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Fisheries

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3.3.1 Introduction

The Wadden Sea Area harbours rich stocks of shellfish, and shrimps of marketable size are abundant in the subtidal areas. The main fisheries are for brown shrimps (*Crangon crangon*) and blue mussels (*Mytilus edulis*). Additionally, there is small scale fishery on cockles (*Cerastoderma edule*), and there is a local fishery with fixed nets and tow nets.

Aquaculture is carried out in two ways: There is one oyster culture (*Crassostrea gigas*) on the island of Sylt, and blue mussels are grown on a large number of culture lots in the Netherlands, Lower Saxony and Schleswig-Holstein.

The following chapters give an overview of recent developments of the national shellfish policies in the trilateral Wadden Sea since 2004 and an update of the landings of blue mussels and cockles, as well as shrimps (Facts and figures see Table 3.5.1).

A more detailed analysis of the fisheries' sector of the Wadden Sea region with emphasis on the economic aspects has been compiled by the Wadden Sea Forum Report (Prognos, 2004).

An overview of all (small scale) fisheries in the Dutch part of the Wadden Sea is given in a (Dutch) report from Wageningen IMARES (Overzee *et al.*, 2008).

An overview of fishing activities in the whole North Sea together with an assessment of fish stocks is given in the Quality Status Report by the OSPAR Commission (OSPAR, 2000) and ICES (2004). A new OSPAR QSR is under preparation for 2010.

The framework for the coastal fisheries (off the 3 sm line) is given by the Common Fishery Policy of the European Union.

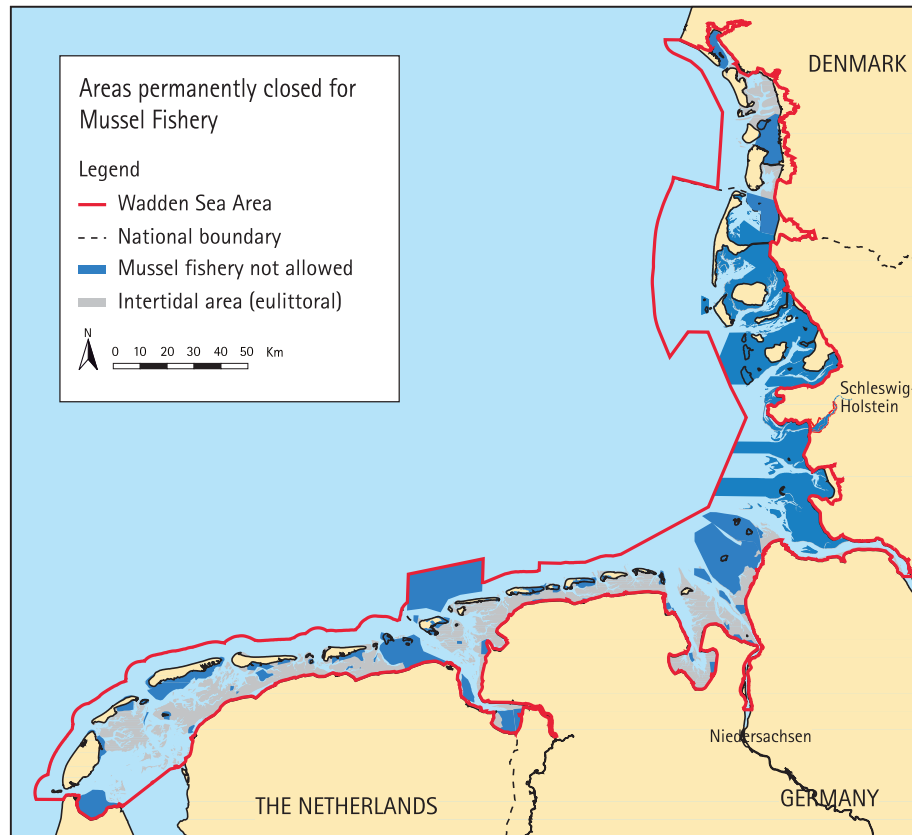
3.3.2 Blue mussel fisheries

Fisheries of blue mussels have been regulated in all countries with regard to the amount of permits, size of culture lots, fishing periods and other regulations (see Figure 3.3.1 and Table 3.3.1). To protect intertidal mussel beds, considerable parts of the Wadden Sea Area have been closed for blue mussel fisheries. In The Netherlands, mussel fishery is restricted to subtidal beds outside areas that are permanently closed. In Niedersachsen, fishery for seed mussels is allowed in significant parts of the intertidal, in accordance with a management plan. In Schleswig-Holstein, mussel fishery is not allowed in the intertidal area, as well as, in most subtidal parts. In the Hamburg National Park, mussel fishery is not allowed. In the Danish part of the Wadden Sea, mussel fishery is allowed on a small scale, in intertidal and subtidal areas, but the quotas since 1992 have been fished in subtidal areas only. In Denmark, commercially sized mussels are fished from wild natural beds.

In The Netherlands and Germany, blue mussel fisheries are mainly carried out on seed mussels from natural beds. Traditionally, seed mussels of around 1 to 4 cm length are transferred from natural beds where they have settled to culture lots where they grow to marketable sizes (on-bottom culture). They are allotted to mussel farmers by the responsible authorities. After 1.5 to 2 years, the mussels on the culture lots are more than about 4.5 cm long, and ready for the market. Seeding of culture lots is usually done in autumn and spring. What remains is a depleted bed, until spatfall occurs again.

On 50 ha of culture lot, a standing stock of 5,000 to 8,000 t of blue mussels may develop,

Figure 3.3.1:
Areas in the Wadden Sea
region permanently closed
for mussel fishery in 2008.



while stocks at natural sites after surviving two years will reach 1,000 to 1,600 t at the most.

The total size of culture lots in the Wadden Sea is about 109 km² (see Table 3.3.1).

Culture lots are leading to an enhancement of blue mussel biomass in comparison with a situation without mussel culture (Bult *et al.*, 2004). Part of the seed and half-grown mussels from the Dutch Wadden Sea are exported to the southwest of The Netherlands for cultivation in the Eastern Scheldt.

No culture lots and exports of seed mussels are allowed in the Danish part of the Wadden Sea because, according to the Danish fishery regulation, no mussels below 5 cm in shell length may be fished, transported or landed. In landing, a by-catch of up to 10% weight of smaller mussels is allowed.

In Germany a research project (2000 - 2004) was developed in the Jade to investigate whether long-line culture could be used successfully as a supplementary source for seed mussels. The

comparison of different tested long-line types has proved that single longtubes carrying net collectors are the most stable system. Artificial collectors were settled by a large number of mussel larvae. Important settling took place between May and July (11,000 to 64,000 ind./m collector). The shell length of suspended mussels increased in their first summer at an average of 1.2 mm per week. Between end of August until end of September a mean of 2 to 9 kg mussels per meter (4,500 to 20,300 ind./m) were harvested and then re-layed on-bottom cultures (Walter & de Leeuw, 2007).

Recently, further experiments are being carried out with new collector methods such as 'smart farms'. This on-growing system consists of several units, which are adapted to each site using PE pipe for buoyancy with a 2-3 meter deep mussel collector-net running the length.

The potential of seed collectors in the Wadden Sea is yet difficult to evaluate as only few attempts have been made so far to explore these

techniques which have proven to be successful in other places. Thus, it is easy to foresee that mussel fisheries will still be reliant on conventional practices for the near future.

In The Netherlands several techniques were developed and tested for a number of years. Kamermans & Smaal (2009) describe the results of the experiments. Scholten *et al.* (2007) give an overview of the techniques, the resulting crop and policy related issues. They advocate extending the experiments and while monitoring possible impacts gradually replace fishery of natural beds by these seed collecting devices.

Amount and abundance of natural spatfall is always varying, thus, catches of mussels show strong fluctuations per year and region. In the last ten-year period, the years 1998 and 1999 allowed higher catches in Germany, while 2001 was a relatively good year in The Netherlands. Because of low seed availability, in the following years the lowest catches were reported, accompanied by a decreasing or failing spatfall and declined mussel beds.

In the period 1994–2007 the average annual landings of mussels were about 56,000 tons wet weight (including shells). Most of them (about 35,000 t) were landed in The Netherlands (Figure 3.3.2). On average about 70% of all Wadden Sea mussels are of Dutch origin.

A considerable part of the German landings are transported to The Netherlands where the majority of landings are traded.

Trilateral Policy and Management

WSP 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).

WSP 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).

WSP 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).

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

WSP 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.

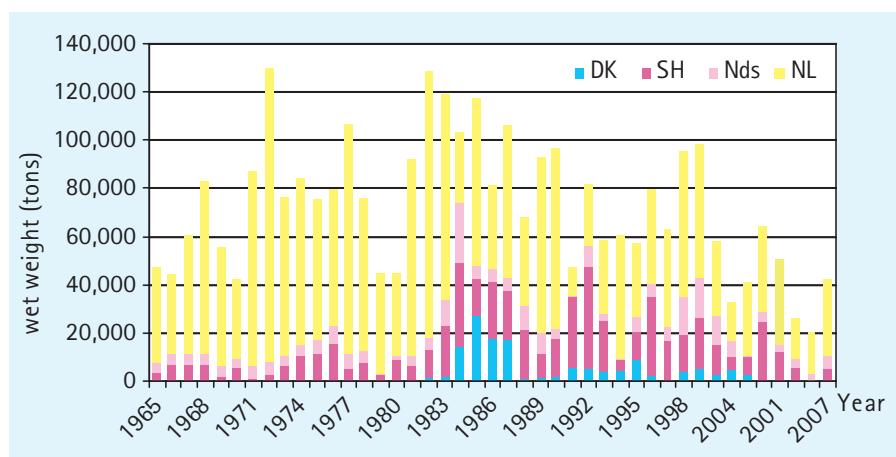


Figure 3.3.2: Landings of Blue Mussels in the Wadden Sea 1965–2007 (in tons wet weight). (sources: Trilateral Workshop on Blue Mussel Fishery Management 2008).

National developments

The Netherlands

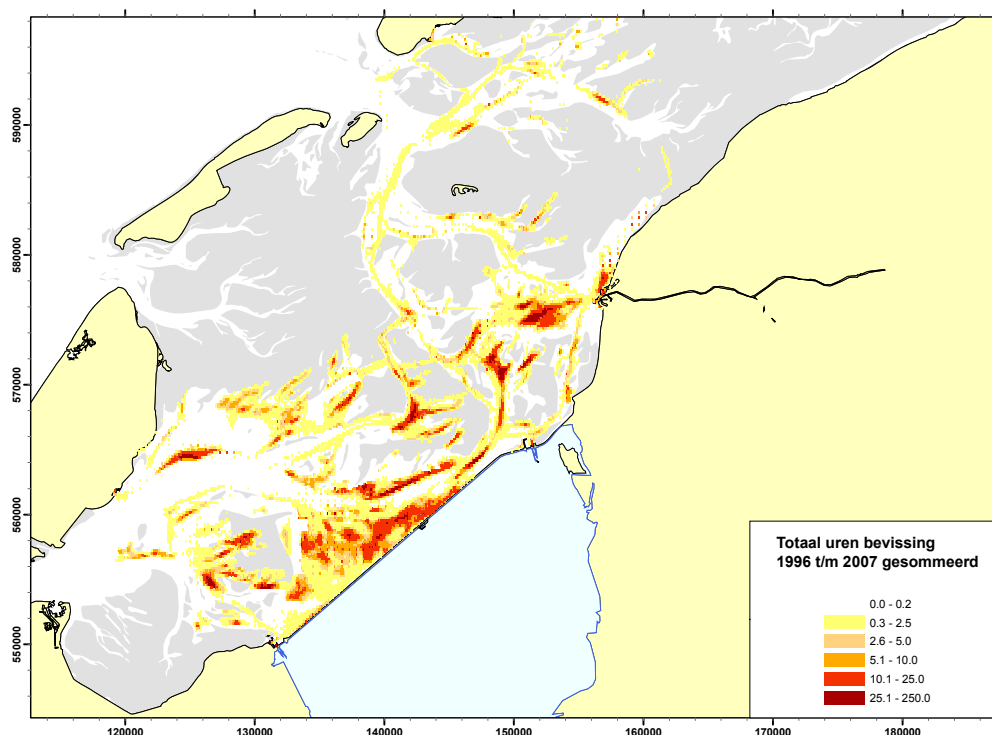
In the Dutch part of the Wadden Sea Area, blue mussel fishery is mainly done for mussel seed. The subtidal seed fisheries occur both in autumn and spring and they remove between 60 and 80% of the spat. Figure 3.3.3 indicates the fished area over several years.

The seed mussels are transferred to culture lots. These occupy an area of 7,600 ha of which 3,300 ha are actually in use. The culture lots are situated in the subtidal of the western part of the Dutch Wadden Sea. The average annual landings of mussels from culture lots in the period 1994–2007 amounted to 35,166 tons of gross weight (including shells). An overview of facts and figures is given in Table 3.3.1.

The National Planning Decree (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. With regard to shellfish fisheries, the PKB refers to the Sea and Coastal Fisheries Policy Document (Structuurnota Zee- en Kustvisserij) which was published in 1993 and has long formed the basis for fisheries policy. The policy focused on three keystones: closed areas, food reservation for birds and co-management (CWSS, 2002). In 2005 it was replaced by a new policy.

In The Netherlands, mussel landings and mussel stocks on natural beds decreased in the eighties leading to an increase of the fishery and culture in Denmark and Germany (Figure 3.3.2). The intertidal stocks, fishery and culture crashed in the early nineties. This event, and a following mass mortality of mussel-eating birds, has led to a strong controversy about mussel farming, which was considered to be a main cause of this collapse. On the basis of an interim report in 1998 and newer observations (1999 and 2000), it was decided to take additional measures in order to enhance the restoration of blue mussel beds in the Wadden Sea and to improve the food availability for birds, by additional closure of 5% of the intertidal area for cockle fishery (and 10% for mussel fishery) of areas with high potential for blue mussel beds and new measures to prevent food shortage for birds (CWSS, 2002; Ens *et al.*, 2004). This 2nd policy phase was accompanied by a comprehensive research program (EVA II) which began in 1999 and ran until 2004 (LNV, 2003; Ens *et al.*, 2004). The results of this research program were only partially used as a basis for the development of a new shellfish policy which was adopted by Parliament in October 2004 (LNV, 2004). The new policy holds for: re-opening of the closed 'best 5%-areas', termination of the mechanical cockle fishery, and, as a consequence, end of the food reservation policy, restriction of subtidal mussel

Figure 3.3.3:
Mussel seed fishery in the
Dutch Wadden Sea (be-
tween 1996 and 2007).



seed fishery on instable mussel beds in autumn leaving them for birds in winter and subsequent fishery in spring, experimental fishery on intertidal beds, experimental development of seed harvesting techniques and general transition to less damaging seed collection.

Mussel stocks of the intertidal part of the eastern Dutch Wadden Sea have recovered since the fishery in the intertidal areas was almost completely closed since 1995. The mussel landings based on subtidal spat, but partly also from import from other countries, increased again but have not reached former levels. The mussel stocks in the subtidal generally stayed at lower levels than in the years before 1990.

In October 2008, a framework agreement (covenant) has been signed by the mussel fisheries sector, green NGOs and the Dutch government about the transition towards sustainable fisheries, as well as nature recovery in the Wadden Sea. In March 2009, an implementation plan was adopted. In this plan it will be aimed to close 20% of the subtidal mussel beds each year cumulatively and replaced by artificial seed collectors. In 2009, about 150 ha seed bed will be left to develop undisturbed, and no fishery will be allowed on them, even if the mussels disappear and new beds develop afterwards. On the other hand the fishery will be allowed to develop methods for seed collection by artificial means (nets and ropes). Considerable areas, in future amounting to more than 600 ha, will be set aside for this development. When successful, an additional 20% of the new spatfall will be left undisturbed next year. In a bit over a decade the whole subtidal seed fishery should be replaced by seed collectors.

Germany: Niedersachsen

In Niedersachsen, blue mussel fishery is regulated according to the Niedersachsen Fishery Ordinance of 1992 by the State Fisheries Administration. The National Park Administration is consulted in the licensing procedure. According to the National Park Law seed mussel fishing is allowed in a number of explicitly specified parts of zone I (the most protected zone) and the whole of zone II (intermediate protection zone). The major parts are formed by an area between Weser and Elbe and the Borkum Riff ground (Figure 3.3.1).

Seed mussels are fished in the subtidal and certain parts of the intertidal area. Wild mussel for consumption may only be fished on sublittoral banks. Five licenses have been issued for mussel seed fishing. The area designated for culture lots has a maximum of 1,300 ha.

Seed mussel fishing is only allowed within the framework of a management plan (Bewirtschaftungsplan, 2004), issued jointly by the fisheries and nature protection authorities. The management plan takes account of the protection aims as laid down in §2 of the National Park Law. Currently, the management plan for mussel fishery is being renewed for a further period. According to the plan, 29 of the described 102 mussel bed sites have been excluded from seed mussel fisheries: 12 sites already excluded according to the National Park Law, 12 additional sites excluded according to the management plan and five additional sites which are voluntarily excluded from fishery to enable a long-term monitoring and a reliable calculation of the total blue mussel stock.

The average annual landings of mussels (from cultures and wild mussels) over the period 1994–2007 were 6,318 metric tons gross weight. Table 3.5.1. gives an overview about facts and figures.

Germany: Schleswig–Holstein

In the Schleswig–Holstein National Park, fishing for seed mussels is only allowed within the subtidal part of zone II and in the subtidal part of four defined areas in zone I (CWSS, 2002).

According to the National Park Law fishing for seed mussels is only permitted with a license 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.

Since 1997 a mussel fishing program for the use of mussel resources in the National Park of Schleswig Holstein has been in force which was amended within the framework of the revision of the National Park Law in 2000. A Framework Agreement between the Ministry and the fisheries sector for the period until end of 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 (CWSS, 2002). A detailed overview of the recent monitoring and management is given by Nehls and Ruth (2004).

The average annual landings from culture lots in the period 1994–2007 were 12,454 metric tons gross weight. The total size of the culture lots in 2005 was 2,000 ha. The facts and figures have been summarized in Table 3.3.1.

Table 3.3.1:
Shellfish fishing. Overview
of facts (source QSR 2004,
updated).

	NL	NDS	SH	DK
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
MUSSEL FISHERY				
Average annual Mussel landings (metric tons gross)	39,132 (94 - 03) 35,166 (94-07) (from culture lots)	7,278 (94 - 03) 6,318 (94-07) (culture + wild)	15,167 (94 - 03) 12,454 (94-07) (from culture lots)	4,507 (94 - 03) 2,507 (94-07) (wild mussels)
Mussel culture in use (ha)	7,600 usable: 3,300	1,300 (maximum)	2,000	none
Number of Licenses	89 (seed fishing vessels) 82 mussel culture	5 (vessels)	8	4
Quota	For seed mussels	None	None	On the basis of stock assessment. In recent years between 0 and 5.000 tons
Permanently closed area (ha)	42,540 (this area covers 18% of total intertidal stock) ¹	93,480 (this area covers about 10 % of total area of intertidal mussel beds) ²	135,000 (this area covers 100% of intertidal mussel beds)	28,700
Additional restrictions	Intertidal: Seed fishery on unstable mussel beds only if at least 2000 ha of 1-year old mussel beds are left.	Additionally 17 sites closed in accordance with Management Plan (about 10% of intertidal mussel beds) ² Min. size 50 mm (wild)	Min. size 40 mm	Min. size 50 mm After 2008 an annual Environmental Impact analysis has to be carried out before fishery can take place.
COCKLE FISHERY				
Average annual cockle landings (tons wet weight)	Mechanical: no landings since 2005 Non-mechanical: around 600 tons of meat yearly	No landings since 1999	No landings since 1989	1997-2007: 898 After 2008 an annual Environmental Impact analysis has to be carried out before fishery can take place.
Number of licenses/vessels for cockle fishery	Maximum of 31 licences for manual cockle fishery (30 actively used) 3)	None	None	1
Permanently closed area (ha)	42,540	100% of conservation area	100% of conservation area	99% of conservation area
Additional restrictions for cockle fishery	Min. size 15 mm. Maximum yearly catch: 5% of the cockle stock	Min. size 30 mm		Min. size 16 mm
SPISULA FISHERY				
Spisula landings, annual average in tons fresh weight (period)	34,630 (1996 - 1999) 36,160 t (1998 - 2003) Probably no Spisula fishery after 2001; last recorded permits ended 31/12-2001	No landings since 1996	No landings since 1995	1,978 (92-95) 1996 - 1998 no landings 2,846 (99 - 03)
Number of licenses	None	None	None	5 (1 active)
Restrictions	Min. size 30 mm	-	Min. size 30 mm	Min. size 35 mm
OYSTER CULTURE				
Oyster culture	Not practiced	Not practiced	1 oyster culture lot	1 license (not used)
Restrictions oyster			Min. size 50 gr	

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

2) Average of 5 years (1999-2003): range 9.5-13.2 %. Additionally, about 10% of the mussel bed areas (average 1999-2003) is closed for fisheries (range: 8.4-12.5%) (Herlyn and Millat, 2004). The closed area covers 33.8% of the National Park area; not all parts of the closed area are suitable for fishing.

3) Mechanical cockle fishery in the Dutch Wadden Sea was closed on 1 January 2005. No cockle fishery in 2004 because of a legal procedure against the licensing procedure.

4) Re-opening of the "5%-areas from 2005 on due to discontinuation of mechanical cockle fishery.

Denmark

In the Danish part of the Conservation Area, commercially sized mussels are fished from wild natural beds because mussel culture is not allowed. There are three areas with a total size of 28,700 ha (42% of the Tidal Area; see Figure 3.3.1) where fishing for wild blue mussel is allowed. The minimum landing size is 50 mm in length. The annual landings of wild blue mussels were on average 2,500 metric tons gross weight in the period 1994–2004. Very limited landings have taken place since 2004. The data has been summarized in Table 3.3.1.

Because of overfishing and severe winters, which caused a decline in some mussel-eating bird species, and reduction of intertidal mussel beds, the number of licenses has been reduced from 40 to 5 and an annual quota of mussels with a maximum of 10,000 tons has been negotiated with the Ministry for Environment. From 2009 onwards the amount of mussels set aside to birds will be 37,000 tons. Currently, there are only four licenses for mussel fisheries.

In 2002, the Danish Directorate for Fisheries has given permission to a nature restoration project for blue mussel beds in parts of the Danish Wadden Sea. Up to 1,000 tons of blue mussel seed have been fished in 2002 in the Horns Reef area, more than 10 km west of the Wadden Sea conservation area, and then re-laid on the seabed in the Wadden Sea Area. The time period for the project was three years.

3.3.3 Cockles

Fisheries of cockles have been regulated in all three countries with regard to the amount of permits, size of culture lots, fishing periods and other regulations (Table 3.3.1).

The Wadden Sea Area is closed for mechanical cockle fisheries in the Dutch and German conservation area. In Denmark, 99% of the Wadden Sea Area is closed for cockle fisheries with the exception of some small areas in Grey Deep along the Esbjerg shipping lane. In the period 1994–2003 average annual cockle landings were about 22,000 tons (wet weight) with lower amounts at the end of the period (Figure 3.3.4). Most of them were landed in The Netherlands. In January 2005, mechanical cockle fishery was stopped in the Dutch Wadden Sea.

The Netherlands

Since January 2005 mechanical cockle fishery in the Dutch part of the Wadden Sea is not allowed any longer. Only a manual cockle fishery is still allowed with a maximum yearly catch of 5% of the cockle stock. A maximum of 31 licenses for manual cockle fishery have been granted. The fished amounts were between 0.1 and 1.5 % of the stock. The amount fished (in tons of meat, 15% of fresh weight) is given in Figure 3.3.5.

Germany

Cockle fishery in the Schleswig-Holstein was stopped in 1989 and in the Niedersachsen National Park in 1992 and is not allowed in the Hamburg National Park.

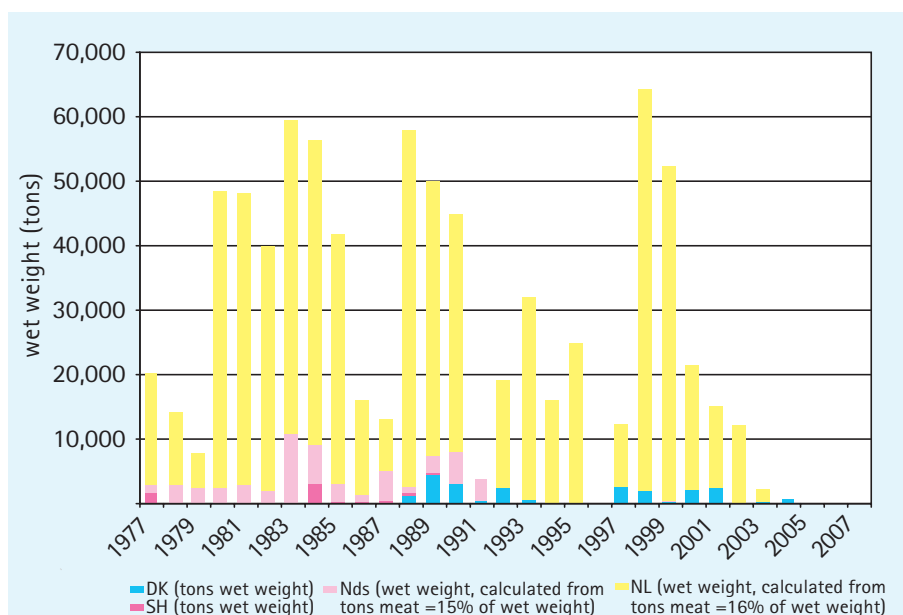
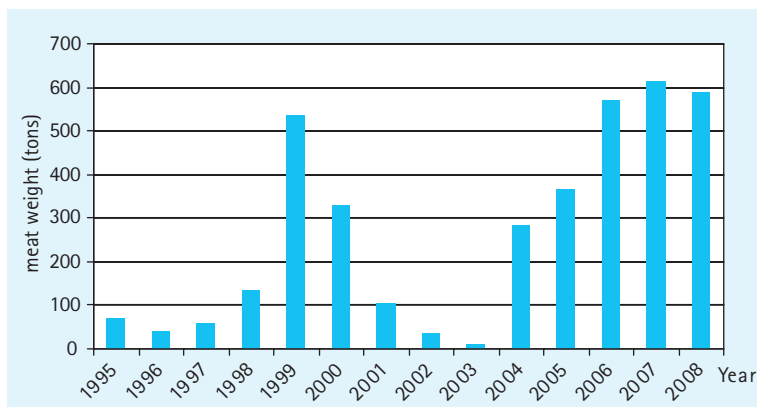


Figure 3.3.4: Landings of cockles in the Wadden Sea 1977–2007 (in tons wet weight) (sources: DTU Aqua, Fischerblatt, RIVO, PVIS).

Figure 3.3.5:
Cockle catch (meat weight)
by hand rakers in the Dutch
Wadden Sea (information
from Rakers Association,
OHV, presented by Bert
Keus).



Denmark

There is one license for cockle fishing in the Danish part of the Wadden Sea. Cockle fishing is restricted to three small areas in the Grådyb, of which one may be fished per year.

In the period 1997–2007 an average annual amount of about 898 tons wet weight of cockles was fished (Figure 3.3.4).

Since 2001, no fishery has taken place because of lack of *Spisula* and food requirement of ducks. Currently, a comprehensive policy for the fishery of *Spisula* (and other shellfish species) is under preparation.

Germany

In Niedersachsen, there has not been any fishing of *Spisula* species or other shellfish species in the Wadden Sea Area since 1995.

3.3.4 Other Shellfish Fisheries

The Netherlands

The average annual landings of *Spisula subtruncata* in the period 1996–2001, taken from the coastal zone north of the Wadden Sea islands, were about 36,160 tons of fresh weight (about 3,600 t meat).

In Schleswig-Holstein, fishing of razor clam (*Ensis* spp.) is not allowed in the Conservation Area. *Spisula solida* fishing may only be carried out outside the 3-mile zone. Since 1996, there has not been any *Spisula* fishing.

Table 3.3.2:
Landings of *Spisula* (1992–
2007) (information from
Per Sand Kristensen).

			Danish landings	
	<i>Spisula solida</i>		Value in euro	pr. kg
	DK-landings tons	Other EU-countries tons	x 1000	euro
1992	484	-	113	0,23
1993	1.651	-	382	0,23
1994	2.716	-	373	0,14
1995	2.877	260	445	0,15
1996	The stock was not fishable due to fishing gear limitations			
1997				
1998				
1999				
2000	55	3.914	9	0,17
2001	214	2.267	56	0,26
2002	1.709	2.656	300	0,18
2003	566	5	110	0,19
2004	1.018	3	198	0,19
2005	31	-	6	0,19
2006	6	-	1	0,19
2007	-	-	-	-
SUM	11.327	9.105	1.993	0,19
Annual	1.030		249	

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

In the Hamburg National Park, shellfish fishing is forbidden in the whole area.

Denmark

In Denmark, there are five licenses for *Spisula* fishing, but only one has been used. After the whole *S. solida* stock in the two fishing sites has disappeared in 1996, *Spisula* fishing started again in 1999 with an annual average of 2,846 t/yr (1999-2003). There has been no fishery on *Spisula* within the last 3 years.

One license for oyster culture has been issued, which is currently not in use.

3.5.5 Shrimp Fishery

In all three Wadden Sea countries, fisheries on brown shrimps (*Crangon crangon*) are carried out in the offshore belt and within the Wadden Sea in all gullies and channels.

Part of the larger vessels (>15 meters) are equipped with VMS (Vessel Monitoring by Satel-

lite). Figure 3.3.6 indicates the fishing pressure. It should be noted that the smaller vessels which can not be traced mainly fish within the islands.

Only in the Danish part of the Conservation Area and in 95% of the area of the Hamburg National Park in Germany shrimp fishery is not allowed. Generally, there are no substantial differences in policies and practices within the Trilateral Cooperation Area, except for Denmark where shrimp fishery is not allowed within the line of barrier islands.

Landings are recorded by country and kept separately. The Working Group on Crangon Fisheries and Life History (WGCRAN) of the International Council for the Exploration of the Sea (ICES), which compiles biological and statistical data on brown shrimp, has met in Ijmuiden end of May 2006 and found new record landings in 2005 for all three Wadden Sea countries (Neudecker and Damm, 2006). However, German landings declined in 2006 and the question arose, whether effort reductions or a reduced stock caused this development (Neudecker *et al.*, 2007).

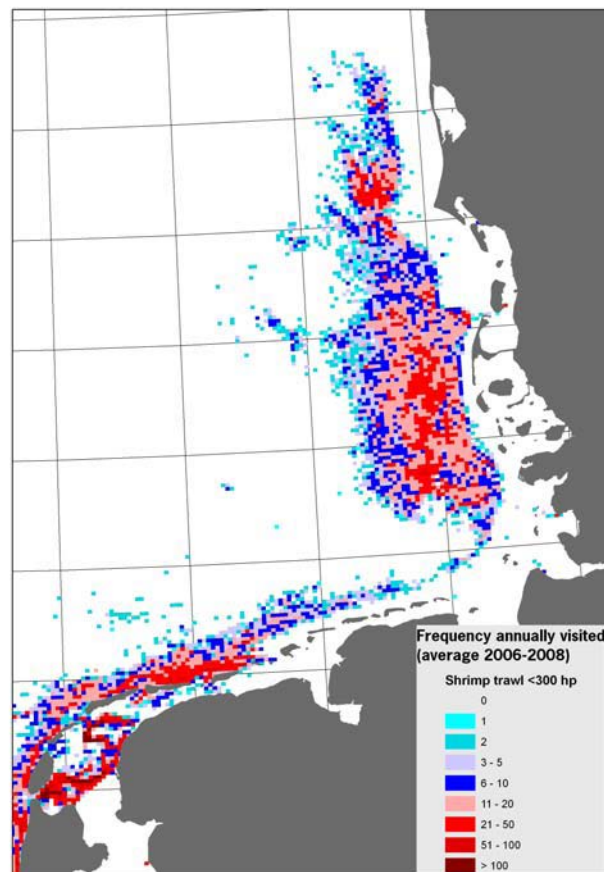
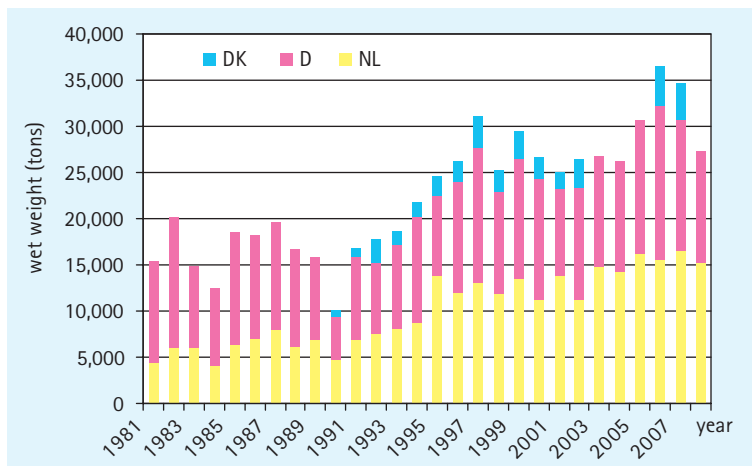


Fig. 3.3.6: Intensity of Shrimp fishery by Dutch vessels in and around the Wadden Sea. The legend indicates the number of visits in an area of 1 square nautical mile (based on VMS information). It should be noted that only around 30% of the fleet is equipped with a vessel monitoring system. Especially the small vessels operating largely within the Wadden Sea do not have such equipment (use of figure by permission of the fishermen association).

Figure 3.3.7: Landings of brown shrimps in 1981–2007 (in tons wet weight) (sources: DTU AQUA, Fischerblatt, PVIS) (DK: data for 1991 – 2002 for Danish vessels).



The Netherlands

In the Dutch part, shrimp fishery is carried out by 204 licensed vessels. Of these, 90 vessels are operating in the Wadden Sea, with 60 exclusively fishing on shrimps. The total average annual catch in The Netherlands (including that from vessels outside the Wadden Sea) was about 15,000 t in most recent years (Figure 3.3.7). According to fishermen, roughly estimated, about half of these landings are fished in the Wadden Sea.

Germany

In Germany, the shrimp catch has been on average 12,000 t/yr (1994–2007). Fishery on small sized shrimp for animal consumption and fish meal is still carried out in Niedersachsen in the second half of the year. The landings are around 600–1,200 t/yr which is about 13% of the amount landed for human consumption in Niedersachsen.

Since the establishment of the National Park of the Hamburg Wadden Sea in April 1990, fishing of shellfish and shrimp in the core zone of the National Park, which is nearly the entire Conservation and Wadden Sea Area, has been prohibited. According to the National Park Law there are exceptions for fishing shrimp for human consumption in three tidal inlets within the core zone, which are also the only designated and marked navigable waters in the Conservation Area. All other areas outside the Conservation Area and inside the Hamburg Wadden Sea Area are not suitable for shrimp fishing.

Denmark

In the last fifteen years, between 21 and 28 licensed vessels have fished for shrimps in Danish waters west of the 'Shrimp Line' (SL) drawn between the Wadden Sea islands from the peninsula of Skallingen to Rømø. Between 100 and 150 vessels (mainly German, Dutch and a few Belgian) fish for shrimps periodically or more permanently in the Danish Economical zone in the North Sea. The SL has been enforced since 1977. In the last fifteen years, the Danish landings have been on average around 2,900 t (only Danish vessels) and about 3,400 t annually (including vessels from other EU countries) (in Figure 3.3.7, Danish data are total landings including foreign vessels). The main landing harbors are Havneby and Esbjerg.

3.5.6 Other Fisheries

The Netherlands

In the Dutch part of the Wadden Sea several other fisheries are carried out, described in more detail in Overzee *et al.* (2008). Gill nets and seines are used to target (mainly) bass and mullet from May–November. There are 13 gill net permits for the Wadden Sea of which 5–6 are actively used. About 4–5 Dutch fishers use seines in the Wadden Sea. Fikes are used in the Wadden Sea for fishing eel, flounder, smelt and Chinese mitten crab. Fyke nets are used all year long, but a peak is observed from August–November. There are 24 fishers with permits for fykes in the Dutch Wadden Sea.

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