

xv - xvi) Analysis of fishing effort (Item 16a) and Assessment of risk of SAI on VME indicator aggregations and VME elements (Item 16b)

Fisheries Commission requested Scientific Council to begin the development of the assessment of risk of significant adverse impacts on VME indicator aggregations and VME elements in the NAFO RA.

a) Analyze fishing effort (VMS data) in the NRA to define areas of different levels of fishing intensity (e.g. a map of 90%, 80%, 70%... effort) and assess these in conjunction with habitat data in order to map out areas where fishing activities would therefore have no or little significant adverse impact on VMEs and where encounter protocols and move on rules would therefore have little utility.

b) In view of the area management currently implemented and to facilitate evaluation of the need for further protective measures in response to UNGA 61/105, assess the risk of significant adverse impacts on VME indicator aggregations and VME elements in the NAFO RA. This assessment should consider spatial and temporal distribution of fishing activity, and the best available knowledge on the spatial distribution of VME indicators and VME indicator elements.

Scientific Council responded:

This is a presentation of preliminary results for a necessary component of reassessment of bottom fishing activities, underlying analysis is to be further refined: The analysis of VMS data indicates that most of the fishing effort for the 2008-2011 period has been concentrated in a relatively small area within the fishing footprint. Most of the overall biomass of the VME species considered (sponges and seapens) outside of the closed areas is found in the large region associated with low fishing intensity, but additional work is required to fully characterize the likelihood of encounters, and the consequent risk of SAIs.

Significant progress has been made to address this FC Request, but further work is required to perform a full assessment of the risk of Significant Adverse Impacts (SAI) on VME species.

The approach taken to address this request so far involved 3 steps, namely;

1. Use NAFO Vessel Monitoring System data (VMS) to generate fishing intensity maps for each year (2008 2011). These intensity maps allow identification of areas that encompass different levels of fishing effort (i.e. mapping the areas associated with different percentiles in the cumulative effort distribution).
2. Generate biomass surface maps utilizing the specified VME taxa caught by the RV surveys (2005 2010)
3. Start the assessment of interactions between VME indicator species and fishing activity by comparing composite fishing intensity maps (i.e. only considering cells that were fished all years) with the biomass layers of sponge and sea pen to evaluate the degree of overlap (i.e. potential for interaction).

The results of the VMS analysis for 2008 - 2011 reveal a consistent spatial pattern of fishing activity with clear spatial gradients in fishing intensity. The most intensively fished region contained one tenth of all effort in an area of only 242km², whereas effort concentration declines as the rest of the footprint is considered. The relationship between area occupied by fishing activity and fishing intensity is shown in Fig. 9 and the spatial extent of selected fishing activity percentiles is shown in Fig. 10.

To test the assertion that highly fished areas have a reduced likelihood of VME indicator species encounters, the interaction between the VMS effort layers and biomass layers for sponge and seapens was undertaken.

For each fishing activity percentile the sum of the VME species biomass present (determined from the survey trawl biomass layers) was calculated and expressed as a percentage of the total biomass for that species (excluding closed areas). The relationship between the percentage biomass for each VME indicator species (sponge and seapen) and the fishing activity percentile area is shown in Fig. 10. The results show that there is a higher proportion of sponge and seapen biomass found in areas of low fishing intensity e.g. <10th percentile, compared to areas fished with higher intensity e.g. >10th percentile.

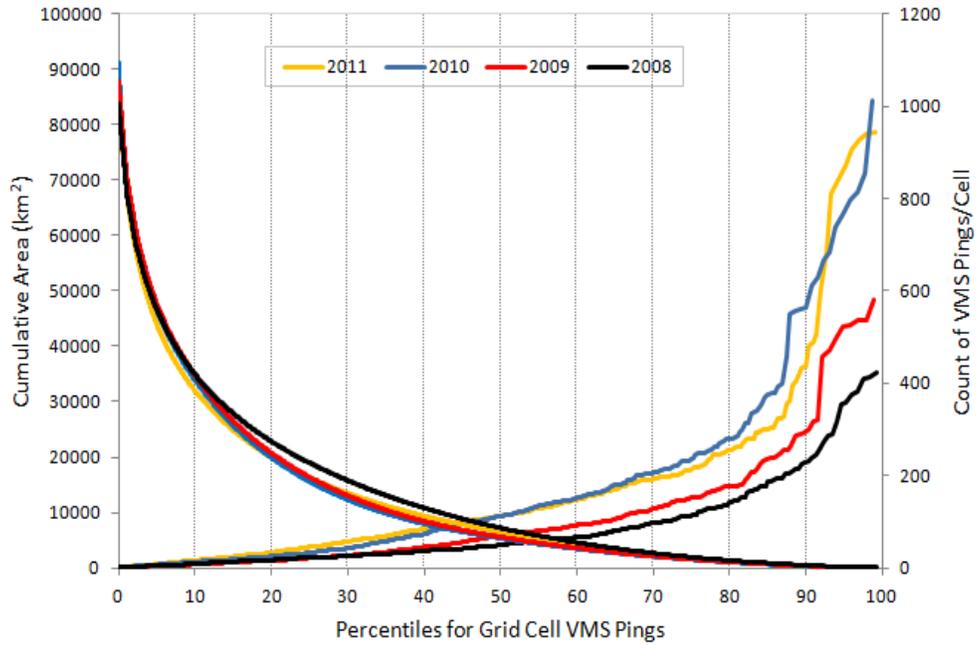


Fig. 9. The relationship between the percentiles for grid cell VMS pings, cumulative area occupied and fishing intensity (Count of VMS pings/cell) for years 2008, 9, 10 & 11. The data highlight how the intensively fished cells occupy a very small area compared to the least intensively fished cells which occupy a very large area.

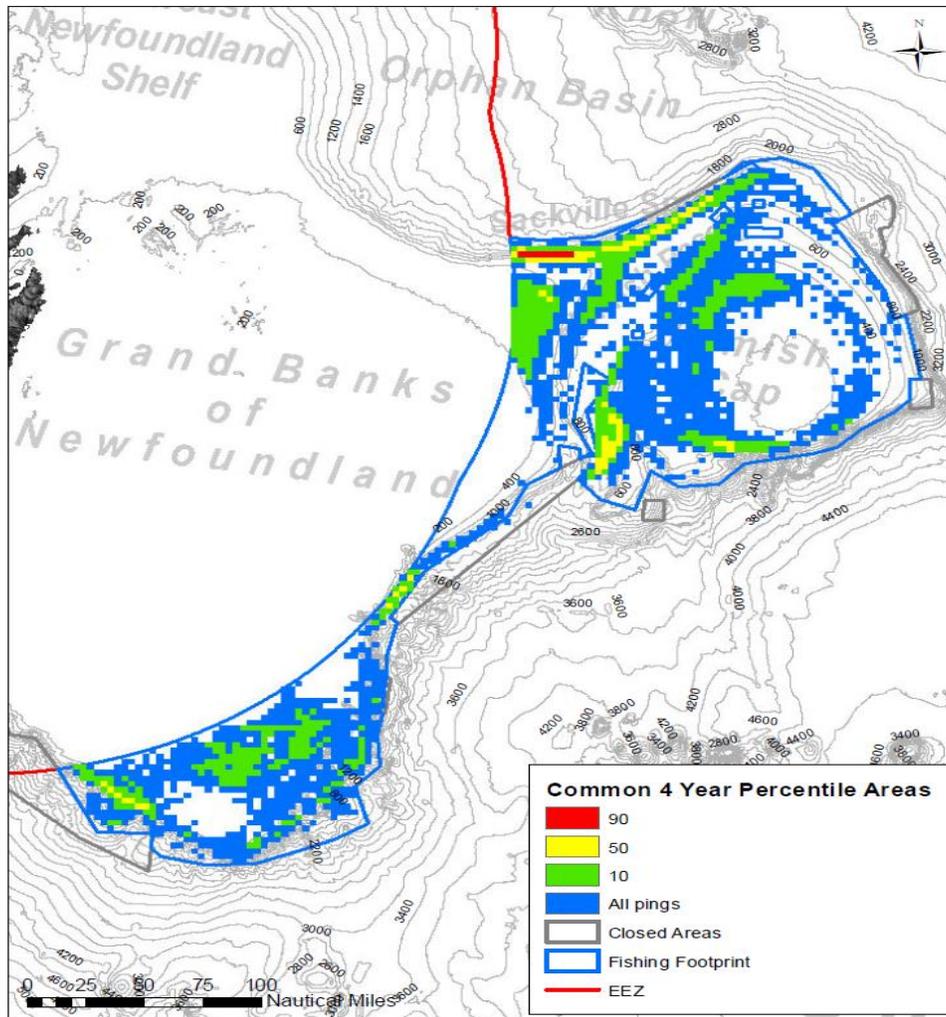


Fig. 10. Map showing the area occupied by the 90th, 50th and 10th percentiles of bottom fishing activity, and all cells with fishing less than the 10th percentile (e.g. all cells with VMS pings). Note the area occupied in blue has exactly the same amount of fishing effort as the area occupied in red indicating that the intensity of fishing activity is much higher in the red area compared to the blue area.