

# Assessment of queen scallop (*Aequipecten opercularis*) in a north-west fjord (“Djúpini”) of the Faroe Islands 2013

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## 1. Introduction

The following assessment is based on a research survey carried out by the scallop fishing vessel M/S Norðheim.

The dominant cohabitants in the main habitat of the scallop are different species of whelks, mussels, starfishes, brittlestars, prawns, sea urchins, sea anemones, hydroids, bristle worms and hermit crabs.

## 2. Material and methods

The methodology in the present assessment is similar to that used for the assessment of the northern component of the queen scallop (Assessment of queen scallop (*Aequipecten opercularis*) in the Faroe Islands 2013, report).

A swept-area biomass is calculated based on 8 hauls recorded by the Faroese scallop vessel Norðheim in January 2013. (Figure 2.1).

The area was divided in 9 equal-sized squares of 3.20 km<sup>2</sup> each (1.723 km longitude, 1.855 km latitude) covering a total area of 29 km<sup>2</sup> (Figure 2.2). Due to logistic issues one station (nr. 8) was discarded and not taken into account in the analysis. The scallop beds are situated in a north-west south-east axis in depths of 90-145

m

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Every square was towed once with a double 12-foot dredge (7.3 m). Towing time was set to 10 minutes and the average towing speed 4.8 knots (8.8 km/h). Catch was recorded in every haul and a random sample of 10 scallops taken for further biological measurements.

Density is calculated by dividing catches by the swept area:

$$\text{Density (kg/km}^2\text{)} = \text{Catch (kg)} / \text{Area Swept (km}^2\text{)}$$

Swept area is calculated as:

$$\text{Swept Area (km}^2\text{)} = \text{towing time (hr)} \times \text{towing speed (km/hr)} \times \text{width of trawl (km)}$$

Biomass is calculated as area of square times density:

$$\text{Biomass (t)} = \text{Area square (km}^2\text{)} \times \text{Density (kg/km}^2\text{)} \times 1000$$

### 3. Results

Geographical distributions of catch, density and biomass are shown in figures 3.1, 3.2 and 3.3 respectively. The graphs clearly display concentrations of scallops in the northern sea-beds whereas the southern waters show almost a complete lack thereof.

A total catch of 3.8 tons was landed with a mean density of 52 t/ km<sup>2</sup> over the entire survey area.

Average catch is 0.5 tons (std. Error = 0.120 t.) while mean density is estimated at 52.2 t/ km<sup>2</sup> (std. Error = 19.3 t/km<sup>2</sup>)

The estimated total biomass of queen scallop in the area is 1 336 tons with an average of 167 t (std. Error = 61.98 t). Following the same management plan implemented in the northern area fishery and based on precautionary-approach principles (20% of total stock) a quota not larger than 267 tons would be reasonable estimate for the sustainable harvest of stock.

The stock consists mostly of scallops aged 2,4 and 5 years old (Figure 3.4) comprising 67% of the total age composition. There is a large overlapping in the length distribution of scallops aged 3 and older (Figure 3.5).

Figures 3.5 and 3.6 display several relations between some of the biological measurements taken on the scallop samples. Wet weight relates exponentially ( $W = aL^b$ ) with scallop shell length (Figure 3.5). The average weight of a 60 mm. scallop is 27 gr. and it can reach up to 43 gr. at a 70 mm length.

It is clear when looking at age-disaggregated shell-length, -width and -thickness distributions that large variability is present in 2-year old scallops compared to older individuals (Figures 3.6.a, 3.6.b, 3.6.c)(This may be an effect of that spawning occurs twice a year in Feb. and Aug.) Asymptotic shell-length and -width is 74 and 80 mm respectively while shell-thickness is estimated at 23 mm. Soft body weight of 4-year and older scallops is limited to the 15-20 gr. interval (Figure 3.6.h).

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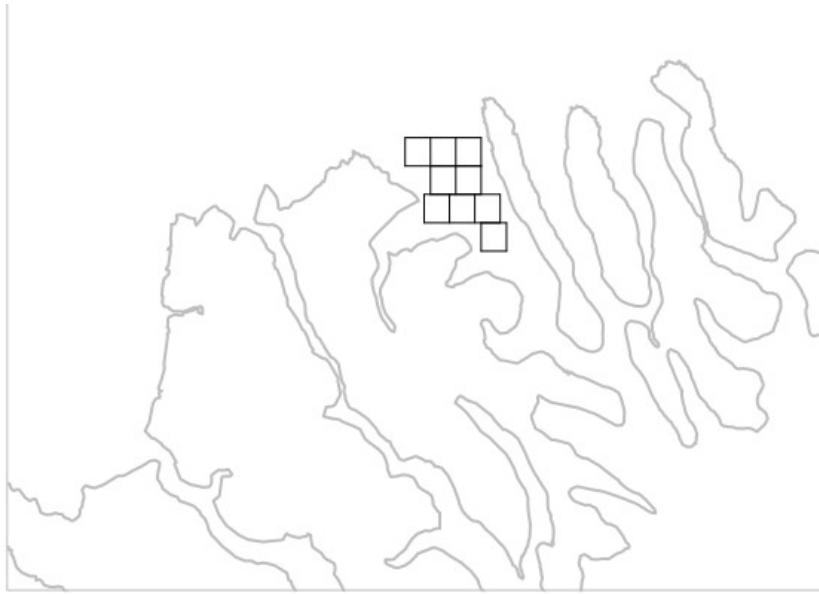


Figure 2.1. Location of the survey area.

Figure 2.2. Geographical representation of the survey area. Station 8 was discarded .

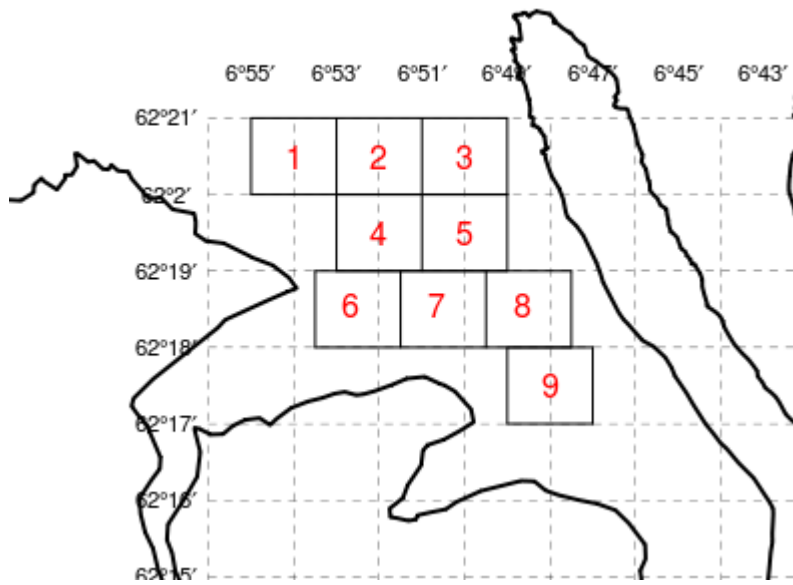


Figure 3.1. Queen scallop. Catches (kg)

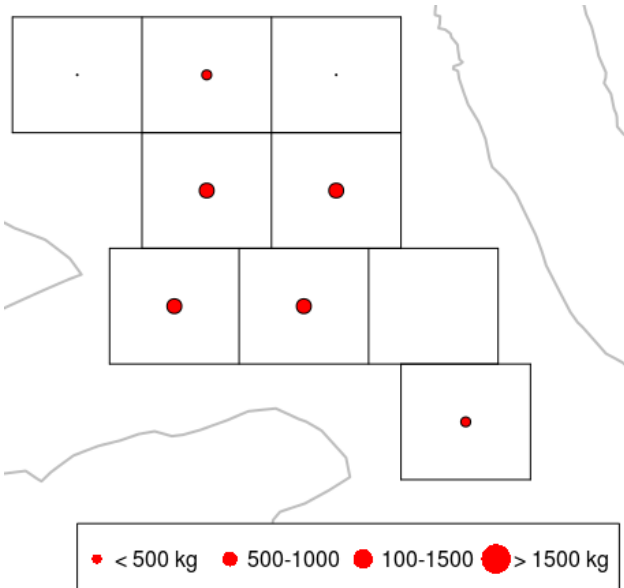


Figure 3.2. Queen scallop. Density estimates (t/km<sup>2</sup>)

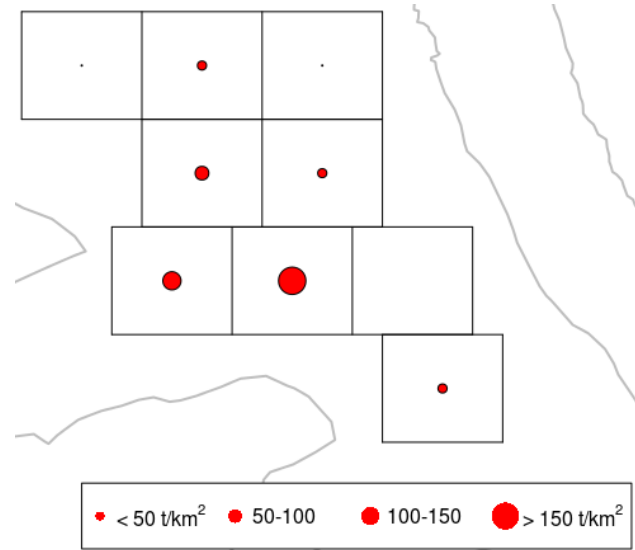
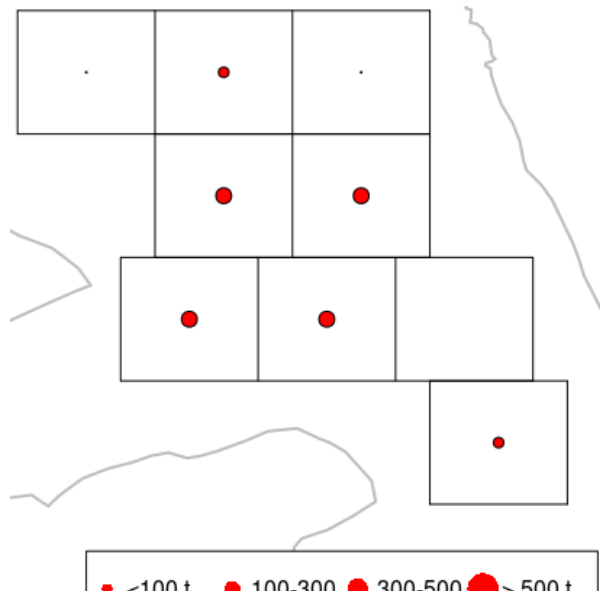


Figure 3.3. Queen scallop. Biomass estimates (tons)



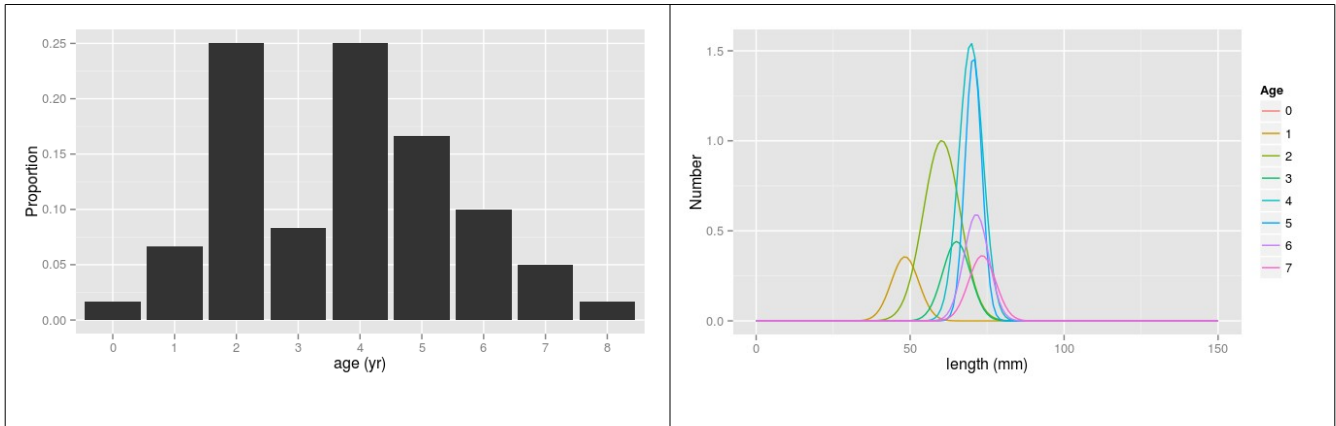


Figure 3.4. Queen scallop. Age composition (left-figure) and age-length relationship (right-figure)

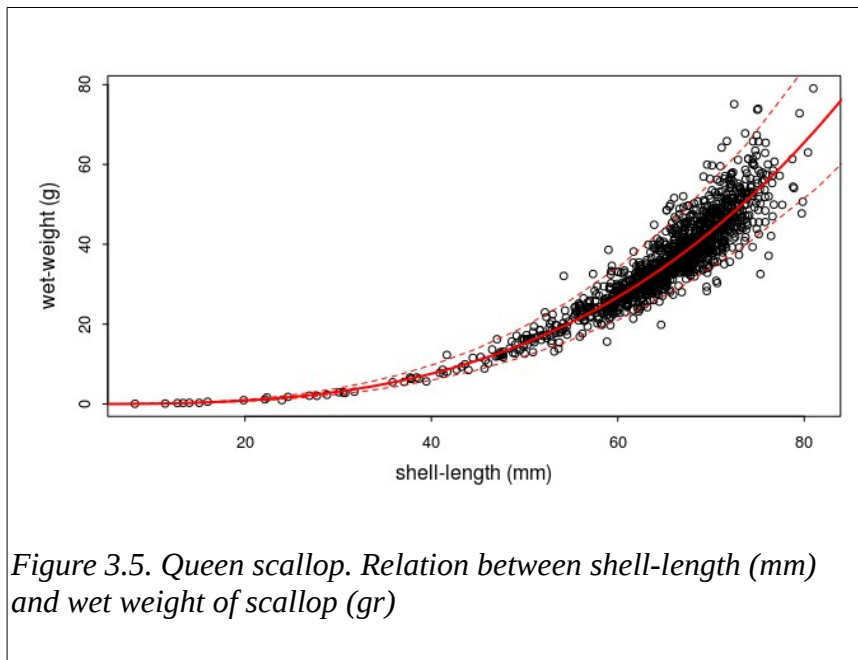
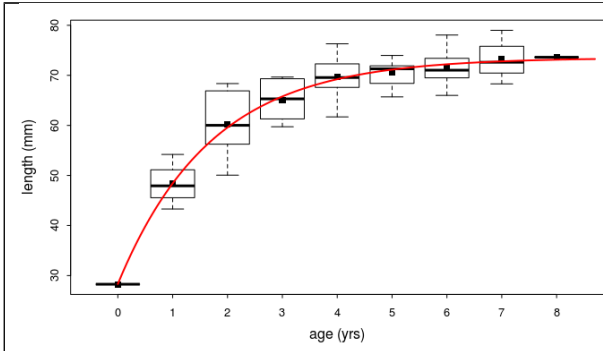
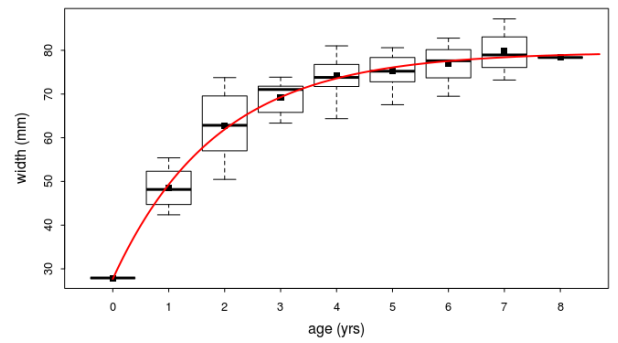


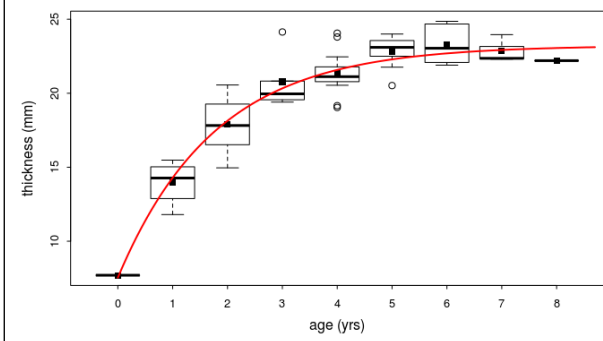
Figure 3.5. Queen scallop. Relation between shell-length (mm) and wet weight of scallop (gr)



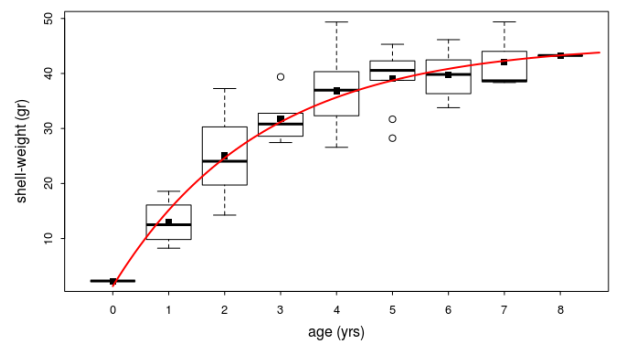
(a) Age (yr)- shell-length (mm)



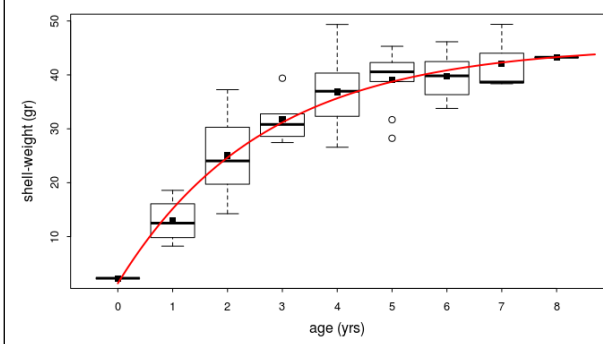
(b) Age (yr)- shell-width (mm)



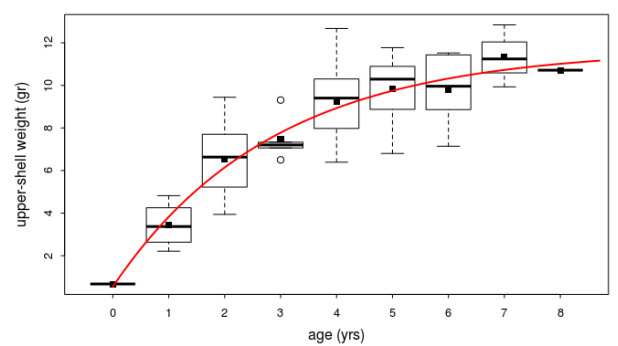
(c) Age (yr)- shell-thickness (mm)



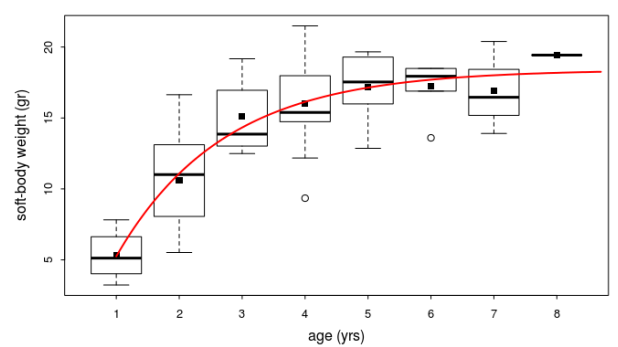
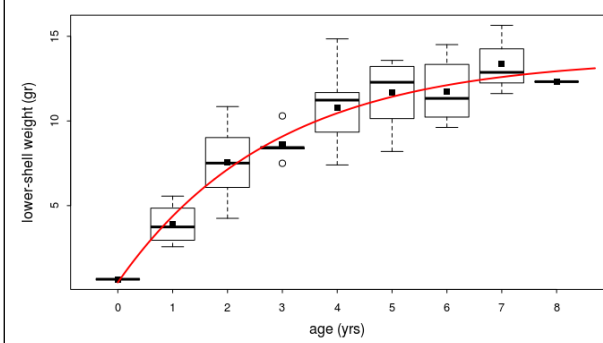
(d) Age (yr)- weight scallop (g)



(e) Age (yr)- shell-weight (g)



(f) Age (yr)- upper-shell weight (g)





(g) Age (yr)- lower-shell weight (g)	(h) Age (yr)- soft body weight (g)
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*Figure 3.6. Queen scallop. Relation between age (years) and shell-length (mm)(a), shell-width (mm.)(b), shell-thickness (mm)(c), scallop weight (gr)(d), shell-weight (gr)(e), upper-shell weight (gr)(f), lower-shell weight (gr)(g), soft body weight (gr)(h).*