

Session 4: Ecosystem science

Advance and shape understanding of the structure, function and dynamics of marine ecosystems — to develop and vitalize marine science and underpin its applications

(18) Decadal changes in harmful algal events from the ICES area found in the HAEDAT database

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Scientists and aquaculturists alike are worried about an apparent increase in the size, frequency and global distribution of harmful algal blooms (HABs). Studies have shown that multiple anthropogenic pressures such as overfishing, eutrophication and global transport could interact with climate change to promote or enhance HAB occurrences. Yet, to date, it is unclear whether observed changes in HAB abundances should be attributed to environmental change or increased vigilance through improved monitoring programs. To enhance our understanding of these natural phenomena, the International Council for the Exploration of the Sea (ICES) - Intergovernmental Oceanographic Commission of UNESCO (IOC) Working Group on Harmful Algal Bloom Dynamics (WGHABD) has entered HAB-data into the Harmful Algal Event (HAEDAT) database for the last 20 years. Contained within are (only) harmful algal events that result in management actions with economic impact – such as closures of shellfish areas or touristic beaches – and events which had clear negative environmental impacts like mortality of marine organisms. These data, collected mainly from routine monitoring programmes, provide a wealth of information that is not routinely accessible for scientific assessment. Based on HAEDAT, the WGHABD is producing a HAB status report on all HAB events in the ICES area, which will contribute to the Global HAB Status report of IOC-UNESCO's intergovernmental panel on Harmful Algal Blooms (IPHAB). The HAEDAT data reveal that changes in the regional distribution of harmful algal events in the North Atlantic area have occurred over the past decades. On the east coast of the USA and Canada, the majority of issues have been caused by paralytic and amnesic shellfish toxins. In contrast, diarrhetic shellfish toxins was the dominant cause of problems in Europe while cyanobacteria events were restricted to the Baltic. Fish mortality – be it farmed or wild – appears to be uncommon within the ICES area, though some instances have been recorded. Overall, HAEDAT provides an essential source of information to legislators and scientists alike. In recent years, Flanders Marine Institute (VLIZ) ensured that the Belgian contribution to HAEDAT is up to date and promoted the use of this tool to several local stakeholders.

Work related to ICES via the WGHABD (the ICES - IOC Working Group on Harmful Algal Bloom Dynamics).

(19) The fate of juvenile sole growth and survival in coastal nurseries under climate change scenarios

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This study shows the effect of climate change on the growth and survival of juvenile common sole (*Solea solea*) in different nursery areas in the North Sea. The climate change scenarios tested are based on IPCC scenario for 2040. Two climate change scenarios are used, one with only abiotic changes and one with also a climate driven timing of spawning. Comparisons are done between a baseline scenario, with current conditions, and the two climate change scenarios, for multiple years and multiple nursery areas.

Under climate change conditions the early arrival of fish larvae in their nurseries results in larger young of the year at the end of summer, but the initially slow growth, despite warmer winter and spring temperatures, causes higher mortality for early arrivals. The combination of arrival densities and arrival day determines which nursery has the highest absolute