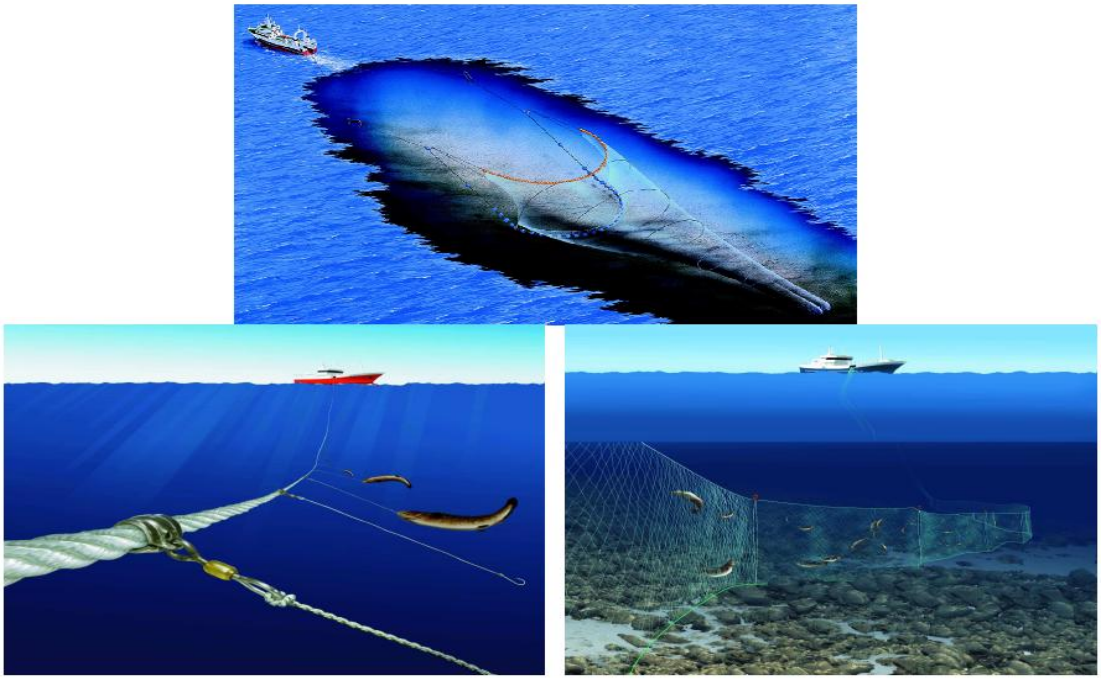
DESCRIPTION OF RELEVANT FISHING GEAR AND FISHERY ACTIVITIES IN THE NORWEGIAN ECONOMIC ZONE

Directorate of Fisheries
2010



FISHING GEAR AND FISHERY ACTIVITY

There are many different types of fishing gear. Some gear has been adapted to certain species on the basis of the species' special characteristics such as their behaviour, their feeding and spawning migration patterns. Changes in fishery activities throughout the year are due to biological and climatic conditions. Active fishing methods have been employed ever since the stone age and have developed over the ages to give us the wide variety of fishing gear we have today. For Norwegian waters, the fishing gear can be divided into the following main groups:

1. Gillnet	(bottom-set gillnet, midwater gillnet and drift net)
2. Hook-and-line gear	(lines, jigging and trolling lines)
3. Trawl	(bottom, pelagic and semi-pelagic trawl)
4. Seines	(Danish and Scottish seines)
5. Closing nets	(Purse seines, shore seines)
6. Other fishing gear	(Such as lobster/crab pots, fish traps and shell scrapers)

Within each main group of fishing gear, such as nets and trawls, there are many different types and sizes. It would not be relevant to provide a detailed description of these in this summary. Thus, in the following, the fishing gear has been divided into two main groups and described in sufficient detail to provide a summary of the most important fishing gear that one can expect to come across in the geographical areas where seismic surveys are conducted. The summary also describes fishing gear used by foreign vessels in the Norwegian Economic Zone. The main groups of fishing gear are divided into passive and active gear.

Def. passive fishing gear:	A fishing device consisting of gear where the fish must seek out the gear in order to be caught, such as longlines and gillnets.
Def. active fishing gear:	A fishing device consisting of gear where the gear must seek out the fish to catch it, such as trawls, closing nets and seines.

The most common species in Norwegian waters can be divided into two main groups:

Pelagic fish:	Herring, mackerel, blue whiting and capelin.
Demersal fish (and shellfish):	Cod, haddock, saithe, prawn, redfish, Greenland halibut, Tusk, ling, blue whiting, greater argentine, spotted catfish, sandeel, Norway pout, plaice, whiting, crayfish, monkfish and wolfish.

Pelagic fish generally live in the open ocean, though they may be found near the seabed during certain periods. Demersal fish mainly live on or near the bottom of the sea, but may also appear in the open sea on occasion, shellfish excepted.

Gillnet

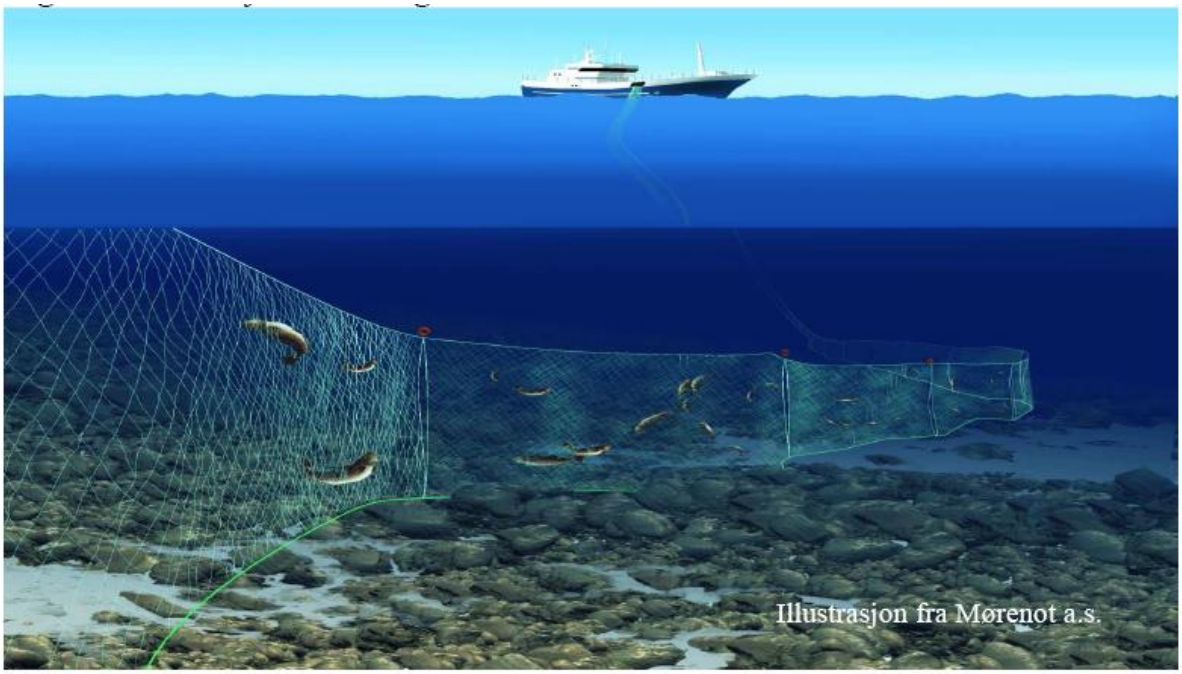
Gillnet fishing has long traditions. Today it constitutes the most important fishing device for much of the Norwegian fishing fleet. Gillnets are principally used by the coastal fishing fleet, but also by larger ocean-going vessels. Fish commonly caught in gillnets include cod, saithe, Greenland halibut, redfish, ling and monkfish. The most common fishing operations that come into contact with seismic surveys are Greenland halibut, cod, saithe and monkfish fishing. Gillnet fishing takes place in various degrees from south to north in the Norwegian Economic Zone.

A gillnet is roughly speaking a piece of net (mesh) with floaters attached to the top and weights at the bottom. The length and height of the gillnet vary according to the type of fish one wants to catch, as does the mesh size. Furthermore, a distinction is made between various types of gillnet fishing such as bottom-set gillnet fishing, midwater gillnet fishing and drift-net fishing. The latter two are not considered relevant in this connection as such gillnet fishing rarely takes place in areas with seismic activity, and have thus not been included in this description.

Bottom-set gillnet

When fishing with bottom-set gillnets a number of nets are tied together to form what is referred to as a chain of gillnets. A chain of nets usually consists of between 10 and 40 gillnets, but may also be longer. One gillnet is usually around 28 metres long, though the length may vary according to the type of gillnet.

Fig.1. Illustration of a chain of gillnets.



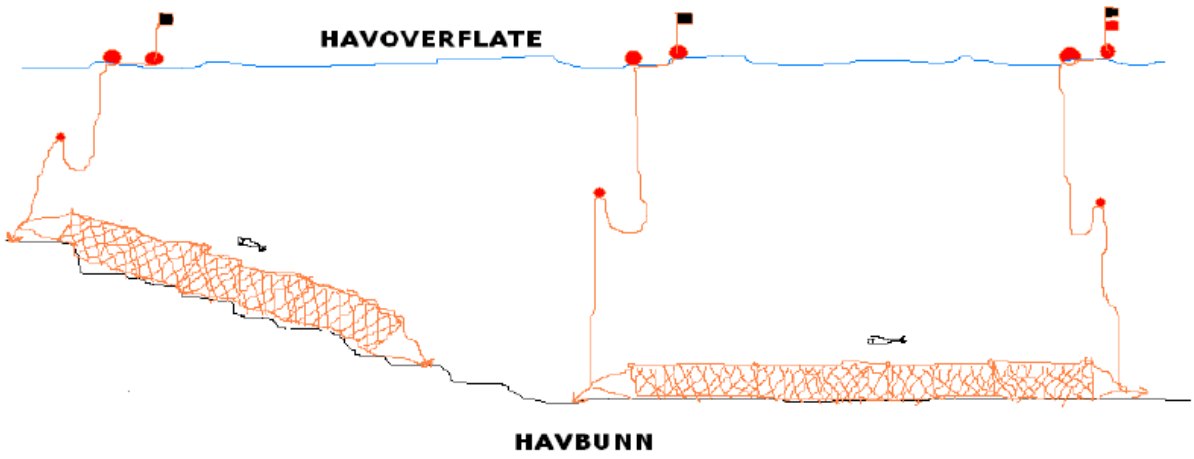
The chain of gillnets is anchored to the seabed when set. Usually stones, iron grapnels or anchors are used as anchorage, depending on the anchoring required in the specific area to prevent the chain of gillnets from drifting with the current. The weight of the anchorage varies, but usually ranges from 20 to 120 kilos, depending on the depth and currents. A vertical line is extended from the surface down to the anchorage, often referred to as a dropline (*terms and expressions may vary according to region and regional dialect*). The length and thickness of the line are adapted to the size of the vessel and to the depths and currents. Sometimes lines are used that are about 1.75 times longer than the depth.

This means that surface buoys can be observed outside the given position of the chain of nets. It is very important to take this into account to avoid collisions with the fishing gear.

The dropline is often marked by one or several corklines, (buoy in front of the main float), floats and a pole with a flag and/or reflectors. The flags indicate which end of the chain that is seen, see Figure 2. In periods of strong currents, the surface buoys may be pulled under the surface and re-emerge when the currents subside. At greater depths and "hill crests" the chain of gillnets is usually set with a so-called "loose end". This means that only one end of the chain is anchored.

Figure 2. Illustration of a chain of gillnets with "loose ends" and chains with two ends

(Surface)



(Seabed)

Figure 3. Illustration of net fishing vessels

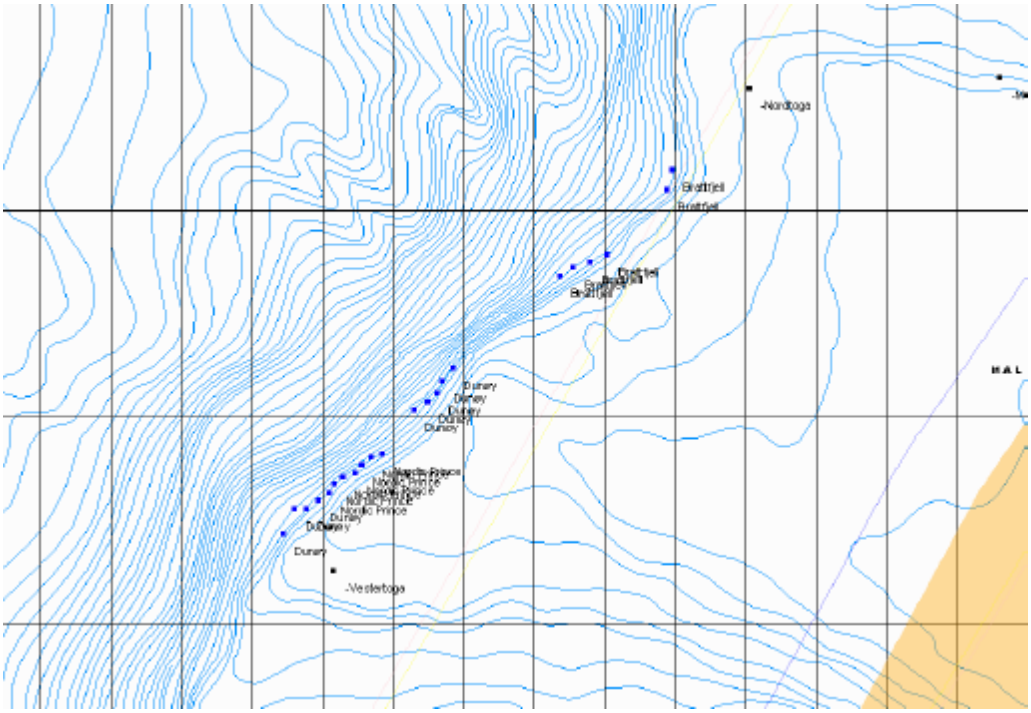
Coastal gillnet fishing vessel (smack)

Ocean-going gillnet fishing vessel (combined longline and gillnet)

As described above, the length of the chain of gillnets varies according to the type of fishing (main species of fish). However, it is rare to see just one chain in the same area. More often than not, one vessel will have several chains of gillnets in the same area and during intense fishing for species such as cod and saithe, many vessels with multiple chains will fish in more concentrated areas.

Below follows an illustration of an activity pattern for bottom set gillnet fishing (chain of nets) in the "Egga Edge" area (continental slope).

Figure 4. Examples of plots showing bottom-set gillnet locations.



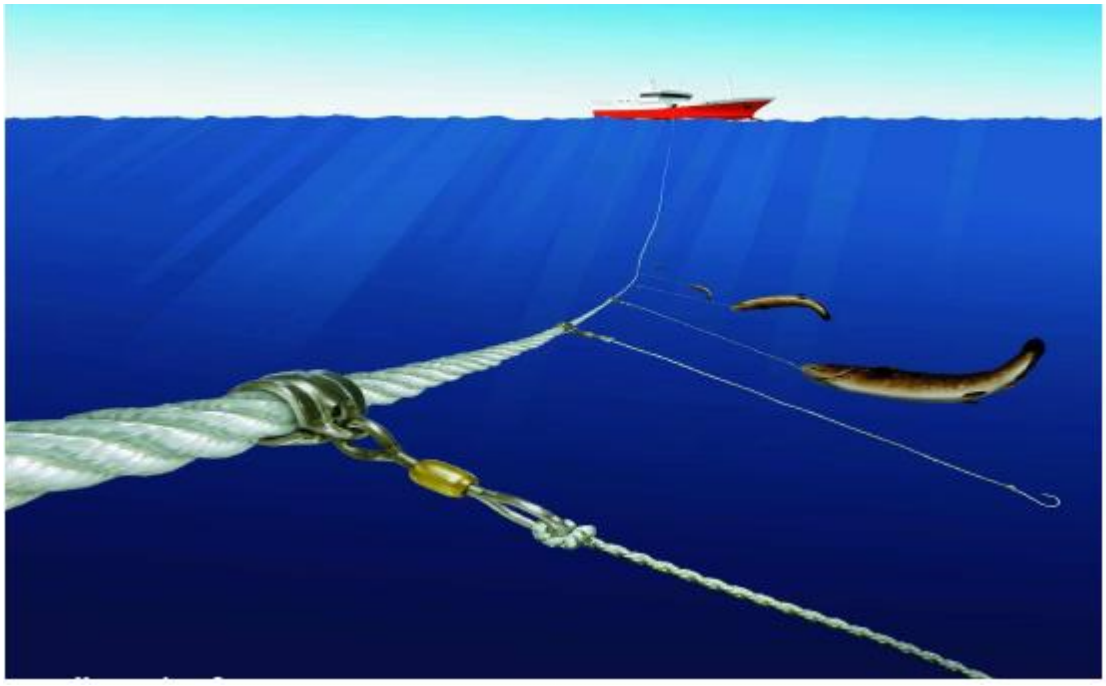
Hook-and-line gear

Hook-and-line gear is a term used for various fishing gear which can, generally speaking, be divided into the main groups “longlines” and “trolling lines”. Within the category longlines are a number of lines such as mid-water lines, stake lines, boulters, bottom-set longlines, etc. Only bottom-set longlines are relevant to this description. As regards longline fishing, we have experienced that there have been some conflicts between the fisheries and the seismic activities regarding the use of area. We will therefore describe longline fishing in detail to improve the understanding of how this type of fishing is conducted. Within the group “trolling lines” we find it relevant to describe mackerel jigging.

Bottom-set longlines

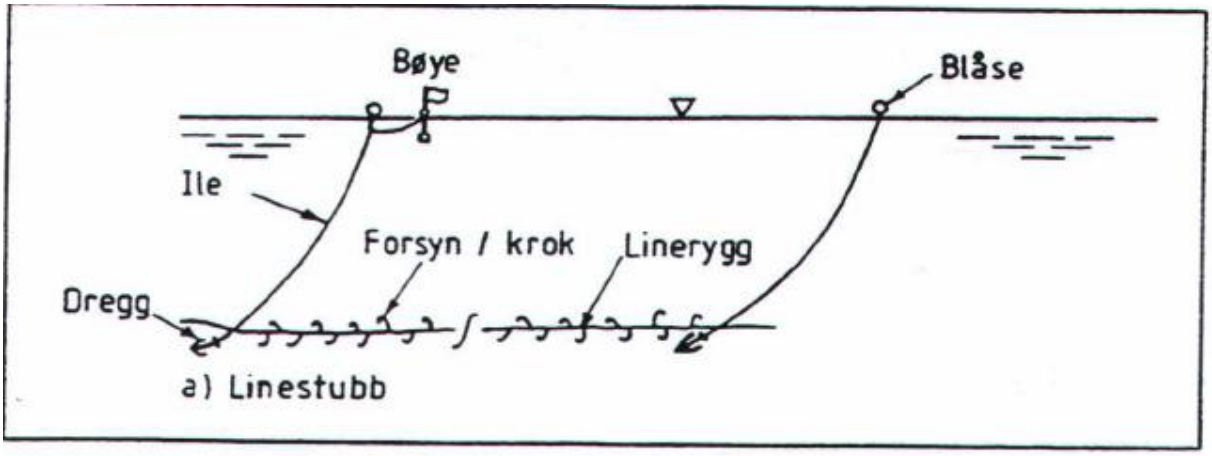
Fishing with bottom-set longlines has long traditions in the Norwegian fishing fleet and is an important fishing gear for both the coastal fleet and the ocean-going fleet. Some vessels using lines have also been designed for gillnet fishing in certain periods. The main species for longline fishing comprise cod, haddock, Greenland halibut, ling, tusk and catfish. However, the coastal fleet’s line fishing for cod, haddock, ling and tusk has a smaller contact area with areas where seismic surveys are taking part.

Figure 5. Illustration of longline during hauling



As its name indicates, bottom-set longlines are set on the seabed. A line is roughly speaking a length of rope (mainline) onto which hooks are attached at regular intervals along the rope. The rope or line attaching the hook to the main line is called a snood. The size of the hooks differs mainly between hooks used for coastal and ocean fishing. A row of lines or a stub which it is sometimes also called, is set up in the same way as a chain of gillnets, see Figure 6. The stub is divided into a given number of branch lines and one line has about 200 hooks. The length of the stub varies according to fish concentrations and seabed conditions.

Figure 6. Illustration of a row of lines



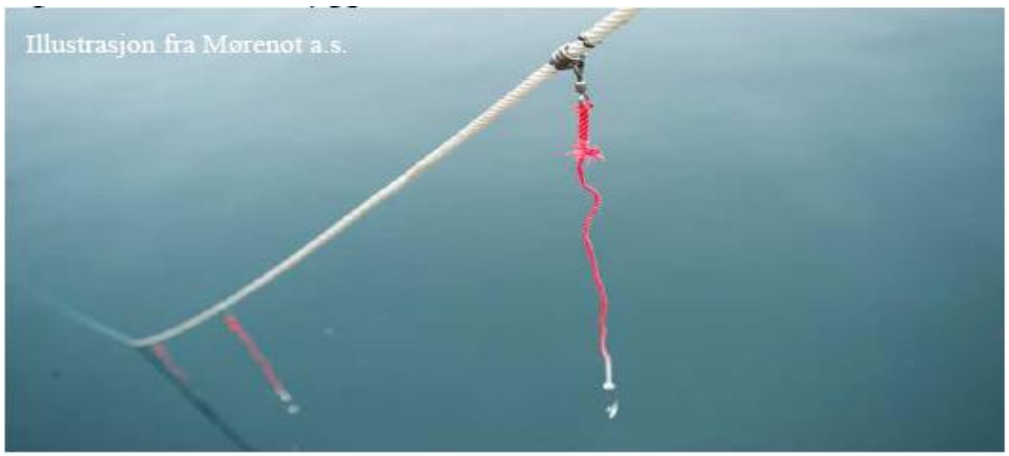
<text in figure>: Buoy, floater, dropline, snood / hook, mainline, grapnel, a) line stub

The row of lines is anchored to the seabed using a normal iron grapnel or an anchor, depending on the anchorage required in the specific area to prevent loose ends from drifting with the currents. The weight of the anchorage varies but ranges from 20 to 80 kilos, depending on the depth and currents.

A vertical line is extended from the surface down to the anchorage, often referred to as a dropline (*terms and expressions may vary according to region and regional dialect*). The length and thickness of the line have been adapted to the size of the vessel and to the depths and currents. Sometimes lines are used that are about 1.75 times the depth. The dropline will always be longer than the depth. This entails that surface buoys can be observed outside the given position of the chain of nets. It is very important to take this into account to avoid collisions with the fishing gear.

The dropline is often marked by one or several corklines, (buoy in front of the main float), floats and a pole with a flag and/or reflectors. In periods of strong currents, the surface buoys may be pulled under the surface and re-emerge when the currents subside. At greater depths and "hill crests" the chain of lines is usually set with a so-called "loose end". This means that only one end of the chain is anchored.

Figure 7. Photo of a main line



The longline fishing itself takes place in basically the same way as gillnet fishing. However, there are bigger differences between coastal vessels and ocean-going autoline vessels in the way they fish. The fishing gear extends farther than chains of nets. On an average 4-6 week's trip, an ocean-going autoline vessel is usually in operation 24 hours a day, seven days a week. An autoline vessel sets and hauls between 30,000 and 50,000 hooks per day. It is not usual to set all the hooks on one stub (35 – 40 nautical miles). The stubs are usually divided into lengths of 8 – 10 nautical miles. Some fisheries divide the stubs into even shorter rows, increasing the number of stubs in the area.

A coastal vessel may also operate on a 24-hour basis using an autoline (automatic baiting), but their trips are shorter (from one to a few days) due to the need to deliver fresh fish. However, most of the coastal line fishing is based on manual baiting on shore. The vessel will bring ready-baited lines to the fishing grounds and set the line in one or several stubs. After leaving the lines in the water for some time (variable), the line is hauled in and the vessel returns to shore. The time the vessel takes from departure to arrival is referred to as one "sjøvær" (one fishing day).

As part of its requisite operation pattern, an ocean-going autoline vessel will always keep moving into new areas. If not, it will soon experience a reduction in catches. This means that rows of line are set in a "new and unused" area, often in parallel to where the previous row was hauled in. Whether the vessel casts the line again immediately after it has been reeled in or after hauling in several lines will depend on the individual vessel and fishery. Figure 9 illustrates how an ocean-going autoline vessel keeps moving into new areas as part of its daily fishing operations. An ocean-going autoline vessel will cast its lines at about eight knots and propulsion during hauling will be approximately two knots. This may, however, vary from vessel to vessel and according to the weather and the currents.

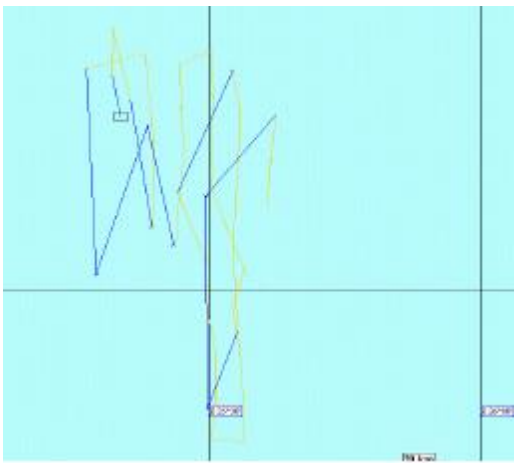
Figure 8. Photo of buoy with floater and hauling of line.

Large areas are required for ocean-going autoline (longline) fishing. As mentioned in the introduction, it is important to be aware of how the fishing activities move across new areas on a daily basis. This is an integral part of the operational pattern for this fleet group.

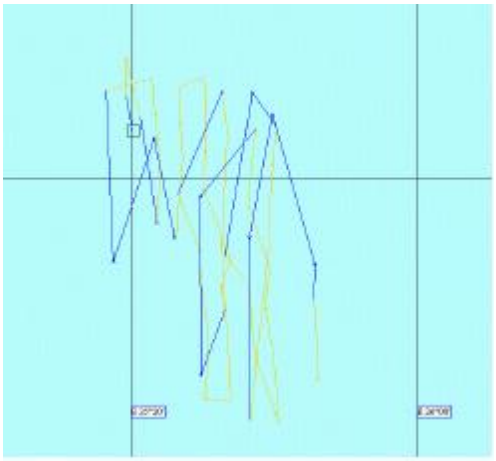
The plots in Figure 9 illustrate how the longline vessels keep moving to new areas as a natural part of their fishing pattern. The blue lines indicate several rows of lines that have been cast in parallel in a north-south direction (the direction will vary), whereas the yellow lines indicate the subsequent hauling process. From day 1 to day 4 we can clearly see that the vessel has moved across a large area as a natural part of the vessels' fishing pattern.

Figure 9. Plots illustrating how a line vessel moves across different sections from day to day.

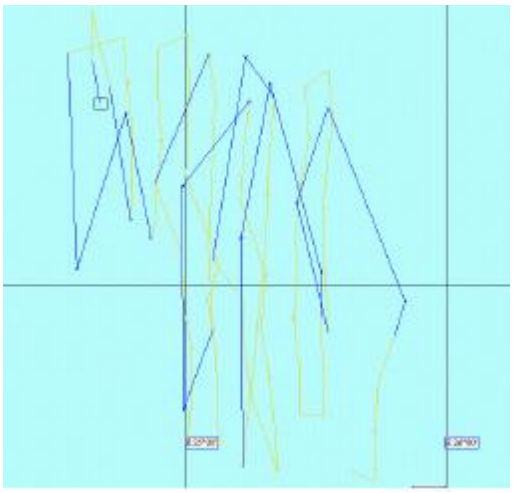
Day 1



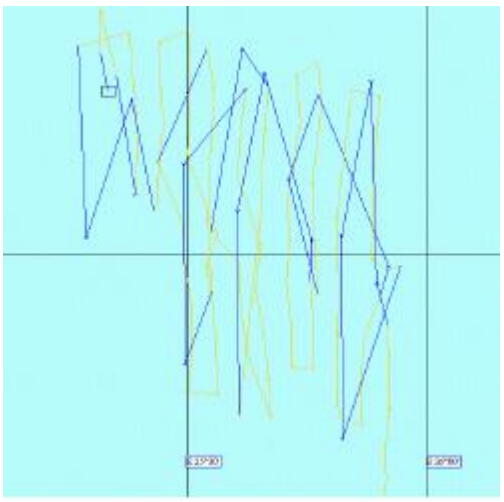
Day 2



Day 3



Day 4



Mackerel jigging

Jigging or trolling for mackerel with a hand line is a common fishing method in the south of Norway. Automated mackerel jigging at the commercial scale which is now common is relatively new. The vessels used for this purpose have grown larger over time. Mackerel jigging was previously considered a coastal fishing activity. However, the distances travelled have grown in step with developments in the fishing industry and now include traditional fishing grounds for mackerel in the North Sea.

The jig is rigged as a hand jig with a synthetic fishing line. A weight is attached to the end and several hooks are fastened along the line. The line is dropped into the sea (trailing behind the vessel) and hauled in by means of a mechanical jig.

This type of fishing may take place individually, but is often characterised by a large number of vessels gathering within the same accessible catch area. The vessels are arranged for fishing by using many jigs simultaneously. This means that the vessel's manoeuvrability is somewhat limited if the vessel is to prevent the hooks from becoming tangled up, despite the fact that the fishing lines do not extend far behind the vessel. The fishing is carried out at relatively low propulsion speeds.

Figure 10. Photos of vessel jigging for mackerel.

Jigging

A jig is a hand line with a weight at the end and hooks attached to the line above the weight. The number of hooks varies. Jigging with a hand-held jig still takes place, but this type of fishing is now largely mechanical, using a mechanical jig.

Generally speaking, a mechanical jig operates by hauling in some of the line and then letting it out again. This process is repeated until the fish load reaches a certain preset pressure, and then the jig will be hauled to the surface (onto the vessel), see Figure 11.

The use of mechanical jigs has the clear advantage that many jigs can be installed on one vessel. It is common to have up to four mechanical jigs on one one-man vessel. As one previously could only use one hand jig per person, mechanical jigs have made jigging much more efficient. Jigging takes place in fjords and proximate coastal areas.

Fishing usually takes place whilst the vessel is stationary. However, the vessel will move somewhat as it will drift with the currents and position itself according to the location of schools of fish.

Figure 11. Photo of vessel cod fishing with mechanical jig.

Trawling

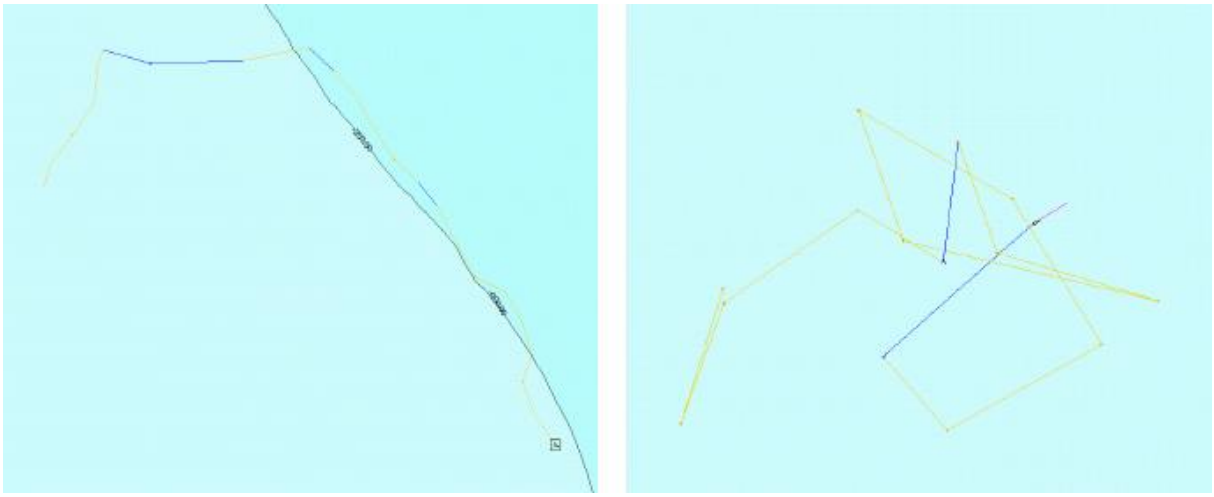
A trawl is a tunnel-shaped fishing net which is towed through the water. The water strains out through the mesh entrapping the fish and retaining them in the cod end of the trawl.

Historically, trawling is a new method. Trawling started about 100 years ago. Since then there has been significant development in terms of methods and equipment, particularly with regard to the size of the trawl and specialisation according to the type of species one wishes to catch. Thus, different trawls have developed that are better for a particular type of fish than others. The shape and size of the trawl vary significantly. The main factors taken into account when it comes to developing and specialising trawling includes fish behaviour, seabed conditions, selection devices (grating and mesh selection) and the vessel's engine power. The pulling speed during trawling ranges from 1.5 knots to 5 knots. Smaller shrimp trawlers travel at the lowest speed, whereas larger whitefish trawlers and pelagic trawlers travel at the highest speed.

Two main uses of trawls have developed: bottom otter trawl and pelagic trawl. In addition, there is a midway solution referred to as semi-pelagic trawl. In the following, we will describe the characteristics of bottom trawl and pelagic trawl, as well as beam trawl as this type of trawl deviates significantly from the ordinary trawling concept.

The trawling activity pattern using a single bottom otter trawl varies according to several factors such as catch availability, the number of vessels on the field, as well as other circumstances. Below follow two plots which illustrate two different activity patterns for a trawler using a single bottom otter trawl. Both plots have a timeframe of 24 hours. The left-hand plot in Figure 12 illustrates a vessel trawling a wide area. This may be because the fish is scattered across a large area or because the vessel is pulling the trawl whilst searching for better fishing grounds. The plot to the right of Figure 12 shows that the vessel is trawling within a concentrated area, indicating that the fish is located within a concentrated area.

Figure 12. Example of various trawling activity patterns in a 24-hour period.



Bottom otter trawl

A bottom otter trawl is a trawl which is towed along or close to the seafloor. As the name indicates, a bottom otter trawl will always be in contact with the seabed. The trawl's contact with the seabed is in principle limited to the yaw (bobbin chains, rock hoppers or lighter rigging) and trawl doors (otter boards). The trawl itself consists of a few main components such as the cod end (trawl bag), extension and trawl net. Floats are attached to the upper and foremost part of the trawl net to provide buoyancy and keeping the trawl open. The bottom foremost part of the trawl net ensures that the yaw is in contact with the seafloor.

Two trawl doors, to the front of each side of the trawl, keep the trawl open horizontally when towed by the vessel's trawl wire which is attached to the trawl doors. The largest doors used today (shrimp trawl doors) weigh 4000 – 5500 kilos each and are 10 square metres. The extension of the trawl and how far behind the vessel it is towed depend on the depth and type of trawl.

Bottom-otter trawls are further divided into three main groups:

Single bottom otter trawl

A single bottom otter trawl is characterised by having one single trawl net towed by one vessel. The trawl net is kept open by two trawl doors. The size and extension of the device vary significantly. Fishing activities with a single bottom otter trawl can be roughly divided into two groups:

1. Trawling for cod, haddock, saithe and shrimp in the entire Norwegian Economic Zone

2. North Sea trawling for blue whiting, Norway pout and sandeel

The former fishing activities are usually carried out by stern trawlers where the catch is hauled on board before the trawl net is emptied. Trawling for blue whiting, Norway pout and sandeel is carried out in more or less the same manner as for pelagic trawl fishing, where the catch is pumped on board while the trawl net is suspended from the sides of the vessel. Some vessels lift the catch on board in smaller lots, so-called "bagging".

Figure 13. Photo of a stern trawler and illustration of a single bottom trawl

Otter twin bottom trawls

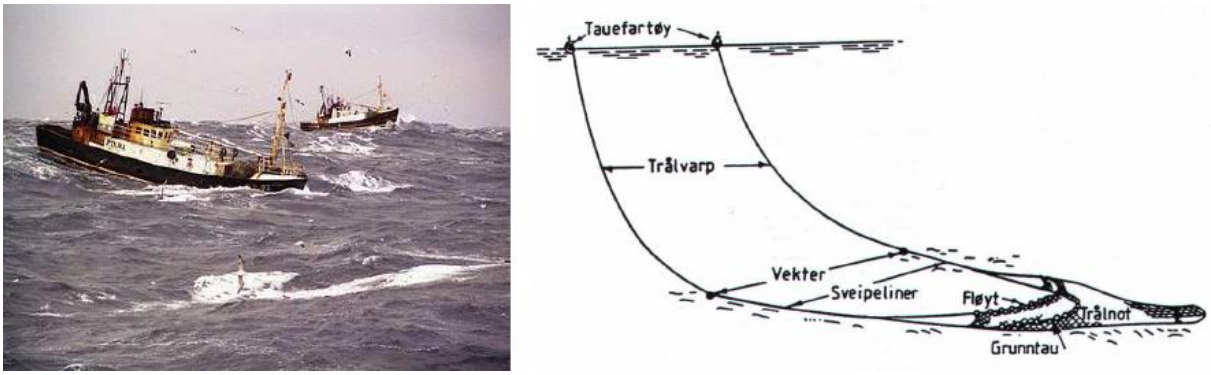
An otter twin bottom trawl is characterised by having two trawl nets rigged next to each other horizontally and towed by one vessel. The trawl nets are kept open by two trawl doors. There is also a weight between the trawls. The size and extension of the equipment may vary a fair bit. The vessel's manoeuvrability will be somewhat limited compared to that of a single bottom trawl. This type of trawling is sometimes used when trawling for cod, haddock, saithe and shrimp.

Figure 14. Photo of an otter twin bottom trawl and illustration of a double bottom trawl.

Pair bottom trawl

Pair bottom trawling is characterised by two vessels towing a trawl net between them. The opening of the trawl net is regulated by the distance between the two vessels, thus trawl doors are not used. The size and extent of the equipment vary a fair bit. When the nets are hauled in, both trawl wires are transferred to one of the vessels. Pair bottom trawling is a technique not much used by Norwegian vessels.

Figure 15. Photo of a pair bottom trawler team and illustration of a pair bottom trawl



<text in ill., from top: towing vessels, trawl warp, weights, sweeplines, floatline, footrope, trawl net>

In addition to the bottom trawling groups described above, there is another type of bottom trawling carried out in the North Sea. This group of trawlers and the trawling device itself is referred to as a beam trawl. The target species for this type of fishing include various types of flatfish.

Beam trawl

Beam trawling is carried out south of 58º North in the North Sea and only by foreign vessels. The fishing method is characterised by a vessel towing two smaller trawls or, more precisely, scraping after the vessel on each side. The equipment consists of a trawl where the doors and the headline have been replaced by a fixed iron construction. Moreover, it is typical for this type of fishing to use short hauls and to trawl at greater speeds than what is common for ordinary bottom trawling. The vessel's manoeuvrability is also better than for ordinary bottom trawling.

Figure 16. Photo of a typical beam trawl and trawling arrangement towed by the vessel

Pelagic trawl or midwater trawl

Pelagic trawling is characterised by the fishing gear not coming into contact with the seabed during fishing. Pelagic trawls are used to fish pelagic species (herring, mackerel, blue whiting, greater argentine and capelin). However, a smaller part of the Norwegian fishing fleet also uses trawling to catch herring, mackerel and capelin. It is most common to use seines to catch the fish mentioned above. The depth where the fishing takes place varies according to where in the water column the fish is located, but it is not common to go deeper than 500-600 meters in Norwegian waters. A pelagic trawler has no yaws of the type commonly used in connection with bottom trawling, but is rigged with a chain on the trawl's groundline. Some trawl types use weights attached to each side of the chain. The weight of these varies a great deal, but for some trawls, it is not uncommon to use weights of 4000 kilos. The extension of the equipment is often greater than for ordinary bottom trawling.

Whereas a bottom trawl often has a top and bottom net, a pelagic trawl is square. This means that there is a top and a bottom panel, as well as two side panels. The function of the doors is to extend the trawl opening horizontally, whereas the weights increase the opening vertically. The trawls can have a vertical opening of 150 metres and a horizontal opening of up to 250 metres. The mesh size of this type of trawl can be up to 256 metres. The mesh size makes it easier to tow the trawl as resistance is lower.

Trawl doors used for pelagic trawling come in different varieties. The size of the doors varies according to the size of the trawl. Doors used for fishing for, for instance, blue whiting will weigh between 2500 and 4000 kilos each and are approximately 13 square metres.

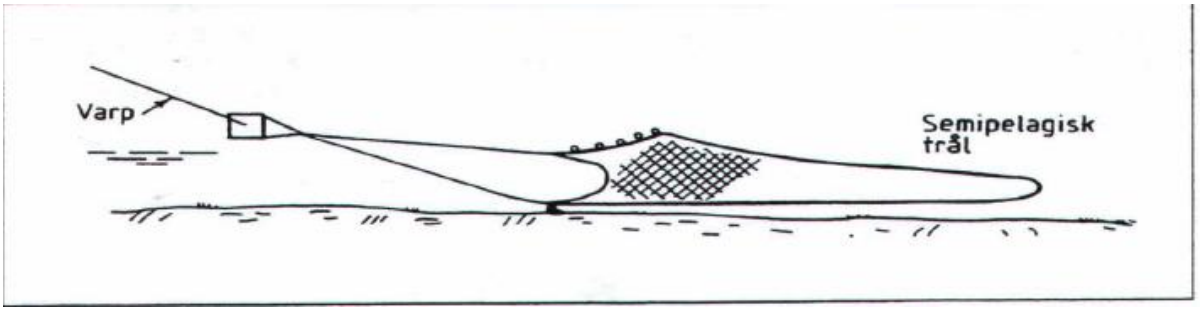
Pelagic trawling is characterised by a vessel towing a trawl net not touching the seabed. Special trawl doors designed for pelagic fishing are used. At the same time, weights are used (often chain clusters) to optimise the trawl opening vertically. The depth of a pelagic trawl is adjusted to the length of the trawl wires and the towing power (the speed of the vessel).

Figure 17. Photo of a pelagic trawler and illustration of a pelagic trawl

Demersal or semi-demersal trawl

Semi-demersal trawling is a combination of the bottom and pelagic trawling methods when a pelagic trawl is lowered down towards the seabed. The trawl can then be towed along near the bottom using two weights, one on each side of the trawl. This method is used to make the most of the catch potential of a pelagic trawl near the seabed, but without towing the trawl itself on the bottom.

Figure 18. Illustration of a semidemersal trawl.

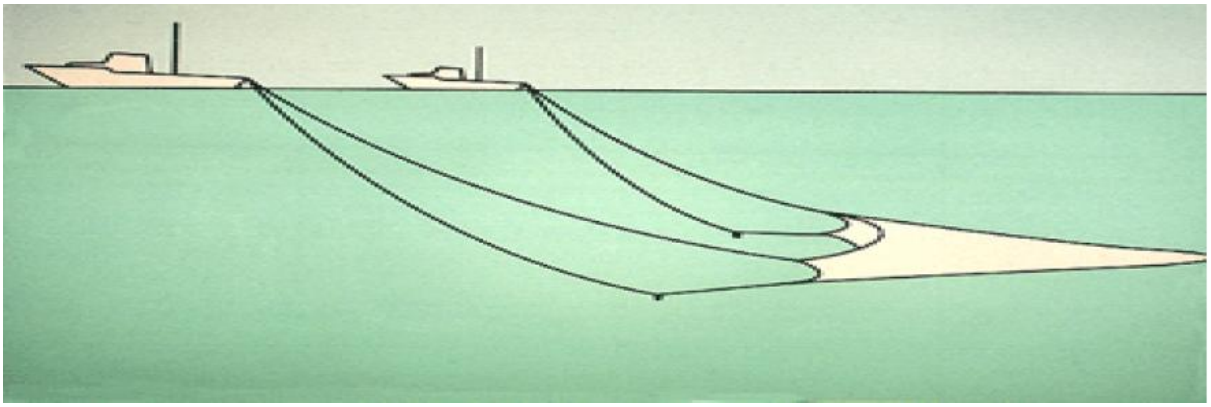


<text in figure: warp, semidemersal trawl.

Pelagic pair trawl

Pelagic pair trawling is usually carried out by smaller vessels and is not very common amongst Norwegian vessels. This method is based on two vessels towing an ordinary pelagic trawl. The opening of the trawl net is regulated by the distance between the two vessels, thus, weights, not trawl doors, are used. The size and extension of the equipment may vary a fair bit. When the net is hauled in, both trawl wires are transferred to one of the vessels.

Figure 19. Illustration of pair trawl with pelagic trawl



Seines

Seine fishing is a fishing method which shares many of the characteristics of trawling, but which does not employ trawl doors. The difference between trawl and seines is that the trawl is towed through the water whereas seines ideally are hauled through the water. There are two types of seine fishing:

1. Danish seine
2. Scottish seine

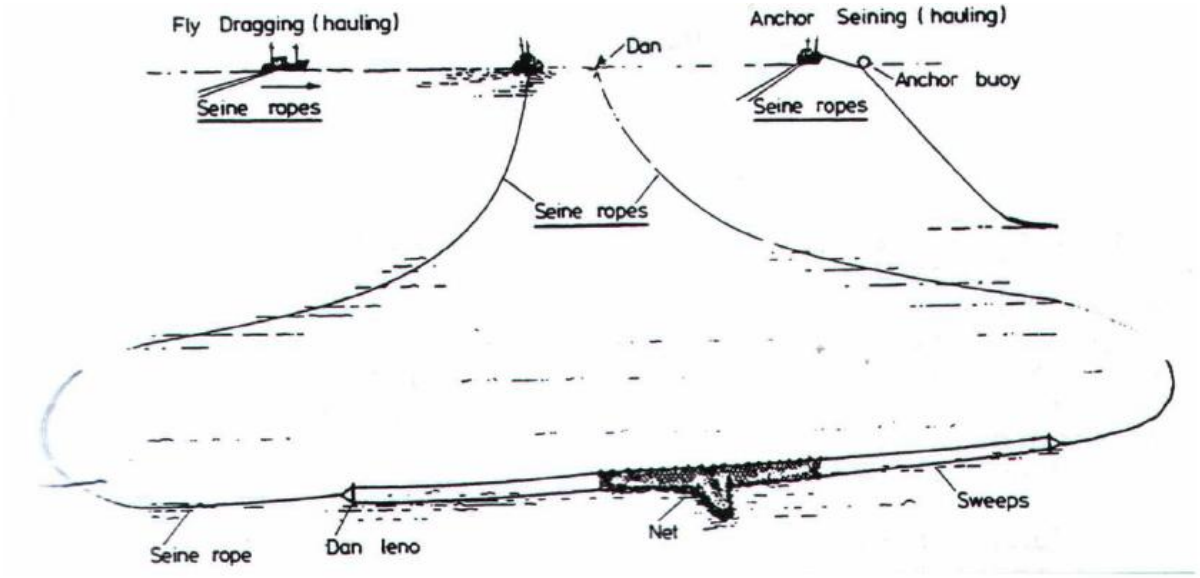
Norwegian fishermen use the Scottish variety. Seine fishing in Norway usually takes place in the north of Norway. The extension and length of the lines vary with the depth and seabed conditions.

Danish seines

This is a type of seine fishing where the vessel is anchored during the catch process. This entails that the vessel is anchored when hauling in the seine after it has been set. As indicated by the name, this is a method frequently used by Danish vessels in the North Sea.

The procedure is to cast anchor and drive the rope out in a circle, see Figure 20. A drag line is then cast followed by a net wing and the seine. Then the last rope is set (arm) in the same way as the first rope. Once the line is fully extended, the vessel proceeds at slow speed back to the anchor buoy. The rope will now sink to the bottom and scare the fish towards the middle of the seine opening as the ropes are hauled. The vessel will now remain still and the propulsion of the seine is caused only by the speed of the hauling. The actual extension of the gear will vary according to many conditions, such as depth.

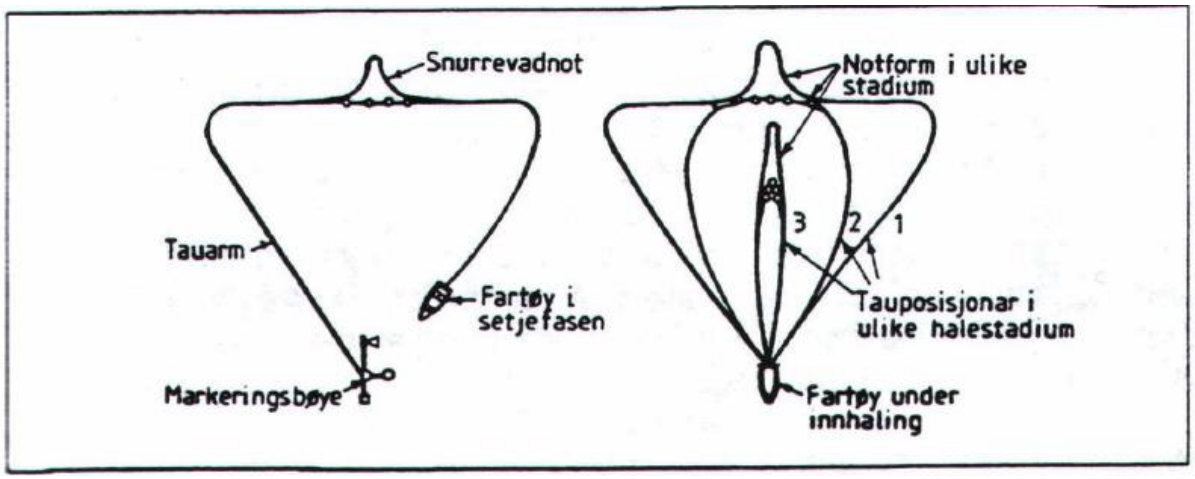
Figure 20. Illustration of fishing with Danish seine



Scottish seine

This type of seine fishing does not involve an anchor buoy, but the vessel is kept still by using engine power during the hauling process. The fishing takes place by launching a buoy. Then the vessel drives out a rope and launches the seine before the last piece of rope (arm) is set. Once the seine has been set, the buoy is taken on board and the hauling commences, whilst the vessel retains its position by means of engine power.

Figure 21. Illustration of fishing with Scottish seine.



<text in figure, clockwise from the right: seine, vessel during the setting phase, marker buoy, rope arm; seine at different stages, rope positions in different stages of hauling, vessel during hauling>

Purse seine

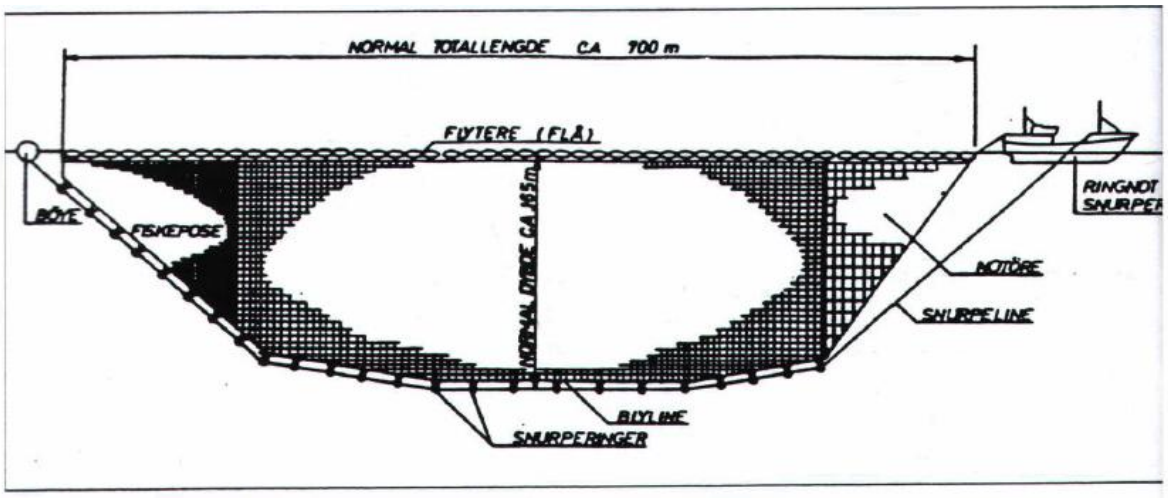
Purse seine fishing has been and still is an important fishing method in Norway. There have been major developments in purse seine fishing. From cotton-thread seines and small vessels using hand power to haul in the seine, to large vessels where the hauling of significantly larger seines has become mechanised. The modern purse seine vessels are amongst the most efficient fishing vessels in Norway today with regard to the number of different species they catch. We are thinking in this respect of vessels fishing herring, mackerel and capelin. Many of these vessels may also be combined with pelagic trawls and some bottom trawls to catch sandeel and Norway pout.

It is, however, important to be aware of the fact that for seine fishing the total number of vessels is divided into two main groups; the purse seine fleet and the coastal fleet. Shore seine fishing is not considered relevant in this connection. Historically, the coastal fleet consisted of smaller vessels fishing nearer to the coast. Recent developments have, however, entailed that when it comes to seine fishing grounds, there is now little distinction between the purse seine fleet and the coastal fleet. Seine fishing can be divided into five main phases:

1. Search phase
2. Casting
3. Pulling (closing the net)
4. Hauling the seine
5. Pumping the catch on board

It is important to differentiate between these phases with respect to the vessel's manoeuvrability. During the search phase, the vessel's instruments are used and the vessel has no equipment in the sea. During the casting phase until the pumping phase, the vessel has very little opportunity to move or change course. During these phases the vessel will to a great extent move (drift) in the direction of the current. The casting phase may last from 1 hour (failed cast) to 4-5 hours. However, this will vary according to how much fish is caught and according to the weather and currents.
A purse seine is basically a large "net sheet". Figure 2 shows the drag line. When pulled, the seine will start to close, entrapping the catch.

Figure 22. Illustration of a purse seine



<text in fig.: Normal total length, approximately 700 m., floaters, purse seine puller, seine ear, purse line, lead line, seine rings, fish bag, buoy, floaters, normal depth approx. 165 m (middle).

When launching a seine, a drift anchor is cast and the seine released at the same time as the purse line is slackened. The seine is set going in a ring towards starboard and back to the end of the seine which was launched first. The seine is then pulled together at the bottom until the purse line and the purse rings are suspended along the side of the vessel and the catch is entrapped in the seine. The seine is then "dried" using a triplex and passed on to the roller/power block and stored in a seine bin in the aft part of the vessel. Finally, the catch is compressed so that pumping on board can commence.

Figure 23. Illustration of a purse seine cast around a school of fish.

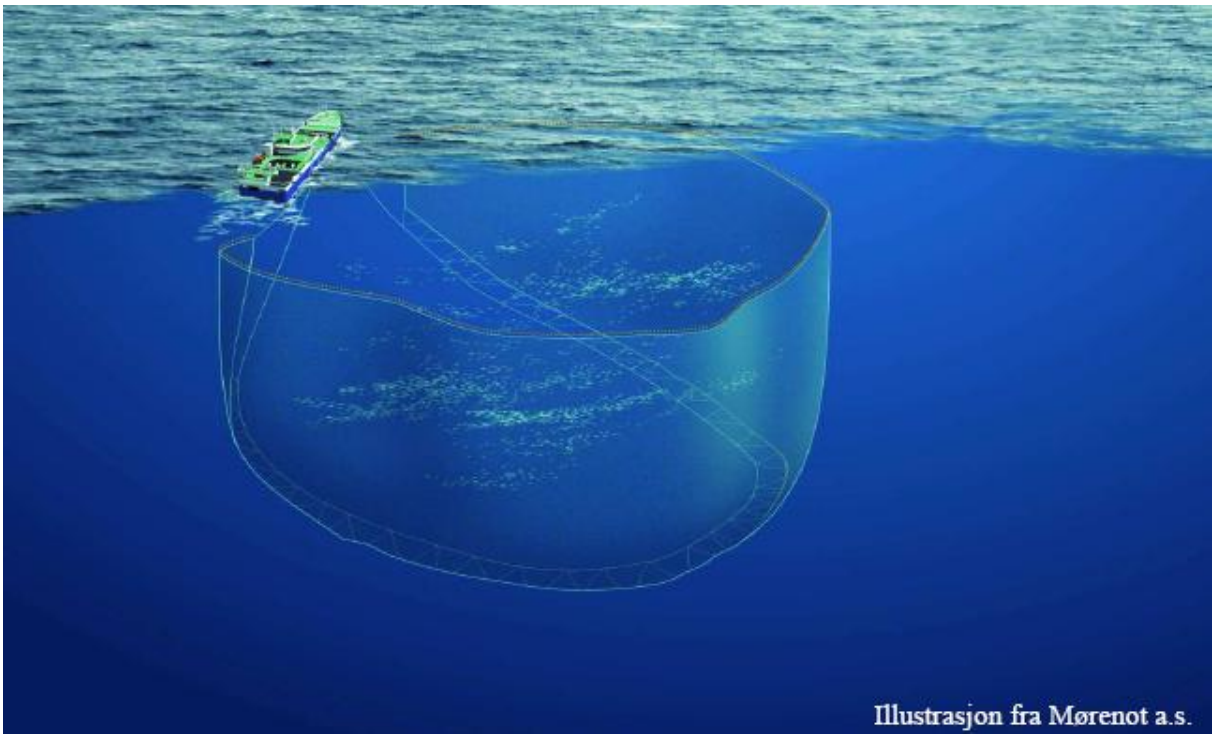


Figure 24. photos of a purse seiner and a coastal seiner