

Shellfish Fisheries

An Overview of Policies for Shellfish Fishing in the Wadden Sea



Common Wadden Sea Secretariat - 2002



Colophon

Publisher

Common Wadden Sea Secretariat (CWSS), Wilhelmshaven, Germany

Photos

Productschap Vis
Harald Marencic

Lay-out

CWSS

Print

Druckerei Plakativ, Kirchhatten, +49(0)4482-97440

Number of copies

500

Published

2002

This publication should be cited as:

CWSS, 2002. Shellfish Fisheries. An Overview of Policies for Shellfish Fishing in the Wadden Sea. Common Wadden Sea Secretariat, Wilhelmshaven, Germany.

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1. Introduction

In this report an overview of national shellfish policies in the trilateral Wadden Sea is presented.

The need for a systematic overview of facts and figures was felt by the Trilateral Working Group in the preparatory phase of the 9th Trilateral Governmental Conference in Esbjerg, 2001.

The information in this Report is divided into two categories, namely blue mussel and cockle fisheries and other shellfish fisheries. For both categories first a summary of relevant trilateral agreements is given, followed by relevant national information. The latter is divided into an introduction, the legal basis, policy, management and research.

There is no section about the Federal State of Hamburg because all kinds of shellfish fishing are forbidden in the Hamburg part of the Conservation Area.

This report does not address shrimp fishing. That is because, with the exception of the Danish and most of the Hamburg parts of the Conservation Area, where shrimp fishing is not allowed, there are no substantial differences in policies and practices within the Trilateral Cooperation Area. Moreover there is little information about the effects of shrimping on the benthos and consequently on the relevant Targets.

It should be noted that this Report only provides an overview of national policies and not an assessment of the differences in these policies. Such an analysis was agreed upon at the Esbjerg Conference (ED §9) and will be carried out in the framework of the implementation of the Esbjerg Declaration.

Three Annexes are attached in which an overview of relevant facts and figures regarding policy and management (Annex 1), a map with permanently closed areas for mussel fishing (Annex 2) and the development of intertidal mussel stocks (Annex 3) are presented. It is stressed that the figures presented are based upon best available data, but that for several parameters the data base is not very firm.

There is (not yet) a common definition of "stable mussel bed". Therefore, throughout this report the term 'stable mussel bed' means beds of which the structure is clearly recognizable over many years (definition according to QSR 1999).

With 'seed mussels' immature mussels used for stocking culture lots are meant (German: "Besatzmuscheln").

2. Bi- and Trilateral Agreements



2. Bi- and Trilateral Agreements

2.1 The Dutch-German Disputed Area

The situation with regard to mussel fishing in the disputed area between Germany and The Netherlands is currently a matter of political negotiation and administrative action.

In May 2001 Lower Saxony issued licenses for seed mussel fishing on the so-called Hond- and Paapzand/Hund und Paapsand, an intertidal sand situated in the disputed area (see map in Annex 2).

The Netherlands had, in the framework of its national shellfish policies (see further 3.1) designated this area as an area permanently closed for blue mussel and cockle fishing.

The area has also been listed commonly by the two countries as a Habitat Directive area.

According to Lower Saxonian regulations the issuing of the licenses was in accordance with both national and federal German law. In accordance with Article 41 of the Ems-Dollart (Eems-Dollard) Treaty, The Netherlands and Lower Saxony are in the process of elaborating a fishery plan which also covers blue mussel fishing.

The Bezirksregierung Weser-Ems and the Dutch Ministry of Agriculture, Nature Management and Fisheries are currently preparing the designation of the area as a joint nature conservation/state nature monument area.

2.2 Trilateral Policies and Agreements

2.2.1 Blue Mussel and Cockle Fisheries

With regard to mussel and cockle fisheries the Targets for the Tidal Area are relevant:

A natural dynamic situation in the tidal area. An increased area of geomorphologically and biologically undisturbed tidal flats and sub-tidal areas.

An increased area and a more natural distribution and development of natural mussel beds, *Sabellaria* reefs and *Zostera* fields.

Viable stocks and a natural reproduction capacity, including juvenile survival, of the Common Seal and the Grey Seal.

Favorable conditions for migrating and breeding birds.

For the implementation of these Targets, a large number of agreements and projects were agreed upon. The Wadden Sea Plan contains the following:

4.1.16. The negative effects of cockle fishery are being limited by:

Cockle fishery is not allowed in the German part of the Conservation Area;

Cockle fishery is not allowed in the Danish part of the Wadden Sea Area, with the exception of some small areas along the Esbjerg shipping lane and in the Ho Bay;

Cockle fishery is allowed in the Dutch part of the Wadden Sea Area, but has been limited by the permanent closure of considerable areas; there are possibilities for additional restrictions to safeguard food for birds. A co-management scheme with the fishing industry is in operation, in which the protection and enhancement of the growth of wild mussel beds and *Zostera* fields are central elements. (Identical with 9.1.3).

4.1.17. The negative effects of mussel fishery are limited by the permanent closure of considerable areas. In addition, the management of fishery on mussels aims at, inter alia, protecting and enhancing the growth of wild mussel beds and *Zostera* fields. (Identical with 9.1.4).

4.1.18. Mussel fishery will, in principle, be limited to the subtidal area. Based on national management plans, which are documented in the Progress Report, fishery on the tidal flats may be granted. The fishery sector is called upon to exchange information on the existing practices and to investigate possibilities for minimizing impacts of mussel fishery, in general and seed mussel fishery, in particular. (Identical with 9.1.5).

4.1.19. The current area of mussel culture lots will not be enlarged.

4.1.20. The existing permit for oyster culture will remain in force for traditional reasons. According to this permit, the imported oysters originate from hatcheries and are under veterinary control. New permits will not be granted.

4.2.2. The development of strategies for the protection and enhancement of *Zostera* and *Sabellaria* on the basis of existing and new knowledge, in view of the not yet completely understood decline of these species.

4.2.3. The investigation of possibilities and conditions for enhancing the growth of natural mussel and cockle beds, *Sabellaria* reefs and *Zostera* fields.

In addition, the Esbjerg II Conference (October 2001) decided upon the following measures with regard to mussel fishing:

ED §9. To acknowledge the efforts that have been made with regard to the policy on the mussel fishery and to stress that the implementation of the Targets on geomorphology, eelgrass beds and mussel beds still deserves attention and, therefore, to evaluate before the end of 2004 the mussel fishery with special attention to stable mussel beds.

ED §10. To base the conservation and management of mussel beds on the protection of sites where stable beds occur and areas with a high potential for the development of stable mussel beds.

2.2.2 Oyster Culture

The trilateral Targets and regulations relevant for blue mussel and cockle fishing mainly relate to the Tidal Area (see 2.2). In addition, the trilateral decision regarding oyster farming must be mentioned as relevant for the Tidal Area. In § 4.1.20 of the Wadden Sea Plan it is stated that

"The existing permit for oyster culture will remain in force for traditional reasons. According to this permit, the imported oysters originate from hatcheries and are under veterinary control. New permits will not be granted."

2.2.3 *Spisula* and other Shellfish Fisheries

Spisula fishing is mainly carried out in the Offshore Zone. Because *Spisula* is an important food source for several bird species, the following Target for the Offshore Zone is relevant:

A favorable food availability for birds.

In line with this Target it was agreed to carry out project 7.2.2 from the Wadden Sea Plan:

7.2.2 An investigation on shellfish stocks (e.g. *Spisula*) and the impact of fishery on the benthic stocks, seaward of the islands and, depending on the outcome, a discussion of the results on a trilateral basis with the aim to safeguard the food stock for birds.

3. Blue Mussel and Cockle Fisheries



3. National Policies: Blue Mussel and Cockle Fisheries

3.1 The Netherlands

3.1.1 Introduction

Fishing on blue mussels in the Dutch Wadden Sea is only done for seed mussels. Seed mussels are spread on mussel culture lots. The area designated for culture lots is 7,200 ha of which 3,550 ha are currently in use. The culture lots are situated in the subtidal of the western part of the Dutch Wadden Sea. Harvesting of consumable mussels takes place in May/June and October.

The average annual landings of mussels from culture lots in the past 10 years (1991–2000) were 37,712 tons of gross weight (including shells).

The average annual cockle landings from mechanical fishing in the Dutch Wadden Sea were 23,215 metric tons of gross weight for the period 1991–2000. There is also non-mechanical fishing of cockles and the amount fished in 2000 was about 2,333 metric tons (350 tons of meat).

An overview of facts and figures is in Annex 1.

It should be noted that policies for cockle and mussel fishing in The Netherlands have many similarities, which is the reason why they are treated in one section. Where, in the following, the term shellfish fishing is used, both cockle and blue mussel fishing are meant.

3.1.2 Legal Basis

Fisheries Law. Regulation for Sea and Coastal Fisheries (1977).

Licenses are issued on the basis of this Regulation. If fishing takes place in inshore waters (such as the Wadden Sea) also nature conservation aspects are taken into consideration. A revision of the Law is underway in which such will also be required for fishing in the North Sea.

Nature Protection Act

About 95% of Wadden Sea Conservation Area is nature protection area according to the Nature Protection Act. A license according to this Act is needed. The specific conditions laid down in the licenses are determined by current policies (see below).

3.1.3 Policy

The Wadden Sea Memorandum (Planologische Kernbeslissing, PKB) for the Wadden Sea sets out the general policies for all human uses in the Wadden Sea conservation area, including shellfish fisheries, for the period 2001–2010.

With regard to shellfish fisheries the PKB refers to the Structuurnota Zee- en Kustvisserij (A Policy Agreement on Sea and Coastal Fisheries) which sets out the main conditions under which fisheries must be carried out, namely

- to maintain bird populations at an average level of the 1980s;
- to maintain and recover natural biotopes (stable mussel beds, cockle beds and eelgrass beds).

In order to reach these goals it was decided that, for the period 1993-1997, on an experimental basis, 26% of the Wadden Sea intertidal area would be excluded from fisheries and that 60% of the mean average food requirement for birds would be reserved for birds.

A management plan for the implementation of these goals was set up by the fisheries sector itself (see also 3.1.4).

A scientific evaluation was carried out in 1998 (see further 3.1.4) and, on the basis of the results and discussions with scientists and interest groups, new policies formulated for the second pilot period which runs from 1999-2003.

For the 2nd phase in principle the same aims are valid. The area permanently closed for fisheries was maintained but the provision to reserve 60% of the stocks for birds has been increased to 70%, as of season 2001/2002.

Some additional conditions were set for the 2nd phase, relating to the recovery of intertidal mussel beds outside the permanently closed areas. To this end an inventory was made of locations most suitable for the development of seagrass and stable mussel beds and it was decided that fisheries would not be allowed here. The precise stipulations are given in 3.1.4.

The evaluation of the 2nd phase will focus on the following questions:

1. What are acceptable effects of shellfish fishing (i.e. both blue mussel seed fishing and cockle fishing) on stable mussel beds and seagrass meadows and on birds (oystercatcher, eiderduck) which eat mussels and are dependent upon these biotopes?
2. Have the policy measures (closure of areas and reservation of food for birds) had the intended effects?
3. Are the results of the measures such that the policy complies with the obligations from the EU Bird and Habitat Directives?
4. If negative effects of fishing are found, which additional measures can be taken to minimize these effects?

Basic material, needed to answer these questions must be delivered by a comprehensive research program, which is being carried out in the period 1999-2003 (see further 3.1.5).

The outcome of the evaluation will be used in the formulation of future shellfish fishery policies, in particular with regard to the intensity of fishing and whether cockle fishing can be continued.

The evaluation process will be supervised by a Steering Committee consisting of representatives of the Ministry of Agriculture, Fisheries and Nature Management (LNV), and the Ministry of Transport and Public Works (V&W), the fisheries organizations, the nature protection organizations and the research program. The reports and the output of the research will, before publication, be screened by an independent audit commission.

3.1.4 Management

According to the above outlined policies, 26% (five areas, see Annex 2) of the intertidal area in the Dutch part of the Wadden Sea Conservation Area are permanently closed for mussel seed and cockle fishing. The total size of this area is about 42,540 ha. Outside the closed areas fishing is carried out according to a management plan which stipulates that seed mussel fishing will, in principle, not be carried out in the intertidal. Only when subtidal stocks are low (less than 40,000 metric tons fresh weight available in the subtidal area) is fishing in the intertidal allowed. The mussel cultivators require a three-year average of 65,000 metric tons of seed mussels for a stable mussel production. In case the threshold leads to a discontinuity in the production, that is, more than 50% relative to the 3 year average, the sector will ask the government to allow seed fishing on the tidal flats. In this case the mussel seed will be extracted from those parts of the intertidal which have the least chances for the development of stable mussel and eelgrass beds. This is the area outside the so-called 10% contour, (i.e. those parts of the intertidal with the best chances for development of stable mussel beds; see further 3.1.5).

With regard to cockle fishing, the so-called 5% contour area (the intertidal area in which the best chances for the development of stable mussel beds exist and which has a size of about 5% of the intertidal) is excluded from fishing. Because part of this 5% is already part of the permanently closed area, it represents an additional no-fishing area of 2% of the intertidal. Moreover, outside the 5% contour, cockle fishing is not allowed in areas where mussel (seed) beds are present.



In total, some 30% of the intertidal area is now closed for mussel seed and cockle fishing, i.e. the 26% permanently closed, together with the areas with highest chances for development of mussel beds (5% and 10% contours).

In addition, in years with limited food availability for birds, 70% of the average food demand of birds (reference bird population in the 1980s) will be reserved for them. It concerns an amount of 10,000 tons of meat (cockle and mussel) in the intertidal and 8,600 tons of meat (cockle, mussel and *Spisula*) in the subtidal and adjacent North Sea.

The maximum amount of cockle meat that may be fished in a normal season (i.e. when no limits in relation with food reservation for birds are fixed) amounts to 10,000 tons.

The above requirements are part of the Management Plan which was established and signed by the fishermen's organizations under the guidance of the Fish Product Board (Productschap Vis). Other measures include, amongst others, a quotation of mussel seed catches also in "normal" years, the mandatory installment of a black box for the automatic monitoring of fishing locations, the exclusion from fisheries of timely observed seagrass stands (which will be taken up in so-called fishing schemes), capacity limitations and better spreading of the cockle fleet, and non-disturbance of seals and birds.

In June 2001, the mussel-, cockle- and oyster producers and traders presented their vision on sustainable shellfish fisheries for the future. The vision is based on an advice by the Social Eco-

nomical Council on sustainable and responsible enterprising. The main objective of the shellfish industry's vision is an economically viable and ecologically responsible fishery that has broad public acceptance. The fishermen choose to take their own responsibility in managing fisheries and nature, based on the principles of adaptive management: continuous improvement through learning by doing. The fishing plans for 2001 are based on these principles.

3.1.5 Research

The scientific evaluation of the first phase (1993-1997) focussed on food availability for birds and recovery of mussel beds and seagrass stands in the closed areas relative to the non-closed areas.

The main conclusions were that the recovery of the mussel beds was below expectation, but that this was due to natural circumstances (ice winters). In this respect it was stressed that the pilot period had been too short considering the large fluctuations in the ecosystem.

The food reservation for birds had a positive effect.

Also a preliminary investigation into the best locations for the development of stable intertidal mussel beds and seagrass meadows was carried out by means of a model analysis in which data on historical distribution and several abiotic factors were applied. The results were published in 1999 in the form of so-called habitat maps. These maps showed for mussel beds six and for seagrass meadows ten suitability classes, and were used as a basis for the additional measures imposed upon

fishing in the 2nd phase (see 3.1.3). The three classes with the highest chances of development of stable mussel beds were taken as areas in which mussel seed fishing would not be allowed. These three classes represent about 10% of the total intertidal area.

A more updated version of the so-called habitat map was completed in January 2002. For this map also historical knowledge of fishermen about stable beds has been used.

The 2nd policy phase is accompanied by a comprehensive research program, comprising of the following sub-projects:

1. Fishing intensity and integration.
Size, catches and fishing effort and possibilities to increase efficiency and reduce impact.
2. Food reservation for birds.
Dependence of oyster catcher and eider duck populations upon the Wadden Sea and causal relationships with fishing impacts.
3. Impact on benthos.
Has cockle fishing had a measurable impact on the benthos and has a shift in species composition occurred in the fished areas? Do these impacts have a measurable effect on bird populations?

4. Development of seagrass meadows.
What are the most suitable locations for seagrass development? Does closure of cockle fishing in potential seagrass areas contribute to development of seagrass?
5. Stable mussel beds.
What are the most suitable locations for the development of stable mussel beds? Which are the mechanisms determining development towards stable bed and which is the impact of fishing on these mechanisms? What is the relative importance of human versus natural factors?
6. Sediment composition.
Has, in the past 50 years, a shift occurred into the direction of more sandy sediments and has cockle fishing contributed to this shift? How does cockle fishing affect sediment composition and how long do the effects last?
7. Dynamics of cockle stocks.
Development of cockle beds and the role of natural and human influences on this development.

3.2 Germany: Lower Saxony

3.2.1 Introduction

In the Lower Saxonian part of the Conservation Area there is only fishing for blue mussels. The fishing of cockles is not allowed. Consumption mussels may only be fished in the subtidal. Seed mussels are fished in the subtidal and certain parts of the intertidal area. Five licenses (of which one is only temporarily used) have been issued for seed mussel fishing. There are culture lots with a total size of maximally 1,300 ha. The average annual landings of mussels (from cultures and wild mussels) over the period 1991–2000 were 7,332 metric tons gross weight.

In the area outside the Conservation Area, but within the Cooperation Area one license for cockle fishing was issued in 1999.

The facts and figures have been summarized in Annex 1.

3.2.2 Legal Basis

According to §9(2) of the National Park Law (Law on the Revision of the Law on the National Park "Niedersächsisches Wattenmeer" of 31 July 2001), seed mussel fishing is allowed in a number of explicitly specified parts of Zone I (the most protected zone) and in the complete zone II (intermediate protection zone). The conditions stipulated in §9(2) are that seed mussel fishing is only allowed in the framework of a management plan (Bewirtschaftungsplan), issued jointly by the fisheries and nature protection authorities. The management plan is valid for a five year period and takes account of the protection aims as laid down in §2 of the National Park Law.

Fishing for consumption mussels is only allowed on sublittoral banks.

The other parts of Zone I are permanently closed for mussel fishing and have a total size of approx-

imately 46,400 ha. The major part (33,000 ha) is formed by one area between Weser and Elbe (see Annex 2).

Licenses for mussel fishing are issued according to the Lower Saxony Fishery Ordinance of 1992 by the State Fisheries Administration. The National Park Administration is consulted in the licensing procedure.

3.2.3 Policy

Blue Mussel Management Plan

In 1998 the Lower Saxonian Ministers responsible for fisheries and nature conservation, signed a Management Plan for blue mussel fishing outside the permanently closed areas, valid for the period 1999–2003.

The goal of the Plan is an effective, conflict-solving merger of economic needs and ecological aims. To this end both sustainable mussel fisheries and the undisturbed development of intertidal mussel beds must be safeguarded. More in particular it is stated that, considering the special conditions in the Lower Saxonian Wadden Sea, seed mussel fisheries in the intertidal is indispensable. At the same time undisturbed development of mussel beds is of special importance, considering the decrease since the mid 1980s.

The Plan states that the licensing and taking of seed mussels will be arranged in such a way that certain traditional mussel sites with a high potential for development will, for an initial five year period, be excluded from seed mussel fishery, so as to enable an undisturbed development of the habitat "mussel bed".

The Management Plan is partly based upon the results of running scientific investigations into the development of intertidal mussel beds (see also 3.2.4 and 3.2.5).

Category	Number of documented locations (see 3.2.5)	Number excluded from fishery according to Management Plan	Number in non-fishery areas according to Nat. Park Law	Total number of beds excluded from fishing
I	20	4	3	7
II	17	8	0	8
III	150	5	28	33
Total	187	17	31	48

Table 1:
Fished and non-fished mussel bed sites according to quality categories

3.2.4 Management

With the aim of implementing the goals from the Plan a number intertidal beds have been excluded from seed mussel fisheries, in addition to those which were already excluded because they are situated within the non-fishing areas (See 3.2.2). It concerns 17 additional beds (see Table 1).

The intertidal beds have been divided into three categories, of which category I represents beds with the highest frequency of occurrence in the surveys since 1966 and category III beds with the lowest frequency of occurrence.

Of a total number of 187 documented intertidal sites, 48 are now excluded from fishing (see Table 1). There are 20 category I beds of which seven may not be fished.

The sites which have not been excluded, are in principle open to seed mussel fishing. The allocation of areas is done by the State Fisheries Administration Bremerhaven on the basis of, amongst others, economic needs, location, suitability and accessibility for fisheries. To this end, the Fisheries Office carries out inventories into location, amounts, densities and percentage of juvenile mussels. The National Park Administration is consulted in the licensing procedure.

The National Park Administration is responsible for the estimation and surveillance of total stocks. For the latter, it is important to monitor the developments of the beds which have been excluded from fisheries and to carry out research in these areas.

3.2.5 Research

On the basis of the evaluation of surveys into distribution and occurrence of intertidal beds from the beginning of the 1950s till 1997 (eight surveys) it was concluded that the area covered by mussel beds had declined from some 50 km² in 1975 to 1.7 km² in the spring of 1996 after which a recovery occurred to about 15 km² in 1996 and 1997. In 1999 an area of 26 km² was monitored. In the study a total of 187 locations of beds had been identified from the early 1950s till 1997.

Many beds were present in most of the surveys throughout the past 30 years and had not or only slightly changed positions, indicating that specific sites have a high potential for the development of mature mussel beds.

Currently, a project is in operation (period 15.6.1999 - 31.12.2002) in which scientific research is carried out, with the aim of evaluating the effects of the measures entailed in the Management Plan. The research consists of:

- annual inventory of the whole stock;
- investigation of size, biomass, density, coverage, age structure and accompanying fauna of mussel beds, especially those from categories I and II (see Table 1);
- investigation of dynamics of mussel stocks and assessment of population and site development, especially in relation to extreme weather conditions (ice, storms) and high spatfalls;
- update of documentation of mussel sites.

3.3 Germany: Schleswig-Holstein

3.3.1 Introduction

In the Schleswig-Holstein National Park, fishing for seed mussels is only allowed within the subtidal part of Zone 2 and in the subtidal part of four defined areas in Zone 1. Fishing for seed mussels in the intertidal of the National Park is forbidden.

The average annual landings from culture lots in the period 1991-2000 were 20,837 metric tons gross weight. The total size of the culture lots in 2001 was 2,300 ha.

Cockle fishing is not allowed in the Schleswig-Holstein part of the Conservation Area.

The facts have been summarized in Annex 1.

3.3.2 Legal Basis

According to §6(2)2 and 6(2)3 of the National Park Law, fishing for seed mussels is only possible with a licence according to §40 and 41 of the Schleswig-Holstein Fisheries Law. The areas where fishing is allowed have been fixed in the Schleswig-Holstein Mussel Fishing Program, which has been issued in accordance with §40-1 of the Fisheries Law (see also 3.3.3 and 3.3.4). According to this Program seed mussel fishing is not allowed in the intertidal of the National Park. The Program also stipulates that the licensed fishing of seed mussels is allowed in the subtidal of four defined areas within Zone 1 and in the subtidal part of Zone 2 of the National Park.

3.3.3 Policy

Since 1997 a Mussel Fishing Program for the use of mussel resources in the National Park of Schleswig Holstein has been in force. The Program has been issued by the Ministry for the Rural Area, Spatial Planning, Agriculture and Tourism (MLLT), in accordance with §40-1 of the Fisheries Law and was amended in the framework of the revision of the National Park Law on 28.06.2000.

The goal of the government of Schleswig-Holstein is a sustainable and environmentally sound

use of mussel resources. Also the stimulation of local processing of the mussels and the concomitant employment in the region are important elements of the national policy.

To achieve this goal a Framework Agreement between the Ministry and the fisheries sector for the period until 31.12.2016 has been agreed upon. The main elements contained in the agreement are the specification of the conditions under which mussel seed fishery and mussel fishery may be carried out, and the development of fishing and culture practices in the period under consideration (see further 3.3.4).

3.3.4 Management

The conditions specified in Framework Agreement are that:

- seed mussel fishery is only allowed in the subtidal, i.e. the area below mean spring tide low water level in the entire zone 2 and in four defined areas within Zone 1;
- the number of licenses is limited to 8;
- mussel culture is not allowed in Zone 1;
- the total area size of culture lots will be reduced from 2400 ha in 1999 to 2000 ha by the end of 2006;
- the landing of wild mussels is not allowed;
- fishing vessels must have a "black-box" system, i.e. the automatic registration of the position of the vessel by satellite positioning;
- the fisheries sector contributes an annual amount of EUR 245,420 (DM 480,000) for administration (20,452), management (92,033) and monitoring (122,710) purposes;
- there is a closed season for fishing seed mussels from 01.05 to 30.06;
- the minimum residence time of mussels on the culture lots is 10 months.

3.3.5 Research

There are currently no specific research programs regarding the effects of mussel fishing.

3.4 Denmark

3.4.1 Introduction

In the Danish part of the Conservation Area fishing for wild blue mussels is allowed in three areas with a total size of 28,700 ha (42% of the Tidal Area; see Annex 2) and fishing for cockles in three small areas in the Grådyb. Mussel culture is not allowed.

The annual landings of wild blue mussels were on average 4,152 metric tons gross weight in the period 1991–2000. The minimum landing size is 50 mm in length.

In the period 1990–1999 an average annual amount of about 7,000 tons gross weight (1,118 tons wet weight) of cockles was fished.

The data have been summarized in Annex 1.

3.4.2 Legal Basis

According to §8 of the Executive Order on Nature Conservation and a Wildlife Reserve in the Wadden Sea it is prohibited to use machines to collect mussels, lugworms and other organisms on and in the seabed.

According to §9 of the Executive Order the stipulations in §8 do not apply to the collection of blue mussels with the permission of the Ministry of Food, Agriculture and Fisheries outside three delimited areas, as indicated in the map in Annex 2.

§10 of the said Order also stipulates that fishing for cockles is allowed in defined areas near the harbor of Esbjerg, with the permission of the Ministry of Food, Agriculture and Fisheries.

3.4.3 Policy and Management

Because of overfishing and severe winters, which in the 1980s caused an additional mortality of some waterbird species, and reduction of intertidal mussel beds, mussel fishing in the Danish Wadden Sea has been severely restricted since the end of the 1980s.

The number of licenses has been reduced from 40 to 5 and an annual quota of mussels is negotiated with the Ministry for Environment and Energy, allowing for a surplus as food for staging birds, based upon stock assessments by the Danish Fisheries Research Institute. In the last years the quota was maximally 10,000 tons.

In 2002 the Danish Directorate for Fisheries has given permission for a nature restoration project for blue mussel beds in parts of the Danish Wadden Sea. The project is a cooperation between the Danish Fishermen Association and the Danish Institute for Fisheries Research with the latter as the responsible part.

The project has the intention to restore mussel beds in "Ribe Løb" and "Jørgens Lo". Up to 1000 tons of blue mussel seed will be fished in 2002 in the Horns Reef area, more than 10 kilometers west of the Wadden Sea Conservation Area, and be placed on the seabed in the Wadden Sea Area. The time period for the project is three years. The restored mussel beds will be monitored and fisheries will not be allowed in this period. The Danish authorities have financially supported the project.

There is one license for cockle fishing. Cockle fishing is restricted to three small areas in the Grådyb of which one may be fished per year. Of the four areas, only two are presently suitable for fishing. Recent applications for a license for fishing cockles in another area and for trading for another area were rejected.

3.4.4 Research

The Danish Fisheries Research Institute (DFU) publishes annual reports on blue mussel stocks and reports on cockle stocks every second year. Currently no targeted research into the effects of shellfish fishing is carried out in Denmark.

4. Spisula and Oyster Fisheries



4. National Policies: Spisula and Oyster Fisheries

4.1 The Netherlands

In recent years fishing for *Spisula subtruncata* has been carried out in the offshore area.

The average annual landings in the period 1996–1999 were 3,463 tons of meat (about 34,630 tons of fresh weight).

According to the Dutch shellfish policy document for the period 1999–2003 (see also 3.1.3 and 3.1.4) a license will be needed for *Spisula* (and other "new" species such as *Macoma balthica* and *Ensis* spp.) fishery as of mid 1999. It is stated that a license will only be provided if stocks "allow such" and only to those persons who can prove that they have been fishing before 1 January 1999.

In the course of the implementation of the 2nd phase of the shellfish policy also nature interests will be taken into consideration in the licensing procedure.

The majority of the Dutch *Spisula* fishermen fishes on the basis of a management plan which sets provisions for minimum size (>30 mm) and prohibits fishing between 1 December and 1 May, the period when black sea ducks feed on these stocks.

The Netherlands' Fisheries Research Institute carries out annual stock inventories in which *Spisula* fishermen are involved now.

The Dutch Ministry for Fisheries is presently working on a comprehensive policy for the fishery on *Spisula* (and other shellfish species except for mussels, cockles and oysters). The proposed outlines of this policy were discussed with fishermen in April 2002. Also nature conservation groups are being consulted. It is expected that decisions about the new policy will be taken by the end of 2002.

4.2 Lower Saxony

There is no fishing on *Spisula* or other shellfish species in the Lower Saxonian Cooperation Area.

4.3 Schleswig-Holstein

Fishing on razor clam (*Ensis* spp.) is not allowed in the Schleswig-Holstein part of the Conservation Area.

Spisula solida fishing may only be carried out outside the 3 nautical miles zone, implying that there is no *Spisula* fishing in the Schleswig-Holstein part of the Cooperation Area. The number of licenses has been limited to six. Landings varied from minimally 425 tons in 1992 to maximally 7000 tons in 1995. In 1996 there was hardly fishing on *Spisula* because the stocks had died in the very cold winter of 1995/1996. The allowed minimum landing size of *Spisula solida* in Germany is 30 mm length.

Since 1996 there has been no *Spisula* fishing.

When fishing starts again, a concomitant research project will be carried out in which the sustainability and compatibility with nature conservation of *Spisula* fishing will be investigated. Criteria for sustainability and compatibility are, that birds are not affected seriously, that *Spisula solidus* shows strategy in reproduction, that the fishing tracks are no longer visible than two years, that discard mortality is not higher than in comparable fisheries, that the amount of bycatch after mechanical sorting is less than 15% in weight of total catch and that the undersized and sorted out *Spisula* are able to survive.

With regard to the impact on birds, amongst others, their food composition will be investigated. If the percentage of *Spisula solidus* larger than 30 mm in the average food composition of diving birds (mainly common scooters) is more than 40%, then the fishery is regarded not compatible with nature conservation. In this case the minimum size must be enlarged.

There is one license for oyster (*Crassostrea gigas*) culture in Schleswig-Holstein. The culture area has a size of 30 ha.

4.4 Denmark

In Denmark, about five licenses have been issued for *Spisula* fishing, but only one vessel has been fishing in two offshore areas. The minimum landing size is 13 mm in width and about 35 mm in length. The total reported Danish landings have been 7,885 tons over the years 1992 to 1995 (about 28% of the recorded fishable stock in 1993 or 11.4% of the total *Spisula solidus* stock recorded). In 1996, the whole *Spisula solidus* stock in the two fishing areas disappeared, probable because of the cold winter of 1995/96.

There is one license for oyster culture in Denmark, which is presently not in use.



Shellfish Fishing - Overview of Facts

	The Netherlands	Lower Saxony	Schl.-Holstein	Denmark
Size Tidal Area (ha) according to trilateral definition (see WSP)	250,000	183,400	222,000	68,500
Intertidal (ha)	124,000	144,000	141,000	55,400
% Intertidal	49.6	78.5	63.5	80.9
BLUE MUSSEL FISHERIES				
Average annual Mussel landings (metric tons gross) 1991 - 2000	37,712 (from culture lots)	7,332 (culture + wild)	20,837 (from culture lots)	4,152 (wild mussels)
Mussel culture in use (ha)	6,500 in use: 3,560	1,300 (maximum)	2,300 (situation 2001)	-
Number of Licenses	89 (seed fishing vessels) 82 mussel culture	5 (vessels)	8	5
Quota	For seed mussels			On the basis of stock assessment. In recent years 10,000 tons
Permanently closed area (ha)	42,540 (this area covers 18% of total intertidal stock) ¹	46,400 (this area covers 8.5% of total area of intertidal mussel beds) ²	141,000 this area covers 100% of intertidal mussel beds)	28,700
Additional restrictions	Additionally 5% of intertidal closed (site most suitable for stable mussel beds: 26% of intertidal stock ¹). Food reservation for birds. (see 3.1.4)	Additionally 17 sites closed in accordance with Management Plan (12.4% of intertidal mussel beds) ²		Min.size consumption mussel = 5 cm
COCKLE FISHERIES				
Average annual Cockle landings (tons wet weight)	Mechanical: 23,215 (1991-2000) Non-mechanical: 2,333 (2000)	53 (1999)	-	7,000 (1990-1999)
Number of licenses/vessels	23/37 (8-14 vessels active in Wadden Sea)	1 (1999)	-	1
Permanently closed area	42,540 ha	100% of conservation area	100% of conservation area	99% of conservation area
Additional restrictions	Additionally 5% of intertidal closed (sites most suitable for mature mussel beds) and food reservation for birds. (see 3.1.4). Min. size 15 mm. Maximum catch in years with sufficient stocks: 10,000 tons of meat.			Min.size 16 mm
SPISULA FISHERIES				
<i>Spisula</i> landings Annual average in tons fresh weight (period)	34,630 (1996-1999)	-	7000 (1995)	1,978 (1992-1995) 1996 and 1997 no landings
No. of licenses	46 of which 8 active	None	6	5 (1 active)
Restrictions	Size > 30 mm	-	Size >30 mm. Only outside 3nm.	Size >35 mm
OYSTER FISHERIES				
Oyster culture	Not practiced	Not practiced	1 oyster culture lot	1 license (not used)

¹) Based upon average annual biomass in spring 1999-2001. Source: RIVO

²) Situation as in 2000. Based upon inventory National Park Administration Lower Saxony.

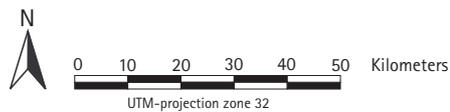
Annex 2

Areas within Tidal Area, permanently closed for Mussel Fishery

It should be noted that there are several additional measures in operation to limit the impact of fishing on flora and fauna. It is stressed that considerable parts of the permanently closed areas indicated on this map are not suitable for mussel fishing.

Legend

- Wadden Sea Area
- Mussel fishery not allowed
- Intertidal Area (eulittoral)



Development of Blue Mussel Beds and Total Biomass of Blue Mussels

Area (ha)	Biomass (tons fresh weight)			
	NL ¹⁾	Nds.	S-H	DK
before 1980 ²⁾	4120	5000		4000
1987			1250	
1988			3000	
1989			3000	
1990		2700 ³⁾	2000	
1991			1800	1100
1992			1900	
1993			1900	950
1994		1300	2000	
1995	1100			1020
1996	400	170		1000
1997	700	1280		
1998	200		600	
1999	300	2895	1000	1050
2000	1000	2342	800	
2001	800	1918		

¹⁾ Surface area and biomass data based upon spring measurements.

²⁾ Figures from before 1980 are based upon the habitat map of Dijkema (1989). This map is based upon aerial photographs from different years over the period 1968-1976 and verified by ground truth in 1978. Only beds larger than 10 ha were included in the map.

³⁾ Data from the period 1989-1991.

Sources: QSR 1999, TMAP Blue Mussel Workshop 2000; NL: RIVO, 2001, DK: DFU Report no. 87-01, June 2001, Blåmuslingebestanden i det danske Vadehav efteråret 2000, by Per Sand Kristensen & Niels Jørgen Pihl; SH: Yearly reports, G. Nehls, Nds: data submitted by G. Millat.

