EVA II: Evaluating the Dutch Policy of Shellfish Fishing in 2003

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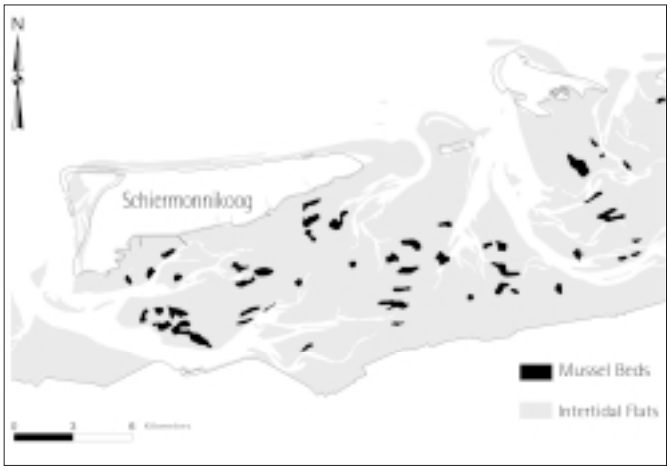
Introduction

Mechanized fishing for cockles and mussels may potentially harm nature in two main ways: it may cause food shortages for birds feeding on large shellfish and damage important habitats like mussel beds, eelgrass beds and tidal flats, including the animals and plants depending on these habitats. Most Dutch nature conservation organizations regard mechanized fishing of cockles as an important threat to the natural values of the Dutch Wadden Sea. They also strongly oppose the practice of taking mussels from intertidal mussel beds. On the other hand fishermen see their activities as sustainable and believe the restrictions that have been placed on their fishing behavior since 1993 to be sufficient to safeguard the natural values of the Dutch Wadden Sea. In that year, a new policy was introduced after the debate between the fishermen and the conservationists had escalated in the late eighties and early nineties. During this period the intertidal mussel beds almost completely disappeared from the Dutch Wadden Sea and fishing for cockles continued, even though stocks had fallen to very low levels. High mortality was reported for Oystercatchers and eider ducks, the two bird species feeding on the sizes of cockles and mussels that are also preferred by the fishermen.

The new fisheries policy will be evaluated in 2003. In this paper, we describe the scientific investigations that we, a consortium of three research institutes, deem necessary for a proper evaluation. The Ministries of Agriculture, Nature and Fisheries and Transport, Public Works and Water Management provide the funds for these investigations.

Current Policy

On 8 November 1991, a large part of the Dutch Wadden Sea was designated as a Special Protection Area under the EU Birds Directive. National legislation, like the "Natuurbeschermingswet" (nature conservation act) and "Planologische Kernbeslissing" (the core decision on planning), must guarantee that the obligations following from this directive are met. Human activities are allowed as long as these human activities do not significantly affect the natural values of the area, including the migratory birds feeding on the intertidal flats during low tide. Regularly, large numbers of these migratory birds are counted, comprising a sizeable part of the world population in many species. The average numbers of the various species during the period 1980-1990 serve as a reference value. The birds and many other animal species are critically dependent on habitats like intact intertidal flats, mussel beds and eelgrass beds. Intertidal mussel beds and eelgrass beds have virtually disappeared from the Dutch Wadden Sea and there is a debate whether the tidal flats can be considered intact. No clear reference value exists for eelgrass beds and the policy aims for maximal restoration. For mussel beds, it is known that they covered 4,100 ha in former times (Fig. 1, left). As a result, the objec-



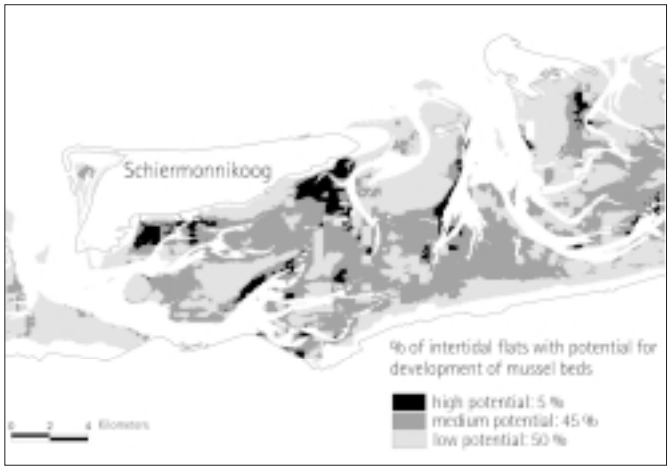


Figure 1:
Left: The distribution of mussel beds in the seventies as determined by Dijkema (1989).
Right: The potential for the development of stable mussel beds as determined from environmental variables like water depth, current velocity and grain size (Brinkman & van Stralen 1999).

tive is to achieve the recovery of 2,000 to 4,000 ha of stable intertidal mussel beds. The tidal flats should not be significantly affected, but it is not very clear how this should be assessed other than by examining the birds that depend on the flats.

To effectuate these aims, the following measures were introduced in 1993. Firstly, 26% of the intertidal flats were permanently closed for mechanized fishing for shellfish (Fig. 2). Secondly, a policy of food reservation was implemented. Fishermen are not allowed to fish for cockles or mussels on the intertidal flats when the stocks of these shellfish have reached a minimal size. It is intended that the birds, mainly Oystercatchers and Eider ducks, should be able to satisfy at least 60% of their food needs with flesh from cockles and mussels. During a mid-term evaluation of the policy in 1998, it was concluded that an adjustment was necessary. The slow return of intertidal mussel beds in the Wadden Sea led to an increase in the area closed for fishing (Fig. 2). The extra areas closed for mechanized fishing for shellfish are selected on the basis of a habitat map, indicating the potential for the development of stable mussel beds (Fig. 1, right).

Science Plan

The various investigations should allow policy makers to answer the following questions in 2003:
1. What are the effects of mechanized fishing for cockles and mussels on the natural values of the Wadden Sea that can be tolerated? These natural values include seals, birds feeding on large shellfish (Oystercatchers and Eider ducks), important habitats like mussel beds, eelgrass beds, tidal flats and the birds depending on these habitats (Knots, Bar-tailed Godwits, Grey Plovers etc.)
2. Do the current policies work according to plan? These policies include permanent closure of 26% of the intertidal mudflats of the Dutch Wadden Sea and a policy to reserve food for the shellfish eating birds in years of low shellfish stocks.
3. Do the current protection measures comply with the obligations from international treaties, most notably the EU Bird and Habitat Directives?
4. In case of negative effects of the shellfish fishing, are there possibilities to reduce the negative impact?
Space does not permit us to describe in detail the various interlocking projects that are necessary to help answer these questions. We will focus in this article on the two major relations between fishing of shellfish and natural values: the influence of fishing on food availability for Oystercatchers and Eider ducks, and the effects of fishing on important habitats. We will discuss each in turn.

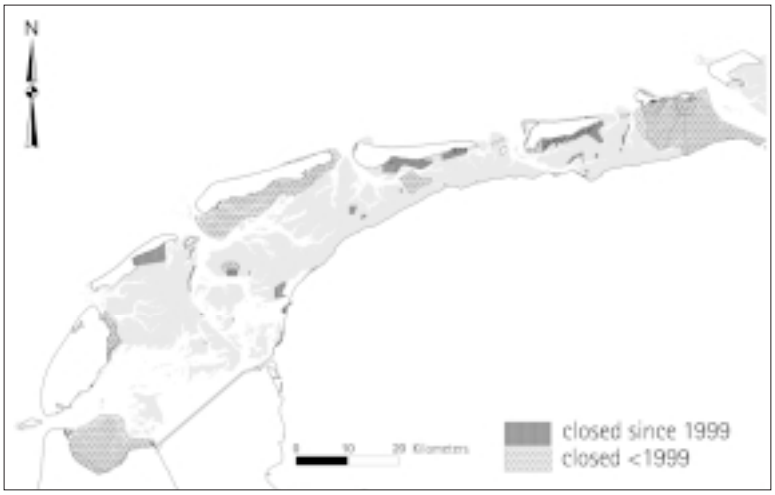


Figure 2: The location of areas that are closed for fishing for shellfish.

Stocks of shellfish are highly variable by nature. In the case of cockles, these fluctuations are primarily caused by massive die-offs during severe winters and highly irregular spatfall (Fig. 3). Birds are much longer lived and, as a consequence, their populations vary much more slowly. Probably, bird numbers are regulated not by the food supply in average years, but by the food supply in poor years. Competition between fishermen and birds feeding on shellfish will therefore be most intense in years of poor food supply. The policy of food reservation is designed to solve this problem and could work in principal. Whether it works in practice depends on whether the underlying assumptions are correct. In the coming years the research program is designed to test the underlying assumptions of the current reservation model. The most important assumption is that fishing only affects shellfish stocks in the current year and not in later years. This will not be true, if fishing of old shellfish affects recruitment in the following years for instance. Next, the actual level of food that needs to be reserved depends on assumptions on energy needs, as well as the extent to which the stock of cockles and mussels can be harvested by the birds and the availability of alternative foods. Finally, the current food reservation policy is restricted to the intertidal flats, yet Eider ducks obtain a significant amount of food from subtidal shellfish stocks.

The most difficult effects that need to be studied are the long-term effects on important habitats, i.e. mussel beds, eelgrass beds and tidal flats. The minimum program consists of a comparison between open and closed areas. Spat of mussels preferentially settles between old mussels and

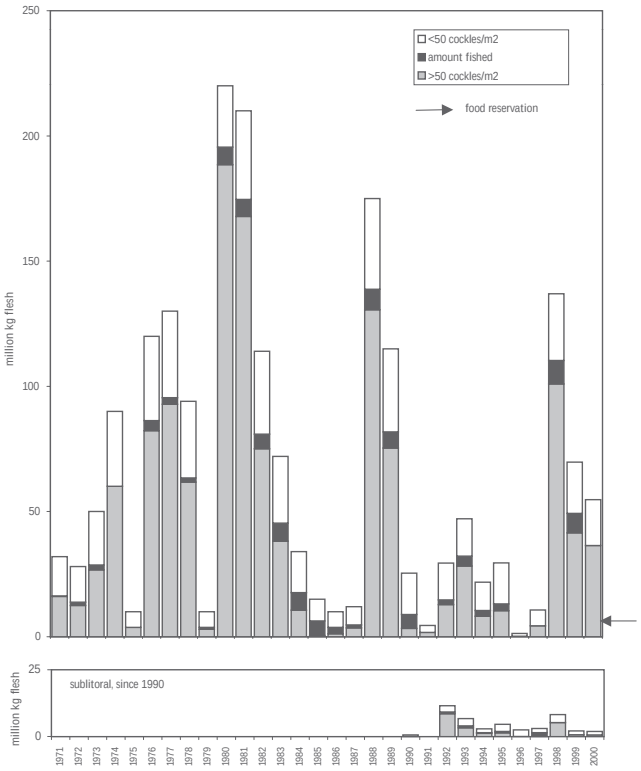


Figure 3: Cockle stock in September in the Dutch Wadden Sea. Before 1990, the estimates are based on parts of the Wadden Sea. Since 1990 RIVO has surveyed the entire Dutch Wadden Sea, including littoral as well as sublittoral areas, in May and extrapolates the numbers to September. The current extrapolation procedure will be improved as part of EVA II.

fishing of old mussels therefore reduces recruitment of mussels. Completely new mussel beds do form however, especially in subtidal areas and after severe winters. We will test the hypothesis that those young mussel beds, which often succumb to storms in their first year, can be made more resistant to storms through selective fishing. We will also test the hypothesis that suction dredging for cockles reduces the likelihood that such new mussel beds will form on the tidal flats. Similarly, we will test if dredging for cockles and mussels reduces the likelihood of eelgrass recovery. The two species of eelgrass used to be quite common in the Dutch Wadden Sea, but nowadays, only a few scattered patches remain.

Last but not least, the effects of suction dredging on the sediments will be studied. According to a detailed long-term study around the island of Griend by Piersma & Koolhaas (1997), suction dredging leads to fine sediments being washed away, resulting in coarse sediments with an impoverished benthic fauna, supporting fewer birds. Studying the literature, Duiker et al. (1998) conclude that there are insufficient data to draw hard conclusions. A major goal of EVA II is to gather conclusive evidence to settle this issue. First, we will analyze whether sediments in the Wadden Sea as a whole have become sandier during the last decades. Next, it must be determined to which extent a sediment change can be attributed to fishing. In one study, sediment and benthic fauna of a large number of cockle beds will be analyzed, comparing beds that were fished during the last couple of years with beds that were not fished. In another study, a restricted number of controlled experiments are conducted where the direct effects of fishing on sediment, benthic fauna and birds will be monitored in greater detail. In addition the development of the numbers of birds depending on the soft sediments in areas open and closed for fishing will be compared.

Getting the (Bad) News Accepted

We cannot predict what our conclusions will look like, but it is very unlikely that both conservationists and fishermen will be pleased by the results. In fact, it seems much more likely that one or perhaps even both parties will be very displeased. It is therefore important that the results of our investigations are accepted as sound by both parties involved however “unpalatable” these results may be. We intend to achieve this goal as follows. First, we aim to publish the results in scientific journals with a proper system of peer review. Getting this quality control requires time and this may conflict with the strict deadlines that must be obeyed. Therefore, an audit committee will judge the scientific quality at an early stage of all the reports that will be produced as part of EVA II. Third, a steering committee was formed that does not only include civil servants from the two ministries involved, but also representatives of both interest groups. This guarantees that all the important questions will be asked and that important results will not remain hidden.

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