

## Wadden Sea Symposium 2009: Science for Nature Conservation and Management - The Wadden Sea ecosystem and the EU Directives

**Theme: I. The dynamic Wadden Sea ecosystem vs a static threshold value approach:**

- what do population trends, abundances or species composition really tell us?
- how to define scientifically sound conservation objectives and assessment criteria?

### Abstract

Although the Wadden Sea is considered as a coastal water, which does not consider fish as a biological quality element, the TMAP Ad hoc fish group was inspired by the approach that was chosen for the development of a fish index for the implementation of the Water Framework Directive (WFD) in transitional waters. The WFD-fish index combines and assesses a number of metrics: selected variables of the fish community which together are considered to give a good reflection of the status of the fish (species composition and abundance) in the specific water body. The present state is compared to 'undisturbed' conditions, while the underlying assumption is that the metrics are in some way related to antropogenic pressures acting on the water system.

The feasibility of this approach for the Wadden Sea fish fauna evoked a great deal of discussion. The lack of (quantitative) historic data makes it impossible to describe, or compare to, a pristine situation which can be used to define targets. The complexity of the Wadden Sea ecosystem and the lack of fundamental scientific knowledge make it extremely difficult to identify driving forces behind the observed changes in the fish fauna. Changes in the Wadden Sea fish fauna (where "more" is not necessarily "better") can be caused by human pressures, but also by natural variability. They can be a result of local processes (occurring within the Wadden Sea) or of large scale processes (occurring in the connected marine or freshwater systems). Furthermore, it is difficult to disentangle direct effects and indirect effects caused by inter-specific interactions.

Nevertheless, the TMAP fish group tried to develop targets and an assessment tool for trilateral Wadden Sea fish. First, a basic reference list was compiled describing the fish species that (can) occur in the Wadden Sea. To help select priority fish species, different selection criteria were considered. These were grouped into criteria on ecology, relevance for management, and sensitivity to driving forces. In addition, monitoring aspects counted as well. A selection of 14 priority species, scoring high on both types of selection criteria as well as monitoring results, was further considered in a joint data analysis of the Demersal Fish Survey (DFS; Wageningen IMARES, The Netherlands), the Demersal Young Fish Survey (DYFS; von Thünen Institut, Germany) and the Schleswig-Holstein Survey (SHS; National Park Agency & Marine Science Service, Germany).

The analyses were carried out on the level of QSR subregion, inside the Wadden Sea proper, thus providing a fine spatial resolution. Trends in species richness, species composition and mean abundance of priority species since 1970 were determined, thus providing a good temporal coverage. Instead of comparing the observed values to an absolute target and assessing the status as "good" or "bad", the observed values are compared to the long term average, to identify relevant changes in indicator species and metrics and relate those, if possible, to causal factors.

The (im)possibility to define targets for Wadden Sea fish is illustrated by the results of this joint analysis.

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