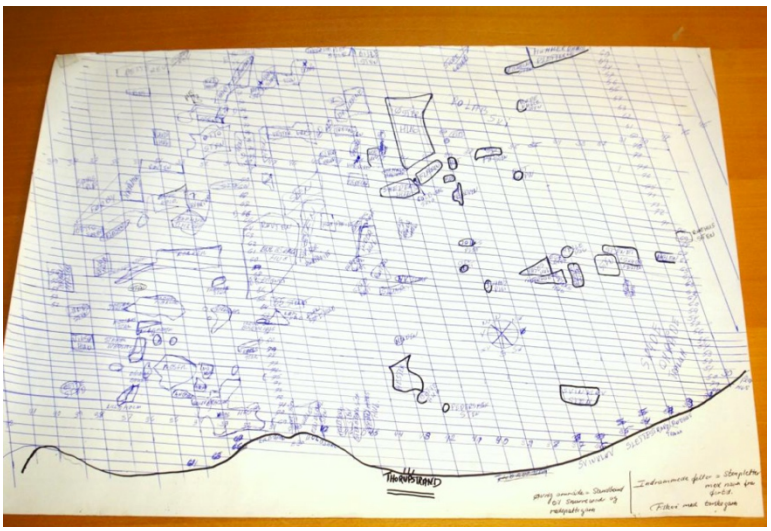
# Unit 2 - The Fishing

The catching area of the Thorupstrand fishers is the southern part of the Skagerrak. They fish from the longshore bars along the shore to the rich slopes along the 800 meters deep Norwegian Deep. The fishery takes place within 20-25 nautical miles from the coast and the vessels (fishing boats) are mostly at sea for less than 24 hours. This means that the catch is landed daily (Rathje et al. 2011:4).

In Thorupstrand there is no harbor. The vessels are hauled on to the shore at the so-called *landing place* after each fishing trip. This way of landing is the traditional way of fishing from the west coast of Jutland. The vessels used are all boats capable of being hauled on the beach. Most of them are wooden boats made of oak and a few are made from fiberglass. The boats need to be solid, but light in order to be hauled on shore – and this excludes large engines as a catch enhancing factor. Thus, a lot of the work on board is still done by man power (Rathje et al. 2011:8).

The location of Thorupstrand is ideal for fishing not only because of the short distance to the rich fishing areas, but also because the village is sheltered from the strong western wind due to the north faced position on the costal line and the rock Bulbjerg west of the landing place. This makes it possible to haul the boats in and out also on days with relatively strong wind – deducing the number of days where fishery is not possible due to the weather.

When tourists ask why they don't build a harbor, many fishers answer: "Why should we?" The whole point of fishing here is the small-scale philosophy; keeping expenses to a minimum and relying on local fishing grounds. Living and fishing the same places their grandparents did – while experience, skill and knowledge is passed down from generation to generation. Handwritten maps reveal unique knowledge of the bottom structures: small reefs, areas with sand bottom, huge stones etc. Using these maps, the fishers have a privileged possibility to fish on the exact right spot depending on season and target species – guided by their grandparents' skill and experience. Every stone and reef of the bay have a local history and are named accordingly (see appendix) Rathje et al. 2011:20+16)).



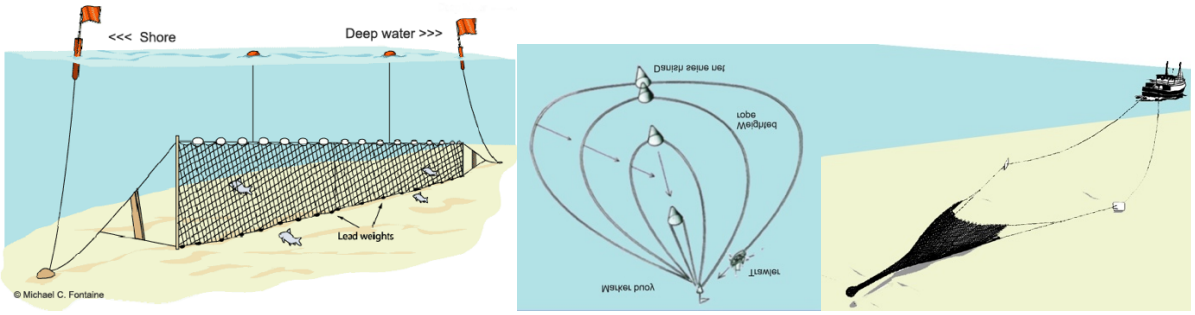
*Map drawn by the Thorupstrand fishermen showing bottom structure in the fishing area north of Thorupstrand. The map is based on year's experience.*

Plaice (Pleuronectes platessa) is the main target species from March to October and cod (Gadus morhua) from October to February. Depending on prices and the occurrence of migrating spawning Dover sole (Solea solea) there is also a small fishery for this species in

March-May. Cod and sole are typically caught in gillnet whereas plaice is the main target species for the Danish seiners. Depending of the season some bycatch is taken and typical species are; Flounder (Platichthys flesus), dab (Limanda limanda) and more sporadic turbot (Psetta maxima) and brill (Scophthalmus rhombus) plus some codfish species such as hake (Merluccius merluccius), haddock 6 (Melanogrammus aeglifinus) and pollack (Pollachius pollachius). The European lobster (Homarus gammarus) and edible crab (Cancer pagurus) is taken sporadic in gillnets.
(Rathje et al. 2011:5: http://havbaade.dk/a-comparison-of-the-coastal-fishery.pdf)

The Thorupstrand fishers way of fishing is eco-friendly because of the size of boats and the fishing techniques they employ. Two fishing methods are used: Bottom gillnet and Danish seine (Anchor seining). A short description of the two techniques is beneficial for appreciating the differences in environmental impact between these gear tyoes and large-scale fishery with bottom trawls.

According to various studies, fishery with gillnet has a rather minimal influence on the sea floor (Jennings and Kaiser, 1998, Rathje et al. 2011). A gillnet is a wall or curtain of netting that hangs in the water. A net is not towed over the bottom but placed static and with a minimal contact with the sea floor. There is, however, a risk of damaging corals if the gillnet is set on reefs. However, there is also the risk of damaging or losing the gear if it is set on reefs, this making this this unattractive for fishers. To avoid unintentional gillnet fishing in reef areas, the local knowledge, experience and skill of the fishers are of huge importance.




*The fishing gear types : gillnet, Danish seines and demersal otter trawl.*

Danish seine (also called ‘anchor seine’) is a quite different technique. A seine is a small net formed as a bag placed at the end of a 3 km (local seines) long rope (see figure x). The catch principle is as follows: At first the fishers sail in a circle while placing the ropes and the seine net in roughly a circular path at the sea floor. After the ropes have been placed at the sea floor, the vessel lies still at the anchor point and slowly draw the ropes back onto the boat. When the ropes are being hauled, that gear makes the ropes jump on the sea floor over and over again. This movement results in a continuously sound at the sea floor – like a knocking of a hammer. This audiovisual technique frightens the fish, and as the sound is getting closer and closer (as the ropes are been hauled in), fish swim towards the center of the gear. In the end, a big amount of fish is encircled in a small area in the middle of the gear and can easily be caught by the seine net just before being hauled onto the vessel (see figure X). This means that the fish is still alive when landed (Rathje et al. 2011:6).

*For more details about this technique see Rathje et al. 2011.*

The research on the impact of Danish seine on the sea floor is very scarce. The impact is understood to be restricted to the ropes being hauled over the sea floor. As this technique is only possible to carry out on sandy areas and as the gar is not towed after the boat, it characterized in Denmark as "low impact" .
Further discussions on environmental effects of the different techniques can be found here: (Rathje et al. 2011:17). (Flintegård, 1986).

As in all fishery *discard* is also an issue in Thorupstrand. Discard can be defined as all fish thrown overboard at sea after a fishing activity. These fish are caught unintentionally as a bycatch and must be discarded either because it is not in demand on the markets or because it cannot be landed due to quota restrictions or minimal length size.

At a worldwide scale, the estimated discard rate is 8 percent of the total catch. Bottom trawl fisheries for finfish and shrimp account for more than 50 percent of total discards at sea while they only account for 22 percent of total catch globally. In general, bottom trawls account for 36 percent of the estimated global discards. Small-scale fisheries generally have lower discard rates of around 3.7 percent – including gillnet and Danish seine (Kelleher, K. 2005).

Discard is a highly relevant subject when it comes to environmental impact. Most fish will not survive being in contact with the fishing gear and thrown back into the sea. Therefor the discard rate reveals if the resources is being harvested in an effective way. Also, discard is not just 'wasted fish' but results in changes in the ecosystem: The diversity of species and size composition of the benthic community in terms of food subsidies and offal (dead fish) that sink to the seabed. Furthermore, discards influence the reliability of the regulations by fishing quotas, as the amount of registered landed fish might be a lot smaller that the actual amount of fish withdrawn from the sea - due to discards (Rathje et al. 2011:9-10) (Kaiser et al. 2000; Tillin et al. 2006).

Compared to other gears Danish seine has the highest survival rate of discarded fish – as mentioned earlier the fish is only in the seine for a very short time before being hauled onto the boat (Humborstad et al., 2009). This reduces the problems with discard from using this gear. If the fish is alive when it is discarded, the impact on the benthic community is much less (Rathje et al. 2011:11-12).

In relation to environmental impact, consumption of fuel is another relevant subject. Across different studies based on literature values it seems a general conclusion – despite great variability – that both Danish seine and gillnets use less fuel per caught value of fish than bottom trawlers (Rathje et al. 2011:18). Especially in Thorupstrand where the distance to the fishing spot is very short.

(Data from literature on fuel consumption of gillnetters give values between 0,2 - 0,5 litres per kg caught fish depending on species compared to bottom trawlers with consumption values from 0,4 to 1,5 litre per kg caught fish. For Danish seiners the values vary between 0,12 l/kg/fish to 0,18 l/kg/fish depending on the target species. These values are again lower than the fuel consumption in the bottom trawl fishery) Rewriting is needed.

When talking to the fishers in Thorupstrand it quickly becomes clear that the regenerative aspect of the fishery is vital to them. As most of them put it: Taking care of the sea is also taking care of their children and the next generation.
The fishers themselves have made a *code of conduct* that describes how they interpret the interconnectedness of their livelihood and the coastal ecosystem. Among other things, it says:

"Our fishery is adapted to the natural behaviour and habitat of the fish, which change according to water temperature, current direction, waves, food and seasons. We only fish when the weather allows us to ensure that we can cross the breakers. When it is windy, the fish do not have to worry about us."