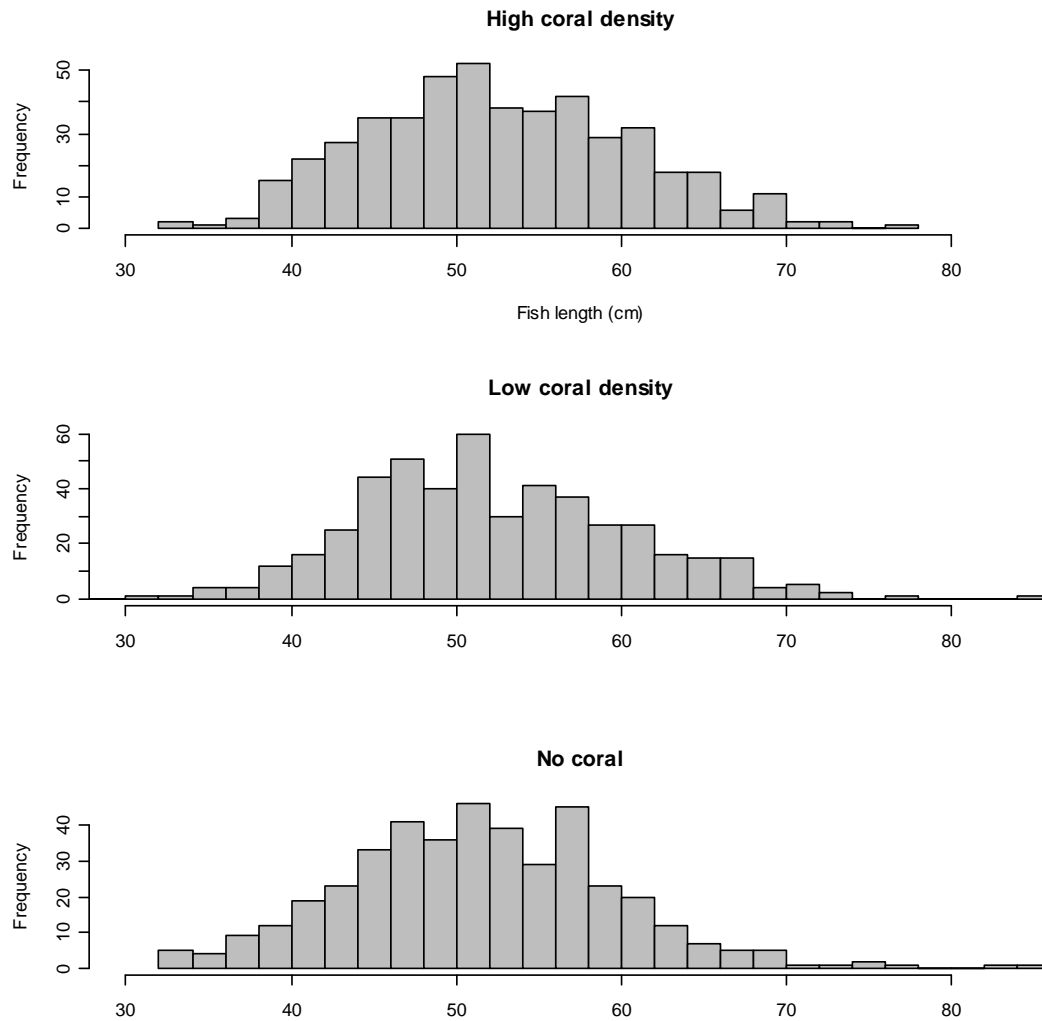


Figure 6 Length distributions of tusk (*Brosme brosme*) captured in areas of high and low coral cover and off coral areas.

Table 1. By-catch of benthic invertebrates and coral fragments, expressed as number of individuals and weight per 1000 hooks, in areas of high (HC), low (LC) and no coral cover (NC).

	WEIGHT			ABUNDANCE		
	HC	LC	NC	HC	LC	NC
Actinaria	0.7623	0.225	0.0125	3.6	0.25	0.125
<i>Brisinga</i> spp.	0	0	0.09375	0	0	0.25
Carcinidae	0.0387	0.1125	0.12375	0.3	0.125	0.125
Gastropoda	0.048	0.307875	0.081625	0.3	1	0.25
<i>Lophelia pertusa</i> (dead)	3.2631	0.93225	1.041625	7.8	2.375	2.125
<i>Lophelia pertusa</i> (live)	0.561	0.0875	0	0.3	0.125	0

<i>Primnoa resedaeformis</i>	1.1823	0.5	0	1.5	0.125	0
Pennatulacida	0	0.02375	0.0375	0	0.125	0.125
Porifera	0.39	0.060625	0.08875	1.5	0.375	0.25
Tunicata	0.096	0.0875	0	0.6	0.125	0

Appendix: Daily log for the cruise

Date	Remarks
18	Departure from Höfn í Hornafirði and sail to Lónsdjúp (~45nm). Deployed and recovered four lines (stations 1-4), one in a low coral area and three in no coral areas.
19	Deployed and recovered four lines (stations 5-8), one in a high coral coverage area, and three in low coral coverage areas.
20	Deployed and recovered four lines (stations 9-12), one in high coral coverage area, one in a low coral coverage area, and two in no coral areas.
21	Deployed and recovered four lines (stations 13-16), one in high coral coverage area, one in a low coral coverage area, and two in no coral areas.
22	Deployed and recovered four lines (stations 17-20), one in high coral coverage area, two in low coral coverage areas, and one in a no coral area. Sail to Höfn í Hornafirði.