

A simple method to evaluate the vulnerability of benthic assemblages to bottom trawling

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We present **1)** a method to evaluate vulnerability of benthos assemblages to bottom trawling, **2)** a joint analysis of the station benthic megafauna assemblages and trawling pressure in order to characterize the effect of bottom trawling on benthic assemblages.

(1)

Sessile, large bodied, stiff, fragile species living on the sediment surface are more vulnerable to bottom trawling than mobile, burrowing, small bodied species with a fast retractable and flexible body. Using these characteristics, the vulnerability of each benthic species of the Barents can be scored and subsequently ranked

into categories: 1 (robust), 2 (medium) and 3 (vulnerable). Vulnerability of the benthic assemblages at each location is then calculated by averaging vulnerabilities of individual species weighted by their relative biomass.

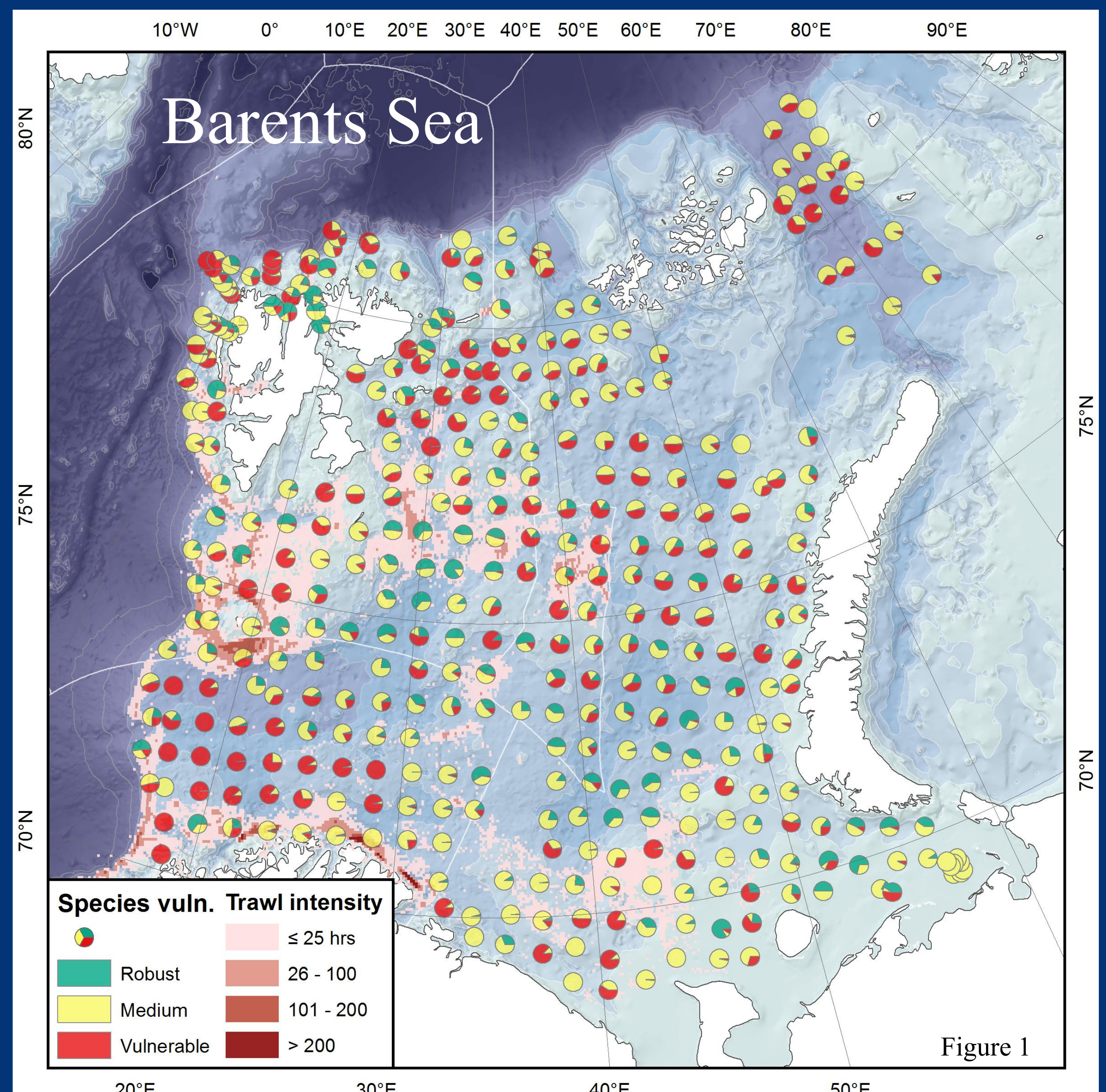
Vulnerable



Robust

The vulnerability distribution per station is shown with the Norwegian Vessel Monitoring System (VMS, bottom-trawlers with a speed between 2 and 5 kn in a 10*10km grid) for the period 2007-2010 (Fig 1). VMS data was not available for other nations trawling activity in Norwegian zone, nor the Russian Economic zone and.

Vulnerable areas are obvious in the South West (*Geodia* sponge beds), in Northern part (*Gorgonocephalus*; sea lilies; sponges and bryozoans) of the Barents Sea and north of Svalbard (*Geodia* and other sponges). These areas should receive special attention for conservation.



(2)

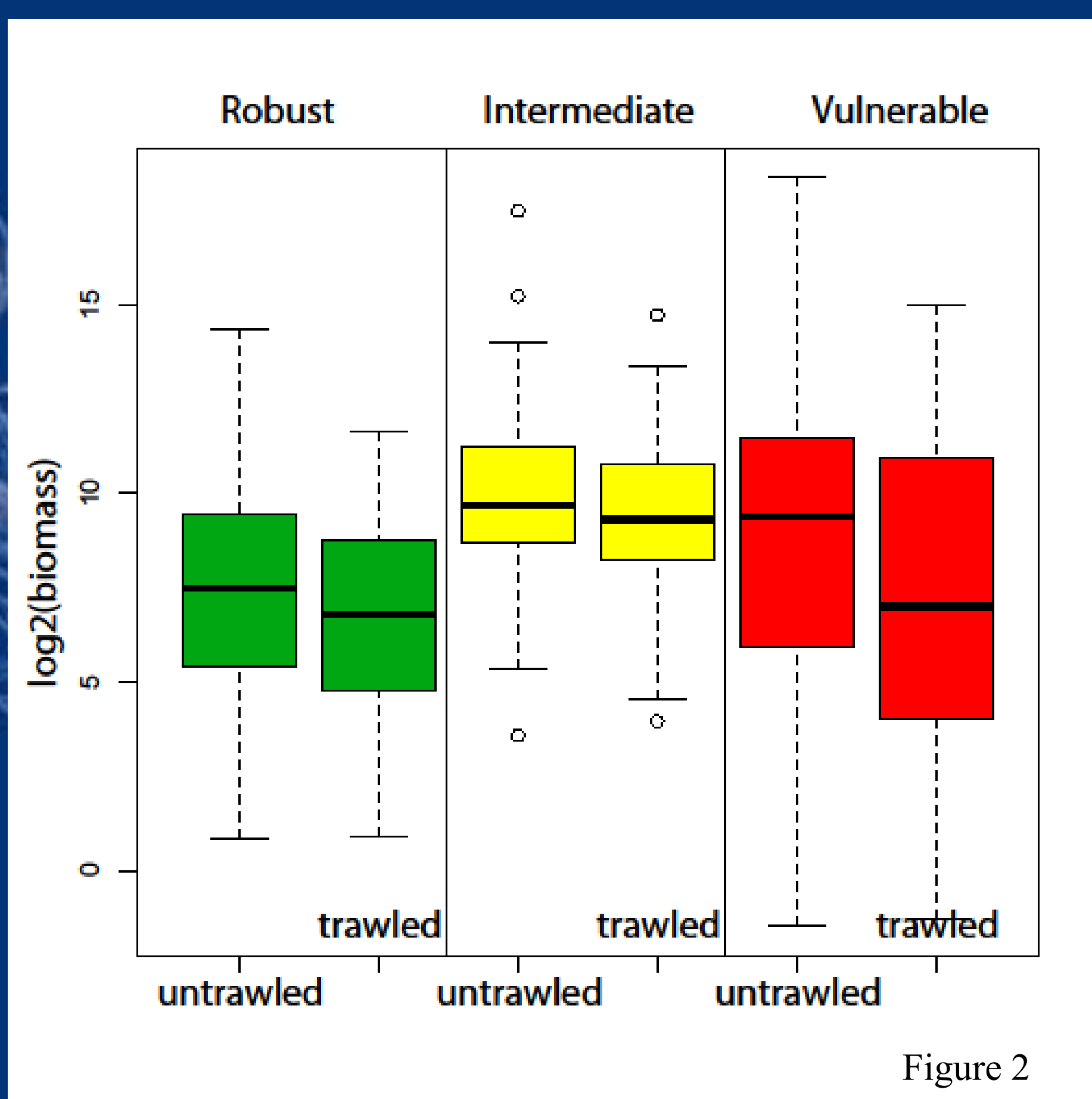


Figure 2

Vulnerability and trawling

The VMS-data was used as a proxy for trawl intensity in the Norwegian Economic Zone. The total biomass of the

community was generally higher on non-trawled compared to trawled stations. (Fig 2).

This simple method, given regional variations in benthos vulnerability toward trawling in the Barents Sea, shows that there is a almost geographical match between trawled areas and faunal associations robust to trawling (Fig 1). Trawling leads to reduced biomass of

benthos everywhere, and this reduction is more pronounced for vulnerable faunal associations (Fig 2).