ENVIRONMENTAL IMPACT OF BOTTOM GEARS ON BENTHIC FAUNA IN RELATION TO NATURAL RESOURCES MANAGEMENT AND PROTECTION OF THE NORTH SEA

EC PROJECT MA 2.549

AN INVENTORY OF VESSELS AND GEAR TYPES ENGAGED IN THE BELGIAN, DUTCH AND GERMAN BOTTOM TRAWLING

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1. ABOUT THE PROJECT

At the beginning of 1992 the EEC project MA 2-549 "environmental impact of bottom gears on benthic fauna in relation to natural resources management and protection of the north sea" was started with six contractors and five subcontractors coöperating. As a first step in the project an inventory of fishing vessels, fishing methods, fishing areas and species fished for has been made based on data-extraction from several databases and an inquiry among skippers and vessel owners, fishing coöperatives, fishermen unions and fishing gear constructors. This inventory was ment as a background source for the following phases of the project. Three institutes coöperated in making up the overview :

- RIVO-DLO - Rijksinstituut voor Visserijonderzoek - Netherlands
- RVZ - Rijksstation voor Zeevisserij - Belgium
- Federal Research Station for Fisheries, Institute for Fishing Technology - Hamburg, Germany.

The year 1990 was chosen as a reference because, at the time of the making of the inventory, complete data sets were only available for that year. The report contains data on the cutter-fleet only. The large stern trawlers, fishing mainly pelagic and semi-pelagic, are left out of consideration.

In the frame of IMPACT II (1994-1996) the present study will be expanded as a sub-project and will be coördinated by the Rijksstation voor Zeevisserij (sub-project I-b - coördinator H. Polet).

2. INVENTORY OF THE BELGIAN, DUTCH AND GERMAN TRAWLER FLEET

The flatfish beam trawl fishery is the most important part of the national fishery for Belgium and the Netherlands. Beamtrawlers land about 81 % of the Belgian and 66 % of the Dutch catches. A small number of trawlers concentrate either on the roundfish or the Nephrops fishery only. Several trawlers are multipurpose vessels.

The fleets can be classified into three subgroups :

- flatfish beam trawlers (engine power > 221 kW, 300 hp)
- small multipurpose beam trawlers (engine power ≤ 221 kW, 300 hp)
- otter trawlers.

The lists of vessel data for the three countries are given in annex 1, table 1; annex 2, table 1; and annex 3, table 1, mentioning all registered cutters and their home port. Ship tonnages are expressed as BRT - bruto register tonnage. The length of the vessels is expressed as overall length.

2.1. INVENTORY OF BEAMERS AND BEAM TRAWL GEAR

Basically the beam trawl (fig. 1) is a simple envelope of netting held open horizontally by a steel tube, the beam, and vertically by two hoop-like trawl heads. As no hydrodynamic forces are needed to open the trawl mouth little power is required to tow a small beam trawl. However, large beam trawls are often heavier due to the additional chainmat (fig. 2) and tickler chain (fig. 3) arrangements which is needed to assure good contact with the bottom at high towing speed, particularly over a rough sea floor.

Double-rig beam trawlers (fig. 4) tow two trawls, one from either side, by means of two derrick booms. Double-rig beam trawling is used to catch shrimp and flatfish.

When considering bottomtrawls the engine power/swept area ratios are a relevant factor in environmental discussions. Table 1 gives an overview of these ratios. A split is made in northern and southern North Sea where trawlers use different gears related to bottom topography and surface sediments. It appears that swept area per unit of power for large cutters is smaller than for small cutters. A possible explanation is that the hydrodynamic component in the gear resistance is larger for higher than for smaller engine power, viz. 75 % against 50 %. Consequently when fishing speed is high, the hydrodynamic resistance increases much quicker than the bottomresistance. Hence the area swept by the large cutters is disturbed by more and heavier tickler chains and with a higher fishing speed.

Figure 5 gives an overview of the gear weights, beam lengths and speed in relation to engine power. One of the most important components of the gear in direct contact with the bottom are the tickler chains and/or chainmat. For the 4.5 m beamtrawl and the 12 m beamtrawl it can be estimated that 80 % and 90 % respectively of the swept area comes in contact with these parts of the gear. There is a relationship between bottom type and weight, number and diameters of chains. The heaviest gears are used on hard bottoms. On a muddy, soft bottom only a few tickler chains, of smaller diameter, are used to prevent the gear getting stuck into the bottom due to excessive weight.

The warplength-depth ratio is related to the bottom type; the softer the bottom, the shorter the warplength used. Warplength and seastate also influence the bottom pressure of the trawlhead. If the gear weight is recorded it should be noted that to maintain contact with the bottom the weight of the gear (all the metal parts, e.g. beam, shoes, bridle) on the bottom is the total weight of the gear (emersed in water), minus the vertical vector. Variance in towing force is up to about 50% of the

average towing force at Bf 4 to 5.

2.1.1. The small multipurpose beam trawlers

The small multipurpose beam trawlers are vessels with engine power ≤ 221 kW (300 hp). These are allowed to fish within the 12 miles zone with beam trawls, according to EEC-regulation no. 55/87, if each beam length is below 4.5 m. Beams over 4.5 m long are also allowed for shrimp trawling. This applies to 101 Belgian, 210 Dutch and 290 German beam trawlers. According to EEC regulation no. 3554/90 these vessels can also catch sole within the 12 miles zone with a beam length over 4.5 m if, in a 12 month's period, 50 % of the landings consist of shrimp. Every year the list with the vessels matching this condition is adapted based on the vessel's catch. For 1990, 39 Belgian vessels appear on that list.

The small multipurpose beam trawlers target different species with different gears according to the season. Target species are shrimp, flatfish and roundfish and the respective gears used are shrimp beam trawl, flatfish beamtrawl and otter or pair trawl.

2.1.1.1. Beam trawling for shrimp

Shrimps (Crangon crangon) are caught along the coasts, in estuaria and in the "Wadden Sea". A typical shrimp beam trawl is 6 to 8 m wide. The height of the trawl head is 50-75 cm. The net itself is of a simple construction, consisting of a top panel, a lower panel and two gussets. Netting material is polyamide and the mesh size ranges from 28 mm in the front part of the net to 22 mm in the codend. The dimensions of the codend are 200 meshes round and 200 meshes deep. In order to protect the codend it is always covered with a large-mesh codend cover (80 mm). A bobbin groundrope with wooden or rubber bobbins keeps the trawl in contact with the sea bed and enables it to ride over stones and other small obstacles. The average towing speed of most vessels is 3 knots. The complete gear weighs between 600 and 900 kg with an average of 750 kg, but it must be kept in mind that these values are estimates.

The catch is sorted with an automatic sieve. Belgian vessels (and also Breskens, NL) use sieves with a 6.5 mm mesh, whereas Dutch vessels use sieves with a 6.88 mm mesh.

Usually, shrimp trawlers, without refrigeration, leave the harbour in the evening, fish for about 12 hours and return in the morning. In wintertime, if temperatures are quite low and shrimp can be preserved longer, some beamers tend to go fishing for up to 24 hours. In some harbours vessels leave and return at high tide. If vessels are equipped with a refrigerator (some vessels in the Netherlands) time at sea is up to two days.

About 20 % (Belgium) and 40 % (Netherlands) of these vessels fish for shrimp all year, mainly the smaller vessels. Approximately 40 % (Belgium) and 30 % (Netherlands) catch shrimp during a shorter period between June and November when the larger shrimp catches occur and switch to flatfish and/or roundfish species in the rest of the year. About 40 % (Belgium) and 20 % (Netherlands) catch shrimp during a longer period but switch to flatfish between March and June.

2.1.1.2. Beam trawling for flatfish

Most of the shrimp trawlers (80 % for Belgium and 85 % for the Netherlands) change to the flatfish fishery especially during the spawning season when adult sole begin migrating to the coastal nursery grounds. This seasonal fishery starts in March and lasts until the end of May. Some vessels (30 %)

continue this fishery during early summer. Then they all revert to shrimp trawling.

All shrimp trawlers are allowed to catch sole with beam trawls over 4.5 m wide. In this fishery two types of gears are used, round nets and V-nets. The so called round nets are traditional nets with few tickler chains. A more modern type of net is the V-net of which the belly has been cut away further backwards in a V-shape and can be rigged with more tickler chains. The average weight of the gear is 700 kg. A variation of approximately 100 kg applies to the variation in the number of tickler chains used.

The netting material used is polyethylene, single braided in the top panel and mostly double braided in the belly of the net. Mesh sizes range from 120 mm in the front part of the net to 90 mm in the codend. The majority of the fishermen use standard codends with 100 meshes round and 50 meshes deep.

2.1.1.3. Otter trawling or pair trawling for roundfish

Between October and February, when shrimp and sole catches are small, the roundfish fishery used to be commonly practised, with cod and whiting as the main target species. As roundfish stocks are very low in the coastal waters otter trawling (fig. 6) and pair trawling (fig. 7) have only occasionally been practised by the coastal vessels during recent years. However 50 % of the skippers intend to switch to this fishery again during winter time if stocks return to normal levels.

For pair trawling large four panel semipelagic nets are used. The nettingmaterial is polyamide and the mesh size decreases from 600 mm in the front of the net to 90 mm in the codend. The netting for the codend is double braided polyethylene or polyamide and the dimensions are standard (100 meshes round and 50 meshes deep).

The otter trawls (two panel trawls) used have considerably varying dimensions. Again mesh sizes are frequently very large in the front part of the net and decrease to the legal minimum mesh size in the codend. The netting material is polyamide or polyethylene and the codends have standard dimensions. Usually oval otter boards, made of steel, are used.

2.1.2. Flatfish beam trawlers

Flatfish beam trawlers are larger vessel with engine power > 221kW (300 hp) operating in the open sea. These vessels are not allowed to fish within the 12 miles zone. The length of the beams ranges from 4 to 12 m. The use of beamlengths over 12 m is prohibited by law.

Beam trawls are equipped with tickler chains to disturb the flatfishes from the seabed. The tickler chains are attached between the beam trawl shoes. Additionally net-tickler chains often are included in the gear and are attatched to the groundrope. It is a main advantage of beam trawling that the number of tickler chains, and consequently the catching power, is only limited by the horse power of the vessel's main engine whereas the number of tickler chains that can be used in otter trawling is limited by the fishing method itself. In order to allow a large number of chains to be used the belly of the net is cut far backwards. These nets are called V-nets because of the shape of this cut.

For operation on very rough fishing grounds beam trawls can be equipped with chain maitrices. Chain matrices are rigged between the beam and the groundrope and prevent bolders from being caught by the net. The belly in this type of beam nets is cut less far backwards than in a V-net. Therefore chain mat nets are also called round nets (R-nets).

The largest vessels combine the chainmat configuration with some extra tickler chains (fig. 8).

Both V-nets and R-nets may be equipped with so called flip-up ropes to prevent large stones from entering the trawl.

Flatfish beam trawl nets are of the same basic construction as the shrimp trawl nets, but of course they are made of heavier netting yarns and have bigger meshes.

2.1.2.1. Beam trawls with chain matrices.

The dimensions of the compartments in the chain matrices are 30x30 cm (3x3 links) or 30x45 cm (3x5 links). Flip-up ropes are usually used by the larger vessels. To release debris, many trawls have an opening cut in the lower panel, just in front of the codend. This is usually necessary as chain matrices beam trawls are used on dirty grounds. Yhe lower panel and the codend consist of mostly double braided polyethylene. The upper panel is made of single braided polyethylene. The mesh size in the net is usually 120 mm. The standard codend is 100 meshes round (selvedges included) and 50 meshes long.

2.1.2.2. Beam trawls with tickler chains.

The number of tickler chains and net-tickler chains is very variable, but the higher the engine power, the higher the number of chains. As V-nets are mainly used on clean grounds, most of the vessels fishing with V-nets do not install flip-up ropes in the net. The same counts for the debris opening in the lower panel. For V-nets the main netting material is polyamide, often double braided in the lower panel and the codend, single braided in the upper panel. The standard mesh size in the net is 120 mm but often larger meshes are used for the front part of the net in order to reduce water resistance.

2.2. INVENTORY OF OTTER TRAWLERS AND OTTER TRAWL GEAR

The most developed method for keeping towed trawls open horizontally is the use of otter boards. These are large boards of steel or wood and iron, weighted on their base by a protective iron shoe, designed for a firm contact with the bottom, and fitted with brackets, or beckets, to which is attatched the kelly's eye assembly. The otter board is designed to be towed over the bottom at such an angle that the pair of doors constantly try to "swim" away from each other, thus spreading the wings of the net and holding the trawl mouth open. The contact of the otter board with the bottom and the water turbulence behind the board can generate a sand cloud which, together with the noise, leads to a herding effect of the fish. At the trawl mouth, the groundrope, assures good contact with the bottom, and the square prevent fish from escaping.

Otter trawls used by the Belgian, Dutch and German "Cutter" fleet exist in a wide variety and mostly are demersal trawls targeted at roundfish as cod, whiting and haddock.

2.2.1. Otter trawling for Nephrops

Beside the traditional Nephrops fleet, many otter trawlers, especially in Belgium, have switched to the Nephrops fishery in recent years due to low roundfish stocks. The exact period when Nephrops is targeted cannot be clearly determined because skippers easily switch between the roundfish and Nephrops fishery depending on the availability of these species on the fishing grounds.

The average towing speed in the Nephrops fishery is 3 knots. The net is usually fished with rectangular wooden otter boards. The Nephrops trawl is a traditional two panel bottom trawl or a more modern twin trawl.

2.2.2. Otter trawling for roundfish

2.2.2.1. Otter trawling in Icelandic waters

Three Belgian vessels are still (1990) allowed to fish in Icelandic waters but this situation will end once they are replaced by new vessels.

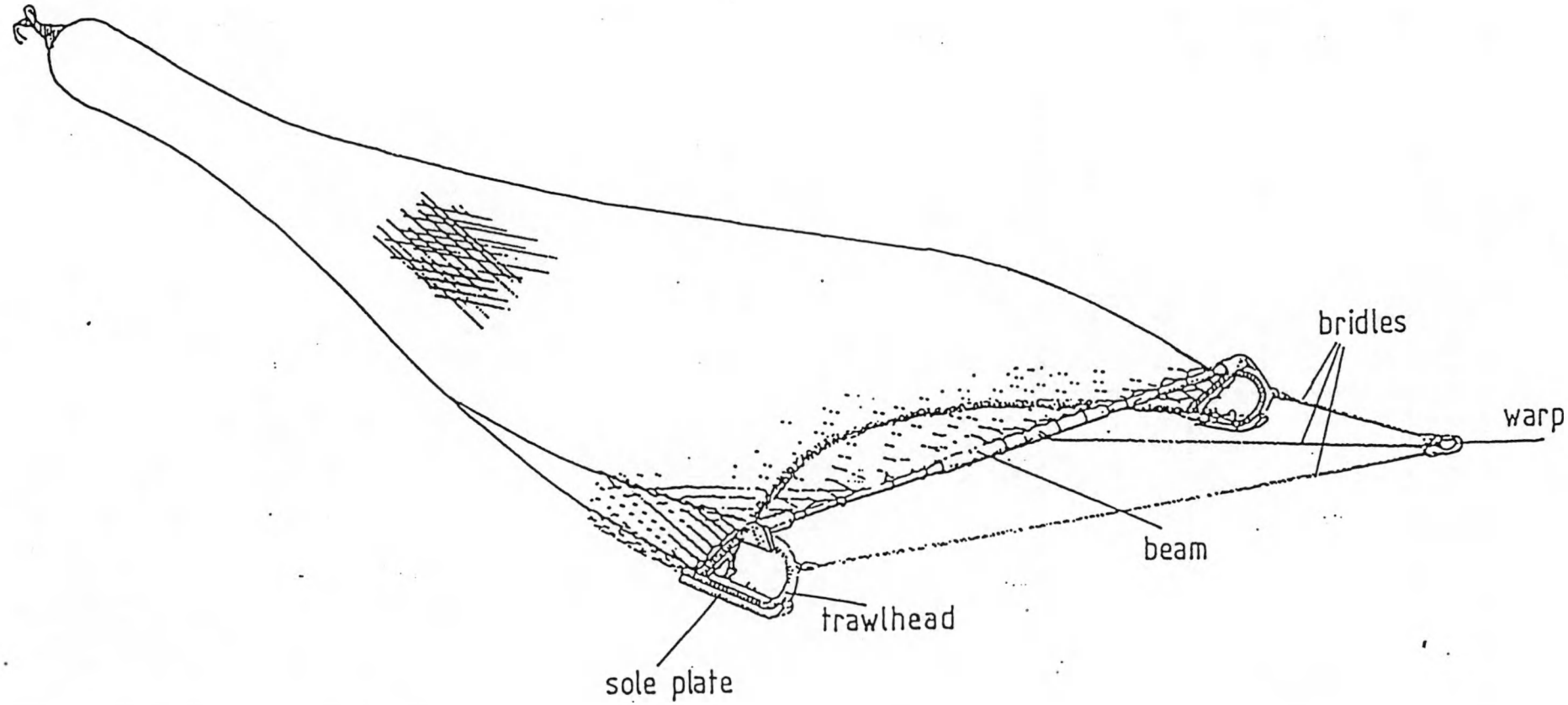
Towing speed is 4 knots. Polyvalent otter boards are used. The gear is based on the Vigneron-Dahl system. The netting material is polyethylene of 135 or 155 mm. The codend consists of double braided polyester. Target species are cod, haddock, saithe and whiting.

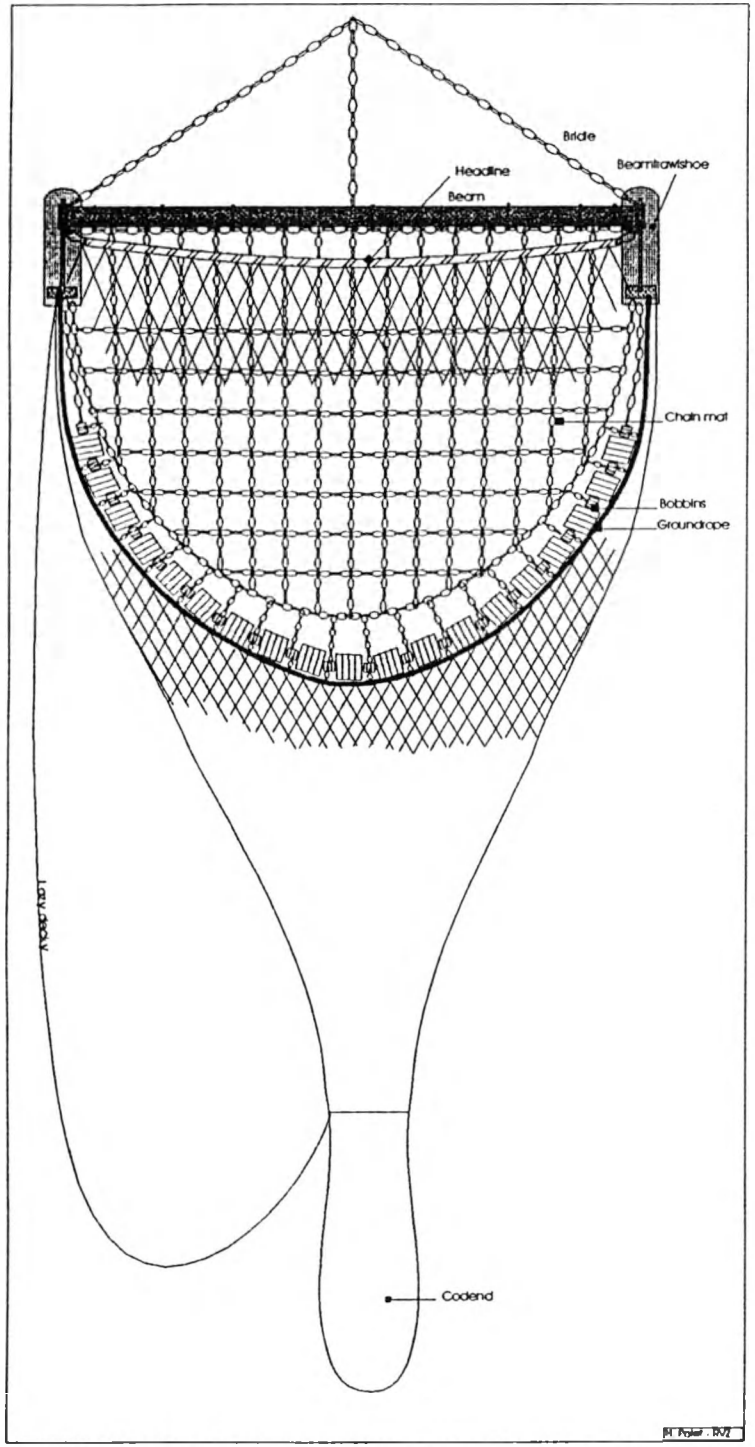
2.2.2.2. Otter trawling in ICES areas IV and VII

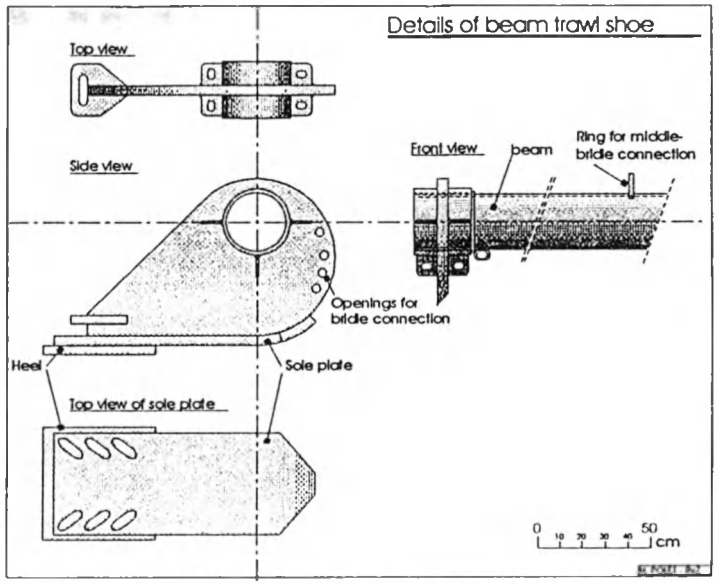
A high variety of trawls and otter boards are used, depending on vessel type (side trawler - stern trawler), fishing ground, target species and light conditions on the fishing ground.

Table 1 : Fishing power related to the swept area

Engine (hp) power (kW)	300 220	1500 1100	2200 1600	3000 N 2200 N	3000 S 2200 S	3700 N 2700 N	3700 S 2700 S
Beam length N* (m)	4	8.7	10.4	12	-	12	-
Beam length S* (m)	4	10.4	12.3	-	12	-	12
Fishing speed (kn)	4.3	5.2	6.2	7.3	7.1	8.3	8.0
Swept surface/h m^2 x 10,000)	3.2	10.0	14.1	16.2	15.8	18.5	17.8
Ratio power/surface	69	80	85	99	101	108	112


bridles
warp
beam
trawlhead
sole plate





Vessel: 883 KW (1200 HP)
BEAMTRAWLER

Fishing gear: Chainmat beamtrawl

- beamlength: 10m, _ 25cm
- headline: 10m, mixed _ 28mm
- groundrope: 17.6m, polyamide
- bobbins: 18m, rubber _ 28cm
- bridles: 6.3m (outer bridle), _ 30mm
- chainmat: Each rectangle contains 5 vertical and 3 horizontal links, _ 18mm

weights for each gear:

- total: 5000kg new - 4500kg used (±1 month)
- beam: 800kg
- 1 trawl shoe: 450kg
- chainmat: 2000kg
- net + bobbins + bridles: 1200kg

Figure 2: Beam trawl with chain matrices

Figure 3a. BEAMTRAWL-GEAR

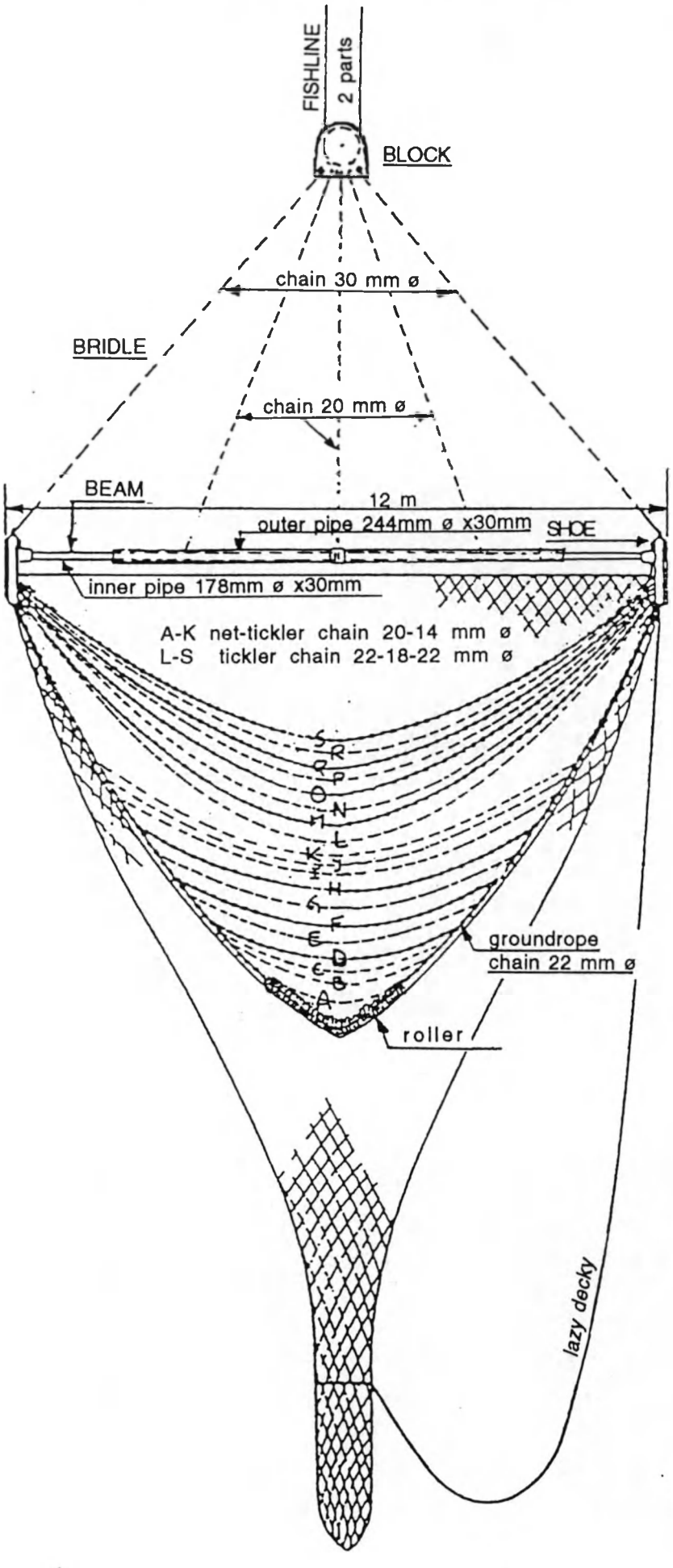


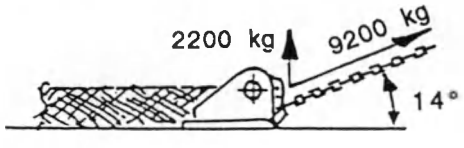
Figure 3b GEAR-DETAILS

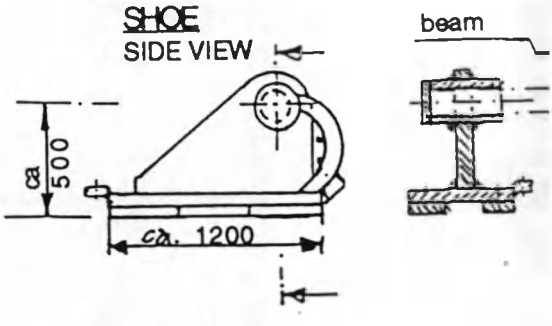
1600 kW (2200 HP) BEAMER
the 7.3 tons gears.

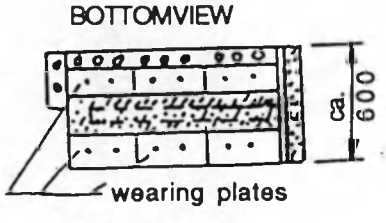
Each gear:	New weight above water	weight under water during approvals
net	+500	
groundrope :		
chain 22 ø	260	/ 200
roller ca 250 ø (most rubber)	550	/ 200
net-ticklerchains		750kg
A-C = 3 x 20 ø	470	/ 350
D-K = 8 x 14 ø		
tickler chains :		
L = 1 x 22 ø	240	
M-O = 3 x 18 ø	435	/ 1020 kg
P-S = 4 x 22 ø	700	
(T-U = 2 x 26 ø	435	
	1810 kg)	
shoe and beam ca. 3200kg		/ 2800
bridle and block ca. 550 kg		/ 480 1080 kg
vert . power : / sin 14°x9200 kg =		/-2200
		2850kg

(chains weared off 15% ≙ 300 kg from new , after 6 weeks of fishing.)

(∡ fishline is 12 -16° , in the South. Northsea with dunes and stones,up to more than 20°.)







wearing layers (welded)

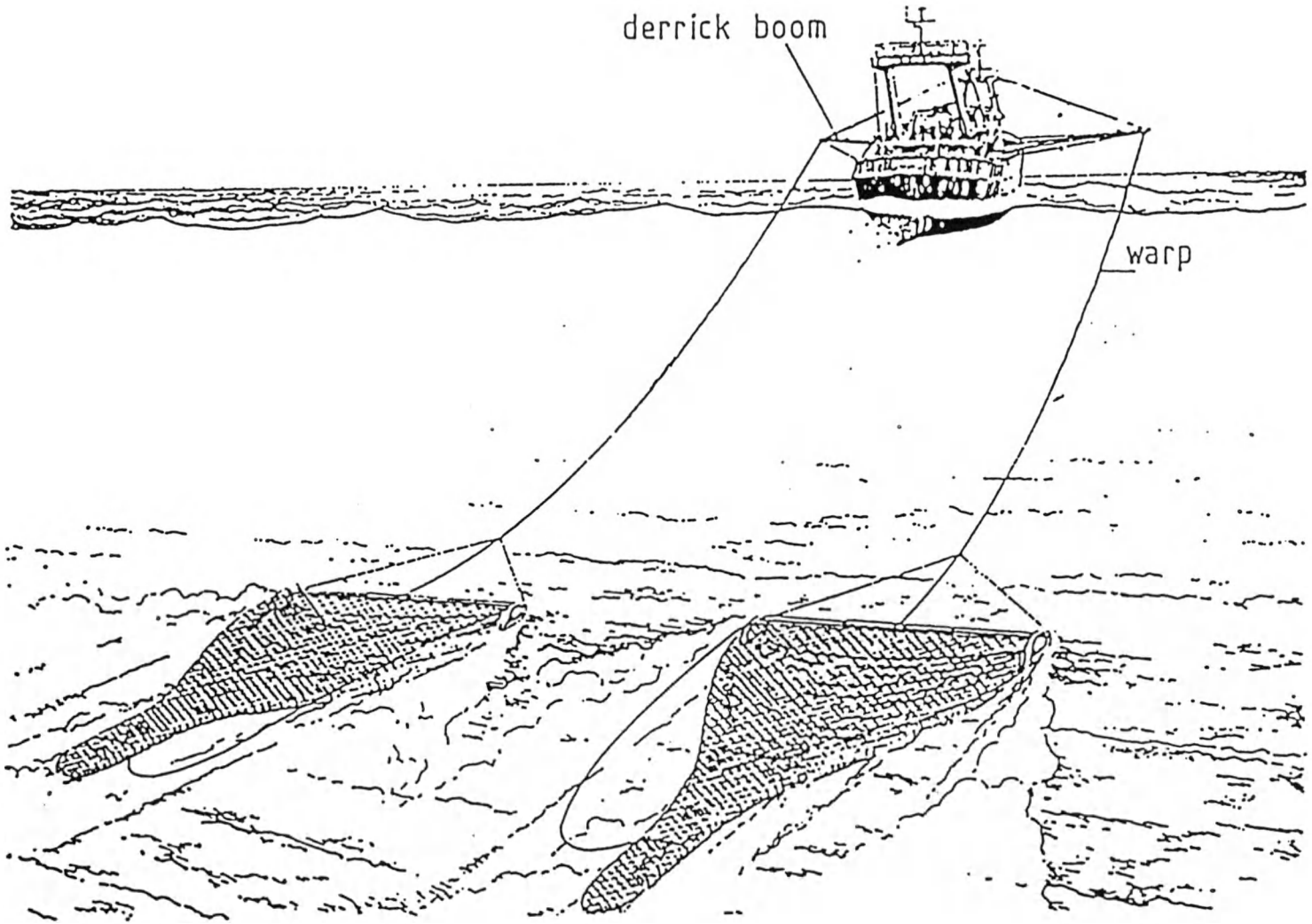


Figure 4 _ Double rig beam trawling

Figure 5. Interrelation engine power, beamlength and gearweight.

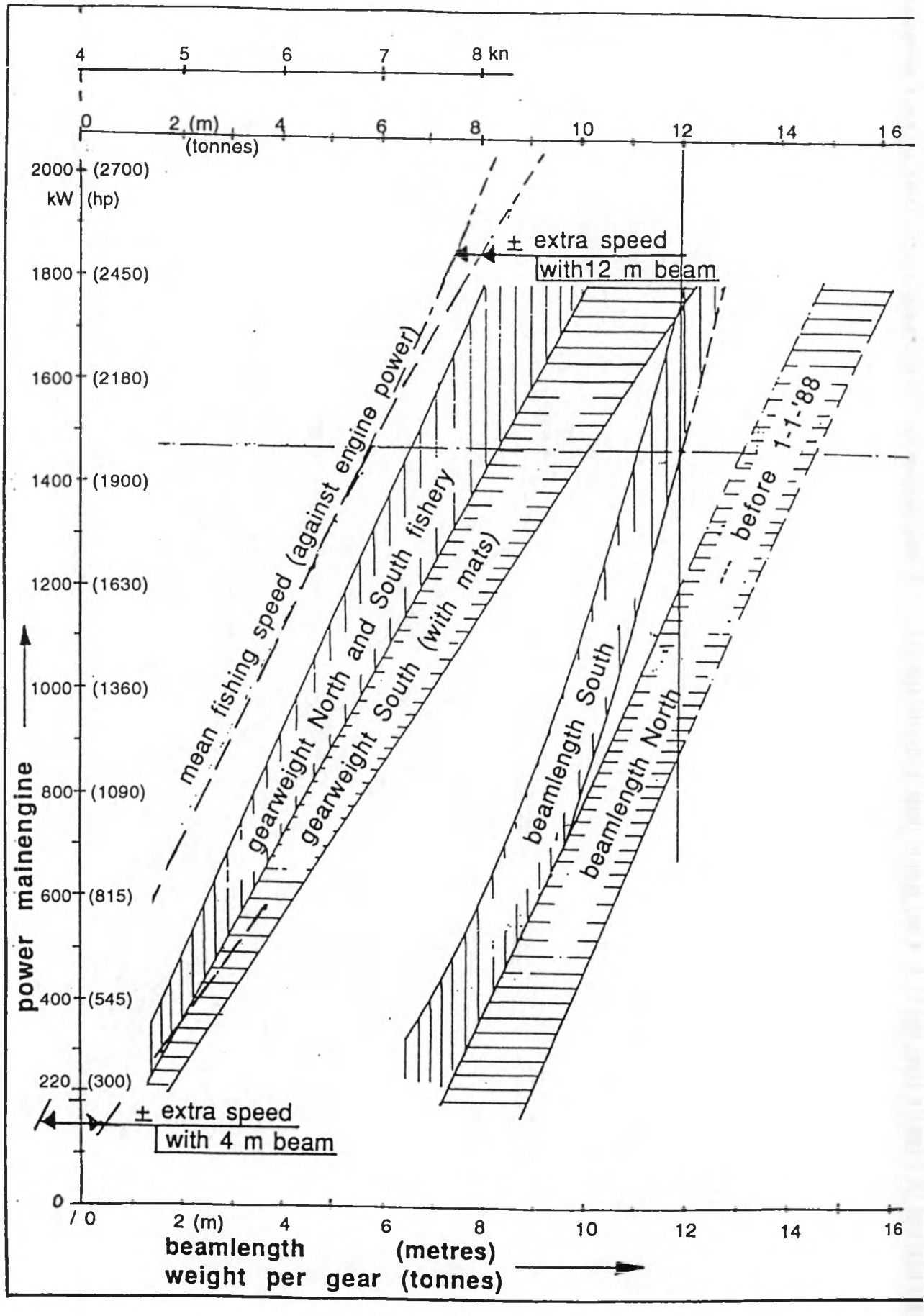


Figure 6: Demersal otter trawling

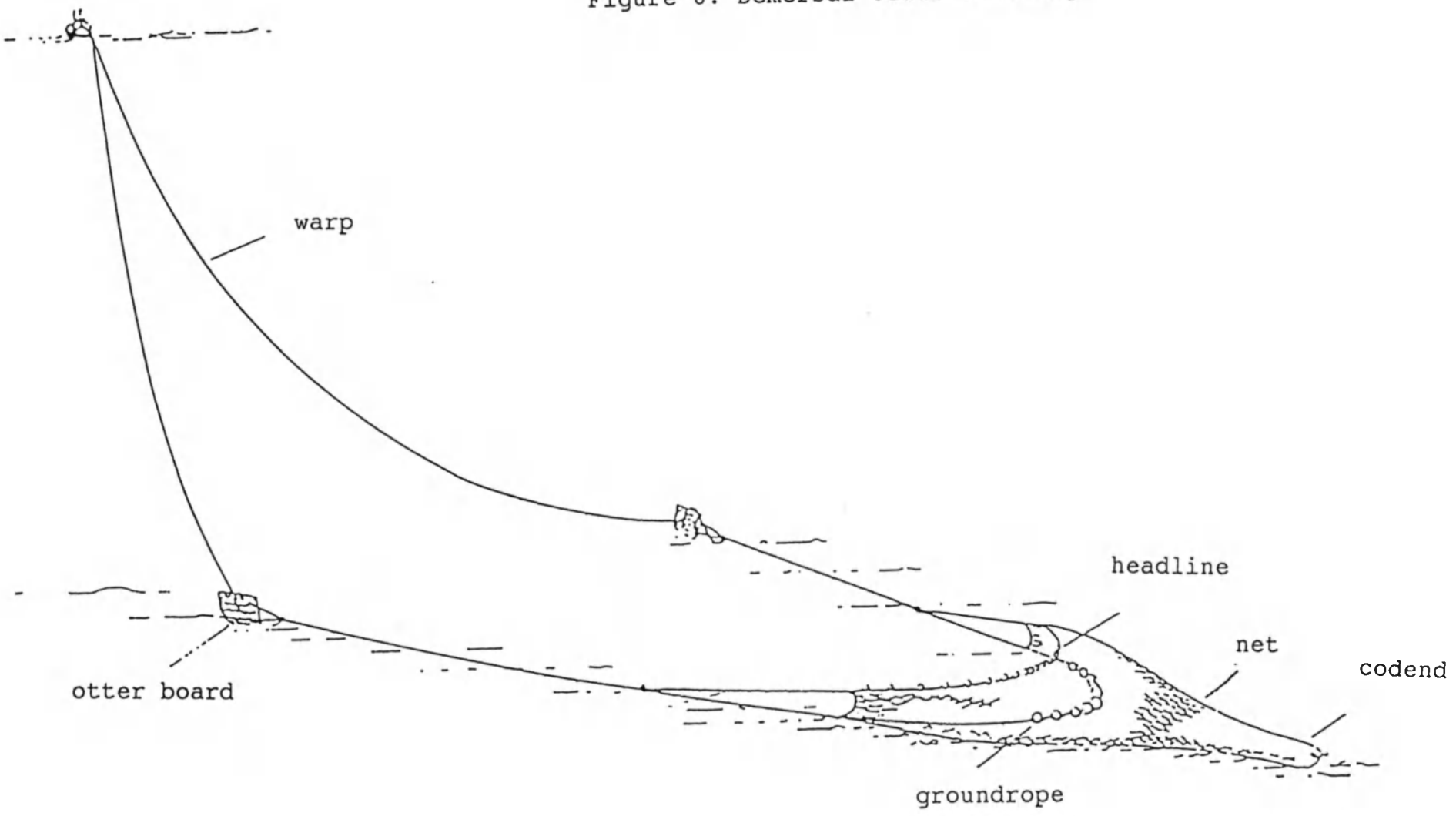
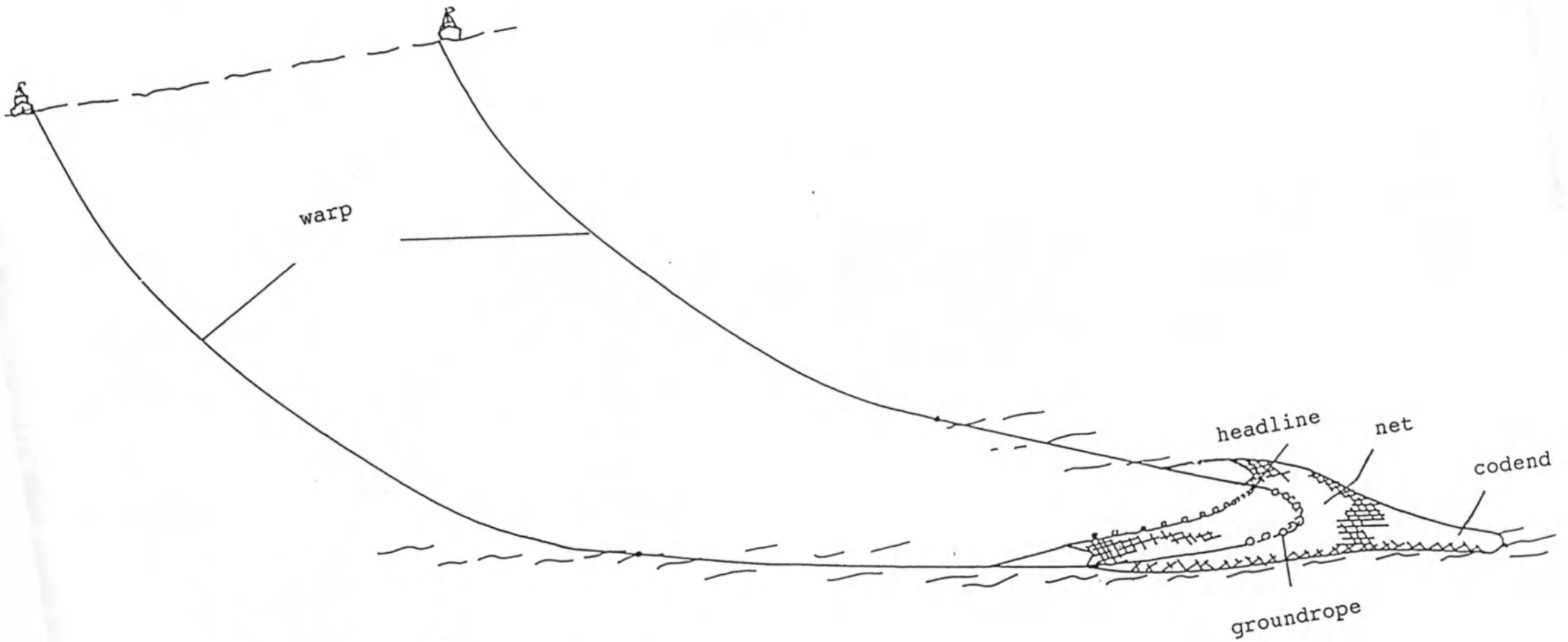


Figure 7: Demersal pair trawling



A 1025 kW beamer
built in1981
with chainmats
and 5 ticklerchains
Wearing peaces
(of old nets) over
the bulwarks.

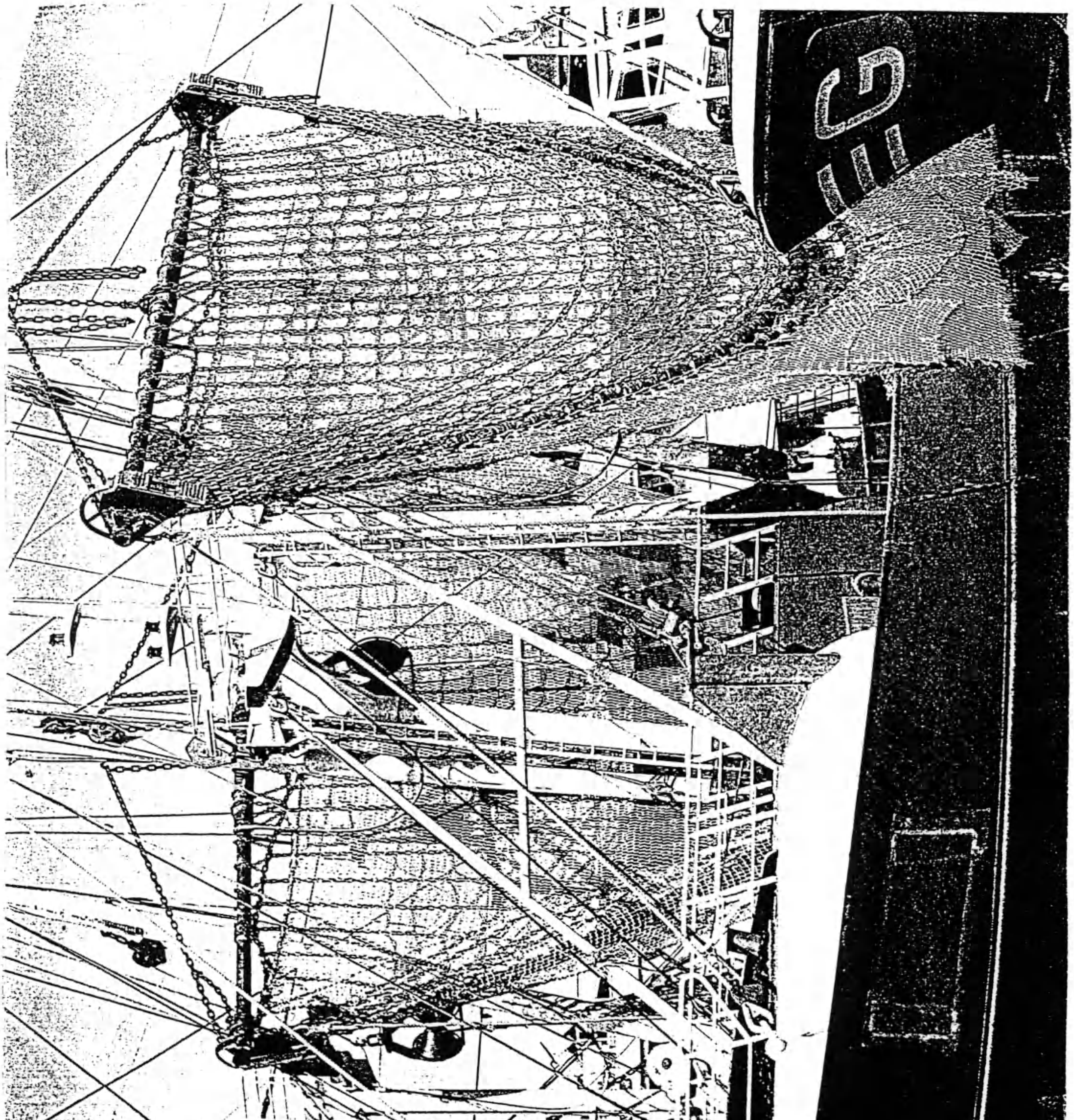


Figure 8 : Beam trawl chainmat configuration combined with tickler chains

ANNEX 1 : Details on the Belgian trawler fleet and gears used

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1. SUMMARY

The inquiry was carried out from december 1991 to April 1992. The skippers/owners of 60 multipurpose beam trawlers (<221 kW, 300 hp) and otter trawlers were questioned on vessel characteristics and on gear and operational parameters. Together with the 79 flatfish beam trawlers inquired for the FAR project TE 2.554 (Improved selectivity in the North sea fishery - Beam trawling) in 1991, 70 % of the Belgian trawlers have now been investigated.

The fleet can be classified into three subgroups :

- flatfish beam trawlers (> 220 kW, 299 hp)
- multipurpose beam trawlers (< 221 kW, 300 hp)
- otter trawlers.

For each subgroup an inquiry form was made up with questions on vessel characteristics, fishing gear characteristics and operational parameters.

A summary of the Belgian fleet composition, its activities, landings and revenues for 1991 is given in table 1. The list of harbours of the Belgian fishery fleet is given in fig. 1.

Beam trawling for flatfish (kW >221, 300 hp) is the most important fishery in Belgium. With 95 vessels out of a total of 200, they account for 83 % of the landings (in tons). This fleet (fig. 2) contains the most modern vessels and has the highest average engine power. Two groups of modern vessels can be distinguished, namely the so called eurocutters with an engine power of 221 kW, 300 hp and the larger vessels with engine powers between 662 kW (899 hp) and 1066 kW (1448 hp). The vessels with engine powers between 221 and 662 kW are often older side trawlers which have been converted into beamers. Two types of fishing gear are used, namely the beam trawl rigged with chain matrices (applied on rough grounds), which is still the most important method, and the beam trawl rigged with tickler chains (applied on clean grounds). The two methods are often applied on the same vessel during different periods of the year and on different grounds, depending on availability of flatfish and quota regulations. Vessels using chain matrices fish mainly in the ICES areas IV_c and VII_{adef}. The ones using tickler chain gear mostly operate in ICES areas IV_{bc}, especially the German Bight.

Belgian shrimp trawlers have shrimp as the main target species but also fish for sole from March to May and for roundfish, if available, in wintertime. Shrimp landings represent only 2 % of the total Belgian landings (tons). Nevertheless 57 vessels are active in this fishery. These vessels have an average engine power of 180 kW (245 hp). Most of the vessels are quite old and have been built in the sixties. The gears used for shrimp are 7 or 8 m beam trawls, for sole 4 m beam trawls with tickler chains and for roundfish otter or pair trawls. All vessels operate within the 12 mile zone.

The Belgian otter trawl fleet consists of 37 vessels, mostly side trawlers, with engine powers between 221 and 589 kW (800 hp). Over 65 % of these vessels fish for Nephrops, which has become more important during the past years because of low roundfish stocks. 4 % of the total Belgian landings (tons) consist of Nephrops. The main fishing grounds are the Botney Gut and Silver Pit in ICES area IV_b and the trawl used is a traditional two panel bottom trawl.

Otter trawling for roundfish, which accounts for 12 % of the total Belgian landings (tons), is carried out with two panel bottom or semi pelagic trawls. Some vessels fish for roundfish all year but most of them switch to Nephrops trawling when roundfish catches are low. The fishing grounds lie within the ICES areas IV_{bc} and VII_{adef}.

2. VESSEL DATA

Table 1 gives a list of the Belgian trawler fleet together with all relevant vessel data as length overall (Loa), gross registered tonnage (BRT), year built, engine power (in kW and hp), age of the engine, the main fishery (b= beam trawling, pl=otter trawling) and the licences. Figure 1 shows the Belgian ports and figure 2 shows the composition of the beam trawler fleet since 1986.

3. BEAM TRAWLERS

3.1. Flatfish beam trawlers

3.1.1. Introduction

The skippers of 79 vessels out of a total of 95 were questioned on vessel characteristics, fishing gear characteristics, fishing grounds and fishing time, target species etc. The inquiry was made among the beam trawlers with an engine power >220 kW (299 hp). This means that the coastal beam trawler fleet was not included.

3.1.2. Results

At the time of the inquiry, January - April 1991, 58 vessels used the so called round nets equipped with chain matrices and 21 vessels used V-nets equipped with tickler chains. Most of the vessels with V-nets only started using them in 1991, and the first to use them started halfway 1990. Because of important restrictions imposed by the Department of Agriculture (Belgium) on the sole catches in the North Sea (where the V-nets are used to catch mainly plaice and sole) since May 1991, most of the vessels using V-nets switched to chain matrices again to continue fishing on rougher grounds with no catch restrictions.

The next table gives the average towing speed and beam length in relation to the engine power for both gear types :

kW	R-nets			V-nets		
	towing	beam	number of	towing	beam	number of
221-442	3.5	6.2	27	3.5	5.0	2
442-662	3.7	8.9	13	4.3	9.6	3
662-810	4.1	9.5	5	4.5	9.0	7
>810	5.0	11.5	13	4.5	10.5	9

Of some vessels equipped with load cells the weight of the complete gear could be given :

kW	beam length (m)	weight (tons)
221	4.5	1.8
883	10.5	5.0
905	10.5	4.5
883	11.0	4.0 (V-net)
883	11.0	5.2
883	11.4	6.0
1066	11.5	6.5

3.1.2.1. Beam trawls with chain matrices. (58 vessels)

- Most of the chains used to construct the matrices have links of 18 mm diameter.

- Dimensions of the compartments in the chain matrices are:
  3 x 3 links (30 x 30 cm) : 25 vessels
  3 x 5 links (30 x 45 cm) : 24 vessels
  5 x 5 links (45 x 45 cm) : 9 vessels

- The chain matrices with the 5 x 5 link configuration are used by vessels with a low engine power (221 kW, 300 hp). The chain diameter is smaller, usually 14 mm, in order to reduce weight. This enables the towing of longer beams.

- Flip-up ropes are used by 25 vessels, most of which have engine power over 442 kW (600 hp).

- To release debris, more than 80 % of the trawls have an opening cut just in front of the codend. This is usually necessary as chain matrices are fished on rough grounds resulting in a large bycatch.

- Netting materials :

  - Lower panel : 80 % of the vessels use polyethylene, mostly double braided. The others use polyamide.
  - Upper panel : all but one use polyethylene, single braided.
  - Codend : all but one use polyethylene double braided.

  - The standard mesh size in the net is 120 mm. Often, the smaller vessels use a larger mesh size in the net in order to reduce the resistance and to fish at a higher speed.

  - The standard codend is 100 meshes round (selvedges included) and 50 meshes long. Almost 80 % of the vessels use this type. Most of the other ones use a shorter codend.

3.1.2.2. Beam trawls with tickler chains. (23 vessels)

Especially the larger vessels (>662 kW, 899 hp) have changed from chain matrices to tickler chain gear, and this since the middle of 1990. At the end of February 1991 over 30 % of the Belgian

North sea quota for sole were already caught. To prevent a premature exhaustion of the quota, landings from North sea fishing grounds were severely limited (25 kg sole / day) for the larger vessels (>662 kW) as from 25 March onwards. As a result, most of these vessels switched to chain matrices again to fish on other grounds. The figures given here date from shortly before this period.

- number of tickler chains attached to the trawl heads : 4-8.
- Number of tickler chains attached to the groundrope : 4-12.

The number of tickler chains is very variable, but in general as the engine power increases, so does the number of chains.

- As V-nets are only used on clean grounds, almost no vessels fishing with V-nets use flip-up ropes, or the debris opening in the lower panel.

- Netting materials :

  - Lower panel : 55 % use polyamide double braided, 35 % use polyamide single braided and only two vessels use polyethylene double braided.
  - Upper panel : 90 % use polyamide single braided. The few others use polyethylene single braided.
  - Codend : 75 % use polyethylene double braided, 25 % use polyamide double braided.

  - The standard mesh size in the net is 120 mm.

  - 70 % use a standard codend, 100 meshes round and 50 meshes long. The others use a longer codend.

3.1.2.3. Fishing grounds

Vessels using chain matrices fish mainly in the ICES areas IV_c and VII_{adef}. Half of the vessels with engine powers <662 kW (899 hp) do not go any further than area VII_d. The others often go as far as the Irish Sea. Time at sea varies from 8 - 12 days for vessels fishing close to home ports, and up to 14 - 16 days for the others.

The vessels using tickler chain gear operate in the clean grounds of ICES areas IV_{bc}, especially the German Bight. Some of these vessels only stay at sea for 5 days, others are at sea for 2 weeks, often landing in foreign ports.

3.1.3. Some figures about the Belgian flatfish beam trawler fleet

Table 3 shows the activities of the Belgian flatfish beam trawler fleet in 1990 for different HP classes. The best returns per day fishing and per unit of engine power are obtained by the 300 HP Eurocutters.

Table 4 shows the landings of sole, plaice, cod and whiting. Although plaice and sole are the most important species, still a lot of cod and other species are caught by this specialised flatfish fishery.

Table 5 shows the landings in 1990 per fish species and per fishing method.

Figure 2 shows the evolution of the beam trawler fleet composition in terms of engine power between 1985 and 1992.

3.2. Small multipurpose beam trawlers - inclusive eurocutters

3.2.1. Introduction

The skippers of 27 multipurpose beam trawlers have been questioned on vessel characteristics, fishing gear characteristics, fishing grounds and fishing time, target species and bycatch etc. All the shrimp trawlers are part of the Belgian coastal beam trawler fleet and have engine powers < 221 kW (300 hp). 27 skippers/owners of vessels out of a total of 57 small beam trawlers were questioned.

3.2.2. Results

3.2.2.1. Beam trawling for shrimp

The average towing speed of most vessels is 3 knots. The beam length used is 7 or 8 m. All skippers use a warplength / depth ratio 2 on soft muddy grounds and 3 on harder sandy grounds.

All vessels apply similar net. The groundrope consist of wooden or rubber bobbins fitted on steel axes with a diameter varying between 16 and 22 mm. The weight of the groundrope, of which the underwaterweight to a great extent is determined by the diameter of the axes, varies between 150 and 300 kg. Some of the vessels with higher engine power use heavier groundropes in order to have a better bottom contact. Only 25 % of the trawls are still equipped with the traditional wooden bobbin groundropes, which wear out sooner but are less expensive. More and more vessels are switching to the modern rubber bobbins. The number of bobbins on a groundrope is 28, 30 or 32, with a diameter varying between 17 and 20 cm. The average length of the groundrope is 8.8 m for a 7 m beam and 10.1 m for an 8 m beam.

The weight of the complete gear lies between 600 and 900 kg with an average of 750 kg, but it must be kept in mind that these values are estimates.

The netting material for all shrimp trawls is polyamide. The mesh size varies from 28 in front of the net to 22 in the codend. The dimensions of the codend are 200 meshes round and 200 meshes deep. In order to protect the codend it is always covered with a large-mesh cover (80 mm).

The Belgian shrimp trawlers mostly fish close to the Belgian coast, within the 12 miles zone. Vessels whose homeport is Antwerpen or Boekhoute also fish on the Schelde and together with vessels from Zeebrugge sometimes fish in the Dutch 12 miles zone. Occasionally vessels from Nieuwpoort fish in the French 12 miles zone.

3.2.2.2. Beam trawling for flatfish (sole)

Most of the shrimp trawlers (80 %) change to the sole fishery during the spawning season when adult sole begin migrating to the coastal nursery grounds. This seasonal fishery starts in March and lasts until the end of May. Some vessels (30 %) continue this fishery during early summer. They all then revert to shrimp trawling again.

All shrimp trawlers are allowed to catch sole with beam trawls with beam lengths over 4.5 m. Nevertheless most of them use 4 m beams. The groundrope consists of a chain and has a length varying between 7 and 11 m. The 7 or 8 m groundropes are typical for the so called round nets, traditional beam trawls for sole with 2, 3 or 4 tickler chains. In the trawls with 11 m groundropes

(the so called V-nets) the belly has been cut away further backwards in a V-shape and can be rigged with more tickler chains. The results of the inquiry do not show a clear relationship between length of the groundrope and the number of tickler chains. A possible explanation is that the number of tickler chains used also depends on the type of fishing ground. On unclean grounds less tickler chains will be applied. The diameter of the links in the tickler chains varies between 12 and 16 mm.

The netting material used is polyethylene, single braided in the top panel and mostly double braided in the belly of the net. 40 % of the nets have an overall mesh size of 90 mm and the other 60 % have larger meshes (120 mm) in the front part of the net. The majority of the fishermen use standard codends with 100 meshes round and 50 meshes deep.

3.2.2.3. Otter trawling or pair trawling for roundfish

Between October and February, when shrimp and sole catches are small, the roundfish fishery used to be commonly practised, with cod and whiting as the main target species. As roundfish stocks are very low in the Belgian coastal waters otter trawling and pair trawling have only occasionally been practised by the coastal vessels during recent years. Still 50 % of the skippers would switch to this fishery again during winter if stocks were to reach normal levels.

For pair trawling large four panel semipelagic nets with 60 m headline and groundrope, 25 m wingline and 8 to 10 m vertical netopening are used. The netting material is polyamide and the mesh size decreases from 600 mm in the front of the net to 400 mm, 300 mm, 150 mm, 120 mm to 90 mm in the codend. The netting for the codend is double braided polyethylene or polyamide and the dimensions are standard (100 meshes round and 50 meshes deep). The otter trawls (two panel trawls) used have considerably varying dimensions, with headline lengths between 10 m and 23 m, groundrope lengths between 14 m and 28 m and mesh sizes of 400 mm in the front part for the larger trawls and 150 mm for the smaller ones. The netting material is polyamide or polyethylene and the codends have standard dimensions. Usually oval otter boards, made of steel, are used.

4. OTTER TRAWLERS

4.1. Introduction

The skippers of 25 otter trawlers have been questioned on vessel characteristics, fishing gear characteristics, fishing ground and period, target species etc. The Belgian otter trawl fleet consists of 37 vessels with engine power between 221 and 589 kW.

4.2. Results

4.2.1. Nephrops trawling

Due to low roundfish stocks many otter trawlers have switched to the Nephrops fishery in recent years. This means that, together with the vessels that traditionally fish for Nephrops, over 65 % of the otter trawl fleet practises this fishery now. Half of the vessels do this all year. The other half fishes for Nephrops during a shorter period (usually between April and September) when larger Nephrops catches occur. This period cannot be clearly determined because skippers easily switch between the roundfish and Nephrops fishery depending on the availability of roundfish on the fishing grounds.

The average towing speed in the Nephrops fishery is 3 knots, with a minimum of 2.5 and a maximum of 3.5 knots.

Only one type of otter board is used, a rectangular wooden otter board of 430 kg and dimensions of 2.4 m x 1.2 m.

The Nephrops trawl is a traditional two panel bottom trawl. The headline length is quite constant with an average of 27 m. The length of the groundrope varies more (between 31 and 38 m) because the efficiency of this trawl depends very much on this length in relation to vessel characteristics and engine power. The central part of the groundrope (+/- 20 m) consists of wire rounded with netting and rope. The rest, together with the lower bridle is made of chain. The upper bridle consists of wire or mixed rope. Both bridles usually have a length of 6 to 7 m.

The netting material is always polyethylene with a mesh size of 90 mm through the whole net. The codend is made of double braided polyethylene and has standard dimensions (100 x 50 meshes).

Fishing grounds visited are the Botney Gut and Silver Pit in ICES area IV_b. Usually vessels stay at sea for 12 days.

4.2.2. Otter trawling for roundfish

4.2.2.1. Otter trawling in Icelandic waters

Three Belgian vessels are still allowed to fish in Icelandic waters. But this situation will end once they are replaced by new vessels.

Towing speed is 4 knots. Polyvalent otter boards of 850 kg are used. The gear is based on the Vigneron-Dahl system, has a headline length of 26 m and a groundrope of 42 m rigged with rubber discs. The netting material is polyethylene of 135 or 155 mm. The codend is 8 m long with 70 meshes round and consists of double braided polyester. One seatrip takes 18 days.
Target species are cod, haddock, saithe and whiting.

4.2.2.2. Otter trawling in ICES areas IV and VII

Only few vessels fish for roundfish all the year round. Most of them switch to Nephrops trawling when roundfish catches are small. The Belgian otter trawl fleet only counts two stern trawlers, the others are side trawlers. A variety of trawls are used, depending on vessel type (side trawler - stern trawler), fishing ground, target species and light conditions on the fishing ground.

Normal towing speed is 3 knots. Usually wooden rectangular otter boards are used with weights between 400 and 500 kg. Few vessels use polyvalent otter boards of 430 kg. All trawls used by the side trawlers have two panels and are demersal or semi-pelagic. Headline lengths vary between 19 and 28 m and groundrope lengths vary between 27 and 38 m. The groundropes consist of rope rounded wire or chain and are often provided with bobbins in the central part. The trawls are made of polyethylene netting with mesh size up to 140 mm in the front of the trawl, decreasing to 100 or 90 mm in front of the codend. Codends consist of double braided polyethylene and have standard dimensions (100 x 50 meshes).

The fishing grounds lie within the ICES areas IV_{bc} and VII_{adef}. The main target species are cod, whiting, skate and different flatfish species.

Table 1: Belgian trawler fleet - 31.12.90

						Engine power				EEC-list :	
Homeport	no.	Name	Loa	BRT	Year built	KW	HP	Engine (yr)	Fishery	55/87	3554/90
O	20	Goewind	14.31	25.80	1971	110	150	1967	b	x	x
O	23	Geoffrey William	20.14	34.50	1930	221	300	1987	b	x	
O	29	Broodwinner	27.20	99.03	1967	221	300	1967	b	x	
O	32	Vicky	13.50	18.44	1935	55	75	1950	b	x	x
O	33	Marbi	34.80	226.22	1976	882	1200	1975	b		
O	35	Torbay	27.20	82.96	1961	337	458	1980	pl		
O	51	Stormvogel	30.58	197.56	1983	662	900	1983	b		
O	62	Seabird II	19.11	37.00	1963	206	280	1984	b	x	x
O	64	Black -Jack	14.00	24.00	1987	110	150	1983	b	x	x
O	82	St-Antoine	14.50	31.00	1987	138	188	1986	s	x	
O	87	Nele	20.04	68.00	1987	220	299	1987	b	x	
O	100	Emilie	16.80	29.91	1964	176	240	1988	b	x	x
O	101	Benny	16.80	29.91	1967	184	250	1987	b	x	x
O	108	Arent	30.28	143.06	1968	485	660	1969	b		
O	110	Jeaninne-Margaret	18.01	39.27	1959	193	262	1986	b	x	x
O	116	Caroline	17.00	29.75	1961	142	193	1987	b	x	
O	124	Fighter	32.23	259.00	1985	882	1200	1985	b		
O	127	Okeanos	28.75	130.90	1968	353	480	1989	b		
O	129	Amandine	36.00	196.66	1961	375	510	1961	pl		
O	135	Maria Duyne	28.00	100.42	1970	276	375	1970	pl		
O	137	Twilight	32.50	247.00	1983	750	1020	1984	b		
O	142	Hermes	20.00	47.13	1957	191	260	1988	b	x	x
O	148	Snipe	20.60	55.31	1957	110	150	1958	b	x	
O	154	Wilmar	25.94	207.00	1988	518	705	1988	pl		
O	172	Jean-Glenn	21.10	59.24	1955	147	200	1969	b	x	
O	187	St. Antonius	23.99	109.00	1989	211	287	1989	b	x	
O	190	Renilde	20.91	49.47	1963	221	300	1987	b	x	
O	191	Natacha	17.00	42.00	1968	176	240	1979	b	x	
O	192	Lydie-Madeleine	22.15	49.31	1957	221	300	1988	b	x	
O	206	Krisjean-Henson	28.00	101.02	1969	268	365	1989	pl		
O	211	Christoph	14.60	27.73	1971	158	215	1988	b	x	x
O	216	Henri-Jeanine	41.43	280.88	1961	551	750	1961	pl		
O	225	Norman Kim	20.60	57.18	1957	184	250	1972	b	x	
O	229	Roger-Jeanine	27.00	98.05	1963	265	360	1962	pl		
O	231	St.Carolus	34.60	264.69	1981	882	1200	1980	b		
O	232	Luc-Peter	28.00	105.75	1966	276	375	1966	pl		
O	274	Lucali	28.00	121.25	1967	221	300	1967	b	x	
O	275	Deo Volente	27.00	100.96	1964	243	330	1964	pl		
O	279	Ramblers	27.20	89.83	1969	309	420	1979	pl		
O	303	Girl Linda	27.20	89.83	1969	313	425	1969	b		
O	306	Cleaner	27.20	98.39	1968	276	375	1967	pl		
O	309	J.Van Maerlant	27.00	98.39	1965	221	300	1965	pl		
O	316	Aegir	32.32	336.00	1987	588	799	1986	pl		
O	318	Belgian Sailor	40.00	183.47	1946	441	600	1958	pl		
O	333	Marco	36.01	329.00	1985	875	1190	1984	b		
O	349	Lady	16.55	68.00	1989	221	300	1988	pl	x	x
O	369	Koningin der Engelen	27.00	90.72	1963	313	425	1983	pl		
O	427	Pascal	23.00	61.08	1964	220	299	1986	b	x	
O	431	Judith	28.00	102.68	1963	367	499	1966	b		
O	455	Zeesymphonie	16.50	36.20	1964	184	250	1967	b	x	x
O	468	Aran	18.70	39.97	1956	132	180	1956	b	x	
O	481	Bi-Si-Ti	17.00	28.23	1960	165	225	1985	b	x	x
O	494	Lucky Star	17.00	29.30	1967	176	240	1987	b	x	
O	499	Coudekercke	27.70	120.65	1968	368	500	1967	b		
O	500	De Hoop	22.60	69.85	1963	215	292	1983	b	x	
O	518	Cutty Sark	28.12	125.24	1969	390	530	1968	b		
O	520	Manuela	17.00	29.98	1964	129	175	1976	b	x	
O	533	Virtus	21.00	57.18	1965	147	200	1963	b	x	x
O	552	Marathon	17.53	39.68	1954	99	135	1954	b	x	x
O	705	Morning Star	27.20	98.92	1971	343	466	1986	b		
Z	5	Drakkar	39.00	210.76	1957	662	900	1981	b		
Z	12	Sabrina	20.80	49.96	1966	210	285	1983	b	x	x
Z	14	Brandon Star	29.00	175.37	1973	662	900	1981	b		

						Engine power				EEC-list :	
Homeport	no.	Name	Loa	BRT	Year built	KW	HP	Engine (yr)	Fishery	55/87	3554/90
Z	15	Stephanie	34.80	224.37	1975	882	1200	1985	b		
Z	16	Kon-Tiki II	31.10	190.46	1973	662	900	1973	b		
Z	19	Sonja	30.70	147.56	1974	515	700	1973	b		
Z	26	De Parel	27.75	117.00	1963	331	450	1969	pl		
Z	27	Mercurius	33.50	199.46	1974	684	930	1974	b		
Z	30	Westhinder	30.70	143.25	1972	441	600	1972	b		
Z	34	Northern-Sky	20.04	68.00	1988	221	300	1988	b	x	
Z	37	Orca	24.55	69.00	1986	220	299	1986	b	x	
Z	38	Manta	24.55	69.00	1986	220	299	1986	b	x	
Z	39	Zuiderzee	32.50	223.62	1982	772	1050	1981	b		
Z	41	Pieterjan	25.58	103.68	1973	276	375	1972	pl		
Z	43	Pandora	27.78	157.96	1980	551	750	1980	b		
Z	44	De Caine	27.78	157.96	1979	551	750	1979	b		
Z	46	Neptunus	34.90	273.00	1983	882	1200	1983	b		
Z	47	Saturnus	27.89	158.49	1980	596	810	1980	b		
Z	48	Wodan	32.50	246.00	1983	882	1200	1983	b		
Z	50	Tijl	30.00	181.93	1982	662	900	1982	b		
Z	53	Van Eyck	34.29	234.00	1981	662	900	1980	b		
Z	54	De Bounty	35.77	328.00	1985	880	1197	1985	b		
Z	55	Goede Hoop	23.49	60.00	1962	221	300	1988	b	x	
Z	56	Orka	23.00	52.00	1960	202	275	1978	b	x	
Z	59	Gudrun	34.90	273.00	1985	882	1200	1985	b		
Z	60	Bleu Angel	36.25	317.00	1988	882	1200	1987	b		
Z	63	Thalassa	20.04	68.00	1987	220	299	1986	b	x	
Z	66	Nelson	30.58	224.00	1985	662	900	1984	b		
Z	67	Rubens	34.90	274.00	1983	882	1200	1984	b		
Z	69	De Kaper	34.90	273.00	1986	882	1200	1986	b		
Z	70	t Westdiep	23.77	70.00	1985	221	300	1985	b	x	
Z	72	Aquarius	29.52	188.49	1967	441	600	1971	b		
Z	76	Zeejager	34.90	273.00	1985	882	1200	1984	b		
Z	78	Vertrouwen	34.90	274.00	1983	904	1230	1984	b		
Z	79	Thorn	23.82	70.00	1986	221	300	1986	b	x	
Z	80	Silverpit	21.08	67.00	1984	221	300	1988	b	x	
Z	84	De Klauwaert	31.25	182.11	1981	795	1080	1989	b		
Z	85	Morgenster	23.82	81.00	1987	221	300	1987	b	x	
Z	86	Surcouf	14.50	31.00	1987	143	195	1985	b	x	
Z	88	Nova Cura	17.95	39.81	1961	104	141	1961	b	x	
Z	89	Sandra	33.53	198.58	1982	883	1200	1982	b		
Z	90	Oosthinder	34.90	274.00	1982	882	1200	1983	b		
Z	91	Noordhinder	34.90	274.00	1985	882	1200	1985	b		
Z	92	Lundy Gannet	34.54	260.32	1980	882	1200	1980	b		
Z	93	Aalscholver	21.08	67.00	1986	220	299	1985	b	x	
Z	96	Jan Van Gent	37.15	366.00	1986	880	1197	1985	b		
Z	97	Cleopatra	34.90	273.00	1986	882	1200	1985	b		
Z	98	Op Hoop van Zegen	30.57	156.49	1970	662	900	1984	b		
Z	99	Terra Nova	33.53	199.60	1975	735	1000	1975	b		
Z	105	Atlas	36.25	317.00	1987	880	1197	1987	b		
Z	114	Zeeengel	28.00	101.91	1964	221	300	1964	b	x	
Z	121	Barentszee	30.58	222.00	1983	662	900	1983	b		
Z	122	Noordster	21.08	67.00	1985	221	300	1988	b	x	
Z	123	Eldorado	27.20	98.39	1964	276	375	1964	pl		
Z	128	Rembrandt	28.75	130.90	1966	243	330	1966	pl		
Z	134	Mercator	28.75	130.90	1966	243	330	1966	pl		
Z	141	Sea Crosser	27.20	98.39	1964	221	300	1964	b		
Z	162	Van Dyck	33.53	199.77	1974	735	1000	1974	b		
Z	181	Zeemeeuw	29.73	129.70	1965	316	430	1984	pl		
Z	183	Christopher	30.70	143.12	1973	551	750	1973	b		
Z	185	Emerald Star	36.92	297.00	1983	882	1200	1983	b		
Z	186	Shannon	34.80	226.43	1975	882	1200	1975	b		
Z	189	Shamrock	29.20	111.07	1966	309	420	1965	b		
Z	196	Zeeduivel	31.35	153.64	1973	588	800	1973	b		
Z	198	Zeenimf	29.20	146.70	1967	368	500	1966	pl		
Z	201	Marie -Madeleine	20.00	49.99	1944	110	150	1957	b	x	x
Z	207	Adamtje	23.77	69.00	1985	221	300	1985	b	x	
Z	243	Drakkar	36.25	317.00	1988	880	1197	1988	b		
Z	284	Vicky	35.05	259.56	1982	1065	1448	1982	b		
Z	296	Mooie Meid	28.02	149.92	1980	540	735	1986	b		

						Engine power				EEC-list :	
Homeport	no.	Name	Loa	BRT	Year built	KW	HP	Engine (yr)	Fishery	55/87	3554/90
Z	300	Veerman	21.08	69.71	1981	221	300	1986	b	x	
Z	307	Zeetrapper	27.20	98.39	1967	276	375	1967	pl		
Z	319	Philadelphian	39.87	264.41	1960	1064	1447	1979	b		
Z	321	Aurora	27.20	80.32	1961	415	565	1974	b		
Z	324	Wielingen	33.60	135.10	1948	368	500	1962	b		
Z	403	Stern	21.00	55.94	1961	110	150	1961	b	x	x
Z	430	Margibel	19.62	49.23	1957	184	250	1970	b	x	x
Z	445	Marina	19.00	41.63	1954	221	300	1985	b	x	x
Z	447	Hurricane	17.12	42.25	1968	143	195	1975	b	x	x
Z	462	Zeeparel	30.70	140.97	1968	441	600	1987	b		
Z	470	Odin	23.82	81.00	1987	221	300	1987	b	x	
Z	472	Condor	18.70	39.35	1955	132	180	1989	b	x	x
Z	474	Argo	20.50	47.78	1963	220	299	1974	b	x	x
Z	483	Carolina	30.70	143.25	1971	441	600	1984	b		
Z	484	Fox	27.20	96.36	1966	221	300	1966	b	x	
Z	501	Asterias	23.97	98.00	1988	221	300	1988	b	x	
Z	502	Regine	28.12	124.13	1967	221	300	1967	pl	x	
Z	506	Noordpool	30.70	143.25	1971	441	600	1986	b		
Z	507	Desiré	27.40	109.29	1966	368	500	1987	b		
Z	509	Telstar	27.20	86.70	1963	221	300	1982	b	x	
Z	510	Albrecht Rodenbach	34.90	273.00	1989	883	1200	1989	b		
Z	519	White Horse	28.32	154.00	1970	386	525	1970	b		
Z	526	Flamingo II	30.70	152.39	1968	368	500	1988	b		
Z	536	Zeevalk	20.50	47.67	1963	165	225	1963	b	x	x
Z	548	Flamingo	23.82	81.00	1988	221	300	1988	b	x	x
Z	554	Lucky-Star II	19.20	45.14	1964	140	190	1963	b	x	x
Z	568	Venus	23.97	98.00	1988	221	300	1987	b	x	
Z	569	Blauwvoet	25.00	97.44	1965	221	300	1964	pl		
Z	571	Custos Dens	38.90	372.00	1989	882	1200	1989	b		
Z	573	La Paloma	25.20	99.02	1964	221	300	1964	pl		
Z	576	Ostara	33.21	182.00	1969	441	600	1988	b		
Z	578	Carohein	21.00	57.84	1965	217	295	1973	b	x	
Z	580	Poseidon	19.80	48.82	1963	206	280	1969	b	x	
Z	582	Asannat	19.80	48.82	1964	107	145	1964	pl	x	
Z	583	Angelina	30.70	142.45	1970	386	525	1969	b		
Z	584	Sea Bird	27.40	109.29	1967	294	400	1967	b		
Z	586	Mermaid	18.00	38.95	1963	143	195	1980	b	x	x
Z	596	De Zwerver	37.09	366.00	1988	880	1197	1988	b		
Z	597	Jupiter	21.00	98.39	1965	221	300	1989	pl		
N	3	Frederick-Patrick	27.20	118.46	1974	331	450	1986	pl		
N	22	Zeester	19.00	34.13	1963	216	294	1987	b	x	
N	36	Donia	34.60	264.69	1981	882	1200	1980	b		
N	40	Ravelingen	25.58	103.68	1973	276	375	1972	pl		
N	45	Herakles	31.35	148.43	1961	397	540	1961	pl		
N	49	Steve	14.00	24.00	1982	143	195	1982	b	x	
N	52	Sea Hunter	23.90	93.00	1984	221	300	1986	b	x	
N	57	Terry	21.15	89.00	1986	221	300	1988	b	x	
N	58	Pascin	19.35	66.00	1986	221	300	1987	b	x	
N	73	Katje	19.60	64.00	1989	220	299	1989	pl	x	
N	75	Sarvy	23.75	89.00	1986	218	297	1986	b	x	
N	95	Jonas II	12.68	18.00	1987	471	640	1987	s		
N	126	Skylight	30.24	132.53	1970	441	600	1981	b		
N	152	Evy	17.50	37.00	1966	221	300	1981	b	x	
N	350	Colette	19.94	61.00	1985	191	260	1985	b	x	
N	402	De Norma	23.78	69.96	1963	208	283	1989	b	x	
N	408	Speranza	22.70	69.63	1969	217	295	1976	b	x	
N	525	Golfbreker	22.60	65.80	1969	206	280	1968	b	x	
N	555	Valentino	16.60	29.98	1954	110	150	1954	b	x	x
N	563	Zee-Adelt	21.00	57.18	1964	221	300	1989	pl	x	
N	575	Francine	21.00	56.56	1966	217	295	1983	b	x	
N	590	Horizon	19.80	48.82	1961	107	145	1961	b	x	
N	599	Zeevogel	21.00	58.66	1964	165	225	1987	b	x	x
N	700	Alex	16.80	29.91	1968	176	240	1984	b	x	
N	706	Ster der Zee	27.20	89.83	1968	276	375	1968	pl		
N	708	Ruytingen	25.58	110.22	1969	276	375	1969	pl		
N	709	Mardyck	25.58	110.22	1969	276	375	1969	pl		
N	719	Atlantic	25.00	86.59	1968	221	300	1967	pl		

						Engine power				EEC-list :	
Homeport	no.	Name	Loa	BRT	Year built	KW	HP	Engine (yr)	Fishery	55/87	3554/90
N	720	André-Jeanine	22.00	63.96	1963	218	297	1986	b	x	
N	723	Pallieter	23.00	75.18	1969	221	300	1969	pl		
N	736	Lucky	22.00	68.00	1969	221	300	1969	b	x	
N	738	Johan	22.00	67.36	1965	221	300	1987	b	x	
N	752	Ter Yde	25.58	101.78	1971	276	375	1970	pl		
N	782	Nancy	14.31	25.80	1971	110	150	1970	b	x	x
B	65	Artevelde	23.82	69.00	1986	221	300	1989	b	x	
B	601	Van Maerlant	17.00	28.93	1962	99	135	1962	b	x	x
BOU	24	Beatrix	19.04	41.38	1964	202	275	1971	b	x	x
K	13	Morgenster	23.94	94.00	1989	218	296	1988	b	x	x

SCHELDT - limited to old offshore line

						Engine power				EEC-list :	
Homeport	no.	Name	Loa	BRT	Year built	KW	HP	Engine (yr)	Fishery	55/87	3554/90
A	2	Nancy	21.39	50.72	1964	213	290	1964	b	x	x
BOU	4	Astrid	13.85	15.67	1982	79	108	1981	b	x	x
BOU	6	Anja	16.62	29.79	1930	103	140	1973	b	x	x
BOU	7	De Enige Zoon	16.67	57.00	1985	219	298	1985	b	x	x
K	8	Aquarium	21.91	56.00	1967	220	299	1983	b	x	x

SCHELDT - limited to new offshore line

						Engine power				EEC-list :	
Homeport	no.	Name	Loa	BRT	Year built	KW	HP	Engine (yr)	Fishery	55/87	3554/90
A	9	Stern	26.14	91.95	1953	221	300	1986	b		
A	18	Simpie	18.82	18.00	1989	44	60	1977	b		
BOU	10	Serena	11.89	17.00	1984	81	110	1984	b		
BOU	11	Exodus	11.47	11.00	1984	110	150	1962	b		
BOU	28	Annie	16.19	28.67	1932	88	120	1956	b		
BOU	119	Josina	19.54	65.00	1970	229	300	1988	b		
R	21	Twee Gebroeders	12.84	23.21	1932	118	160	1973	b		

b : beam trawler

pl : otter trawler

Fishery	No. of vessels	Engine power (KW)	No. of cruises	Fishing days	Landings (tons)	(%)	Landings per fishing day (kg)	Returns (Bfr/day)
Otter trawl	51	336	517	4800	4202	12	875	70710
Pair trawl -cod-	14	180	68	126	69	0	548	28728
Beam trawl -shrimp-	53	166	3873	3959	661	2	167	23527
Beam trawl -flatfish-	169	514	5103	26819	29548	82	1102	118204
Otter trawl -Nephrops-	33	279	340	3722	1538	4	413	54557
Other (**)	2	353	84	146	79	0	542	69385
Total	212 (*)	434	10021	39622	36253	100	915	96436

(*) Some vessels change their fishing method during the year, so that these vessels have been counted twice.

(**) Dredges, gillnets, lines

Table 1 : Composition and results of the Belgian fishing fleets in 1990. (Welvaert, M., 1990).

HP	number of vessels	number of cruises	fishing days	average		landings (tons)	landings p. fishing day (kg)	total returns (mil BEF)	returns p. fish. day (BEF)
				HP	BT				
< 270	26	1186	1587	202	41	345	218	35.9	22651
270 - 300	52	1685	8047	298	74	4096	509	425.1	52827
300 - 600	16	193	2215	486	122	2035	919	178.2	80445
600 - 900	17	356	3739	679	158	4430	1185	400.0	106971
900 - 1100	13	281	3292	944	208	4780	1452	429.0	130320
> 1100	32	764	8012	1209	287	14597	1822	1390.9	173601
total	154	4465	26892	711	168	30283	1126	2859.1	106318

Table : Activities of the Belgian beam trawl fleet in 1990. (Welvaert, M., 1990).

HP	landings of sole		landings of plaice		landings of cod		landings of whiting		other		total	
	tons	%	tons	%	tons	%	tons	%	tons	%	tons	%
< 270	94	27	125	36	7	2	8	2	111	32	345	100
270 - 300	873	21	1787	44	143	3	52	1	1241	30	4096	100
300 - 600	264	13	977	48	100	5	28	1	666	33	2035	100
600 - 900	586	13	2415	55	314	7	52	1	1063	24	4430	100
900 - 1100	664	14	2579	54	420	9	83	2	1034	22	4780	100
> 1100	2178	15	7918	54	1189	8	206	1	3097	21	14597	100
total	4659	15	15801	52	2173	7	429	1	7212	24	30283	

Table : Landings of sole, plaice, cod and whiting by the Belgian beam trawl fleet in 1990. (Welvaert, M 1990).

	otter trawl		otter trawl (Nephrops)		pair trawl (cod)		beam trawl (shrimp)		beam trawl (flatfish)		other	
	tons	%	tons	%	tons	%	tons	%	tons	%	tons	%
haddock	540	77	1	0	-	-	-	-	159	23	-	-
cod	1248	33	94	3	184	5	8	0	2174	57	82	2
whiting	680	47	191	13	130	9	8	1	430	30	-	-
plaice	554	3	543	3	12	0	9	0	15801	94	-	-
ray	203	16	18	2	-	-	-	-	1017	82	1	0
sole	204	4	115	2	-	-	1	0	4659	94	1	0
redfish	70	100	-	-	-	-	-	-	0	-	-	-
anglerfish	10	4	1	0	-	-	-	-	236	96	-	-
picked dogfish	63	62	5	5	-	-	-	-	34	33	-	-
less.sp.dogfish	58	12	0	-	-	-	-	-	424	88	-	-
other demersal fish	777	15	90	2	13	0	43	1	4198	82	5	0
pelagic fish	38	16	2	61	30	13	8	3	8	3	1	0
crustaceans and molluscs	68	3	502	23	-	-	489	22	1143	52	-	-
total	4513	12	1562	4	369	1	566	2	30283	81	90	4

Table :Landings per fish species and per fishery in 1990. (Welvaert, M., 1990).

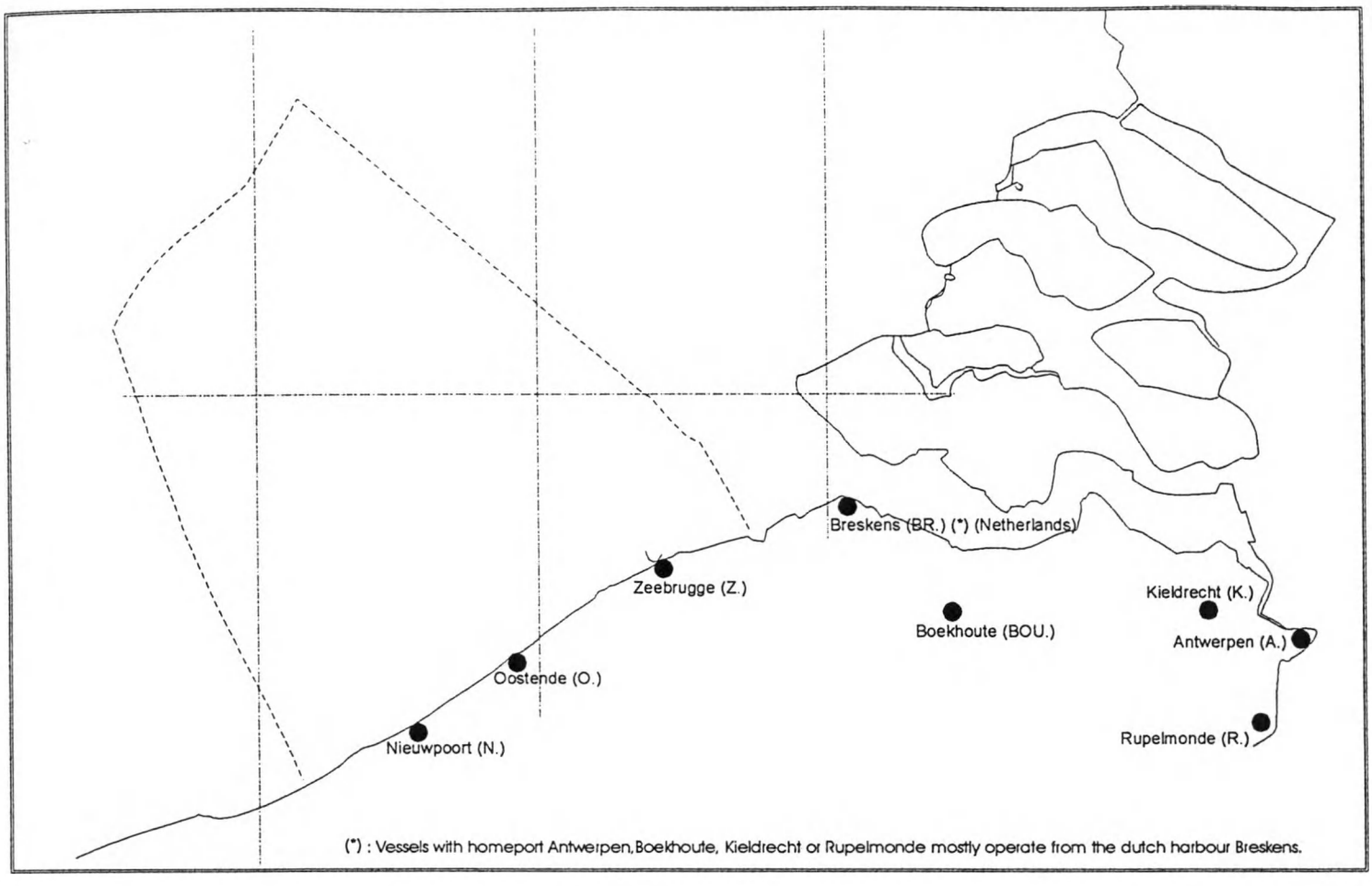
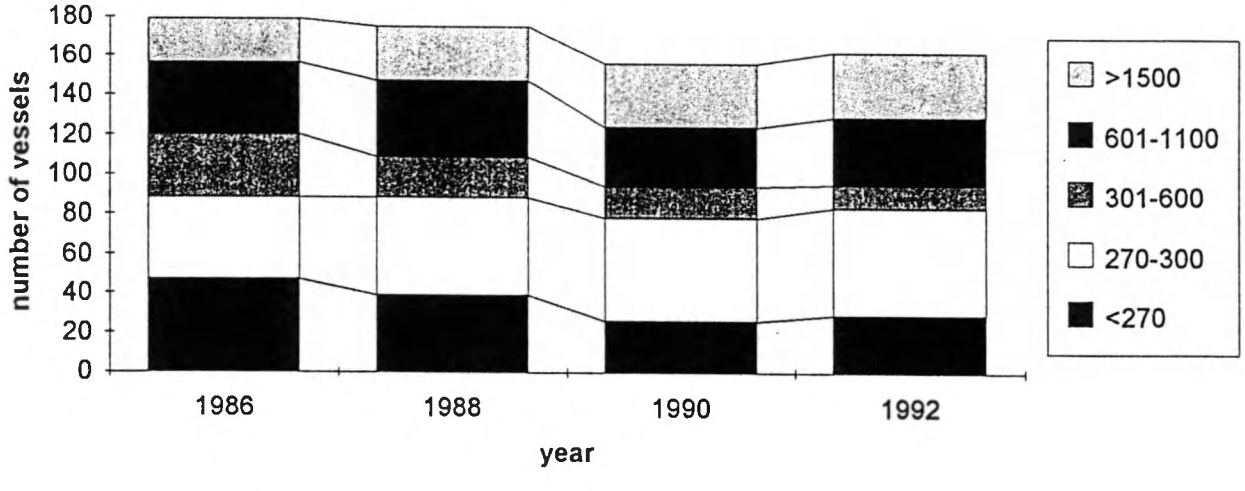


Figure1 : List of harbours of the Belgian fishery fleet

Figure 2 :Evolution of the beam trawler fleet composition.



ANNEX 2 : Details on the Dutch trawler fleet and gears used

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1. SUMMARY

The report overviews the composition of the Netherlands inshore trawler fleet (cutterfleet), mainly fishing with beam trawls. An overview of the whole fleet is given in table 1 and 2. Details are provided on the gears used. To make comparison possible with the Belgian data the year 1990 was selected.

Special attention was given to the impact of the various fishing gears. About 86 % of the allocated fishing power (engine power x seadays) is taken up by the beam trawl fishery. It is the fishing technique with the highest bottom resistance.

The Netherlands inshore fishing fleet (1990) can be divided in the following classes:

1) 220 large trawlers, all beam trawlers with an engine power over 800 kW (1100 hp); they make 84 % of the engine power of the inshore fleet. Of these vessels 98 % of the power is used for flatfish beam trawling and 2 % for herring pair trawling (for a part of the year).

2) 63, usually older trawlers between 221 and 800 kW (301 and 1100 hp), making 4.5 % of the engine power of the inshore fleet. Of these vessels about 60 % is used for whitefish (and herimg) and 40 % is used for beam trawling for flatfish. This part is decreasing each year (see fig. 1 and 2).

3) 250 multipurpose cutters up to 220 kW (300 hp), 11.5 % of the engine power of the cutter-fleet. Of these vessels about 50% are fishing for shrimp, about 7 % for whitefish and about 40 % mainly for beamtrawling on flatfish.

Only the vessels belonging to class 3 are allowed to operate beamtrawls within the 12-miles zone and the plaice box.

2. ABOUT THE PROJECT

In the framework of EEC project MA 2-549 it was agreed that the fisheries institutes of Belgium, Germany and the Netherlands should start with an inventory of fishing vessels,active in bottom trawling, as a background source for the study to evaluate the environmental impact of bottom gears on benthic fauna in relation to natural resources management and protection of the North Sea.

This report is the Netherlands contribution to this part of the above mentioned project. The report contains data on the "cutter"-fleet only. The large sterntrawlers, fishing mainly pelagic and semi-pelagic, are are not dealt with.

At present the report is based on enquiries made via fishing cooperatives, fishermen's unions and fishing gear constructors, if relevant, data from individual fishermen were added.

3. VESSEL DATA

Table 1 gives a list of the vessels of the Dutch offshore trawler fleet and their home ports. Table 2 gives the same vessels with their licences, tonnage, length and engine power. From this list, showing the vessels in decreasing power, it is obvious in which power range the separate licences are falling. Nearly all vessels have propellernozzles, so they have about 30 % extra pulling force when fishing. Mostly they use fixed propellerblades, having the full main power when fishing and about 85 % of the main power when steaming. This is no problem for most of the vessels, which are overpowered anyhow (having more power in relation with the ship length and form than they can use when free steaming).

Table 3, 4, 5 and 6 are based on data from the Netherlands Agriculture Economics Institute (LEI-DLO). Table 3 gives the number of vessels, engine capacities, age of the vessels and crew numbers. Table 4 shows the gross revenues of several branches of fishery. Table 5 shows the investments. Finally table 6 gives the gross proceeds of each class of vessels divided into power-groups.

Figure 1 illustrates the different power-classes of fishing vessels for the last years, figure 2 gives the change in power from 1972 to 1992 and figure 3 shows the real effected efforts for the different fishing methods by multiplying the main engine powers (in hp) with fishing days. Pair trawling is carried out twice as much as other trawling.

In total the offshore trawler fleet, composed of beam, otter and pair trawlers, landed about 80 % (1990) of the total Dutch catches (see table 4).

When looking at the effected fishing powerin 1990, 86 % was used for beam trawling (see fig. 3) and this was mainly carried out by vesels with engine powers over 800 kW (1100 hp).

4. BEAM TRAWLERS

4.1. Flatfish beam trawlers

Beam trawling for flatfish is the most important sector for the fishing industry of the Netherlands. Beam trawlers land about 69 % of the total Dutch sea fishery catches (1990) with a value of about Dfl 580 million. Looking at the catching effort (expressed in power x fishing time) beam trawlers with an engine power over 1100 kW (1500 hp) take 86 % of the fishing intensity of the North Sea area, with a growing part for the beamers with engine power over 1100 kW (1500 hp) (see figure 2).

In 1987 the Dutch government decided to limit the width of the beam trawl to 12 m and to allow a maximum of two fully rigged beam trawls per vessel. This now resulted in a maximum used power of about 2200 kW (3000 hp) for the highest engine powers (up to more than 3000 kW) for the central North Sea. However for new vessels to be built and new engines to be installed an additional restriction came into force the same year limiting the maximum engine power to 1470 kW (2000 hp).

A split is made in northern and southern fishing areas as trawlers need gears related to the bottom topography and surface sediments which is reflected in the gears in use depending on the home ports of the cutters.

From the table the following comments can be made :

- It appears that the swept area per unit of power for large cutters is smaller than for the small cutters.
- A possible explanation is that the hydrodynamic component in the gear resistance is larger for larger engine power than for lower engine power, viz. 75% against 50% is a consequence of the higher fishing speed whereas the hydrodynamic resistance enlarges more quickly than the bottomresistance.
- That the "smaller"-swept area by large cutters has been disturbed by more and heavier tickler-chains and with a higher fishing speed.

For the use of the different gears see 2.2.

4.2. Eurocutters

The eurocutter derives its name from the EEC-funding to support the development of small inshore trawlers with an engine power of 150-220 kW. 166 units operate in the Dutch fisheries, in total responsible for 7.2% of the allocated horsepower days (Table 1). About 35% of these vessels fish for flatfish, but the majority fish for shrimp. Annex 5 gives the landings of shrimps. At times of poor landings they will catch more round- and flatfish. With special licenses they are still allowed to fish with 12 m beam trawls. The flatfish eurocutters, operating within the 12 mile limit, are restricted to a maximum beam size of 4.5 m.

It is important that this group is limited and that the individual 300 hp limit is not exceeded because of the nursery function of the 12 miles zone and the plaice box.

4.3. Gear data

A comparison is made of the contact with the bottom of the chains for different types of gear, as the chains (tickler chains and/or chainmats) are the most important components of the gear in direct contact with the bottom. For the inshore beam trawl (beamlength 4.5 m) and standard beam trawl (12 m) it can be estimated that 80% and 90% respectively of the swept area come in contact with these gear parts.

There is a relationship between bottom type and the weight, number and diameters of the chains. The heaviest gears (more and heavier chains) are used on hard bottoms. On a muddy - soft - bottom only a few chains are used, otherwise the gear would get stuck into the bottom due to excessweight. Also small ticklerchains are much higher on these grounds. This explains why the fishing gear of e.g. the Urk fleet (UK), fishing in the eastern part of the southern and central North Sea (smooth and even fishing grounds) are on average much lighter than those of the Katwijk fleet (kW), which

operates more in the south-western part of the North Sea where small sandwaves occur.

The so-called flip-up rope is used on ground with boulders and stones; for fishing areas see fig. 4. Where stones could be caught by the nets, fishermen will use chainnets, squares about 30 x 30 cm, and sometimes additional ticklers if the engine power is high enough.

The warplength-depth ratio is related to the bottom type . The muddier, and hence softer the bottom, the less warp is run out, so that the warp can be retrieved quicker if the gear becomes stuck. Warplength also influences the bottom pressure of the trawlhead (trawl shoes). If the gear weight is recorded it should be noted that to maintain bottom contact the weight of the gear (all the metal parts, e.g. beam, shoes, sprot) on bottom is the total weight of the gear (emersed in water), minus the vertical vector. Variance in towing force is up to about 50% of the average towing force at Bf 4 to 5.

The netmaterial is polyamide for the top panel of the net and also polyamide for the lower panel, but heat treated for the aftend, otherwise the material takes up sand and the mesh length shortens.

4.4. Fishing areas

The main fishing areas are given in Figure 4a for the use of different gears and Figure 4b-d for the mean frequency of fishing. In these areas fishermen often have their favourite trawltracks to which they regularly return. Shallows are cleared out by continually fishing in the same area. A regular return to such a place makes sense as in time fish will again aggregate in it. So it may be that at some localities the fishing frequency is more than 10 times/year and others once a year or not at all.

5. ROUNDFISH TRAWLERS

A small number of trawlers concentrate on roundfish only (gadoids as cod, whiting, saith). Several trawlers, however, are multipurpose vessels. The Dutch fishery consists of about 60 of these roundfish trawlers. About 75% of these vessels have an engine power of 222-810 kW (300-1100 hp), in general these are older vessels. In all the roundfish trawlers in total use up to 9% of the horsepower days (Table 1) allocated to the fishing fleet. The breakdown is 42% pairtrawling, 16% ottertrawling and 37% beam trawling. The remaining 4% of the efforts goes to pairtrawling for herring. Several roundfish trawlers belong to the category "Eurocutters", and are therefore very small trawlers.

6. CONCLUSIONS

Of the Dutch inshore fishery about 86 % of the fishing effort (power x time) is taken up by the beam trawl fishery for flatfish (fig. 3).

When investigating environmental effects of beam trawls it should be noted that each specific fishing ground (sand, mud, gravelly sand, stones etc.) is fished by a beam trawl rigged for that type of fishing ground.

Also it is not sure that all fishery efforts are general divided per ICES quadrant. Research to that subject is going on. After that maybe more details of used gears are requested.

Special attention was focused on the swept area of the various fishing powers. This might explain to a greater extent that comparatively large cutters catch less than small cutters. However, as smaller cutters have a high investment per unit of power and a relatively large crew, the financial optimum - hence the optimum size fishing unit - is not to be found among the smallest cutters.

Table 1 : Dutch inshore trawler fleet per 31.12.90

nr	ship	by	BRT	Loa	kW
1	ARM 4	87	483	45.68	2820
2	ARM 7	87	483	45.68	2820
3	ARM 20	86	467	45.39	2820
4	ARM 44	85	467	45.54	2647
5	ARM 15	88	494	45.56	2574
6	ARM 18	85	547	45.51	2423
7	ARM 17	87	479	43.70	2206
8	ARM 22	81	347	39.98	1765
9	ARM 25	85	69	24.45	221
10	ARM 46	84	70	23.73	221
11	BR 14	87	480	45.68	2820
12	BR 57	86	469	45.54	2794
13	BR 18	88	399	40.20	2206
14	BR 43	83	391	40.20	1765
15	BR 7	87	66	22.30	221
16	BR 10	67	39	18.56	221
17	BR 15	82	69	23.92	221
18	BR 25	67	67	22.50	221
19	BR 30	68	64	21.58	221
20	BR 35	81	83	24.45	221
21	BR 45	86	70	20.34	221
22	BR 47	64	49	21.10	221
23	BR 29	67	46	19.68	220
24	BR 50	60	36	17.26	191
25	BR 19	61	37	18.36	165
26	BR 23	29	36	18.54	165
27	BR 37	53	31	16.50	157
28	BR 24	48	22	14.30	151
29	BRU 12	75	243	37.40	1029
30	DZ 7	59	38	19.75	176
31	DZ 3	61	45	18.31	174
32	DZ 2	49	28	17.75	128
33	DZ 5	21	21	17.44	85
34	DZ 1	27	25	16.34	74
35	EH 12	86	48	19.57	140
36	GO 22	87	480	45.60	2868
37	GO 31	86	481	45.68	2625
38	GO 1	83	404	42.00	1985
39	GO 26	83	407	42.00	1985
40	GO 28	86	362	42.44	1985
41	GO 38	82	391	40.20	1985
42	GO 5	82	298	40.40	1765
43	GO 59	84	328	39.38	1765
44	GO 19	74	302	36.60	1665
45	GO 9	84	259	35.79	1603
46	GO 25	75	301	36.68	1489
47	GO 41	84	341	40.13	1489
48	GO 8	89	349	39.06	1471
49	GO 11	89	313	39.00	1471
50	GO 20	88	349	39.45	1471
51	GO 32	89	355	39.53	1471
52	GO 44	90	326	39.02	1471
53	GO 23	87	263	35.79	1449
54	GO 18	74	268	42.89	1287
55	GO 3	81	266	37.05	1103
56	GO 27	72	222	37.40	1103
57	GO 36	74	234	35.34	1103
58	GO 14	81	236	36.05	1048
59	GO 30	80	203	34.18	1048
60	GO 6	73	209	32.49	1029
61	GO 16	74	177	29.17	1029
62	GO 40	80	211	33.86	1029
63	GO 37	73	203	34.00	993
64	GO 55	74	198	34.00	985
65	GO 7	73	208	23.99	956
66	GO 48	79	228	34.40	934
67	GO 56	74	220	33.87	912
68	GO 4	80	196	33.86	908
69	GO 24	75	205	32.00	735
70	GO 29	79	62	23.22	221
71	GO 33	84	63	19.51	221
72	GO 57	87	58	20.34	221
73	GO 58	84	65	22.37	221
74	GO 131	80	83	23.85	221
75	GO 52	62	28	17.83	134
76	HA 75	64	50	19.56	221
77	HA 106	84	69	24.06	221
78	HA 50	67	41	18.22	165
79	HA 11	8	45	23.00	158
80	HA 61	88	40	20.15	156
81	HA 44	47	41	21.90	143
82	HA 13	60	36	18.02	135
83	HA 14	48	30	17.66	134
84	HA 39	12	35	19.00	134
85	HA 41	89	51	20.20	134
86	HA 62	5	43	19.58	126
87	HA 8	88	51	20.20	125
88	HA 29	29	24	17.46	124
89	HA 6	27	36	19.55	116
90	HD 23	88	492	45.68	2941
91	HD 24	87	404	40.20	2169
92	HD 64	88	448	42.85	2169
93	HD 3	88	441	42.85	1765
94	HD 21	87	401	40.20	1765
95	HD 22	82	398	40.20	1765
96	HD 27	85	402	40.20	1765
97	HD 80	84	313	41.08	1765
98	HD 4	85	300	40.40	1676
99	HD 7	84	336	40.25	1618
100	HD 36	87	320	39.90	1471
101	HD 225	80	345	40.00	1471
102	HD 226	82	342	40.13	1471
103	HD 38	73	247	39.19	1397
104	HD 30	83	285	30.81	1324
105	HD 96	75	260	37.10	1287
106	HD 202	79	269	36.28	1132
107	HD 16	79	255	37.14	1103
108	HD 26	74	259	37.10	1103
109	HD 34	75	221	35.10	1103
110	HD 70	74	259	37.00	1103
111	HD 18	73	190	35.56	908
112	HD 67	72	165	32.84	908
113	HD 63	68	113	31.74	518
114	HD 19	58	89	27.54	368
115	HD 28	59	89	25.69	368
116	HD 5	54	51	19.55	221
117	HD 9	64	70	24.95	221
118	HD 14	59	50	19.50	221
119	HD 32	90	130	24.00	221
120	HD 57	74	70	22.39	221
121	HD 65	90	121	24.00	221
122	HD 175	88	41	20.50	162
123	HD 45	26	16	16.20	77
124	KG 2	81	70	24.45	221
125	KG 5	90	104	23.13	221
126	KG 6	88	77	23.54	221
127	KG 7	80	84	24.45	221
128	KG 9	85	69	23.02	221
129	KG 12	54	70	22.96	221
130	KG 14	86	67	23.34	221
131	KW 88	87	483	45.60	2818
132	KW 34	87	472	45.54	2625
133	KW 42	88	476	43.70	2206
134	KW 35	83	432	43.45	2059
135	KW 36	83	433	43.29	2059
136	KW 22	81	296	39.30	1544
137	KW 45	82	326	42.85	1471
138	KW 145	90	405	40.20	1471
139	KW 12	74	207	34.44	1103
140	KW 11	74	219	34.76	1007
141	KW 189	73	215	37.95	993
142	KW 5	72	174	34.15	908
143	KW 4	63	169	34.74	728
144	KW 63	73	146	28.90	662
145	KW 191	61	192	33.60	597
146	KW 7	61	129	26.80	588
147	KW 137	81	163	26.50	588
148	KW 173	64	131	30.72	445
149	KW 125	63	136	28.09	441
150	KW 77	57	120	27.46	386
151	KW 24	59	80	24.92	368
152	KW 72	82	69	21.70	221
153	KW 144	65	50	21.05	221
154	KW 132	51	70	24.80	220
155	KW 37	60	42	18.16	175
156	LE 62	82	406	40.20	1985
157	LE 64	82	418	42.00	1654
158	LE 63	81	346	39.94	1471
159	LO 7	87	69	22.97	221
160	LO 8	51	62	22.97	221
161	LO 20	87	47	19.60	188
162	LO 14	21	36	21.61	128
163	LO 5	27	27	18.76	125
164	LO 10	22	51	23.34	124
165	LO 2	47	23	13.20	103
166	LO 4	34	17	11.22	99
167	LO 15	26	46	18.60	97
168	LO 26	23	26	18.43	94
169	NZ 12	50	23	15.30	114
170	NZ 21	60	22	15.35	99
171	NZ 1	31	23	14.92	83
172	OD 1	89	347	39.06	1471
173	OD 36	80	296	39.93	1324
174	OD 50	76	248	34.54	1103
175	OD 17	73	207	33.00	1048
176	OD 8	75	175	32.51	882
177	OD 6	87	209	33.04	662
178	OD 5	90	53	20.57	221
179	OD 9	84	70	24.44	221
180	OD 18	89	62	20.30	221
181	OD 7	69	70	23.99	220
182	OD 3	49	26	14.00	188
183	OL 26	67	70	23.75	221
184	OL 5	49	45	16.92	188
185	OL 6	13	32	17.19	134
186	OL 37	23	40	20.54	134
187	SCH 28	73	128	29.91	588
188	SCH 10	68	70	22.47	221
189	SCH 25	85	56	18.57	221
190	SCH 43	57	85	26.78	221
191	SCH 64	68	76	22.26	221
192	SCH 65	68	64	24.32	221
193	SCH 60	62	41	17.58	202
194	SCH 36	68	20	12.70	121
195	SCH 66	49	40	17.90	104
196	SL 7	83	259	35.79	1324
197	SL 12	83	278	39.52	1324
198	SL 45	83	261	35.79	1324
199	SL 3	80	194	30.55	904
200	SL 6	86	70	25.00	221
201	SL 9	84	70	22.43	221
202	SL 42	86	70	25.00	221
203	SL 16	48	22	15.45	134
204	SL 22	38	36	15.75	125
205	ST 4	49	35	17.02	188
206	ST 20	90	42	19.99	184
207	ST 10	60	27	17.29	175
208	ST 21	87	42	17.81	132
209	TH 43	86	328	39.38	2000
210	TH 24	68	97	26.24	478

nr	ship	by	BRT	Loa	kW
211	TH 45	67	98	26.19	449
212	TH 5	85	69	22.97	221
213	TH 7	83	69	24.30	221
214	TH 10	90	175	22.97	221
215	TH 15	45	54	21.51	221
216	TH 25	84	69	24.30	221
217	TH 35	84	67	22.75	221
218	TH 36	69	68	22.46	221
219	TH 42	85	69	24.45	221
220	TH 61	81	84	23.95	221
221	TH 41	32	36	16.80	151
222	TH 16	2	43	23.26	134
223	TH 26	5	29	19.52	74
224	TM 30	63	153	33.00	221
225	TM 9	10	37	22.80	202
226	TM 16	63	39	18.50	188
227	TM 8	62	30	16.95	175
228	TM 19	21	38	22.35	103
229	TS 3	88	58	18.99	156
230	TS 6	32	32	20.44	115
231	TS 9	58	33	19.00	113
232	TS 2	83	30	16.14	100
233	TS 7	14	22	16.77	97
234	TX 36	88	402	40.28	2206
235	TX 66	85	374	44.10	2169
236	TX 43	87	398	40.28	2132
237	TX 4	84	391	40.20	1985
238	TX 94	84	313	41.08	1765
239	TX 33	87	302	40.40	1680
240	TX 2	84	336	40.65	1665
241	TX 1	74	297	40.80	1647
242	TX 48	83	295	40.40	1500
243	TX 19	90	422	42.00	1471
244	TX 5	79	267	36.28	1397
245	TX 14	74	265	36.11	1397
246	TX 34	74	242	38.17	1324
247	TX 37	80	345	40.00	1324
248	TX 38	83	360	39.96	1324
249	TX 49	83	262	38.33	1324
250	TX 68	80	266	36.48	1324
251	TX 21	75	263	36.75	1176
252	TX 9	73	230	34.40	1066
253	TX 22	74	175	29.23	1044
254	TX 29	80	212	35.34	956
255	TX 52	82	98	22.55	441
256	TX 56	82	98	22.55	382
257	TX 7	63	44	21.74	221
258	TX 12	64	70	22.90	221
259	TX 27	89	56	23.95	221
260	TX 41	62	70	24.89	221
261	TX 18	66	47	19.41	206
262	TX 50	85	63	19.45	188
263	TX 30	6	34	19.57	176
264	TX 88	90	35	18.30	174
265	TX 10	82		29.00	134
266	TX 11	28	36	23.38	125
267	TX 25	79	24	14.55	74
268	UK 104	87	430	45.02	2397
269	UK 156	88	430	45.02	2397
270	UK 68	87	370	42.44	2000
271	UK 268	86	368	42.44	2000
272	UK 1	88	434	42.70	1838
273	UK 141	75	311	40.28	1816
274	UK 292	75	319	41.30	1779
275	UK 44	84	411	42.00	1765
276	UK 155	84	411	42.00	1765
277	UK 161	81	351	39.94	1765
278	UK 162	81	346	39.94	1765
279	UK 179	80	349	39.94	1765
280	UK 33	87	353	39.38	1750

nr	ship	by	BRT	Loa	kW
281	UK 67	82	361	43.09	1750
282	UK 366	87	454	43.97	1739
283	UK 281	87	340	42.05	1676
284	UK 16	82	421	40.72	1654
285	UK 95	82	378	40.74	1654
286	UK 97	83	282	39.58	1654
287	UK 226	83	390	40.82	1654
288	UK 71	74	283	39.15	1618
289	UK 317	80	315	40.82	1618
290	UK 53	87	360	40.73	1570
291	UK 253	83	337	39.38	1507
292	UK 87	83	298	40.40	1500
293	UK 64	83	390	40.82	1489
294	UK 41	75	267	40.30	1471
295	UK 43	89	403	40.20	1471
296	UK 61	88	352	40.20	1471
297	UK 91	81	345	40.00	1471
298	UK 105	74	264	36.81	1471
299	UK 133	89	375	40.73	1471
300	UK 153	90	363	40.11	1471
301	UK 165	79	298	39.92	1471
302	UK 168	89	454	43.97	1471
303	UK 237	81	372	39.13	1471
304	UK 287	74	286	38.20	1471
305	UK 300	80	284	39.62	1471
306	UK 383	90	384	41.78	1471
307	UK 98	81	294	38.77	1397
308	UK 208	82	294	38.77	1397
309	UK 4	74	260	40.24	1324
310	UK 19	82	297	39.55	1324
311	UK 34	81	277	37.39	1324
312	UK 42	79	326	41.20	1324
313	UK 63	85	295	38.75	1324
314	UK 73	72	228	37.85	1324
315	UK 88	74	254	39.83	1324
316	UK 143	80	344	40.00	1324
317	UK 152	80	300	39.86	1324
318	UK 154	80	300	39.86	1324
319	UK 172	81	283	38.25	1324
320	UK 183	81	293	38.77	1324
321	UK 195	81	282	38.71	1324
322	UK 365	79	250	39.10	1324
323	UK 367	83	319	42.50	1324
324	UK 368	75	265	38.98	1324
325	UK 217	81	282	38.23	1265
326	UK 17	72	243	46.48	1176
327	UK 224	80	266	36.51	1176
328	UK 194	88	242	36.30	1118
329	UK 66	74	219	33.99	1103
330	UK 167	74	218	34.05	1103
331	UK 184	81	264	36.54	1103
332	UK 202	80	265	36.51	1103
333	UK 282	81	264	36.54	1103
334	UK 283	83	264	36.54	1103
335	UK 284	80	277	36.52	1103
336	UK 246	80	270	36.51	1102
337	UK 45	73	248	38.76	1055
338	UK 20	74	201	33.24	1048
339	UK 136	74	221	34.94	1029
340	UK 243	73	255	35.50	1029
341	UK 69	73	210	31.99	956
342	UK 92	73	199	34.00	956
343	UK 188	74	246	34.58	956
344	UK 222	73	213	38.04	949
345	UK 2	73	280	40.38	912
346	UK 59	74	251	34.75	912
347	UK 197	73	174	32.92	908
348	UK 18	70	153	31.52	890
349	UK 114	73	215	34.12	882
350	UK 127	72	194	33.92	882

nr	ship	by	BRT	Loa	kW
351	UK 164	69	220	34.12	882
352	UK 175	72	192	33.96	882
353	UK 193	74	238	33.95	882
354	UK 232	73	232	34.24	882
355	UK 308	74	166	29.36	827
356	UK 36	73	167	32.25	746
357	UK 37	72	167	32.25	746
358	UK 176	75	189	33.62	735
359	UK 32	71	163	32.88	706
360	UK 38	68	119	30.19	662
361	UK 177	80	162	30.05	662
362	UK 51	70	164	30.60	588
363	UK 89	72	105	29.74	588
364	UK 149	68	123	30.29	588
365	UK 158	82	180	29.16	588
366	UK 132	68	116	29.42	551
367	UK 142	69	140	30.15	529
368	UK 289	62	129	26.97	529
369	UK 52	69	132	29.25	518
370	UK 159	67	0	30.20	515
371	UK 307	71	100	25.06	488
372	UK 137	67	111	27.89	441
373	UK 333	59	80	23.71	397
374	UK 7	63	80	25.50	390
375	UK 247	66	80	24.15	382
376	UK 48	67	133	28.60	368
377	UK 135	82	97	24.93	368
378	UK 145	82	97	24.93	368
379	UK 22	81	92	24.54	317
380	UK 216	66	79	25.10	316
381	UK 170	61	80	25.16	265
382	UK 6	85	69	22.82	221
383	UK 186	85	70	24.44	221
384	UK 189	64	69	24.60	221
385	UK 233	60	51	20.27	221
386	UK 234	56	70	23.07	221
387	UK 244	81	84	24.45	221
388	UK 160	55	44	18.94	169
389	UK 146	79	40	17.57	134
390	UK 144	59	21	15.00	118
391	UQ 7	38	40	18.53	184
392	UQ 1	23	35	19.96	149
393	UQ 10	29	33	18.79	147
394	UQ 16	74	35	15.55	147
395	UQ 3	23	22	16.18	143
396	UQ 17	11	43	21.80	121
397	UQ 4	10	34	19.00	110
398	UQ 6	54	11	12.74	110
399	UQ 8	13	28	19.10	94
400	VD 54	67	98	26.04	465
401	VD 19	72	102	26.19	441
402	VD 77	59	77	23.75	313
403	VD 18	85	67	22.37	221
404	VD 128	63	60	23.80	220
405	VD 32	64	64	25.45	206
406	VD 6	84	70	23.95	188
407	VLI 27	87	481	45.68	2820
408	VLI 26	82	406	40.20	1985
409	VLI 25	80	345	40.00	1471
410	VLI 28	88	313	39.00	1471
411	VLI 6	86	311	38.06	1324
412	VLI 7	81	267	32.51	1324
413	VLI 1	71	171	31.90	901
414	VLI 2	71	169	32.91	882
415	VLI 8	85	70	24.45	221
416	WK 119	83	70	23.84	221
417	WL 5	87	62	20.34	221
418	WL 3	88	55	19.64	155
419	WL 21	46	41	17.98	134
420	WL 10	76	19	20.41	132

nr	ship	by	BRT	Loa	kW
421	WL	18 78	24	14.55	112
422	WL	4 24	37	19.77	110
423	WL	15 24	22	16.55	107
424	WL	2 27	31	18.59	106
425	WL	8 27	27	19.36	92
426	WON	24 90	79	22.06	221
427	WON	2 44	70	23.95	220
428	WON	29 49	22	14.99	136
429	WON	77 61	24	19.05	121
430	WON	43 47	28	17.32	113
431	WR	47 74	270	36.12	1324
432	WR	109 72	165	32.76	904
433	WR	224 64	123	31.80	625
434	WR	160 63	74	23.46	466
435	WR	48 68	98	26.19	456
436	WR	67 67	136	30.95	441
437	WR	76 62	116	29.83	441
438	WR	1 60	90	25.69	397
439	WR	210 59	79	24.55	382
440	WR	19 69	103	26.98	360
441	WR	51 58	78	24.02	338
442	WR	115 62	59	24.88	325
443	WR	12 84	47	19.98	221
444	WR	17 68	70	22.47	221
445	WR	20 63	70	24.60	221
446	WR	21 55	58	22.99	221
447	WR	22 56	70	24.69	221
448	WR	23 87	70	24.69	221
449	WR	34 82	70	24.45	221
450	WR	44 38	68	24.00	221
451	WR	54 84	51	19.00	221
452	WR	60 63	58	24.80	221
453	WR	68 60	50	21.90	221
454	WR	71 60	41	17.89	221
455	WR	108 65	70	24.64	221
456	WR	122 62	54	24.66	221
457	WR	128 66	47	19.15	221
458	WR	129 63	69	24.30	221
459	WR	136 60	70	24.92	221
460	WR	174 64	70	23.85	221
461	WR	213 62	48	21.96	221
462	WR	248 61	70	23.70	221
463	WR	15 60	70	23.75	220
464	WR	57 89	53	20.35	220
465	WR	222 58	82	24.03	220
466	WR	3 61	36	18.14	214
467	WR	10 83	53	20.55	188
468	WR	72 11	42	21.00	188
469	WR	77 66	39	17.88	188
470	WR	88 62	60	21.25	188
471	WR	2 69	41	18.62	188
472	WR	29 63	50	21.06	184
473	WR	244 61	51	21.91	184
474	WR	27 64	41	19.03	176
475	WR	75 60	41	17.74	176
476	WR	98 61	32	18.07	176
477	WR	89 67	31	17.26	175
478	WR	36 57	29	18.02	169
479	WR	106 60	41	21.25	134
480	WR	123 51	24	19.86	134
481	WR	171 99	46	22.13	125
482	WR	24 51	33	20.60	118
483	WR	102 51	28	17.78	118
484	WR	107 61	36	18.14	118
485	WR	131 61	16	14.00	74
486	WR	16 78	24	14.55	71
487	YE	52 83	69	24.12	221
488	YE	138 87	69	24.73	221
489	YE	139 85	70	25.09	221
490	YE	76 6	67	26.06	151

nr	ship	by	BRT	Loa	kW
491	YE	31 15	60	25.15	147
492	YM	44 74	246	38.97	1323
493	YM	11 80	285	38.92	1250
494	YM	203 86	390	39.89	1102
495	YM	204 87	390	39.89	1102
496	YM	205 85	339	34.23	882
497	YM	206 86	339	34.23	882
498	YM	154 59	166	30.68	551
499	YM	6 50	64	22.00	260
500	YM	18 65	70	25.20	221
501	YM	25 80	50	17.60	220
502	YM	8 53	50	18.22	202
503	YM	9 85	55	19.49	165
504	YM	34 84	55	19.50	164
505	YM	31 57	50	20.03	154
506	ZK	57 88	420	42.10	1471
507	ZK	87 60	94	25.66	397
508	ZK	52 88	25	13.99	240
509	ZK	14 83	55	19.98	221
510	ZK	40 57	70	24.63	221
511	ZK	49 63	49	21.06	220
512	ZK	12 11	32	24.18	218
513	ZK	48 64	60	24.72	206
514	ZK	2 88	54	20.25	188
515	ZK	33 5	31	20.45	176
516	ZK	44 63	39	19.02	174
517	ZK	23 63	49	21.05	173
518	ZK	5 64	40	19.03	169
519	ZK	9 82	60	18.03	162
520	ZK	15 58	35	17.74	160
521	ZK	18 27	24	17.40	138
522	ZK	54 84	45	18.00	138
523	ZK	11 26	29	20.58	134
524	ZK	35 7	21	18.48	134
525	ZK	31 50	24	15.76	124
526	ZK	3 32	33	20.70	121
527	ZK	21 24	38	21.46	118
528	ZK	8 59	26	17.20	113
529	ZK	17 47	22	16.82	113
530	ZK	4 79	22	15.20	96
531	ZK	7 25	25	18.15	96
532	ZK	46 23	33	21.36	92
533	ZZ	16 24	45	28.14	129

nr = number

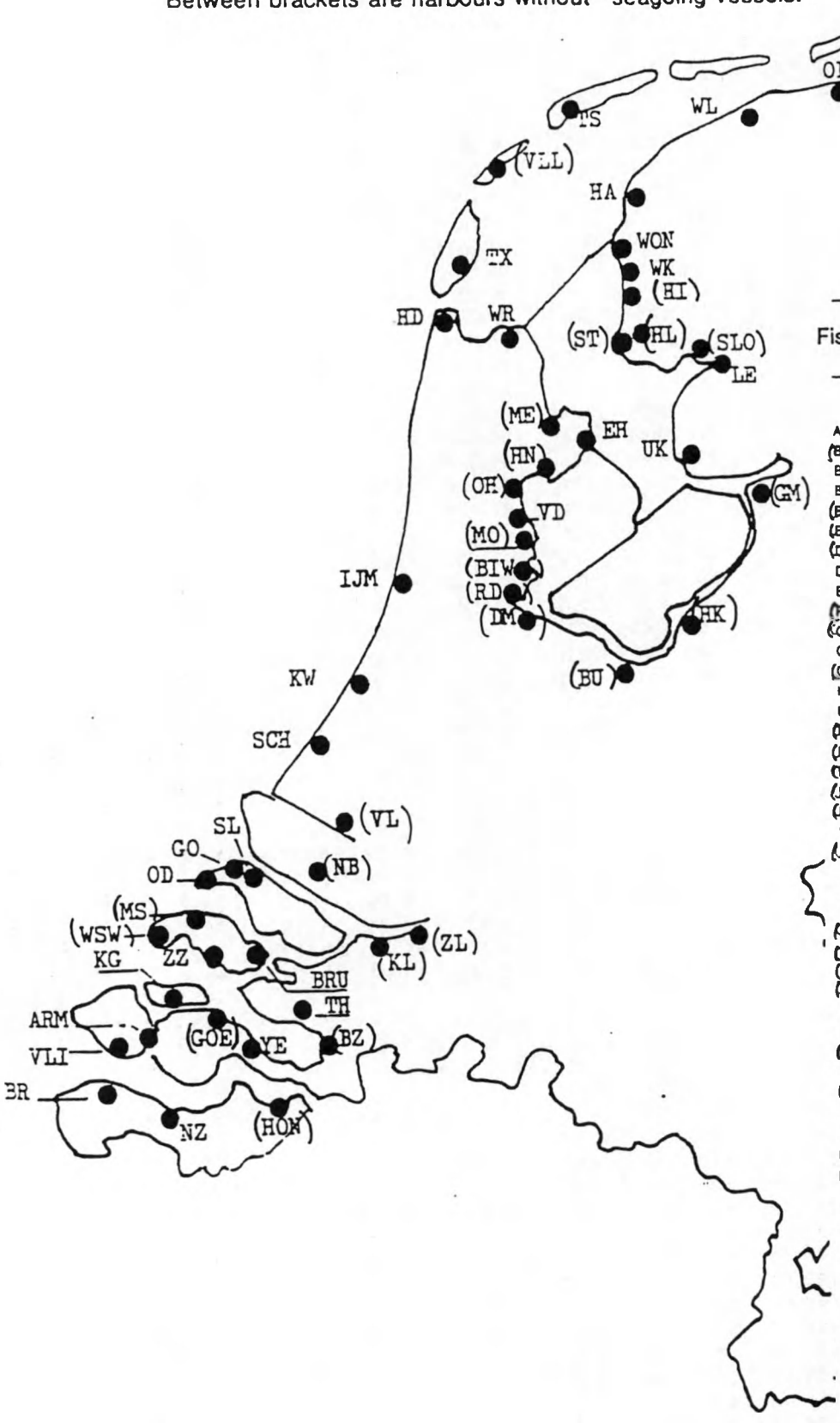
by = year of building

BRT = Bruto Register Tonnage

Loa = lengh over all

kW = kilo Watts mainpower

List of harbours of the Dutch fishery fleet.
Between brackets are harbours without seagoing vessels.



Fish Number	municipality
ARM	Arnemuiden
(BIW)	Broek in Waterland
BR	Oostburg-Breskens
BRU	Brunisse
(BU)	Bunschoten
(BZ)	Bergen op Zoom
(DM)	Diemen
DZ	Delfzijl
EH	Enkhuizen
(FL)	Finsterwolde
(GM)	Genemuiden
GO	Goedereede
(GOE)	Goes
HA	Harlingen
HD	Den Helder
(HI)	Hindeloopen
(HK)	Hardenwijk
(HL)	Hemelumer-Oldeferd
(HN)	Hoorn
(HON)	Hontenisse
KG	Kortgene
(KL)	Kiundert
KW	Katwijk
LE	Lemsterland-Lemmer
LO	Ulrum-Lauwersoog
(ME)	Medemblik
(MO)	Monnickendam
(MS)	Middenschouwen
(NB)	Nieuw-Beijerland
NZ	Terneuzen
OD	Goedereede-Ouddorp
(OH)	Zeevang Oosthuizen
OL	Oostdongeradeel
(RD)	Amsterdam-Ransdorp
SCH	Den Haag-Scheveningen
SL	Goedereede-Stellendam
(SLO)	Sloten (Friesland)
(ST)	Staveren
TH	Tholen
TM	Termunten
TS	Terschelling
TX	Texel
UK	Urk
UQ	Usquert
VD	Edam-Volendam
(VL)	Vlaardingen
VLI	Vlissingen
(VLL)	Vlieland
WK	Workum
WL	Westdongeradeel
WON	Wonseradeel
WR	Wieringen
(WSW)	Westerschouwen
YE	Reimerswaal-Yerseke
IJM	Velsen-IJmuiden
ZK	Ulrum-Zoutkamp
(ZL)	Hooge en Lage Zwaluwe
ZZ	Zierikzee

Table 2 : Dutch inshore trawler fleet : licences per 31.12.90

nr	by	BRT	Loa	kW	R	S
1	88	492	46	2900		
2	87	480	46	2900		
3	87	483	46	2800		
4	87	483	46	2800		
5	86	467	45	2800		
6	87	480	46	2800		
7	87	481	46	2800		
8	87	483	46	2800		
9	86	469	46	2800		
10	85	467	46	2600		
11	86	481	46	2600		
12	87	472	46	2600		
13	88	494	46	2600		
14	85	547	46	2400	R	
15	87	430	45	2400		
16	88	430	45	2400		
17	87	479	44	2200		
18	88	399	40	2200		
19	88	476	44	2200		
20	88	402	40	2200		
21	87	404	40	2200		
22	88	448	43	2200		
23	85	374	44	2200		
24	87	398	40	2100		
25	83	432	43	2100		
26	83	433	43	2100		
27	86	328	39	2000		
28	87	370	42	2000		
29	86	368	42	2000		
30	83	404	42	2000		
31	83	407	42	2000		
32	86	362	42	2000		
33	82	391	40	2000		
34	82	406	40	2000		
35	84	391	40	2000		
36	82	406	40	2000		
37	88	434	43	1800		
38	75	311	40	1800		
39	75	319	41	1800		
40	81	347	40	1800		
41	83	391	40	1800		
42	82	298	40	1800		
43	84	328	39	1800		
44	88	441	43	1800		
45	87	401	40	1800		
46	82	398	40	1800		
47	85	402	40	1800		
48	84	313	41	1800		
49	84	313	41	1800		
50	84	411	42	1800		
51	84	411	42	1800		
52	81	351	40	1800		
53	81	346	40	1800		
54	80	349	40	1800		
55	87	353	39	1800		
56	82	361	43	1800		
57	87	454	44	1800		
58	87	302	40	1700		
59	85	300	40	1700		
60	87	340	42	1700		
61	74	302	37	1700		
62	84	336	41	1700		
63	82	418	42	1700		
64	82	421	41	1700		
65	82	378	41	1700		
66	83	282	40	1700		
67	83	390	41	1700		
68	74	297	41	1600		
69	84	336	40	1600		
70	74	283	39	1600		
71	80	315	41	1600		
72	84	259	36	1600		
73	87	360	41	1500		
74	81	296	39	1500		
75	83	337	39	1500		
76	83	295	40	1500		
77	83	298	40	1500		
78	75	301	37	1500		
79	84	341	40	1500		
80	83	390	41	1500		
81	89	349	39	1500		
82	89	313	39	1500		
83	88	349	39	1500		
84	89	355	40	1500		
85	90	326	39	1500		
86	87	320	40	1500		
87	80	345	40	1500		
88	82	342	40	1500		
89	82	326	43	1500		
90	90	405	40	1500		
91	81	346	40	1500		
92	89	347	39	1500		
93	90	422	42	1500		
94	75	267	40	1500		
95	89	403	40	1500		
96	88	352	40	1500		
97	81	345	40	1500		
98	74	264	37	1500		
99	89	375	41	1500		
100	90	363	40	1500		
101	79	298	40	1500		
102	89	454	44	1500		
103	81	372	39	1500		
104	74	286	38	1500		
105	80	284	40	1500		
106	90	384	42	1500		
107	80	345	40	1500		
108	88	313	39	1500		
109	88	420	42	1500		
110	87	263	36	1500		
111	73	247	39	1400		
112	79	267	36	1400		
113	74	265	36	1400		
114	81	294	39	1400		
115	82	294	39	1400		
116	83	285	31	1300		
117	80	296	40	1300		
118	83	259	36	1300		
119	83	278	40	1300		
120	83	261	36	1300		
121	74	242	38	1300		
122	80	345	40	1300		
123	83	360	40	1300		
124	83	262	38	1300		
125	80	266	36	1300		
126	74	260	40	1300		
127	82	297	40	1300		
128	81	277	37	1300		
129	79	326	41	1300		
130	85	295	39	1300		
131	72	228	38	1300		
132	74	254	40	1300		
133	80	344	40	1300		
134	80	300	40	1300		
135	80	300	40	1300		
136	81	283	38	1300		
137	81	293	39	1300		
138	81	282	39	1300		
139	79	250	39	1300		
140	83	319	43	1300		
141	75	265	39	1300		
142	86	311	38	1300		
143	81	267	33	1300		
144	74	270	36	1300	R	
145	74	246	39	1300		
146	74	268	43	1300		
147	75	260	37	1300		
148	81	282	38	1300		
149	80	285	39	1300		
150	75	263	37	1200		
151	72	243	46	1200		
152	80	266	37	1200		
153	79	269	36	1100		
154	88	242	36	1100		
155	81	266	37	1100		
156	72	222	37	1100		
157	74	234	35	1100		
158	79	255	37	1100		
159	74	259	37	1100		
160	75	221	35	1100		
161	74	259	37	1100		
162	74	207	34	1100		
163	76	248	35	1100		
164	74	219	34	1100		
165	74	218	34	1100		
166	81	264	37	1100		
167	80	265	37	1100		
168	81	264	37	1100		
169	83	264	37	1100		
170	80	277	37	1100		
171	80	270	37	1100		
172	86	390	40	1100	R	
173	87	390	40	1100	R	
174	73	230	34	1100		
175	73	248	39	1000		
176	81	236	36	1000		
177	80	203	34	1000		
178	73	207	33	1000		
179	74	201	33	1000	R	
180	74	175	29	1000		
181	75	243	37	1000		
182	73	209	32	1000		
183	74	177	29	1000		
184	80	211	34	1000		
185	74	221	35	1000		
186	73	255	36	1000		
187	74	219	35	1000		
188	73	203	34	1000		
189	73	215	38	1000		
190	74	198	34	1000		
191	73	208	24	1000		
192	80	212	35	1000	R	
193	73	210	32	1000		
194	73	199	34	1000		
195	74	246	35	1000		
196	73	213	38	1000		
197	79	228	34	1000		
198	74	220	34	880		
199	73	280	40	880		
200	74	251	35	880		
201	80	196	34	880		
202	73	190	36	880		
203	72	165	33	880		
204	72	174	34	880		
205	73	174	33	880		
206	80	194	31	880		
207	72	165	33	880		
208	71	171	32	880		
209	70	153	32	880	R	
210	75	175	33	880		

nr	by	BRT	Loa	kW	R	S
211	73	215	34	880		
212	72	194	34	880		
213	69	220	34	880		
214	72	192	34	880		
215	74	238	34	880		
216	73	232	34	880		
217	71	169	33	880		
218	85	339	34	880		
219	86	339	34	880		
220	74	166	29	810	R	
221	73	167	32	740	R	
222	72	167	32	740		
223	75	205	32	740		
224	75	189	34	740		
225	63	169	35	730	R	
226	71	163	33	710		
227	73	146	29	660	R	
228	87	209	33	660		
229	68	119	30	660		
230	80	162	30	660		
231	64	123	32	630	R	
232	61	192	34	600	R	
233	61	129	27	590	R	
234	81	163	27	590	R	
235	73	128	30	590		
236	70	164	31	590	R	
237	72	105	30	590	R	
238	68	123	30	590		
239	82	180	29	590	R	
240	68	116	29	550		
241	59	166	31	550	R	
242	69	140	30	530	R	
243	62	129	27	530	R	
244	68	113	32	520		
245	69	132	29	520	R	
246	67	0	30	510	R	
247	71	100	25	490	R	
248	68	97	26	480	R	
249	63	74	23	460	R	
250	67	98	26	460	R	
251	68	98	26	460	R	
252	67	98	26	450	R	
253	64	131	31	450	R	
254	63	136	28	440	R	
255	82	98	23	440	R	
256	67	111	28	440	R	
257	72	102	26	440	R	
258	67	136	31	440	R	
259	62	116	30	440	R	
260	59	80	24	400	R	
261	60	90	26	400	R	
262	60	94	26	400	R	
263	63	80	26	390	R	
264	57	120	27	390	R	
265	82	98	23	380	R	
266	66	80	24	380	R	
267	59	79	25	380	R	
268	58	89	28	370	R	
269	59	89	26	370	R	
270	59	80	25	370	R	
271	67	133	29	370	R	
272	82	97	25	370	R	
273	82	97	25	370	R	
274	69	103	27	360	R	
275	58	78	24	340	R	
276	62	59	25	320	R	
277	81	92	25	320	R	
278	66	79	25	320	R	
279	59	77	24	320	R	
280	61	80	25	260	R	

nr	by	BRT	Loa	kW	R	S
281	50	64	22	260	R	
282	88	25	14	240		
283	85	69	24	220	R	S
284	84	70	24	220		S
285	87	66	22	220		S
286	67	39	19	220	R	S
287	82	69	24	220	R	S
288	67	67	23	220		S
289	68	64	22	220	R	
290	81	83	24	220		S
291	86	70	20	220	R	S
292	64	49	21	220	R	S
293	79	62	23	220	R	S
294	84	63	20	220		S
295	87	58	20	220		S
296	84	65	22	220	R	S
297	80	83	24	220	R	S
298	64	50	20	220		S
299	84	69	24	220	R	S
300	54	51	20	220	R	S
301	64	70	25	220		S
302	59	50	20	220		S
303	90	130	24	220		
304	74	70	22	220		S
305	90	121	24	220	R	
306	81	70	24	220	R	S
307	90	104	23	220	R	S
308	88	77	24	220	R	S
309	80	84	24	220	R	S
310	85	69	23	220	R	S
311	54	70	23	220	R	S
312	86	67	23	220	R	S
313	82	69	22	220	R	S
314	65	50	21	220		S
315	87	69	23	220		S
316	51	62	23	220	R	
317	90	53	21	220	R	S
318	84	70	24	220	R	S
319	89	62	20	220	R	S
320	67	70	24	220	R	S
321	68	70	22	220		S
322	85	56	19	220	R	S
323	57	85	27	220	R	S
324	68	76	22	220	R	
325	68	64	24	220	R	S
326	86	70	25	220	R	S
327	84	70	22	220	R	S
328	86	70	25	220	R	S
329	85	69	23	220	R	S
330	83	69	24	220	R	S
331	90	175	23	220	R	S
332	45	54	22	220		S
333	84	69	24	220	R	S
334	84	67	23	220		S
335	69	68	22	220		S
336	85	69	24	220	R	S
337	81	84	24	220	R	S
338	63	153	33	220		S
339	63	44	22	220		S
340	64	70	23	220		S
341	89	56	24	220		S
342	62	70	25	220	R	S
343	85	69	23	220	R	S
344	85	70	24	220		S
345	64	69	25	220	R	
346	60	51	20	220	R	S
347	56	70	23	220	R	
348	81	84	24	220	R	
349	85	67	22	220	R	S
350	85	70	24	220	R	S

nr	by	BRT	Loa	kW	R	
351	83	70	24	220	R	
352	87	62	20	220		
353	90	79	22	220		
354	84	47	20	220	R	
355	68	70	22	220	R	
356	63	70	25	220	R	
357	55	58	23	220		
358	56	70	25	220		
359	87	70	25	220	R	
360	82	70	24	220		
361	38	68	24	220	R	
362	84	51	19	220		
363	63	58	25	220		
364	60	50	22	220		
365	60	41	18	220		
366	65	70	25	220	R	
367	62	54	25	220		
368	66	47	19	220		
369	63	69	24	220	R	
370	60	70	25	220	R	
371	64	70	24	220	R	
372	62	48	22	220	R	
373	61	70	24	220	R	
374	83	69	24	220		
375	87	69	25	220	R	
376	85	70	25	220	R	
377	65	70	25	220		
378	83	55	20	220		
379	57	70	25	220	R	
380	67	46	20	220	R	
381	51	70	25	220	R	
382	69	70	24	220	R	
383	63	60	24	220	R	
384	44	70	24	220		
385	60	70	24	220		S
386	89	53	20	220		S
387	58	82	24	220		S
388	80	50	18	220	R	S
389	63	49	21	220		S
390	11	32	24	220		S
391	61	36	18	210		S
392	66	47	19	210		S
393	64	64	25	210	R	S
394	64	60	25	210		
395	62	41	18	210		S
396	10	37	23	210		
397	53	50	18	210		S
398	60	36	17	190		S
399	87	47	20	190		S
400	49	26	14	[illegible]		S
401	49	45	17	190		S
402	49	35	17	190		S
403	85	63	19	190		S
404	84	70	24	190		
405	83	53	21	190	R	
406	11	42	21	190		
407	66	39	18	190		
408	62	60	21	190		
409	88	54	20	190		
410	63	39	19	190		
411	69	41	19	190		
412	90	42	20	180		
413	38	40	19	180		
414	63	50	21	180		
415	61	51	22	180	R	
416	59	38	20	180		
417	6	34	20	180		
418	64	41	19	180		
419	60	41	18	180		
420	61	32	18	180		

nr	by	BRT	Loa	kW	R	S
421	5	31	20	180		S
422	60	42	18	180		S
423	60	27	17	180		S
424	62	30	17	180		S
425	67	31	17	180		S
426	61	45	18	180		S
427	90	35	18	180		S
428	63	39	19	180		S
429	63	49	21	180		S
430	55	44	19	170	R	
431	57	29	18	170		S
432	64	40	19	170		S
433	61	37	18	170	R	S
434	29	36	19	170		S
435	67	41	18	170		S
436	85	55	19	160	R	
437	84	55	20	160	R	
438	88	41	21	160		S
439	82	60	18	160		S
440	58	35	18	160		S
441	8	45	23	160		S
442	53	31	17	150	R	S
443	88	40	20	150		S
444	88	58	19	150		S
445	88	55	20	150		S
446	57	50	20	150	R	
447	48	22	14	150		S
448	32	36	17	150		S
449	6	67	26	150		
450	23	35	20	150		S
451	29	33	19	150		S
452	74	35	16	150		S
453	15	60	25	150		
454	23	22	16	150		S
455	47	41	22	140		S
456	86	48	20	140		S
457	27	24	17	140		S
458	84	45	18	140		S
459	49	22	15	140		S
460	60	36	18	130		S
461	62	28	18	130		S
462	48	30	18	130		S
463	12	35	19	130		S
464	89	51	20	130		S
465	13	32	17	130		S
466	23	40	21	130		S
467	48	22	15	130		S
468	2	43	23	130		
469	79	40	18	130		
470	46	41	18	130		S
471	60	41	21	130		S
472	51	24	20	130		S
473	26	29	21	130		S
474	7	21	18	130		S
475	87	42	18	130		S
476	76	19	20	130		S
477	24	45	28	130		
478	49	28	18	130		S
479	21	36	22	130		S
480	5	43	20	130		S
481	88	51	20	130		S
482	27	27	19	130		S
483	38	36	16	130		S
484	28	36	23	130		S
485	99	46	22	130		S
486	82	29	18	130		S
487	29	24	17	130		S
488	22	51	23	130		S
489	50	24	16	130		S
490	68	20	13	130		

nr	by	BRT	Loa	kW	R	S
491	11	43	22	130		S
492	61	24	19	130		S
493	32	33	21	130		S
494	59	21	15	120		
495	51	33	21	120		S
496	51	28	18	120		S
497	61	36	18	120		S
498	24	38	21	120		S
499	27	36	20	120		S
500	32	32	20	120		S
501	50	23	15	120		S
502	58	33	19	110		S
503	47	28	17	110		S
504	59	26	17	110		S
505	47	22	17	110		S
506	78	24	15	110		S
507	10	34	19	110		S
508	54	11	13	110		S
509	24	37	20	110		S
510	24	22	17	110		S
511	27	31	19	100		S
512	49	40	18	100		S
513	47	23	13	100		S
514	21	38	22	100		S
515	83	30	16	100		S
516	34	17	11	100		S
517	60	22	15	100		S
518	26	46	19	100		S
519	14	22	17	100		S
520	79	22	15	100		S
521	25	25	18	100		S
522	23	26	18	100		S
523	13	28	19	100		S
524	27	27	19	100		S
525	23	33	21	100		S
526	21	21	17	90		S
527	31	23	15	80		S
528	26	16	16	80		S
529	27	25	16	75		S
530	5	29	20	75		
531	79	24	15	75		S
532	61	16	14	75	R	S
533	78	24	15	71		S

nr = number

by = building year

BRT = Bruto Register Tonnage

Loa = length over all

kW = kilo Watts mainpower

R = roundfish licence

S = shrimps licence

no call = flatfish license

Note : half of the roundfish and on third of the shrimp licences have also flatfish licenses

TABLE 3, 4

TABLE 3. FLEETS OF SEA FISHERIES AND MUSSELCULTURE; NUMBER OF VESSELS, ENGINE CAPACITY, AGE OF VESSELS AND NUMBER OF CREW.

	1984	1985	1986	1987	1988	1989	1990
Number of vessels							
- cutterfisheries	625	610	620	611	603	573	533
- freese trawlers	27	22	15	13	13	13	13
- mussel culture	79	77	77	79	79	82	82
Total	731	709	712	703	695	668	628
Engine capacity (x1000 hp *))							
- cutterfisheries	525	534	539	580	599	574	544
- freese trawlers	82	75	66	59	68	76	80
- mussel culture	26	26	27	29	31	35	37
Total	633	635	632	668	698	685	661
Age of the vessels							
- 0 - 10 year	256	235	230	249	272	279	268
- 11 - 20 year	189	196	192	176	146	113	104
- over 20 year	286	278	290	278	277	276	256
Total	731	709	712	703	695	668	628
Number of crew							
- cutterfisheries	2919	2981	2961	3026	2848	2652	2496
- freese trawlers	586	499	397	349	382	379	419
- mussel culture	238	233	235	241	241	250	251
Total	3743	3713	3593	3616	3471	3281	3164

*) 1 hp = 0,736 kW. Source : Direction of Fisheries; Shipping Inspectorate;Product-partnership (?) for Fish and Fishproducts, LEI-DLO

TABLE 4

GROSS REVENUES OF SEA FISHERIES, MUSSEL CULTURE AND OTHERS.
(x milion dutch guilders) a)

	1984	1985	1986	1987	1988	1989	1990
Cutterfisheries	693	794	762	744	649	659	689
Freese trawlers	203	215	171	161	143	152	149
Total sea fisheries	896	1009	933	905	792	811	838
Mussel culture b)	29	49	68	69	77	88	99
Oyster culture	13	13	17	14	17	17	11
Cockle fisheries	pm	pm	pm	pm	pm	pm	pm
Various	1	1	1	1	1	1	1
Total	939	1072	1019	989	887	917	949

a) Inclusive supply in foreign harbours; b) Exclusive of the mussel take out by the Mussel Fund. Source: Direction of the Fisheries, Product-partnership (?) for Fish and Fishproducts, estimate of LEI-DLO

Cutter fleet = inshore trawler fleet

TABLE 5

INVESTMENTS IN SEA FISHERIES, MUSSEL CULTURE AND OTHERS.

	1984	1985	1986	1987	1988	1989	1990
Cutter fisheries							
million dutch guilders b)	140	87	90	172	128	63	64
numbers :							
new ships	31	23	19	25	25	13	15
other ships c)	3	2	–	–	1	2	3
lengthening a. o.	7	3	11	18	5	3	2
new engines	38	27	23	19	21	9	12
Freese trawlers							
million dutch guilders b)	79	34	59	4	80	95	50
numbers :							
new ships	3	1	2	–	2	2	1
other ships c)	–	–	–	–	–	–	1
lengthening a. o.	–	1	–	1	–	–	–
Mussel culture							
million dutch guilders b)	5	1	4	12	16	23	14
numbers :							
new ships	1	–	2	3	5	7	3
other ships c)	1	1	–	–	–	3	2
lengthening a. o.	3	2	1	5	4	1	3
new engines	7	2	3	10	4	5	4
Other sectors d)							
million dutch guilders b)	4	3	5	14	23	2	2
numbers :							
new ships	1	1	3	4	8	–	2
other ships c)	1	–	2	1	1	7	4
lengthening a. o.	1	–	–	3	2	3	1
new engines	–	2	–	3	2	3	2
Total fleet							
million dutch guilders b)	228	125	158	202	247	183	130
numbers :							
new ships	36	25	26	32	40	22	21
other ships c)	5	3	2	1	2	12	10
lengthening a. o.	11	6	12	27	11	7	6
new engines	45	31	26	32	27	17	18

a) Bruto investments, exclusive electronical instruments en deck machinery (date of maiden trip); b) Bruto, without subtraction of Premium for Investment; c) Second hand from foreign country or other industries; d) Oyster, cockle and other coastal fisheries.

TABLE 6 . CUTTERFISHERIES; GROSS PROCEEDS BY HP-GROUP AND TYPE OF FISHERY. (x a million of Dutch guilders)

	1984	1985	1986	1987	1988	1989	1990
1-200, hp							
- beamtrawl	2	2	1	1	1	1	1
- ottertrawl	0	.	1	0	0	0	.
- pairtrawl (roundfish)	0	1	.	.	.	.	.
- shrimptrawl	16	21	20	25	20	21	20
- various	0	0	.	.	.	0	0
- total	20	24	21	26	21	22	21
201-300 hp							
- beamtrawl	25	34	41	44	37	37	39
- ottertrawl	4	7	11	12	9	7	4
- pairtrawl (roundfish)	15	25	21	28	18	11	5
- herring pairtrawl	0	0	.	.	.	.	.
- shrimptrawl	20	17	20	16	24	42	34
- various	3	7	4	3	5	4	4
- total	68	89	97	105	93	102	85
301-600 hp							
- beamtrawl	6	1	7	5	5	5	8
- ottertrawl	10	6	7	6	6	5	4
- pairtrawl (roundfish)	25	29	17	18	13	12	10
- herring pairtrawl	2	2	1	1	1	1	.
- various	1	2	1	2	2	2	3
- total	44	39	34	33	26	25	25
601-1100 hp							
- beamtrawl	66	52	40	39	35	29	22
- ottertrawl	11	11	16	7	15	7	4
- pairtrawl (roundfish)	27	36	17	22	32	15	11
- herring pairtrawl	13	13	12	7	1	.	2
- various	.	.	1	0	.	.	0
- total	117	111	86	75	83	50	39
1101-1500 hp							
- beamtrawl	198	213	193	159	138	127	127
- ottertrawl	6	4	2	4	.	2	.
- pairtrawl (roundfish)	3	6	2	2	2	.	0
- herring pairtrawl	4	8	13	25	8	9	7
- total	211	231	210	189	148	138	134
1501- hp							
- beamtrawl	233	298	311	313	297	318	379
- herring pairtrawl	.	2	2	3	3	4	5
- various	0	.	.	.	.	.	.
- total	233	301	313	316	300	322	384
All ships							
- beamtrawl	530	599	593	561	505	516	577
- ottertrawl	31	27	37	30	25	21	12
- pairtrawl (roundfish)	70	97	57	69	55	38	26
- herring pairtrawl	19	25	28	36	13	14	14
- shrimptrawl	37	38	40	43	44	63	53
- various	5	8	6	5	7	6	7
- total	693	794	762	744	649	659	689

. Not observed in that group; 0 Less than 500,000 Dutch guilders

FIGURE 1

Change in numbers of the inshore trawler fleet 1986 - 1991

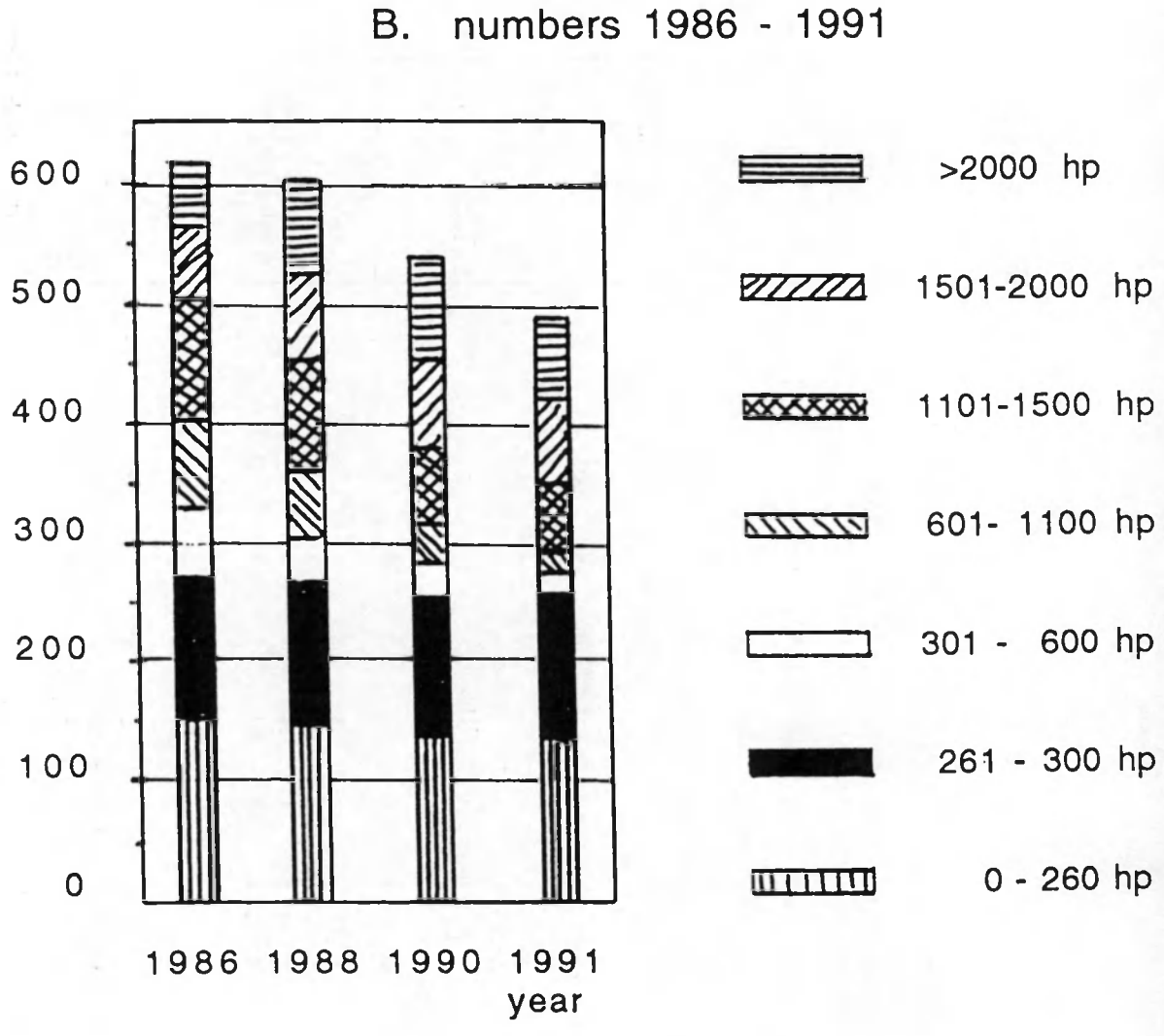


FIGURE 2 Change in fishing power

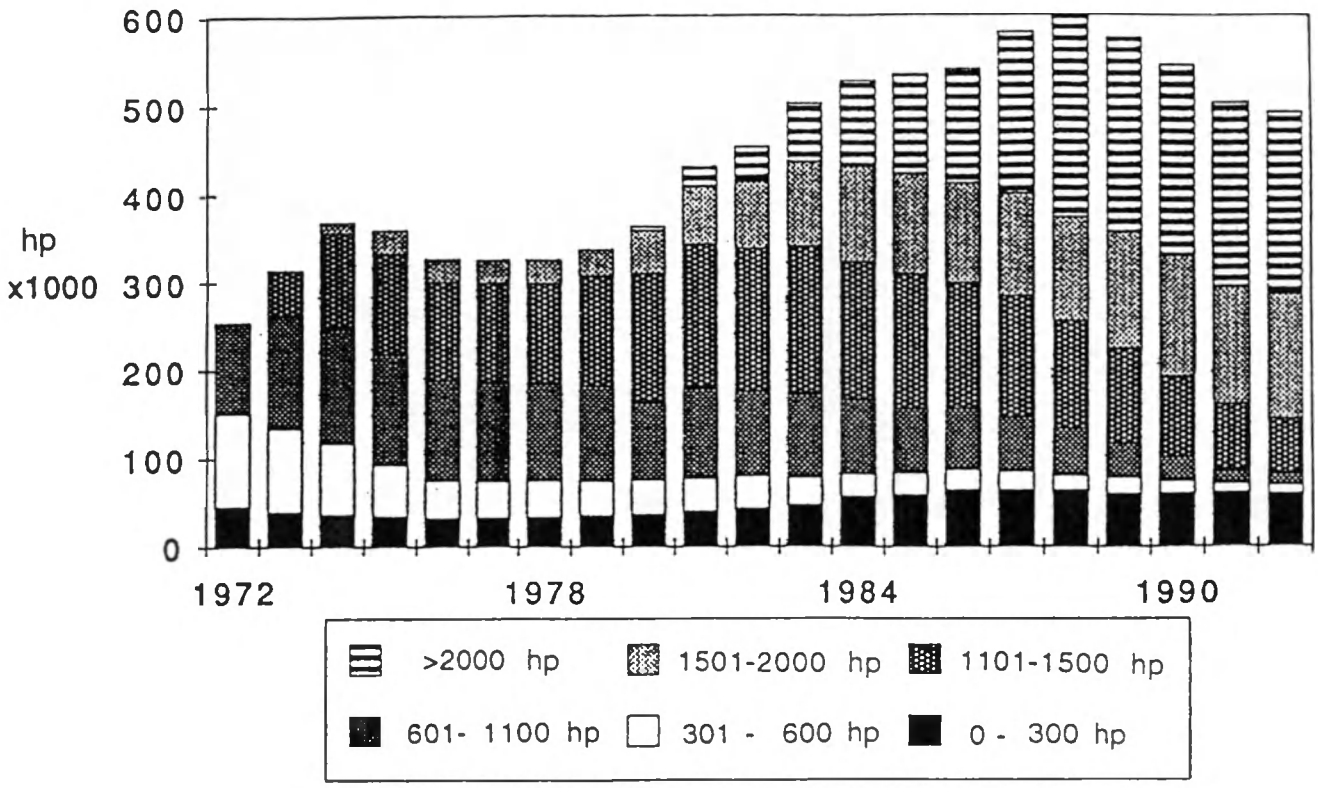


FIGURE 3
Change in efforts related to the fishing gear

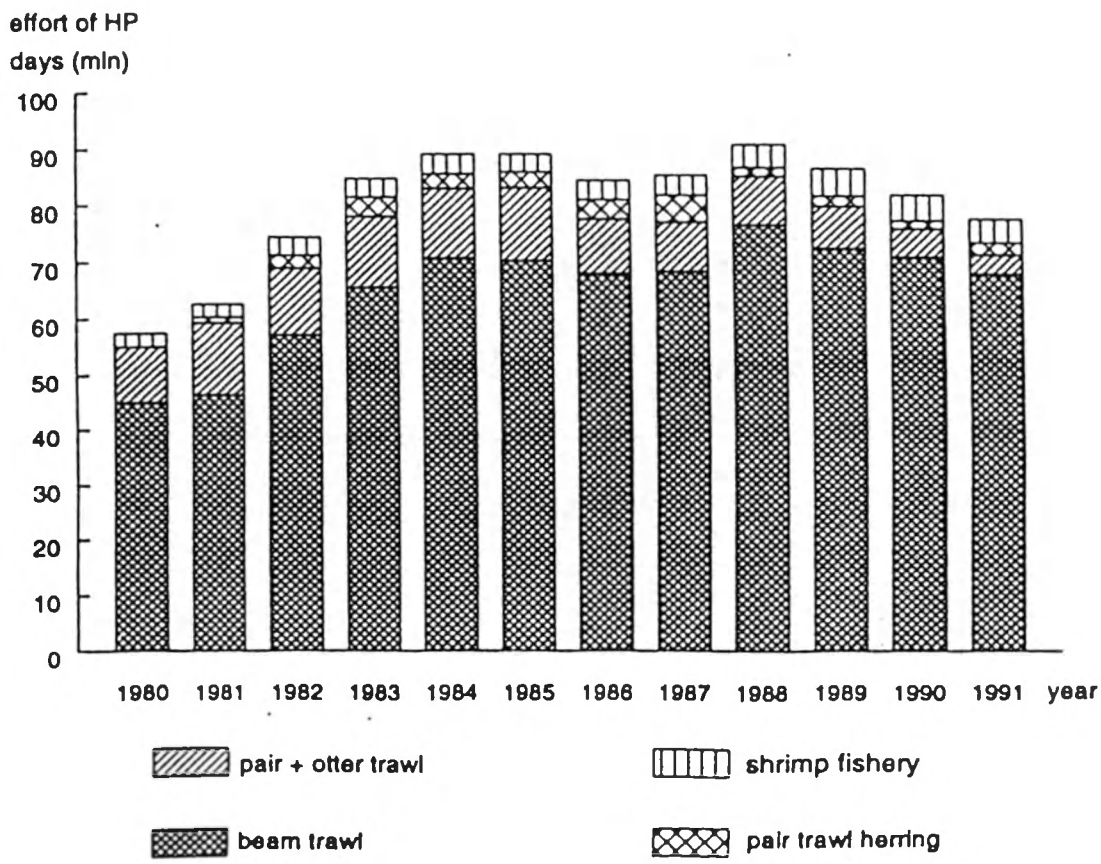
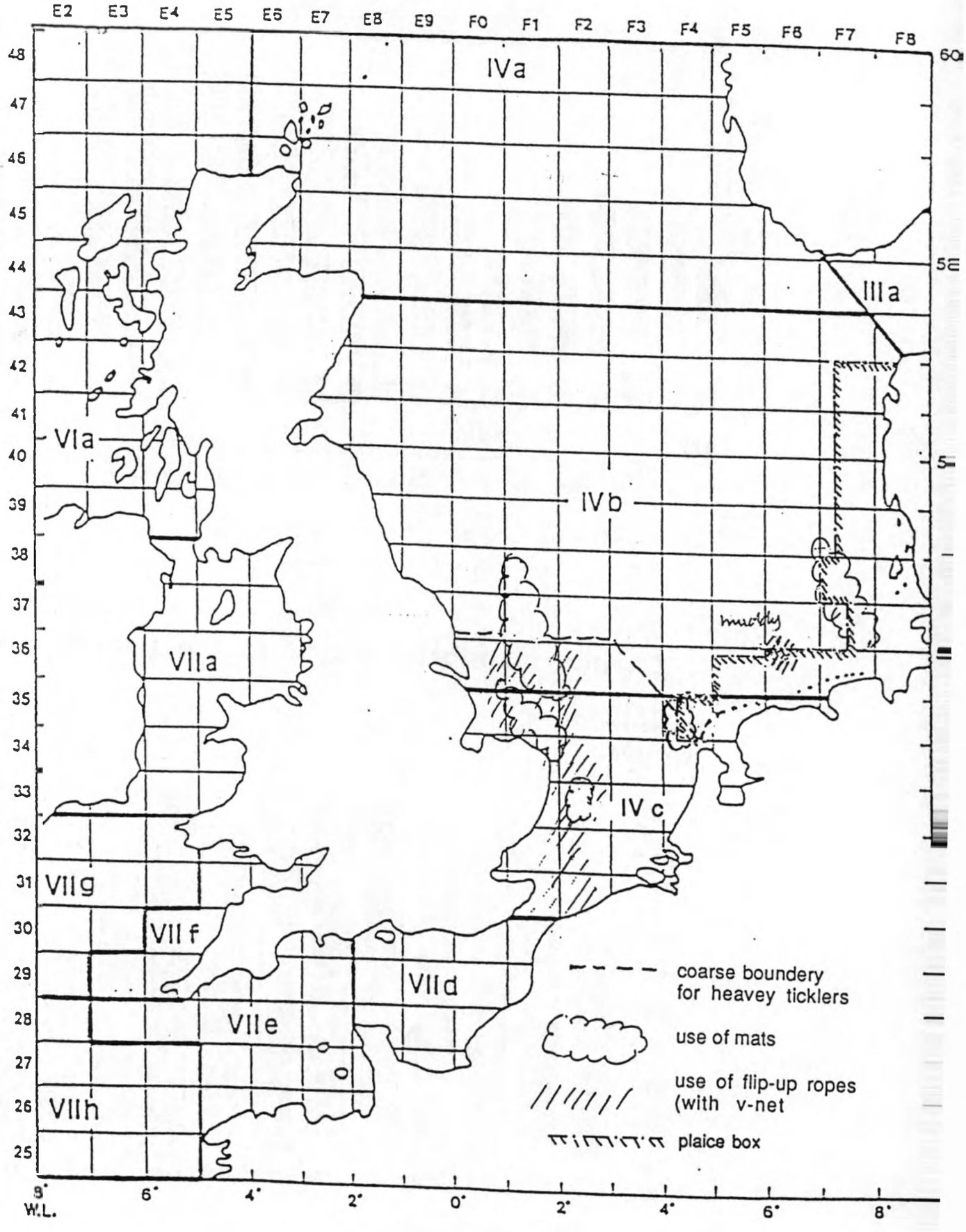


Figure 4 a : Fishing areas : use of gears by the Dutch beam trawlers



ICES fishing areas and ICES quadrants

Figure 4b. Registrated fishing effort of the Dutch beamers > 300 hp, in fishing days per ICES quadrant.

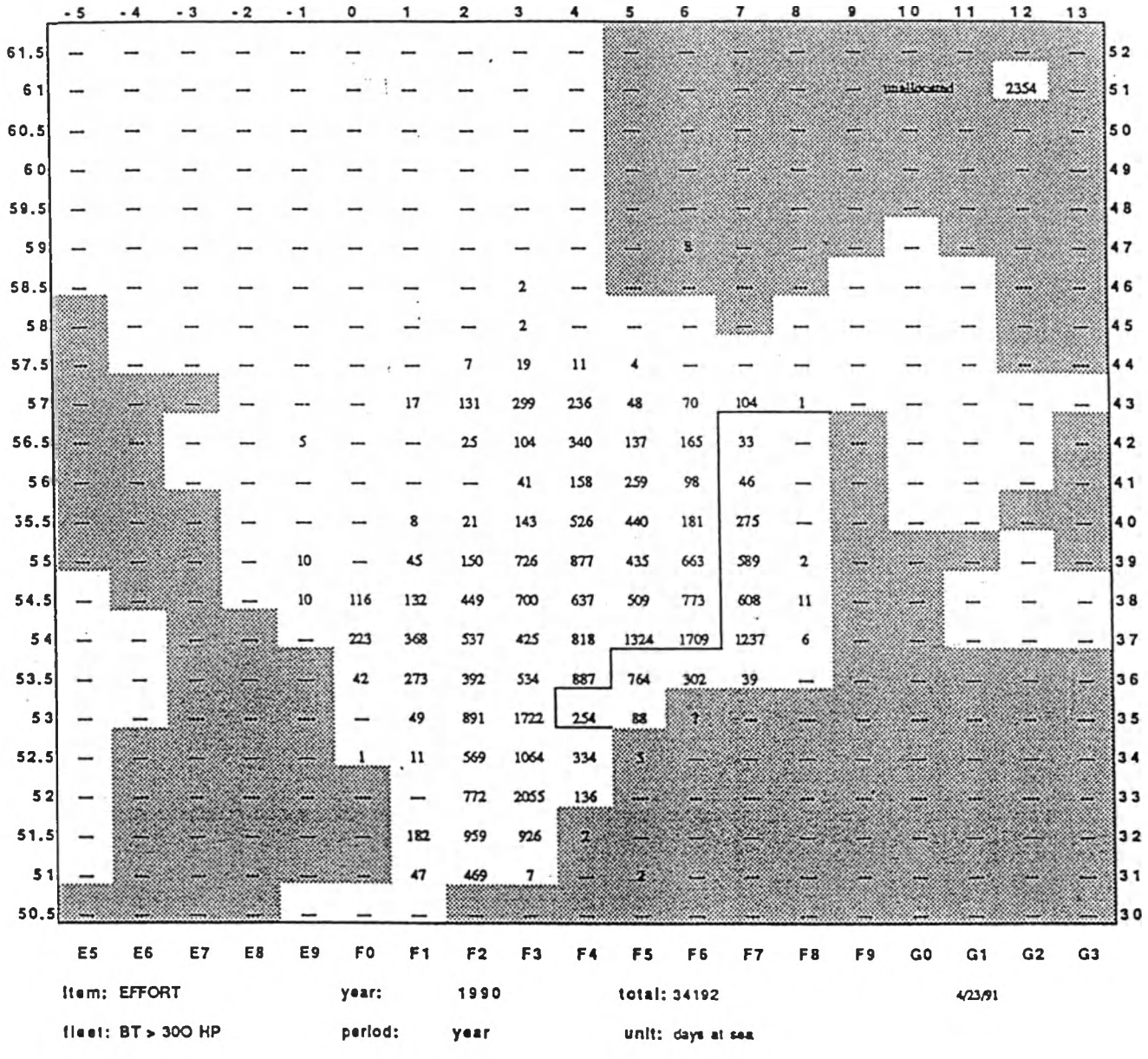


Figure 4c. Registrated fishing effort of the Dutch beamers ≦ 300 hp, in fishing days per ICES quadrant.

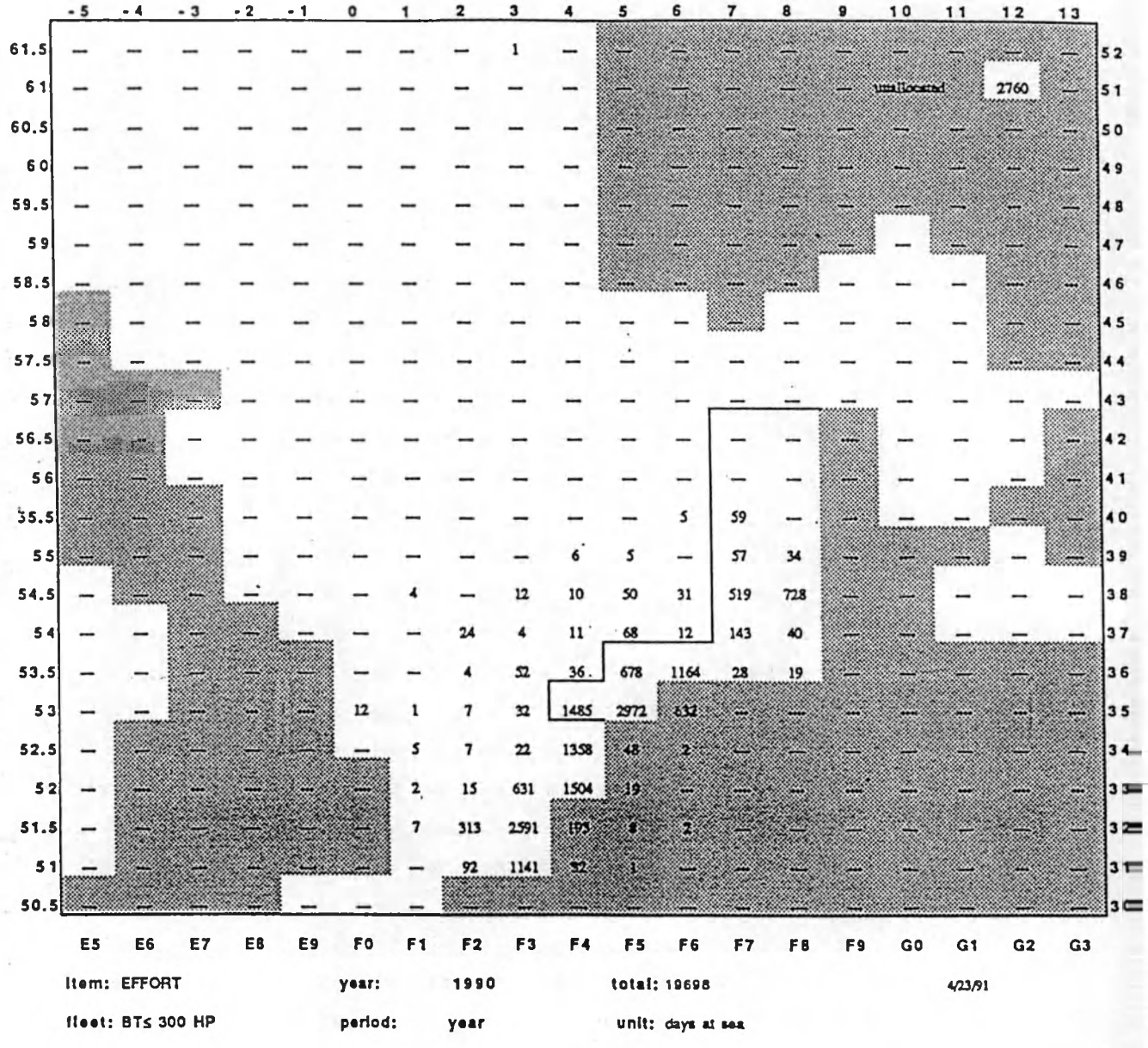
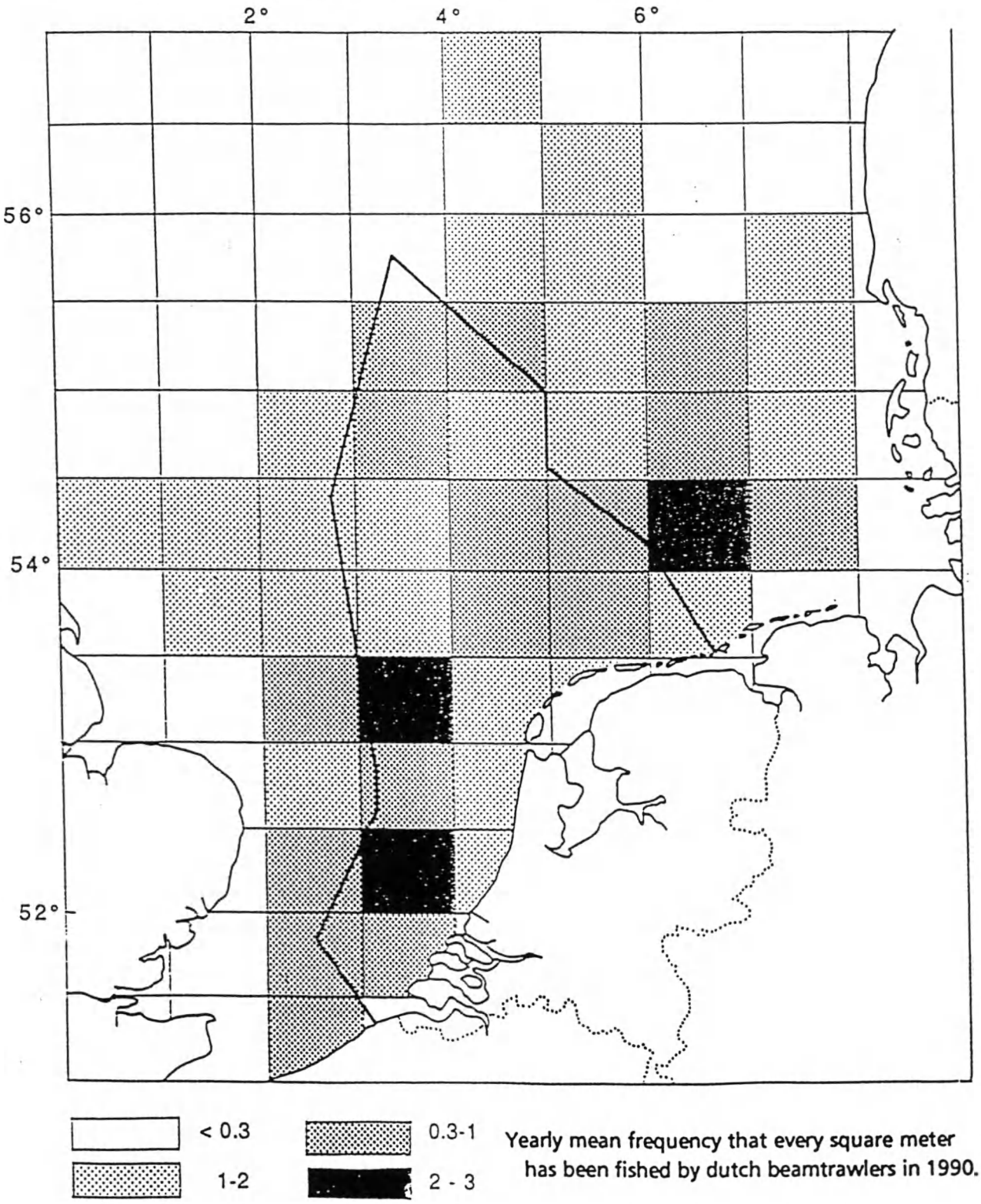


Figure 4d. Fishing effort: yearly mean frequency that every square meter has been fished by dutch beamers in 1990 (roughly, mean per ICES quadrant).



ANNEX 3 : Details on the German trawler fleet and gears used

Table of contents

1. VESSEL DATA

There are 615 vessels in the German cutter (all trawlers except the large stern trawlers operating pelagic gear) fleet (1992). More than 50 % of these vessels work with otter trawls. In the coastal waters the cutters operate beam trawls targeting shrimp. This part of the fleet consists of 290 vessels (all vessels corresponding to the EC-regulation 3094/86). Table 1 contains some of the technical data of this fleet. 48 of these cutters are engaged in beam trawling for flatfish, the others are working on shrimp (more than 60 % of the earnings must be on shrimps). The catch season on shrimps is from April to December. Some of the bigger cutters are working in parts of the year (about 3 months) on flatfish.

8 large beam trawlers with an engine power higher than 221 kW (300 hp) are working under the german flag. 5 of these vessels are former Dutch beamers (see table 2).

The age structure of the small beam trawler fleet is clear from figure 1. The age structure of the cutter fleet which is active in pair or otter trawling, is similar. The main target species of this fleet are cod, saithe and haddock.

2. GEAR DATA

The small shrimp beam trawler fleet uses beam trawls with a beam length of 6 to 9 m each. The towing speed of these vessels is 2.5 kn in calm waters, about 3.5 kn with the tidal stream and about 1.5 kn against the tidal stream (speed over the ground). The weights of the gear on shrimps are 500 to 900 kg.

Because of the EEC regulation 3094/86 the cutters fishing for flatfish use beam trawls with a beamlength of 4.5 m. These gears have a weight of about 1000 to 1200 kg, depending on the towing speed and on bottom conditions.

3. FLEET ACTIVITIES

The activities of the fleet in the year 1990 are shown in figure 3.

Table 1 : German trawler fleet 31.12.90

					Engine power	
Homeport	no.	Loa	BRT	Year built	KW	HP
ACC	1	17.14	32.5	1968	176	239
ACC	10	18.79	49.81	1977	218	296
ACC	11	14.06	15.31	1956	107	145
ACC	12	17.09	34.87	1981	176	239
ACC	13	15.01	18.49	1957	164	223
ACC	16	15.14	20.03	1963	144	196
ACC	2	14.97	17.9	1986	175	238
ACC	3	20.04	49.8	1962	184	250
ACC	4	15.56	26.75	1970	175	238
ACC	6	15.25	20.57	1967	175	238
ACC	7	15.09	17.9	1986	175	238
ACC	8	18.15	36.96	1981	184	250
ACC	9	18.95	42.85	1985	219	298
AG	8	14.96	18.79	1957	146	198
AZ	5	15	20.76	1929	145	197
BEN	1				184	250
BEN	2	17.07	35.91	1980	188	255
BOR	1	15.49	21.08	1968	132	179
BOR	2	19.27	44.43	1963	180	245
BRA	3	23.99	74.92	1982	220	299
BRA	5	24.65	69.99	1983	221	300
BRA	7	18.65	60.5	1973	219	298
BRA	8	22.97	69.49	1984	220	299
BUES	2	9.75	4.49	1938	66	90
BUES	4	13.2	14.65	1946	100	136
BUES	6	12.81	13.21	1956	125	170
BX	765	22.45	69.96	1981	221	300
CUX	1	11.66	20.45	1986	104	141
CUX	3	14.14	19.6	1936	130	177
CUX	6	12.5	11.86	1950	130	177
CUX	7	15.25	19.5	1965	162	220
CUX	8	11.79	10.33	1946	92	125
DAN	3	12.7	11.25	1931	68	92
DIT	1	15.25	20.57	1965	188	255
DIT	18	17.19	36.97	1983	217	295
DIT	2	15.3	21.69	1970	110	149
DIT	5	15.25	20.57	1964	147	200
DIT	6	15.25	20.57	1964	170	231
DIT	9	16.02	23.83	1967	180	245
DOR	12	15.64	24.26	1981	165	224
DOR	13	14.25	18.35	1959	125	170
DOR	15	12.49	11.24	1960	124	168
DOR	16	15.55	28.29	1971	220	299
DOR	2	15.73	22	1983	161	219
DOR	4	16.38	27.84	1987	216	293
DOR	5	14.64	19.96	1961	164	223
DOR	8	14.25	16.53	1966	137	186
FED	1	15.14	20.03	1960	191	260
FED	10	15.44	20.72	1961	180	245
FED	11	11.8	10.98	1948	93	126
FED	2	15.04	17.39	1956	147	200
FED	3	16.2	32.15	1976	217	295
FED	4	17.7	36.99	1981	180	245
FED	5	18.24	36.93	1988	183	249
FED	6	11.8	10.09	1950	93	126

					Engine power	
Homeport	no.	Loa	BRT	Year built	KW	HP
FED	7	13.91	13.09	1963	110	149
FED	8	1768	35.29	1967	184	250
FED	9	15.55	21.87	1974	191	260
FRI	1	14.72	22.52	1968	138	188
FRI	18	13.25	15.19	1965	136	185
FRI	20	14.29	20.25	1964	130	177
FRI	23	14.15	18.3	1968	151	205
FRI	3	13.05	15.07	1962	151	205
FRI	35	12.35	10.83	1965	107	145
FRI	36	13.17	15.1	1964	131	178
FRI	7	14.3	20.51	1967	151	205
FRI	75	15.5	22.02	1941	145	197
FRI	76	15.14	16.67	1964	151	205
FRI	86	13.15	15.66	1957	151	205
GRE	1	15.25	20.57	1965	146	198
GRE	10	15.96	24.48	1975	165	224
GRE	11	17.84	27.35	1980	184	250
GRE	12	15.98	22.7	1977	188	255
GRE	13	15.97	24.1	1974	145	197
GRE	14	16.41	33.93	1980	184	250
GRE	15	17.03	34.43	1969	186	253
GRE	16	17.14	32.63	1969	184	250
GRE	17	17.14	32.63	1969	206	280
GRE	18	16.28	34.92	1976	132	179
GRE	19	18.41	34.86	19.69	184	250
GRE	2	15.62	23.89	1972	110	149
GRE	20	17.75	35.29	1969	190	258
GRE	21	16.03	29.93	1970	140	190
GRE	22	16.05	23.55	1973	199	270
GRE	24	17.26	36.92	1977	221	300
GRE	25	16.16	29.73	1971	190	258
GRE	28	12.33	18.8	1979	110	149
GRE	29	16.96	36.71	1980	219	298
GRE	3	17.1	44.13	1984	184	250
GRE	5	16.97	30.59	1987	186	253
GRE	6	15.96	29.09	1971	145	197
GRE	7	17.2	36.77	1979	221	300
GRE	8	15.38	20.57	1967	146	198
HAR	1	15.96	23.07	1973	191	260
HAR	10	16.1	30	1987	114	155
HAR	14	15.17	21.08	1966	180	245
HAR	2	13.86	13.61	1959	150	204
HAR	20	15.25	21.08	1969	175	238
HAR	4	15.36	20.7	1970	199	270
HAR	5	15.23	21.75	1971	175	238
HAR	6	16.72	34.94	1979	217	295
HAR	8	17.51	35.01	1983	184	250
HF	348	15.1	12.88	1892	88	120
HF	511	16.22	23.96	1950	79	107
HF	552	18.21	35.18	1970	176	239
HF	562	17.26	36.91	1973	165	224
HF	567	21.44	68.89	1981	221	300
HF	573	21.65	71.39	1990	221	300
HOO	1	16.45	36.96	1980	136	185
HOO	3	15.58	21.36	1970	132	179

					Engine power	
Homeport	no.	Loa	BRT	Year built	KW	HP
HOO	52	15.92	25.19	1975	199	270
HOO	53	17.15	49.85	1980	180	245
HOO	61	15.46	22.64	1971	206	280
HOR	1	15.14	20.03	1959	110	149
HUS	18	18.76	38	1979	184	250
HUS	19	18.51	36.98	1980	184	250
HUS	2	14.31	15.2	1961	129	175
HUS	25				138	188
HUS	28	15.55	25.59	1971	165	224
HUS	33	15.01	18.41	1956	146	198
HUS	6	14.28	15.34	1963	174	236
HUS	7	15.56	21.03	1970	175	238
HUS	9	16.65	30.62	1965	180	245
NC	321	23.94	69.92	1984	220	299
NC	322	23.87	66.83	1985	221	300
NC	326	23.56	70.02	1957	210	285
NC	458	16.15	27.18	1961	146	198
NEU	225	18.83	49.88	1978	184	250
NEU	226	15.41	21.1	1968	147	200
NEU	227	15.58	21.36	1970	175	238
NEU	228	15.42	21.74	1971	147	200
NEU	229	15.51	21.01	1970	147	200
NEU	230	14.18	19	1987	110	149
NEU	231	15.23	31.11	1988	184	250
NEU	235	12.97	11.06	1952	110	149
NEU	240	15.38	20.8	1967	135	183
NEU	241	12.78	10.21	1956	114	155
NEU	243	15.52	24.11	1960	177	240
NEU	245	16.27	25	1983	180	245
NEU	319	13.18	15.15	1958	138	188
NG	2	25.06	99.83	1971	220	299
NOR	201	18.91	35.01	1979	213	289
NOR	202	14.06	15.3	1956	107	145
NOR	203	16.67	33.88	1956	169	230
NOR	205	16.44	25.05	1980	161	219
NOR	206	16.11	29.78	1971	197	268
NOR	207	15.42	20.67	1971	147	200
NOR	208	17.09	32.54	1969	191	260
NOR	209	12.65	13.26	1946	96	130
NOR	210	15.14	20.03	1960	147	200
NOR	211	16.05	23.55	1973	175	238
NOR	212	11.19	12	1989	92	125
NOR	223	15.55	21.16	1976	110	149
NOR	224	15.1	17.15	1949	110	149
NOR	225	15.66	20.82	1979	110	149
NOR	228	15.51	21.08	1968	185	251
NOR	230	15.16	17.98	1959	110	149
NOR	231	17.1	35028	1982	219	298
NOR	232	15.25	20.57	1966	110	149
NOR	236	16.58	28.36	1961	99	135
ON	180	18.33	34.55	1969	213	289
PEL	1	17	40	1986	184	250
PEL	2	14.55	23.34	1965	132	179
PEL	3	17.99	36.97	1978	183	249
PEL	9	17.94	34.96	1971	182	247

					Engine power	
Homeport	no.	Loa	BRT	Year built	KW	HP
SC	14	17.99	35.15	1969	184	250
SC	15	20.24	63.84	1983	184	250
SC	18	19.19	43.37	1962	183	249
SC	19	24.69	69.35	1986	221	300
SC	2	19.71	61.38	1982	221	300
SC	20	16.53	30.89	1967	169	230
SC	21	24.18	80	1967	184	250
SC	32	17.5	33.47	1959	184	250
SC	33	19.47	36.75	1947	184	250
SC	34	18.09	37.35	1969	184	250
SC	36	11.06	15	1986	100	136
SC	4	14.98	30	1986	184	250
SC	43	22.37	65.01	1985	221	300
SC	44	24.55	75	1959	184	250
SC	45	15.4	21.99	1947	135	183
SC	5	18.24	67.14	1988	183	249
SC	52	17.61	34.85	1968	184	250
SC	54	17.77	35.09	1968	162	220
SC	57	18.7	46.73	1949	184	250
SC	58	19.6	65	1989	221	300
SC	6	18.79	61	1986	184	250
SC	7	18.4	49	1979	184	250
SC	8	17.15	35.28	1971	179	243
SCHL	1	12.91	11.71	1960	55	75
SD	1	14.58	23.97	1960	184	250
SD	11	17.23	35.14	1970	184	250
SD	12	15.71	25.79	1970	172	234
SD	13	16.17	31.6	1973	147	200
SD	14	15.9	29.09	1970	159	216
SD	15	16.65	34.48	1982	184	250
SD	16	16.04	28.52	1979	178	242
SD	18	16.21	28.93	1971	180	245
SD	19	17.35	35.15	1971	182	247
SD	2	15.33	19.51	1965	124	168
SD	20	15.65	25.91	1971	165	224
SD	22	16.21	32.57	1976	184	250
SD	23	16.02	36	1986	184	250
SD	24	15.09	28.11	1976	182	247
SD	25	15.47	20.8	1968	153	208
SD	26	16.72	39	1983	147	200
SD	28	16.73	34.1	1978	181	246
SD	3	17.26	36.96	1974	184	250
SD	30	14.99	24.3	1963	140	190
SD	31	16.15	27.18	1963	182	247
SD	32	16.01	36	1985	165	224
SD	33	17.24	35.28	1973	184	250
SD	34	15.65	22.98	1973	146	198
SD	35	16.84	40	1987	184	250
SD	4	15.34	22.24	1971	147	200
SD	5	15.66	26.18	1971	140	190
SD	6	17.24	34.87	1968	184	250
SD	7	18.71	47.63	1979	184	250
SD	8	14.35	27	1983	165	224
SD	9	16.65	30.82	1968	184	250
SH	6				221	300

					Engine power	
Homeport	no.	Loa	BRT	Year built	KW	HP
SH	7	23.23	66.63	1985	221	300
SH	19	17.98	52.88	1982	221	300
SPI	1	14.09	18.45	1964	138	188
SPI	10	15.25	20.57	1965	147	200
SPI	2	15.67	22.98	1980	169	230
SPI	3	????	????	????	145	197
SPI	4	15.59	25.47	1979	184	250
SPI	5	15.09	22.8	1977	191	260
SPI	6	15.14	20.03	1963	110	149
SPI	7	12.5	9.9	1932	132	179
ST	1	16.6	33.79	1960	162	220
ST	11	16.4	33.99	1977	184	250
ST	12	15.58	35.6	1980	165	224
ST	17	18.16	36.15	1960	165	224
ST	2	25.05	79.87	1961	184	250
ST	20	16.03	28.93	1968	165	224
ST	22	18.14	40.56	1978	180	245
ST	24	15.9	29.09	1969	99	135
ST	26	23.69	61.39	1963	184	250
ST	28	17.95	36.63	1973	184	250
ST	29	17.82	31.36	1963	147	200
ST	3	18.54	39.12	1964	182	247
ST	30	18.58	47.49	1984	213	289
ST	5	20.57	49.93	1959	176	239
ST	6	15.98	29.15	1966	107	145
ST	7	17.17	33.28	1969	184	250
ST	8	19.4	40.11	1947	184	250
SU	12	19	49.95	1978	184	250
SU	13	14.25	19.61	1966	88	120
SU	2	14.08	16.4	1963	131	178
SU	3	18.56	46	1977	184	250
SU	4	17.98	49.06	1946	162	220
SU	5	17.27	35.49	1980	184	250
SU	6	20.67	49.4	1978	184	250
SU	7	15.79	25.06	1968	110	149
SU	8	17.04	41.23	1972	184	250
SU	9	17.63	33.64	1990	184	250
SW	1	15.06	27.8	1974	125	170
SW	2	15.65	26.43	1979	182	247
SW	3	17.59	32.23	1990	182	247
SW	4	16.98	43	1986	184	250
SW	5	15.6	22.48	1962	130	177
TOEN	1	9.64	8.04	1978	74	101
TOEN	2	8.2	6	1961	40	54
TOEN	4	14.07	16.05	1959	88	120
TOEN	32	15.25	24.44	1965	165	224
TOEN	6	11.26	15.46	1948	130	177
VAR	1	15.55	21.32	1976	175	238
VAR	11	11.75	12.55	1932	140	190
VAR	18	13.91	13.09	1962	109	148
VAR	6	15.89	23.76	1974	180	245
WIT	1	14.32	19.05	1966	124	168
WIT	12	16.15	31.93	1976	183	249
WRE	1	16.19	26.57	1970	130	177
WRE	10	16.21	32.89	1976	184	250

					Engine power	
Homeport	no.	Loa	BRT	Year built	KW	HP
WRE	2	15.14	20.03	1962	131	178
WRE	3	16.3	29.27	1976	169	230
WRE	4	16.35	27.83	1987	184	250
WRE	5	16.6	31.92	1979	221	300
WRE	6	15.14	20.03	1961	110	149
WRE	7	15.59	24.31	1979	138	188
WRE	9	17.15	35.28	1970	184	250

Table 2. Beam trawlers over 24 m and 221 kW

Vessel	L all	GT	kW	Year built
NG 1	36.28	247.22	939	1979
SC 25	39.04	249.34	912	1975
SC 31	37.87	234.82	1104	1973
SL 2	32.74	176.42	919	1971
ST 27	34.15	173.73	908	1973

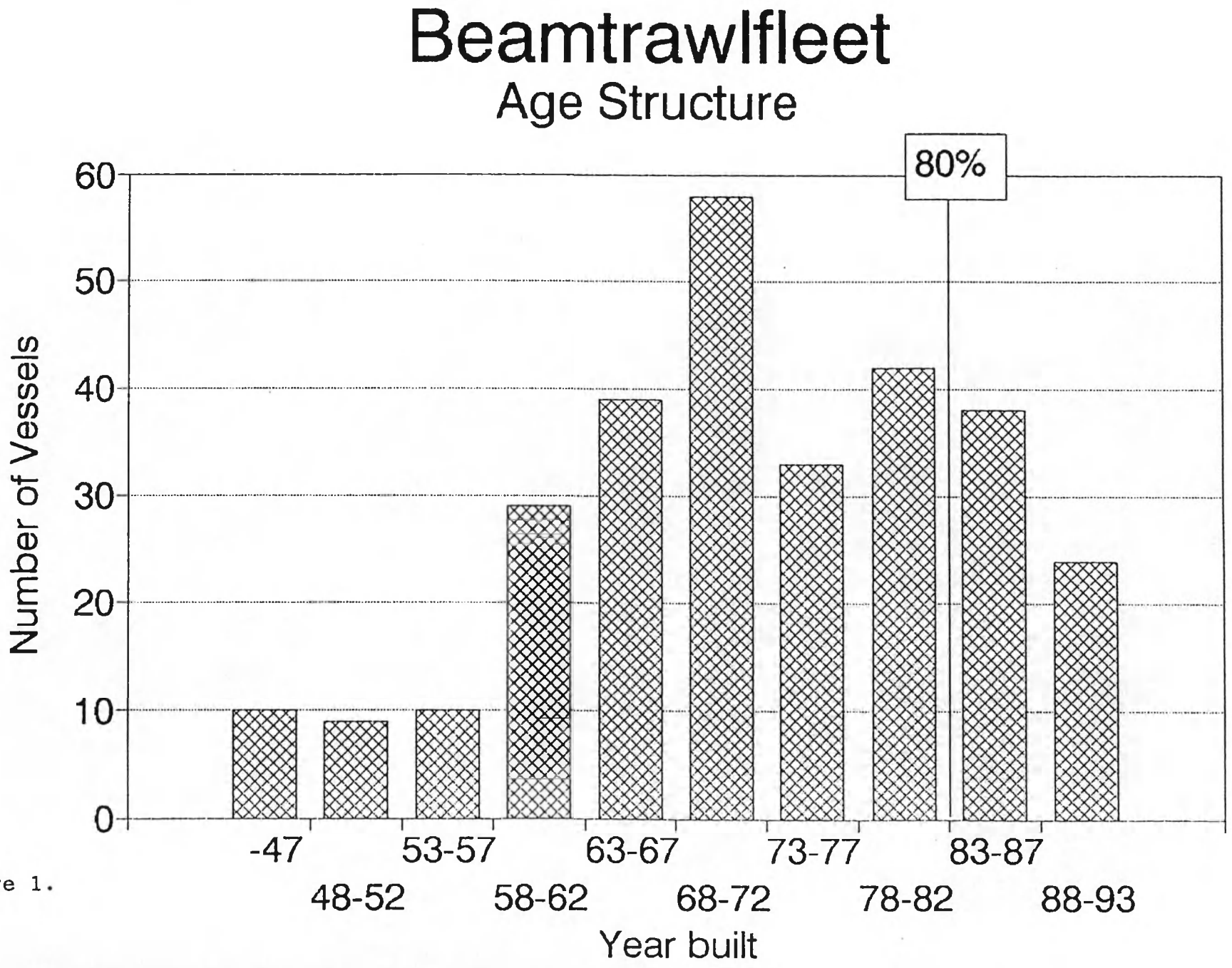

Beamtrawlfleet
Age Structure
80%
Number of Vessels
60
50
40
30
20
10
0
-47
48-52
53-57
58-62
63-67
68-72
73-77
78-82
83-87
88-93
Year built

Figure 1.

German Beam Trawlers 1992
EEC-Reg. 3094/86

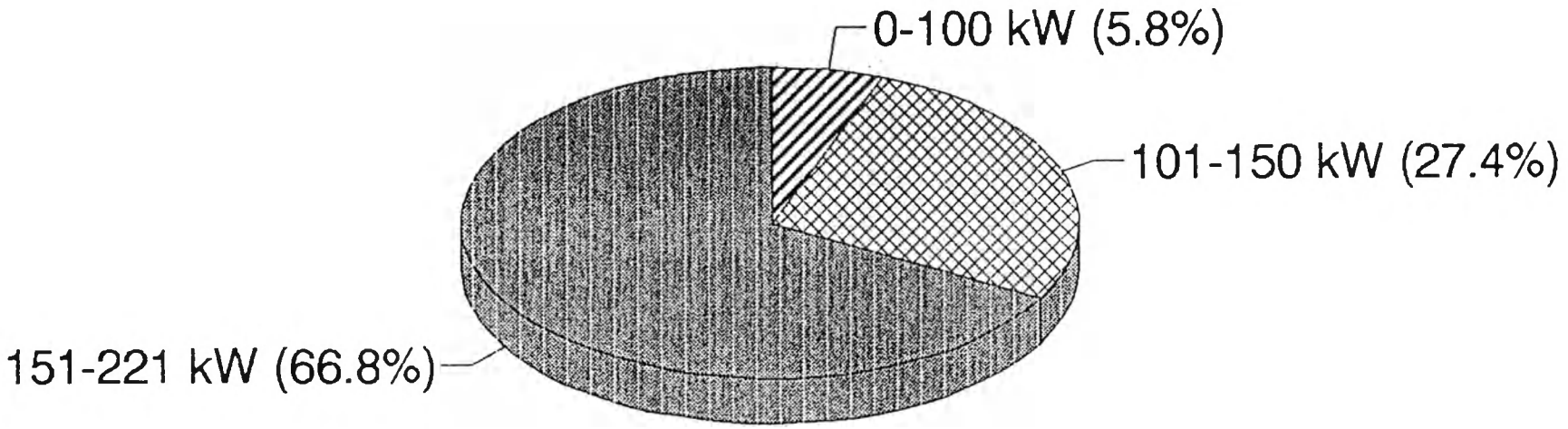
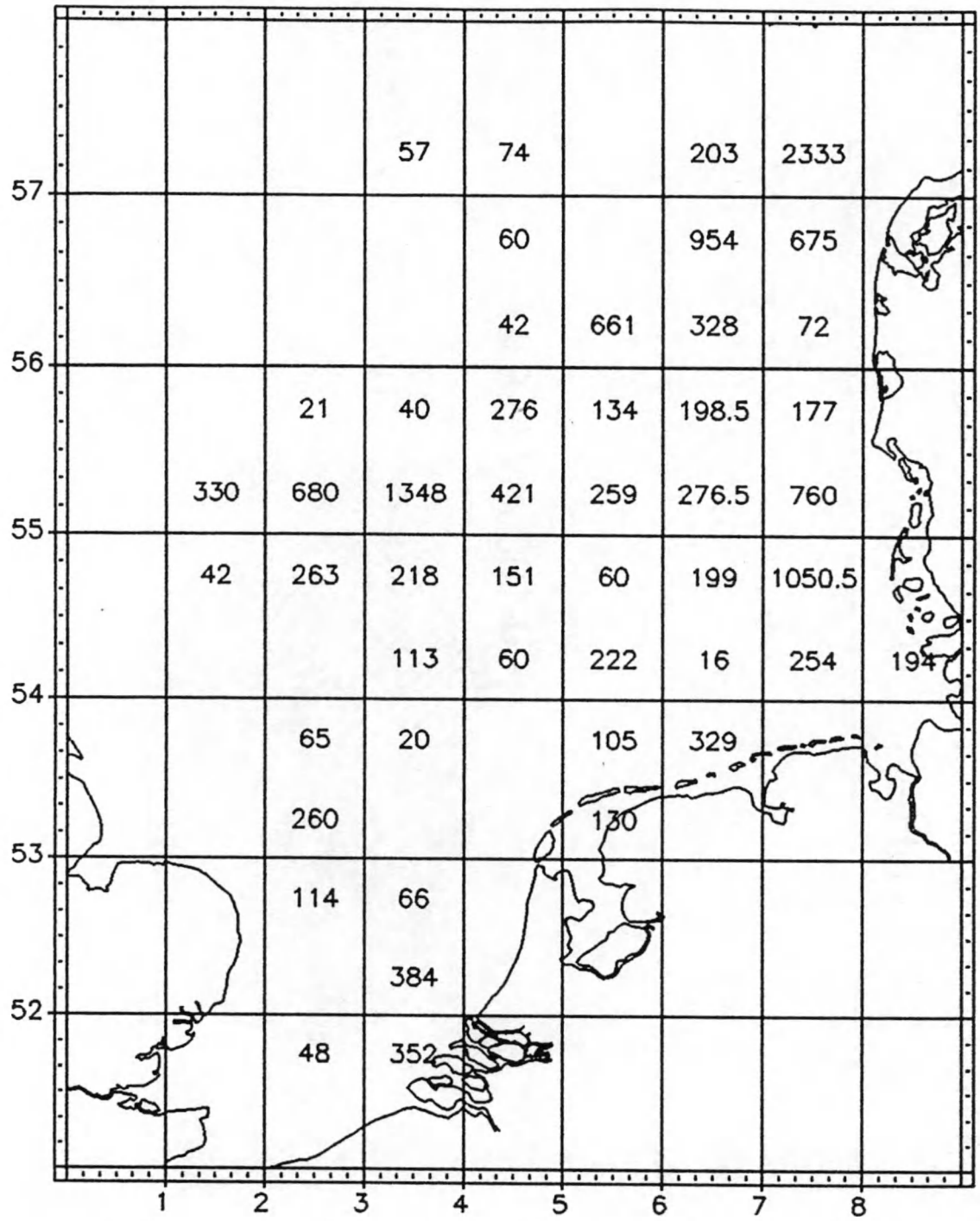


Figure 2.



Fishingtime 1990

German Beamtrawler > 221 kW (5 Vessels)

Σ Year 15096 h

Figure 3.