

advice, and the user could link through to the actual advice or the Advice drafting group report if they wanted more information.

(11) Understanding vessel ownership and firm organization in French Atlantic fisheries: a typology

Arne Kinds^{1,2,3}, Olivier Guyader¹, Pascal Le Floc^h¹

¹ Unité d'Economie Maritime, UMR 6308, CNRS, IUEM, Ifremer, Univ Brest, Plouzané, France. E-mail: arne.kinds@univ-brest.fr

² Faculty of Bioscience Engineering, Ghent University, Belgium

³ Instituut voor Landbouw- en Voedingsonderzoek (ILVO), Ostend, Belgium

E-mail: arne.kinds@ilvo.vlaanderen.be

The European fishing industry is largely perceived as existing of a multitude of individually owned, locally operated fishing vessels, despite growing evidence of concentration through vertical integration and companies owning fishing vessels across multiple Member States. The drivers behind capital accumulation and concentration in the fishing sector remain poorly understood, however. Most studies on investment behaviour have looked at entry and exit of vessels from two angles. First, they consider that investment decisions depend on current economic incentives (e.g., anticipated levels of returns, current profits, stock-dependent costs of harvesting). Second, they consider that changes in the regulatory environment may shift these economic incentives, causing new investment patterns. Widely studied examples of such changes are government interventions aimed at reducing excess capacity: subsidies, buyback programs and access regulations. However, reducing this question to a matter of investment behaviour is limiting, and it has been suggested that the organizational structure of fishing firms must be taken into account to better understand the strategies behind vertical integration and the investment in multiple fishing vessels. In this paper, we analyse multi-ownership in the light of the characteristics and strategies that lie at the basis of the organizational structure of French Atlantic fishing firms (i.e., fishing strategy, firm management, vessel maintenance, marketing strategy, ownership structure, etc.). Research questions include: (1) which organizational forms exist (and co-exist) today in the French Atlantic fishing sector (2) what defines them, (3) how did they emerge and (4) what can be expected from them in the future (in terms of their evolution and persistence). A typology was constructed based on 80 semi-structured interviews with vessel owners along the French Atlantic coast, in which both qualitative and quantitative information was collected. Multiple Correspondence Analysis (MCA) in combination with hierarchical clustering was used to construct the typology.

Work related to ICES via WGECON (Working Group on Economics)

(12) Genetic structure of sole in the Irish and Celtic Sea

Sophie Delerue-Ricard^{1,2}, Loes Van de Castele², Gregory Maes^{1,3}, Henrik Christiansen¹, Hans Polet² and **Filip A.M. Volckaert**¹

¹ Laboratory of Biodiversity and Evolutionary Genomics (LBEG), KU Leuven, Ch. Deberiotstraat 32 box 2439, B-3000 Leuven, Belgium

² Research Institute for Agriculture, Fisheries and Food (ILVO), Ankerstraat 1, B-8400 Oostende, Belgium

³ Laboratory for Cytogenetics and Genome Research, Center for Human Genetics, Genomics Core, KU Leuven, Herestraat 49, B-3000 Leuven, Belgium

E-mail: filip.volckaert@kuleuven.be

Sole (*Solea solea*) is a species with a complex life cycle evolving between the spawning grounds where adults release gametes, nursery grounds where juveniles settle and metamorphose, and feeding grounds where (sub)adults feed. Spawning stock biomass in the Irish Sea (ICES area 7a) and Celtic Sea-Bristol Channel (ICES area 7g) has reached an all time low leading to concerns for its recruitment and future viability. We address here the connectivity of adult and juvenile sole based on an intensive sampling campaign between 2003 to 2009 (adults) and 2016 (juveniles). Fish were genotyped either with 426 gene-linked single nucleotide polymorphisms or with 5000 Single Nucleotide Polymorphisms (SNPS) obtained through ddRAD (double digest Restriction site Associated DNA markers) sequencing. Irish and Celtic Sea sole represent a distinct genetic group, identifiable at specific loci. The results point to limited connectivity between the area and adjacent waters. It allows to trace Irish and Celtic Sea sole with molecular markers. In addition, juveniles of Liverpool Bay, Cardigan Bay and Bristol Channel represent distinct subpopulations, again pointing to restricted gene flow within the area, linked to

the local physical oceanography. In conclusion, the rebuilding of the Irish and Celtic Sea stocks of sole will depend to a large extent on local recruitment dynamics.

Work related to ICES via Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGSSK).

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Session 3: Conservation and management science

Develop tools, knowledge, and evidence for conservation and management — to provide more and better options to help managers set and meet objectives

(13) Providing ICES advice to OSPAR – an impression of the process

Jan Vanaverbeke¹ & Bob Rumes¹

¹ Royal Belgian Institute for Natural Sciences, OD Nature, MARECO, Vautierstraat 29, 1000 Brussels, Belgium

One of the core tasks of ICES is to provide scientific advice on the marine ecosystem to governments and international regulatory bodies that manage the North Atlantic Ocean and adjacent seas. At the end of 2018, ICES received a ‘Request for advice on the current state and knowledge of studies into the deployment and environmental impacts of wet renewable technologies and marine energy storage systems’, a request subsequently passed on to the Working Group on Marine Benthic Energy Developments (WGMBRED) and the Working Group on Marine Renewable Energy (WGMRE). Due to a restructuring process at ICES, and a shift in chairs in both WGMBRED and WGMRE, and the strict deadline, this proved to be a challenging process. The ICES secretariat supported the process by providing a suitable workspace (both physical and digital) and convened a specific workshop (WKWET, chair: Jan Vanaverbeke) attended by WGMBRED and WGMRE (Belgian) members, and external specialists in the field. This workshop was used to create a conceptual framework to unify the assessment of a wide range of wet renewable energy devices on a wide variety of marine receptors. The assessment showed that key receptors constraining the deployment of wet renewable devices are marine mammals, seabirds and fish. In addition, the review revealed that cumulative impact assessments with regards to wet renewables are in a very early stage of development causing a lot of uncertainty in decision making processes. The report provides the strong recommendation to move towards receptor-based assessments that consider both the ecological links between the abiotic and biotic components of the marine ecosystem and the feedback links between the different biotic components. This should be achieved by hypothesis-driven research, taking into account the link between structural components and the functioning of marine ecosystems, as this ultimately determines the provisioning of marine ecosystem services to society. This calls for cross-border coordination and cooperation in setting standards for data collection, sharing information, and setting research agendas.

Work related to ICES via WGMBRED (Working Group on Marine Benthic and Renewable Energy Developments), WGMRE (Working Group on Marine Renewable Energy), WKWET is chaired by Jan Vanaverbeke (RBINS).

(14) Highlighting EARS: putting data and operations in the global environmental context Highlighting the EARS software

Thomas Vandenberghe¹

¹ OD Nature, Royal Belgian Institute for Natural Sciences RBINS, Rue Vautierstraat 29, 1000 Brussels, Belgium.
E-mail: tvandenberghe@naturalsciences.be

The Eurofleets Automatic Reporting System (EARS v2) software is a set of services that allows the Principal Investigators or any person authorised to do so, to log their sampling events in a way that is helpful both for the scientific goals of the programme and for the data management that follows the cruise, for instance the OSPAR data reporting to ICES. The software has been available on the R/V Belgica since 2017-2018 for users wanting to test the software. Its software development has restarted thanks to the H2020 Eurofleets+ project, and the problems discovered during test runs dating