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**Factors influencing tag-recovery rates in the Norwegian spring-spawning herring tagging scheme**

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The tag-recovery data on Norwegian spring-spawning herring is an important input when the stock size is estimated in the ICES working group. Basically one compares the number of tagged fish with the number of recovered fish given a known number of screened fish for a given year class. One further assumes that the tagged individuals undergo tagging mortality immediately after tagging and throughout the rest of the year, whereas in subsequent years tagged fish are subjected to natural mortality and to fishing mortality at the same rate as untagged fish. However, it turns out that this assumption is rather uncertain. Despite the fact that this stock has been tagged with the same methodology almost on an annual basis since the late 1940s, there have been significant variations in returns from the various releases even within the same experiment. Obviously these variations add significant uncertainty to the abundance estimates. In the present paper the effect of all possible influencing factors on tag-recovery rates are tested based on data recorded during the wide number of historic experiments; such as data on the catch operations, handling, tagging, fish size and quality, besides data on the environmental conditions and location of the experiments.

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**The correlation between tag-recovery data and VPA-data in Norwegian spring spawning herring**

Aril Slotte and Are Dommasnes

The present paper compares the results from two methods of abundance estimation in Norwegian spring-spawning herring: the tag-recovery model and the VPA-model. More specifically the number of recovered tags from selected year classes is correlated with the expected tag recoveries from VPA-tunings in the ICES working group. In the tag-recovery model two parameters have significant influence on the result: the tagging mortality and the number of years allowed to mix before recovered. Thus, the analysis includes results with tunings of both these parameters.

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**Use of tag-recovery data to determine migration routes of Norwegian spring-spawning herring**

Aril Slotte

At present Norwegian spring-spawning herring are tagged annually with tags of steel (20x4x1 mm) injected into the belly of the fish, which are later detected when catches are screened through metal detectors. This is a tag-recovery method that in fact was introduced in this stock in the late 1940s. In the years to come the tag-recovery data was used to demonstrate the characteristic homing migration pattern between selected wintering grounds, spawning grounds, and feeding grounds. At the same time they clearly demonstrated how this stock might stray and change both wintering areas, spawning grounds, and feeding grounds. The present paper gives an overview of the results of these tagging experiments and how they have contributed to new knowledge of the migration behaviour of this stock from the 1940s until present time.