

Introduction

The main spawning grounds for Icelandic cod (*Gadus morhua*) are located along the southwest coast, however the small scale structure within this region is not well documented and research has identified other areas contributing to the pelagic juvenile population (Marteinsdottir *et al*, 2000).

Spawning grounds can be mapped by examining the distribution of (1) fisheries targeting spawning cod and (2) confirmed spawning cod samples collected by the Marine Research Institute (MRI). In this poster, we outline the following:

1. **Creation of a map detailing Icelandic cod spawning regions and sub-regions.**
2. **Utilisation of the map to study the relative spatial distribution of spawning females.**

Method

- Logbook entries and survey samples from 1991-2012 considered.
- Data restricted to the main spawning period (15th Mar-21st May).
- **Identification of potential spawning sites from logbook entries:**
 - Catch must consist of $\geq 60\%$ Cod.
 - Vessel gross tonnage > 9.9 and gear type = gillnet or trawl.
 - Icelandic waters divided into minute by minute gridcells.
 - Gridcells fished > 2 times in a season a potential spawning site.

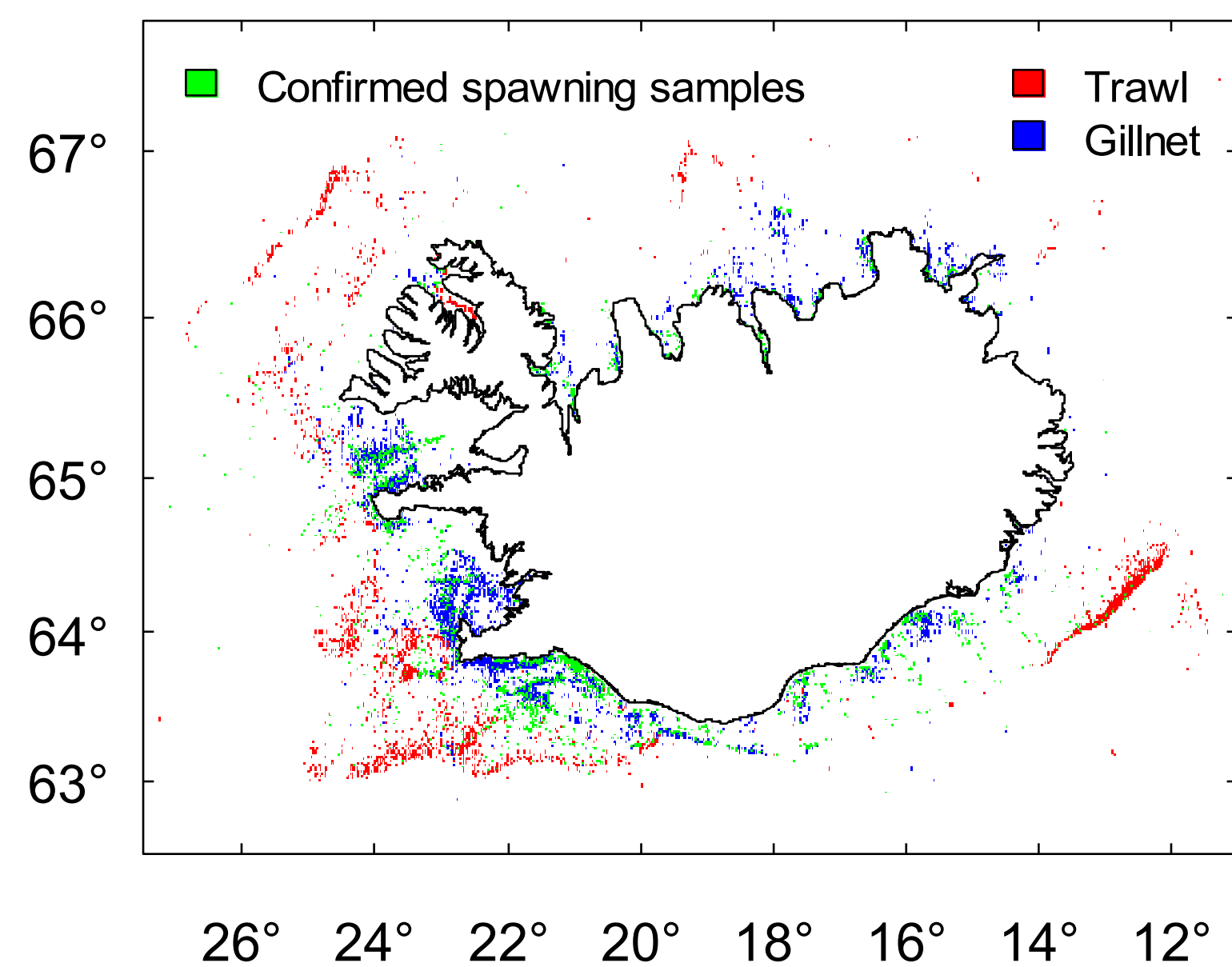


Figure 1. Potential spawning sites identified using the above criteria; confirmed spawning samples also displayed.

- **56 spawning sub-regions defined:**
 - Aggregations of fisheries records.
 - Confirmed spawning cod samples.
 - Areas historically delineated by fishermen.
- **6 spawning regions defined:**
 - Sub-regions pooled into regions according to proximity and hydrography, partly based on BORMICON regions (Stefansson and Palsson, 1997)

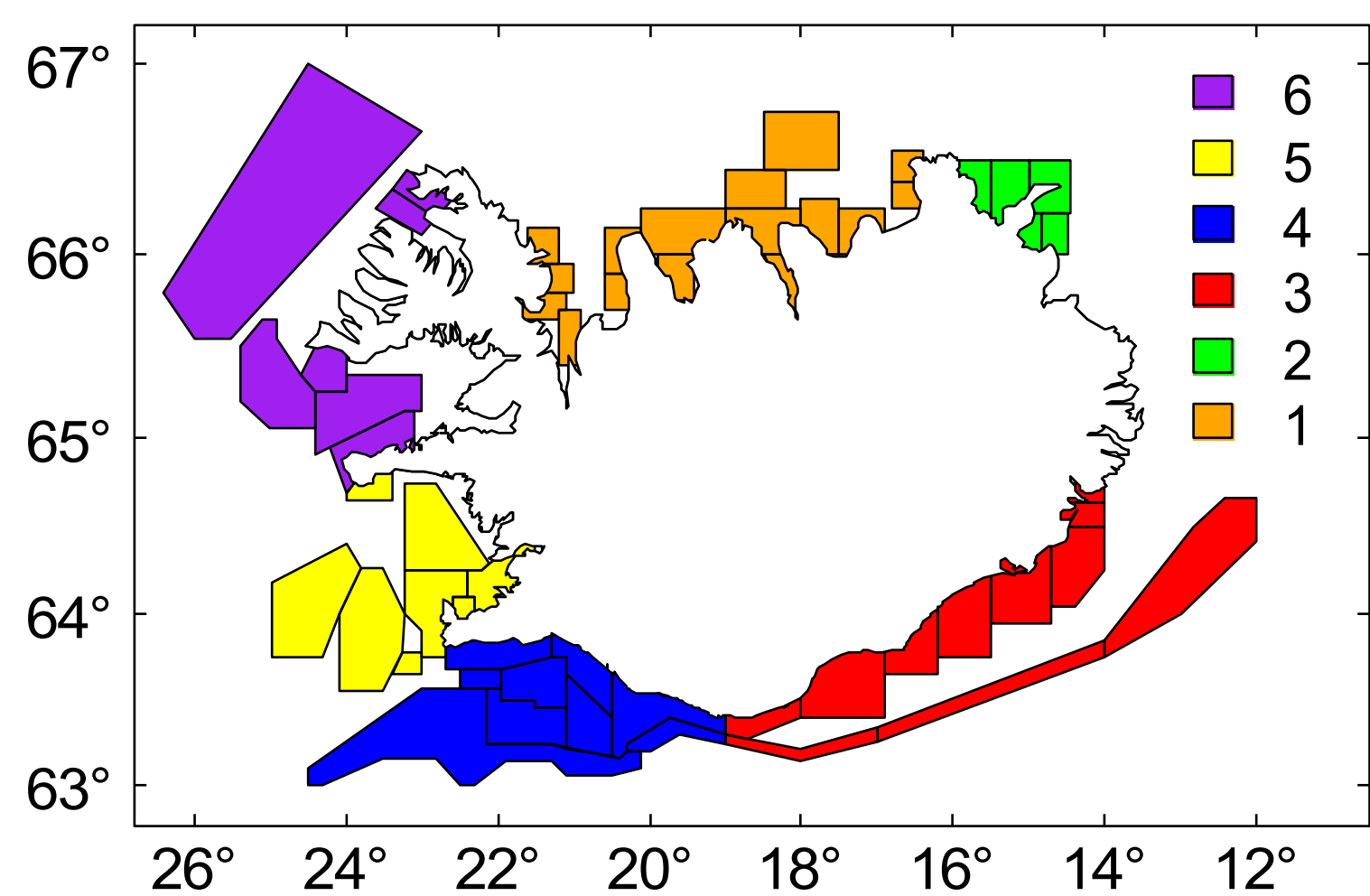


Figure 2. Fifty-six sub-regions grouped into six regions.

Spawning female abundance (from gillnet survey data):

- Length distribution and proportion of spawning females per region per year calculated using maturity ogives and sex ratios.
- Number of female spawners scaled by number of gillnet stations in each region to create an abundance index of spawning females.
- Sub-region size is calculated by summing the number of unique trawl and gillnet gridcells. If there are no gillnet gridcells, size = 0.
- The index is used, together with sub-region size, to calculate the relative distribution of spawning females by sub-region per year.

Results

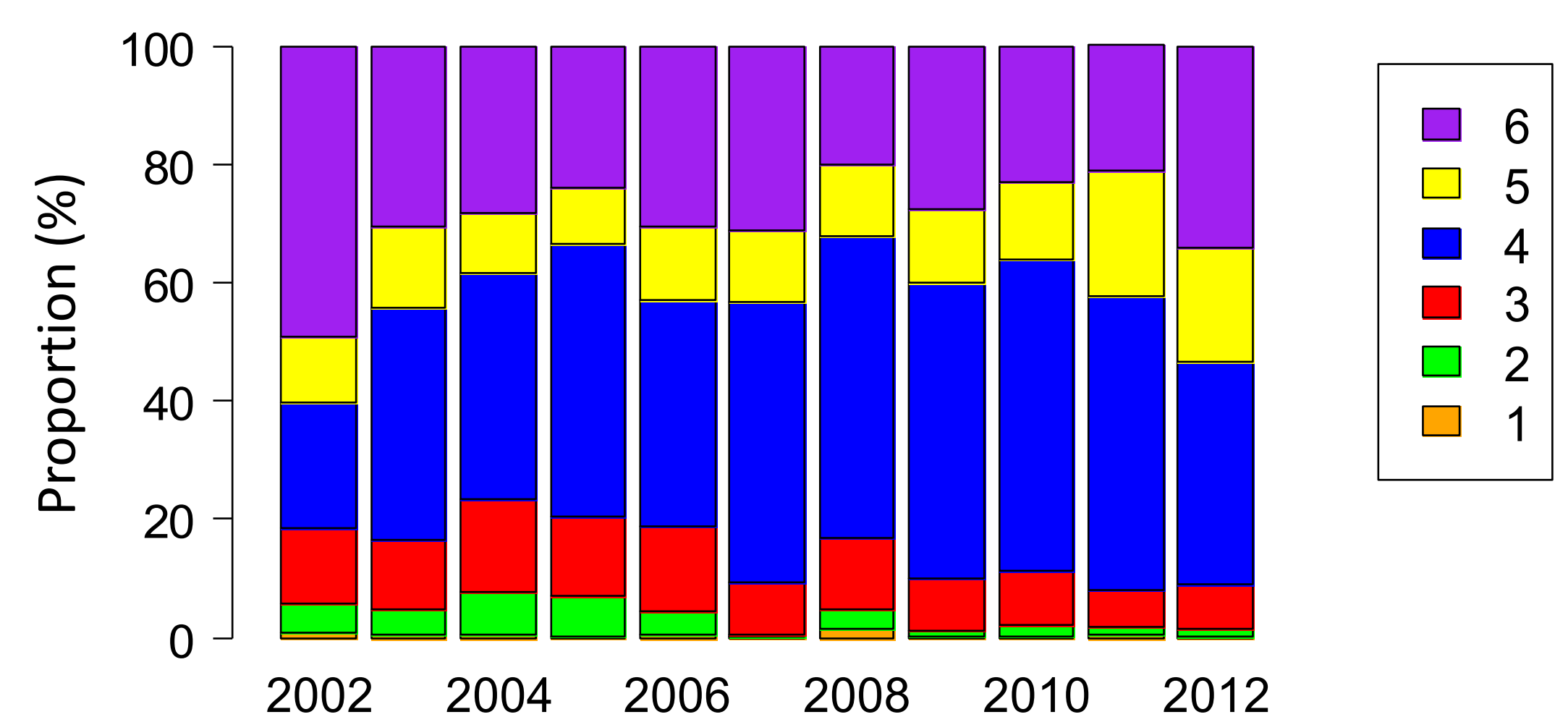


Figure 3. Proportion of spawning females by region per year

Region	10 year mean (%)
6	29.0
5	13.4
4	42.8
3	11.0
2	3.3
1	0.5

- Proportion of spawning females is greatest in the southwest (4), followed by the northwest (6).
- Regions 5 and 3 contribute a smaller amount, whilst the northern coast (1 & 2) has the smallest contribution.
- Proportions remain fairly stable over time.

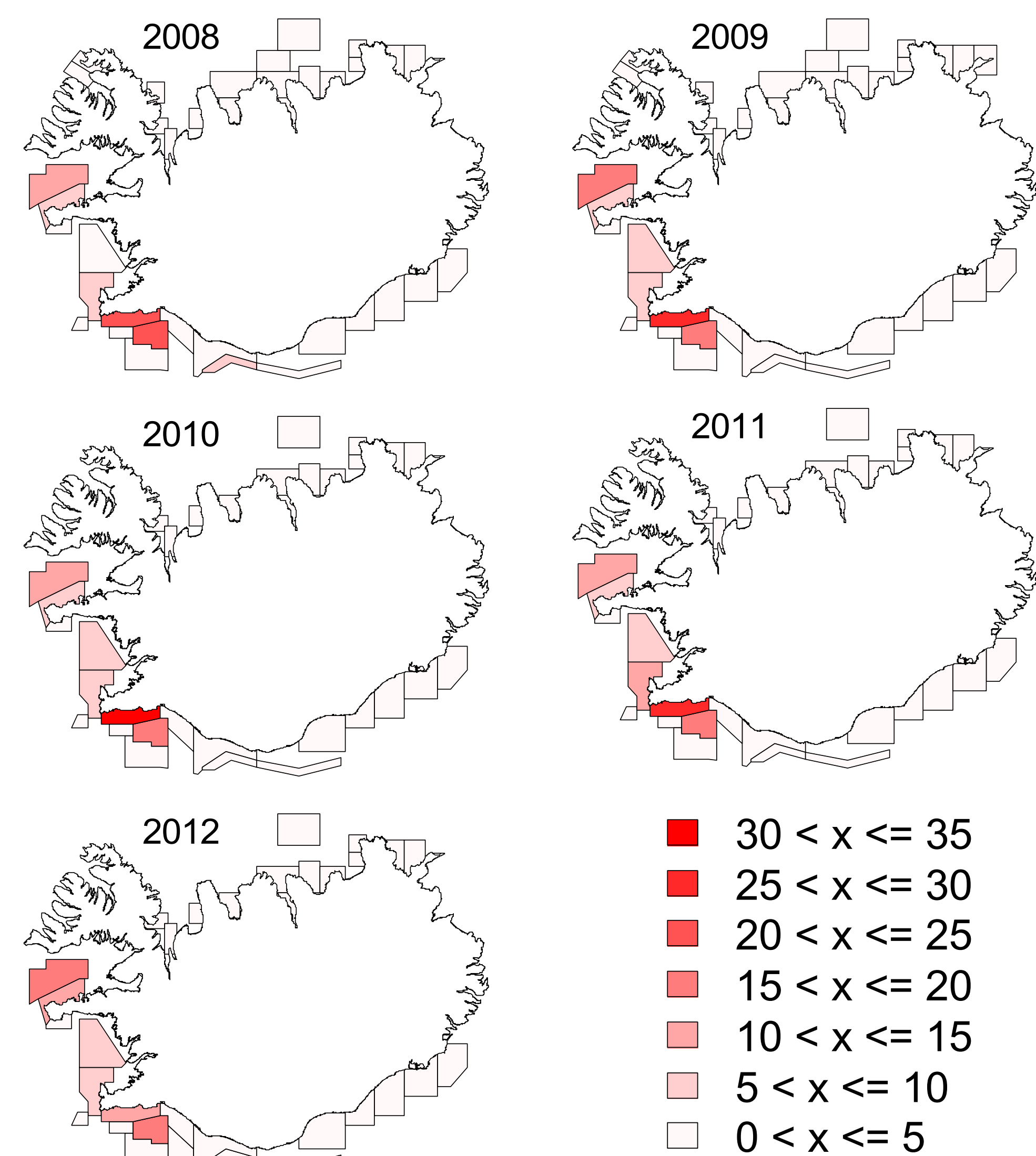


Figure 4. Proportion of spawning females by sub-region per year (%). Sub-regions not displayed were either not surveyed by MRI, or had size = 0.

- The two sub-regions in Selvogsbanki (region 4) contribute on average 43%, followed by two in Breiðafjörður (region 6) at 25%, and two in Faxaflói (region 5) at 15%.
- All other sub-regions typically contribute less than 5% each year.
- Spawning females are not uniformly distributed throughout regions. Steep gradients between adjacent sub-regions suggest spawning is a location-specific event.
- The sub-region map will provide a template for further work to look in finer detail at spawning site selectivity, early life stage dispersal and connectivity, and sub-stock structure.

References:

Marteinsdottir, G., Gunnarsson, B. And Suthers, I. 2000. Spatial variation in hatch date distributions and origin of pelagic juvenile cod in Icelandic waters. ICES Journal of Marine Science. 57(4): 1182-1195.
Stefansson, G., and Palsson, O. K. 1997. BORMICON. A boreal migration and consumption model. Hafrannsóknastofnunin Fjölrit, 58. 223 pp.