SEA URCHIN – ÍGULKER
Strongylocentrotus droebachiensis

COMMERCIAL FISHING

Dredge fishing for sea urchin started in 1993. Landings peaked in 1994 at about 1500 tonnes, decreased drastically until 1997 when the fishery stopped. Decreased catches can be attributed to market factors, but the main fishing areas were severely affected by the effort in those years. In 2004, fishing started again with minor landings (30–40 tonnes) until 2007 when it reached 134 tonnes. In 2007–2014 the landings were 126–146 tonnes but have increased since then reaching 350 tonnes in 2017.

CPUE has been fluctuating between 340–483 kg/hour from 2007 until 2016 (with a mean of 420 kg/hour). There is no minimal landing size, but the mean size (diameter) in the catch from all fishing areas investigated in 2015 was 59.3 ± 10.5 mm. The fishing has mainly been conducted in Breiðafjörður and only one boat has been active in the fishery since 2004, although in the last years, several other boats have participated in the fishery with small landings. The fishing is conducted from September until March/April depending on the quality of the roes.

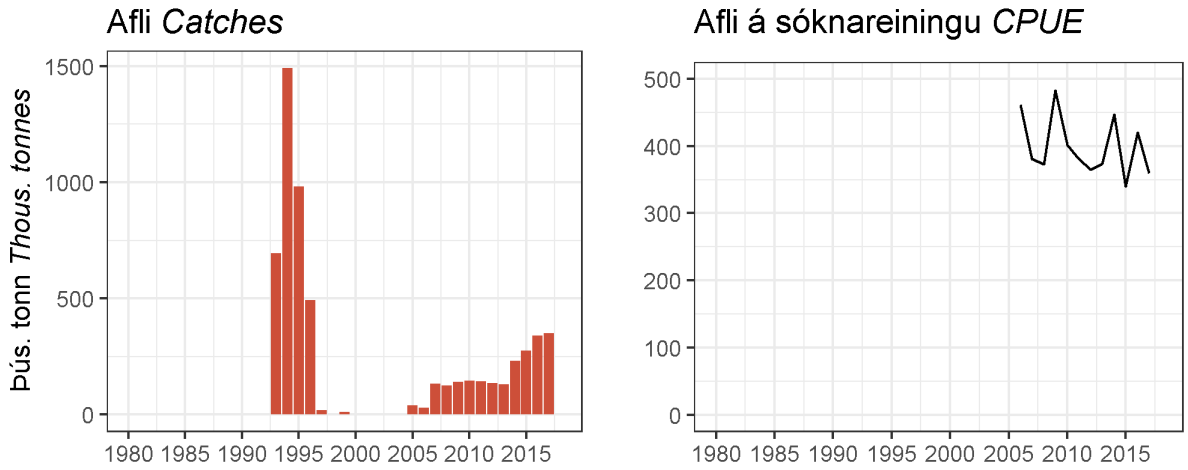

Figure 1. Sea urchin. Catches and CPUE 1993-2017

Mynd 1. Ígulker. Afli og afli á sóknareiningu 1993-2017.

In the last two years, the fishery in Breiðafjörður has expanded to north and west, as a maximum allowable catch has been sat in the main fishing area in southern Breiðafjörður.

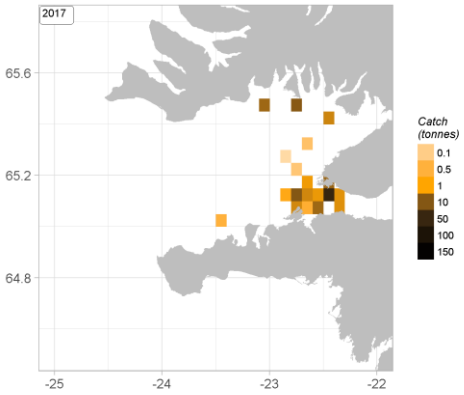

Figure 2. Sea urchin. Distribution of catches in 2017.

Mynd 2. Ígulker. Útbreiðsla veiða 2017

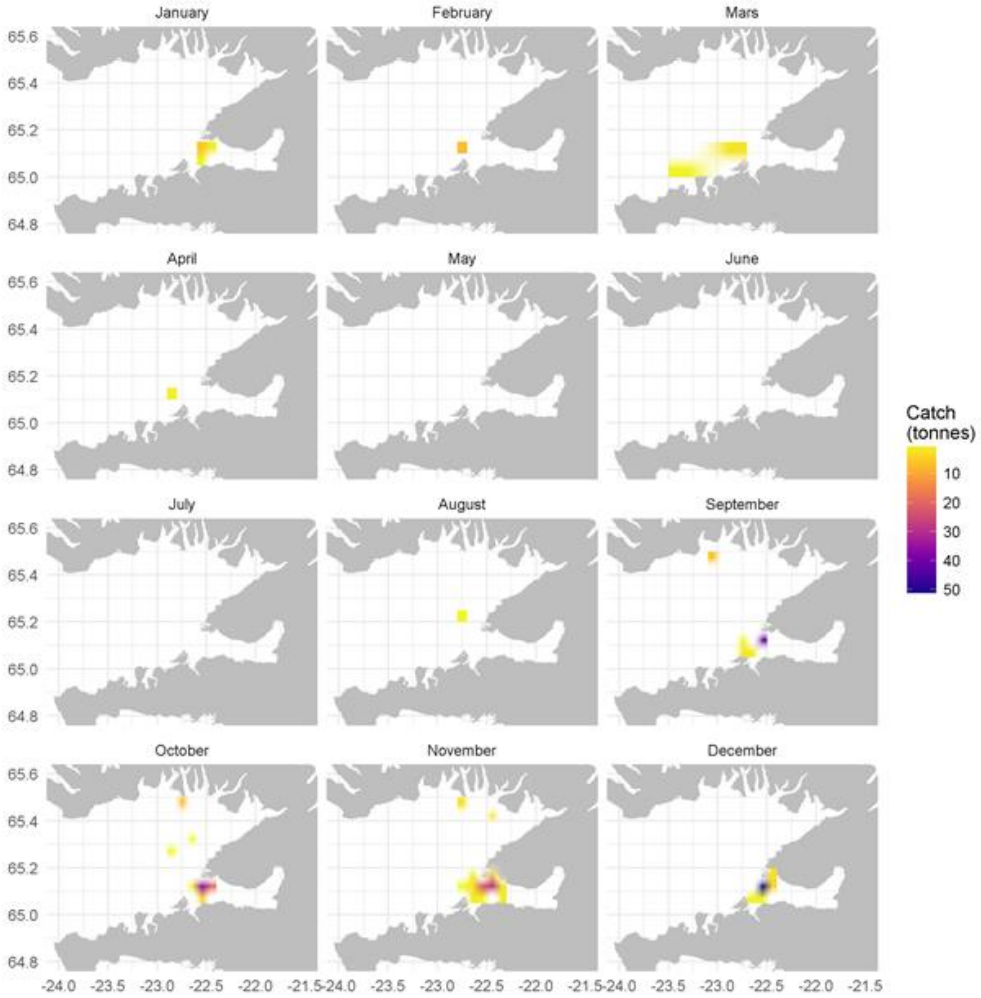

Figure 3 Sea urchin. Distribution of catches (tonnes) by months in 2017.

Mynd 3 Ígulker. Útbreiðsla veiða frá janúar til desember 2017.

SEA URCHIN SURVEY

Surveys were conducted in September 2015 and April 2016 to assess biomass of sea urchin in the main fishing area in southern Breiðafjörður south of 65°10'N and east of 22°40'W at depths of 8–60 m, by swept area method and underwater photography. Most of the tows (88%) were at depths of 8–35 m. The surveys were conducted by a commercial sea urchin fishing vessel (Fjóla SH-7). The dredge used is 250 cm in width and with 150 cm long catch–bag. The mesh size of the catch–bag is 100 mm.

To determine the density/abundance of urchins, each catch was weighed, and the distance covered by the dredge was calculated. The total catch weight was divided by the size of the area covered in each tow to give biomass in kg/m^2. Biomass estimates for any given area were calculated from the mean biomass in that area multiplied by the total size of the area. The density (ind./m^2) was calculated by dividing the mean wet weight of the individuals in an area into the abundance (kg/m^2) of the area (swept area method).

An underwater camera was used to estimate the density of urchins. Photographs were taken at 19 sites within four of the seven investigated subareas. At each site photographs were taken at several locations, with a total of 160 photos taken. Later sea urchins from the photos were counted and the density observed (no/m^2). The results from the dredge survey from the same area at the same time were compared to the density observed from the photos before dredging to assess the efficiency of the dredge. The results showed that the distribution of the green sea urchin in Breiðafjörður is very patchy, showing smaller fishing areas, ranging in size from 0.3–3.4 km^2. The stock size was assessed to be about 3000 tonnes in the area investigated. The average efficiency of the dredge had been estimated to be 23%.

To investigate the reproductive cycle (gametogenesis and spawning), 30 samples were collected monthly from September 2016-August 2017 (except June and July), from two different fishing areas at 60 and 30 m depth, respectively. A total of 300 urchins were collected at each site. For each sample, test diameter for each urchin was measured to the nearest 0.1 mm with vernier calipers and the total weight to the nearest 0.1 mg. The urchins were opened and drained and weighted again and the water content in each individual estimated. The gonads were removed, blotted dry, their wet weights determined, and GI was calculated as percentage of the total wet weight of the total body mass.

LENGTH DISTRIBUTION OF SEA URCHIN

The mean size (diameter) distribution for the area investigated showed that the highest proportion of the stock is 60 mm in diameter but ranged in size from 17 to 85 mm.

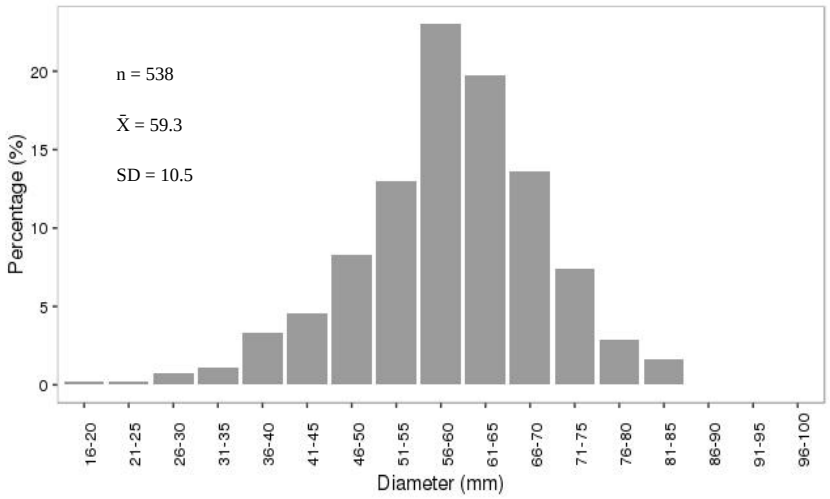

Figure 4. Sea urchin. Size (diameter in mm) frequency distribution for all areas combined in the study areas in Breiðafjörður in September 2015 and April 2016.

Mynd 4. Ígulker. Stærðardreifing (þvermál í mm) á rannsóknarsvæðum í Breiðafirði árin 2015 og 2016.

REPRODUCTIVE CYCLE OF SEA URCHIN

The green sea urchin displays a distinct annual cycle of reproduction as indicated by temporal changes in gonad index through the year investigated.

The results indicate a relatively high gonad index (GI) at both depths throughout the whole investigation period, however the gonad index was always lower at greater depth. One spawning season in April was observed at both sites, but minor spawning continued into May at 30 m depth.

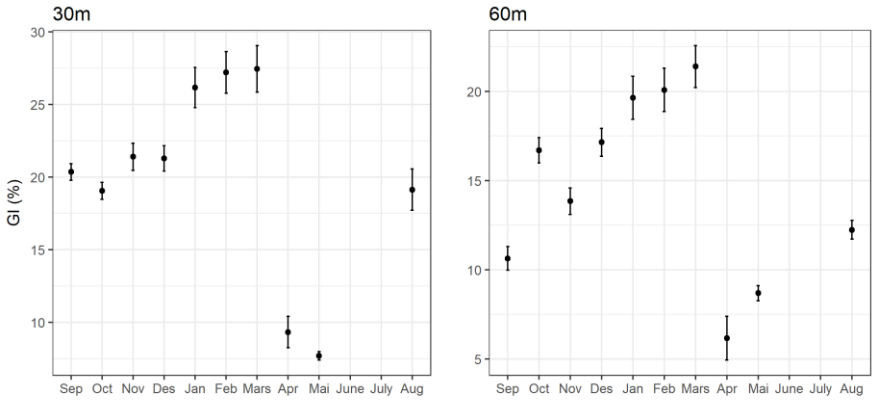

Figure 5. Sea urchin. Gonad index ± SE from September 2016 to August 2017 at two fishing sites in September 2016-August 2017.

Mynd 5. Ígulker. Kynþroskastuðull (GI) ± SE á tveimur veiðisvæðum í Breiðafirði frá september 2016-ágúst 2017.

ADVICE

For the fishing year 2018/2019, the MFRI advices that total allowable catch should not exceed 250 tonnes (about 10% of the assessed stock size) in the main fishing area in Breiðafjörður, south of 65°10´N and east of 22°40´W. The fishing area is divided into two subareas by a line (65°08´N, 22°31´V and 65°04´N, 22°25´W) and the catch should be limited to 150 tonnes west of the line and 100 tonnes east of the line.

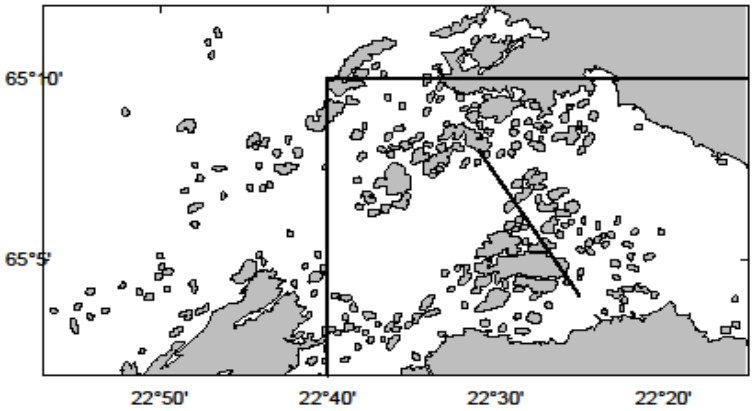

Figure 6. Sea urchin. The main fishing area in southern Breiðafjörður divided into two subareas by a line.
Mynd 6. Ígulker. Aðal veiðisvæði ígulkerja í Breiðafirði og skipting svæðisins í tvö undirsvæði.