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**Recruitment in the North Sea Autumn spawning herring stock: disentangling fact from fiction in a stock complex and incorporating sub-stock dynamics into the assessment**

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**Abstract**

The North Sea Autumn spawning Herring (NSASH) stock is considered to comprise of four main components (Orkney-Shetland, Buchan, Banks and Downs) which start spawning in the north in September and finish in the south in January/February. Recruitment in this stock is highly variable and encapsulating the dynamics will almost certainly entail incorporating the sub-stock dynamics in to our understanding and in to the assessments. The perception is that since about 2001 the recruitment regime has shifted to become less productive and a number of hypotheses have been raised as explanations, ranging from cannibalism to a regime shift affecting the available prey for the over-wintering larvae. Since the spawning grounds are separated both spatially and temporally the spatial dynamics, especially in relation to sub-stock dynamics need to be considered. Currently fishery independent data are available on the spawning stock structure and biomass, relative contributions of each stock component to the egg and larvae production, numbers of larvae that survive the first winter and the number of recruits one year later. In this contribution, we explore the data available on the dynamics of the various components of this stock, utlise dynamic modelling e.g. particle tracking on larvae to investigate spatial variability in early life history stages and examine how environmental forcing further complicates our perceived understanding of the recruitment processes. In addition, we present preliminary results and a way forward for using particle tracking models and otolith characteristics to aid in determining the spawning origins of larvae and juveniles and illustrate how this information can be implemented in modified assessment models for North Sea herring.

**Keywords:** North Sea, herring, stock complex, recruitment, larvae, particle tracking

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