

Consequences of seismic surveys: by Bjørnar Nicolaisen

Fishermens experiences and headlines in media 2007-2010.

Seismic surveying for new oil – and gas reservoirs is going to escalate in the the years to come. This means that searching for oil/gas is coming closer to land and coastal areas and into the arctic areas. Oil-activities at sea have been going on for over 40 years in Norway, but these activities have been far away from the coastline until recently. The Norwegian Oil Directory started seismic surveys outside Lofoten, Vesteraalen and Senja (LoVeSe) in 2007, 2008 and 2009, and the coastal fishermen in these areas for the very first time experienced what seismic shootings do to the coast and fisheries. When the coastal fishermen for the first time brought those consequences into the media, many people and even central politicians onshore became aware of all the damage seismic shootings and the shock waves created by those do to fisheries and the environment in the sea.

Until then there has been lack of information about seismic surveys and consequences of seismic surveys. With the experiences from LoVeSe it looks likely that the oil-industry and the seismic companies have been aware for a long time that public insight into their activities will damage their reputation, public acceptance and business.

Experiences from the shootings in LoVeSe show that consequences of seismic shootings are strongly underrated– perhaps partly because seismic shootings damage environments which not are visible for most of the humans. But the enormous shock waves hits life under the surface strongly and consequences may after some time also be noticed for other environments connected to the sea.

In this publication you will find some of the damages of seismic shootings that are documentable and some indications of unrecovered damages of seismic shootings based on the coastal fishermen's experiences and some reports in media during the periode of 2007 – 2009.

What is a seismic survey?

A seismic vessel is a special designed vessel towing 2 or more cables at a length of 6-8 kilometers. The seismic air gun arrays are being fired every 8th or every 10th second. The pressure waves have to be very powerful to be able to pass through several hundreds meters of water, through 7-9 kilometers of rock and still be strong enough to return and be detected at the surface. The pressure waves are spread in all directions.

One of the proven effects of seismic shootings is that the shock waves have an startle effect on fish at all distances within 18 nautical miles (34 kilometers) (documented by Institute of Marine Research in Norway, 1993.) The reason of this limit is that during the survey on Nordkappbanken in 1992 fisheries it was not achieved to research the impact further away than 18 n.m. from the noise source.

The other documented effect is that the pressure from the airguns kill fish residing close to the cables. There is no evidence of how much bio mass a seismic survey might kill. Fishermen believe that bio mass on larger scales is being killed.

1. Fishermens experiences in LoVeSe.

Generally.

Any kind of fishery or catch is based upon a certain assumption for the species. In fishing and catching these assumptions are the routes fish and sea mammals travel for feeding and breeding, or the fact that local fishstocks are feeding close to the coastline most of the year. Those assumptions are the basis for all kinds of fishery and catch.

The most important coastal fisheries in the northern part of Norway are based on haddock, pollack and cod. The coastal fishermen are fishing haddock and pollack most of the year, and these species form the economic basis of businesses and activities in the coastal districts.

When the seismic surveys began summertime in 2007 all the catches were reduced immediately. Only small fish were caught, and fishermen explain this by the fact that small fish have limited abilities to escape from the pressure. The big and most valueable fish was scared away.

While the fish escaped from the areas there were reports that big pollack had entered deep into the fiords inside LoVeSe.

6 weeks after the shootings were ended in 2008 and 2009, there were for a short time good catches of pollack close to the island of Senja. This lasted only 2-3 days, and in 2009 the industrial trawlers had big catches further north (outside Finnmark county).

It is likely to believe that pollack – first escaping from the seismic shootings and into the fiords east of LoVeSe, was so afraid of the pressure waves and stayed in the fiords until 5-6 weeks after the shootings were ended. When the pollack finally came out of the fiords it was hungry and scared, and escaped into distant areas outside Finnmark and later on into the Barents Sea.

One may assume that fish wish have to escape because of the pressure-waves miss the opportunity for feeding or that important breeding wanderings are disturbed. Experienced fishermen believe that seismic shootings kill and sterilize fish and other bio mass on large scales every year. A lot of the biomass is food for the most important species of fish along the coastline. These issues have not been confirmed so far, but we may be quite sure about the fact that the consequences of seismic shootings are very much worse than what the oil industry and the seismic companies tell us.

Trawl and danish seine.

In the moment seismic shootings starts, trawlers and danish seiners may increase their catches in close-up areas. Our theory is that fish on the run tend to accumulate over a shorter periode of time in close-up areas. As fish from other areas start to run away from the pressure waves the density of fish in close-up areas will increase. Fishing vessels using trawl and danish seine have successfully taken advantage of this phenomenon and increased their catches for a day or two close to seismic surveys.

A few days later catches will decrease and there will be no basis for fishing any more. Fishermen in The North Sea have experienced similar patterns during the past 40 years.

Net fishing.

The same experiences as with trawlfishing. Just after the shootings have started catches increases

strongly for a short period of time. After 1 – 2 days catches decrease and fishery is made impossible.

The owner of a fishing vessel catching catfish told us that catches increased enormously the first 2 days after shooting began. The third day there was no more fish in the nets and it stayed like that until long after the shootings had ended.

Longlines.

This kind of fishing method is very sensitive to any kind of disturbance. Successfully fishing with longlines depends very much upon fish acting without stress. The fish must stay in the fishing area and must hunt for food to bite the bait. Fish caught on longlines always have the hook in the jaw.

During the seismic shootings in LoVeSe fishermen experienced 50 – 70 % loss in their catches from day one when the shootings started.

Longliners experienced haddock with the hooks fastened in the bellies. This indicates panic amongst the fish and fish trying to escape from the pressure waves.

Angling with machines.

This method is used to catch pollack outside LoVeSe summertime, and these fisheries are the most important kind of fishery for the smallest fishing vessels in the area. It takes place during the time from May til October.

Fishermen experienced the same pattern as in longlining, and the fish did not return to the fishing banks until 2 months after the shootings had ended each year.

In 2012 (3 years after the last seismic shooting) catches are still reduced compared to the situation before the first year of seismic surveys.

Whale hunting.

« - The night of Sunday the 24th of May «Kato» arrives our the catching area, and hunting is good for both of us during the morning. In the middle of the day the seismic vessel comes into the area. We are told to keep a distance. Quite soon we become aware that the whales in the area change behaviour, they become more and more restless, they swim in all directions with great speed, jumping. It is impossible to come close to them (which we depend on) and suddenly they disappear. The rest of the day we search forwards and backwards through the area in all directions to see if we are able to find the whales again, but there is nothing in sight.

On Monday we move to another area again. In the area N5701 – E00523 we find some whales. The seismic vessel arrives again and the same thing happens. The whales in the area go crazy, swim in all directions, jump above the surface and disappears. The occurrence of bait in the sea also disappeared where the seismic vessel went forwards, and the waters seemed dead.»
(Kato's captain Dag Narve Myklebust, interviewed by Fiskeribladet 28.05.2009.)

2. Headings in media during the shootings.

During the years when the seismic surveys took place in LoVeSe there were many headlines in media related to the shootings. In addition there were headlines in the media most of the readers didn't pay attention to although those reports might be connected to the shootings. Examples:

- **Copepods (in Norwegian «raudaate») came onshore in Holmstad»,** Bladet Vesteraalen 18.06.2008: The paper writes about a beach close to a school in a place called Holmstad that was colored red tuesday and wednesday that week. The phenomenon is so unusual that even an experienced fisherman did not know what had come ashore.
- **«Inexplainable dead fish in Boe»,** Bladet Vesteraalen 18.06.2008: The paper writes about a person collecting a plastic bag full of dead tobis in a few minutes on a beach in Boe in Vesteraalen. It is easy to notice that the newspaper never mentioned the fact that they only documented dead fish which had come ashore on this particular beach, and never focussed on the amount of dead fish that might be lying on the seabed.
- **«Act of disgrace»,** Nordlys, 15.07.2009: The paper shows a picture of a small whale caught by a man in a small boat with his bare hands in Kaldfjorden, a fiord close to Tromsø. The animal was in a flock with many other animals, and it is likely to believe that the animal either was nearly starved to death or badly hurt when it could be caught by hand.
- **«Sea birds are dying along the coast line»,** Klassekampen, 19.01.2010: Stein Byrkjeland in the countys department for environment in Hordaland County is quoted in the article: «Totally seen the stock of sea birds is reduced by 70 % since 1995», says adviser Tore Larsen. During the summer of 2010 the County Governor of Sogn og Fjordane has done a research of the population of seabirds in the county. The report shows that species like oystercatchers, common gulls, razorbills and guillemots have been reduced between 25 and 50 %. Black-backed gulls and herring gulls had been reduced by more than 50 %, while the population of puffins was reduced by 90 %. Species like eiders and kittiwakes had been reduced by more than 90 %.
- **«Intrusive whale»,** Fiskeribladet Fiskaren, the fall 2009: Heading about an intrusive whale with abnormal behavior on the fishing banks close to Andøya. Fisherman Hans Johan Nordvoll says: «For several days we have fed a whale. It comes close to our boats and we feed it with pollack. The whale is so close to my boat that I am able to reach it with my hook. It is scary when it's only 2-3 meters away. If we loose a pollack or throw a pollack, it comes up and eats it.» Further he says: «Yesterday it was hunting for the smallest fish that escaped through the meshes of danish seines – the fishing equipment used by the biggest vessels here.»

After the seismic shootings were finished in 2009 this killer whale was observed by many fishermen. It seems likely that the whale had some kind of damage which disabled it to feed itself.

3. Summary.

The natural resources are the basis for settlements along the Norwegian coastline. To protect this environment and settlements, in the Norwegian constitution we have a law called the law of marine resources.

Media or interviewed actors? connected to the headlines never suggest the seismic shootings could have caused the referenced happenings. Neither can we claim that seismic shootings is **not** the reason for the number of minor catastrophes in the environment under, on and above the surface during the last years. The reports indicate that something is going wrong in the marine environment, and the race for new oil reserves aided by comprehensive seismic shootings around the world makes it likely to believe that «seismic surveys» create extensive damages and consequences.

The law of marine resources is based upon an important precautionary principle which has not been enforced by Norwegian authorities so far, despite the many indicators in Norwegian and foreign media the last years.

Norwegian fishermen's experiences are unambiguous and well documented. Seismic shootings scares fish and sea mammals over large distances. Many fishermen believe that when the pressure waves influence fish over large distances, the explosions must create dramatic effects for all kinds of life beneath the surface. We can not exclude a scenario where a large number of fish and bio mass are being killed during seismic shootings. Our conclusions coincide with the indications put forward in local newspapers and media during the years 2007 – 2010.

If our conclusions are correct, all life connected to the sea is badly damaged by seismic shootings.

Norwegian fishermen are strictly and continuously regulated by the Norwegian authorities. The fishermen are frustrated by the lack of regulations pursuant to Norwegian law for seismic vessels. The Norwegian fishermen's experiences, the conclusions of Institute of Marine Research and Norwegian legislation show that Norwegian authorities accept a situation where the Norwegian coast guard is taking no actions against seismic vessels which demonstrably and increasingly «are destroying the opportunity of catch by shooting, noise or other improper conduct» (Norwegian law of marine resources §24).

Although Norwegian fishermen are protected by the Norwegian laws, our authorities ignore the fact that seismic vessels evidently destroy fishery every time such vessels are closer than 18 nautical miles to fishing vessels and/or fishing banks.

The example from the fishing ground close to Andenes show that seismic shootings might damage fishery for years. The rich fishery for pollack has been down since the first year the shootings took place (2007), and has not recovered even though it's been 3 years (in 2012) since the last shooting was finished.