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Risky businesses –

A perspective on fishers' risk in the oil versus fish dilemma in Lofoten and Vesterålen

Mia Høgi

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Abstract

Being a fisher is considered to be one of the most dangerous occupations in the world. Injuries are common, and death is a recurring event. The fishers experience competition for the space they are utilize and in the most important fishing area in Norway, Lofoten and Vesterålen; the oil industry has stated their interest in what they think is the most unopened prospective area on the Norwegian continental shelf. The area is a high latitude ecosystem with few yet but abundant species; fish, sea birds and sea mammals, and is regarded to be a vulnerable area by the Institute of Marine Research. The fishers experience risk on a daily basis in their occupation, but the oil industry presents new threats through seismic activity, area access conflicts and the risk of oil spills. Through analysis of documents and interviews with relevant people the social constructionist approach to risk will deal with the fishers' current risk, and fishers' risk in regards to the oil industry in the case of Lofoten and Vesterålen. The results indicate that the fishers underestimate personal risks that come with the occupation while they see the possible risk with the oil industry, especially in regards to oil spills, as a real threat. The seismic activity performed during the last three years showed a large resentment toward the oil industry and the majority of the fishers are reluctant to the oil industry. Although the possibility of an oil spill in the area is regarded as diminutive by the oil industry and the Norwegian authorities, the consequences can be massive and can affect the resources the fishers' rely on. The uncertainty in regards to oil spill, extended effects (e.g. employment opportunities) and effects on the fishing industry in addition to knowledge gaps and the fishers' lack of control largely explains the fishers' negative attitude to the oil industry.

Key words: fishers', Lofoten and Vesterålen, social construction of risk, oil.

If citing the present material, you are kindly requested to contact the author[♣]

♣ eplemia@hotmail.com. Thank you.

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Acronyms

BP	British Petroleum
Cal-fin	*Calanus finmarchicus*
CWC	Cold Water Coral
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EVOSTC	Exxon Valdez Oil Spill Trustee Council
NGU	Geology Surveys of Norway (Norges Geologiske Undersøkelser)
HES (HMS)	Health, Environment, Safety (Helse, Miljø, Sikkerhet)
IQ	Individual Quotas
ICES	International Council for the Exploration of the Seas
IMR (HI)	Institute of Marine Research (Havforskningsinstituttet)
IPIECA	International Petroleum Industry Environmental Conservation Association
ITOPF	International Tanker Owners Pollution Federation Limited
LoVe	Lofoten and Vesterålen
MAREANO	Marine Area Database for Norwegian Coasts and Sea Areas
MD	Ministry of Environment (Miljøverndepartementet)
OED	Ministry of Petroleum and Energy (Olje- og energidepartementet)
NEAFC	North-East Atlantic Fisheries Commission
NINA	Norwegian Institute of Nature Research
NPI/NP	Norwegian Polar Institute (Norsk Polarinstitutt)
OD	Oil Directorate (Oljedirektoratet)
o.e.	Oil equivalent
PINRO	Polar Research Institute of Marine Fisheries and Oceanography
Sm^3	Standard cubic meter
UNCLOS	United Nations Convention on the Law of the Sea
UNESCO	United Nations Educational, Scientific and Cultural Organization
SEAPOP	Seabird Populations
SDFI(SDØE)	States Direct Financial Interest (Statens Direkte Økonomiske Engasjement)
SSB	Statistics Norway (Statistisk Sentralbyrå)
TAC	Total Allowable Catch

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1 Introduction

Being a fisher is one of the most dangerous occupations in Norway. Injuries have to be anticipated, and death is a regular occurrence in the occupation. 2008 was the first year in recorded history with no deaths at sea in Norway (Grytås, 2009). From 1998 to 2003 61 people died in the Norwegian fisheries and almost 2000 people were injured (Aasjord et al., 2005). But, for some reason the fishers' do not seem to acknowledge the risk they are exposed to. A survey carried out by the Norwegian Maritime Directorate in 2005 for the small scale fleet, which include vessels between 6 and 10,6 meters of length, led to the discovery of grave security faults on the majority of the vessels (Aasjord et al., 2006). Several of the vessels lacked or had deficiencies with essential safety equipment on the vessels; e.g. survival suits and life rafts. The fishers do not seem to contemplate the risks they are exposed to and willingly live with the risks on a daily basis. But when safety measurements are to be implemented the fishers' perceive them as unnecessary decrees rather than attempts to increase their personal safety at sea.

However, fishers are not only experiencing personal risks. The fishers' have experienced competition about the areas they use from other industries such as aquaculture, shipping, recreational fishing and boating and other forms of resource exploitation. This competition is perceived by the fishers' as a threat to their livelihood. The new uses can bring an increased risk for the fishers'; in terms of a more limited access to their traditional fishing grounds, a risk they give the impression that they are more reluctant to accept than their own personal risks.

Lofoten and Vesterålen[1], the most important fishing area in Norway, is home to many fishers and the area has recently gained attention because of expectations of another resource; oil and gas. The petroleum industry believes that LoVe is the most prospective unopened area for oil and gas on the Norwegian continental shelf. Due to the Oil Directorate's (OD) need for increased knowledge of the possible resources in the area they have mapped the seabed by seismic shooting. This was done during the late summer months, which was considered to be a time with minimum hinder for the large fishing fleet in the area. Even though, it was evident that the seismic activity caused massive demonstration from the fishers toward the oil industry, and for possible future oil developments in the area.

[1] *Lo*foten and *Ve*sterålen=LoVe

[2] The estimations of oil released varies from everything between 1 000 to 100 000 barrels a day.

LoVe is the most important fishing ground for the fishing of spawning North East Arctic Cod, also called the skrei. The fish migrate in large numbers to the area in January and abundance and proximity to shore makes the fish easy to catch. The Norwegian Spring Spawning Herring uses LoVe as a winter habitat and supports an important fishery. In addition to this there are fisheries for saithe, haddock, redfish and greenland halibut in the area. The large fishing fleet in the area employs a large number of persons and generates a substantial income for the area. The high abundance of fish draws prey such as sea birds and sea mammals in large numbers to the area. The area's high abundance of species is due to the areas oceanographic and geographical features such as high inflow of warm Atlantic water, whirl pools and different habitats. Because of the areas importance for many species and the high concentrations of those species the Institute of Marine Research, IMR, and the Norwegian Polar Institute, NP, has designated the area to be a vulnerable and valuable area.

Due to a falling oil production the oil industry is looking for new areas to increase the oil production. Since the beginning of the Norwegian petroleum 'adventure' in the 1970's the oil industry has relied on new areas being opened up for production. The oil industry contributes enormously to the export income and is therefore a major contributor for the financing of the Norwegian welfare system. Although the fisheries have a large regional importance in LoVe, the oil revenues are of major importance for Norway's economy.

The reoccurrence of the petroleum industry in a major fishing area has regained interest for the old debate of oil versus fish. When the areas north of Stadt, by the 62° latitude, were to be opened for hydrocarbon exploration during the 1970's the slogan was the same; oil or fish. Regardless of the decrease in numbers of fishers' and vessels the last century, fishing is still an important activity. Today there are few areas which are not opened for exploration and LoVe is by far the most controversial area within the Norwegian Exclusive Economic Zone (EEZ).

Because of an expected increase in activity in the areas in the Barents Sea and the sea areas off Lofoten an ecosystem based management plan was published in 2006. Because of a recognized lack of knowledge of certain key topics in the area a massive and intensive research endeavor was undertaken, which included the seismic activity already mentioned and a mapping of the seabed. The research was mainly done in the areas off Lofoten, areas with large expectations for oil and gas resources. Thus, the oil versus fish 'hot potato' will be up for new debate when the Management Plan will be up for revision in late 2010.

Although many are opposing oil activities in the vulnerable and pristine environment of LoVe, there are also many who believe that oil will revive the region, and lessen its dependence on the fishing industry. But the visibility and atrocities of the consequences of an oil spill is not easy to forget. Two oil spills, both from vessels, in Norwegian waters within the last year illustrate the fear and the risk following oil in sea environments. Recently, the oil opponents can stress their arguments further; a massive oil spill from the sunken British Petroleum (BP) platform 'Deepwater Horizon' in the Gulf of Mexico is thought to cause severe damage to the vulnerable ecosystem in the area[2]. The fishing activity in the area has already been stopped and the fishing vessels are now part of the oil clean up team. The oil spill and its consequences are thought to be larger than the probably most famous oil spill from the Exxon Valdez. Already fishers have been affected by the spill, which BP regarded to be unlikely to happen (Ask, 2010). It is also worth noting that BP is a significant company on the Norwegian continental shelf and has been a model for the organizing of Norwegian oil companies as well (Ryggvik, 2010).

Although the risk of significant oil spills are regarded to be small and large spills are considered to be unlikely to happen, relevant actors have used the spill as an example of a worst case scenario for LoVe. The oil spill in the Gulf of Mexico illustrates again that the risk can never be totally eliminated. Peoples', also fishers', perception of risk, is influenced by recent events, and through interactions with other people. The fishers' perception of risk, I argue, is socially constructed, on the basis of among many things; information, experience and of course recent happenings. The theory of risk as a social construction suggests that group's perception of risk is a product of common values. What is considered to be risky is defined by the group, and the risks constructed are not necessarily the scientifically largest risks.

There is a large difference in the fishers' perception of risk; regarding their own personal risks in the occupation as a fisher; and the risks following oil activity. Taken the evidence into

[2] The estimations of oil released varies from everything between 1 000 to 100 000 barrels a day.

consideration, it can seem as a paradox that the fishers' are in denial of their own hazardous activity, fishing, while emphasizing on the risks of oil activity, where it can be claimed that more than 40 years of oil activity in the North Sea can suggest that it should be the opposite.

1.1 Research questions

Some research has been conducted regarding the same topic, oil and fish in LoVe, as I have chosen. Therefore I tried to find research questions and a topic that have yet to be elaborated on. The research questions have changed and evolved after more literature has been published and studied and interests have changed.

In the thesis I will answer the following research questions:

- (1) Considering that being a fisher is already a risky occupation, which risks do the fishers' face today?
- (2) What makes the oil industry and its operations more threatening for the fishers; their lives, the occupation and the industry they are a part of?
- (3) Considering that the fishers seem to accept a high personal risk, what makes the fishers so reluctant to accept the oil industry in the area?

1.2 Motive for study

The topic is interesting for me as an International Fisheries Management student and as a 'product' of the welfare state, financed by the oil. The two poles; the fish and the oil, represents the old familiar tradition of harvesting a sustainable resource and on the contrary the non-renewable black gold which represents income and can be seen as an enemy towards the fight against climate change. The topic also represents the old traditional industry; the fishing, which has become a center of attention because of its co-existence with nature. In regards to fishers' risk, it is interesting to see how the modernization of the fishing fleet might have made life as a fisher easier, but the modernization also comes with unexpected side effects. In particular, I also find the case of Lofoten fishery interesting as I recently found out that a great-great-great-grandfather died at sea in the Lofoten fishery.

I find the area of subject particularly interesting and it will be fascinating to watch the end result of the process. In viewing Norway as a large petroleum producer- and exporter and as a self proclaiming country fighting climate change LoVe becomes part of an internationally important discussion. LoVe represents the harvesting of sustainable resources, but might also be an important step in the quest for an even larger oil fund to support the welfare system for future generations.

It was imperative for me to choose a topic I found interesting because it is then easier to motivate myself for the studies. It was very important for me to try to conduct research that would be multidisciplinary, which I believe I have accomplished.

1.3 Structure of the thesis

The thesis is divided into seven chapters. The second chapter will deal with the appropriate theory, where the social constructionist approach is important for the thesis, and in the third chapter I will elaborate on the methodology used for the thesis, in particularly the analysis of documents and interviews that I have conducted. I will then continue with two background chapters for the understanding of my analysis. The chapters will contain information regarding LoVe, fisheries, oil, history and vulnerability and examples of oil spills and vulnerable ecosystems that can be compared with LoVe. Further on, chapter six will debate the research questions and my findings, before ending the thesis with a discussion (chapter 7) and a conclusion (chapter 8).

2 Theoretical approach

The research questions for this thesis deal with risk and risk perceptions. For the purpose of the thesis risk theory and theory on risk perception will be necessary in order to answer the research questions.

In the following I will use Ulrich Beck's theory regarding the world risk society. Ulrich Beck is a German sociologist who wrote the book "Risk Society" which was published in 1986 (English in 1992). The book is "one of the most influential European works of social analysis in the late twentieth century" (Lash and Wynne, 1992:1). The book was published shortly after the Chernobyl disaster in 1986, and following the book having an extraordinary impact (Zinn, 2008b). The book is influenced by the general focus on environment in its time period (Zinn, 2008a). I will also use theory regarding the social construction of risk.

But before commencing on the theory it is necessary to explain what risk is. The definitions of risk vary in regards in what matter they will be used. For instance, a financial definition of risk will emphasize different aspects than a psychological definition. Risk is often portrayed to be the result of the probability and the consequences of an event (MD, 2006, Olsen, 2010b), see Figure 2.1.

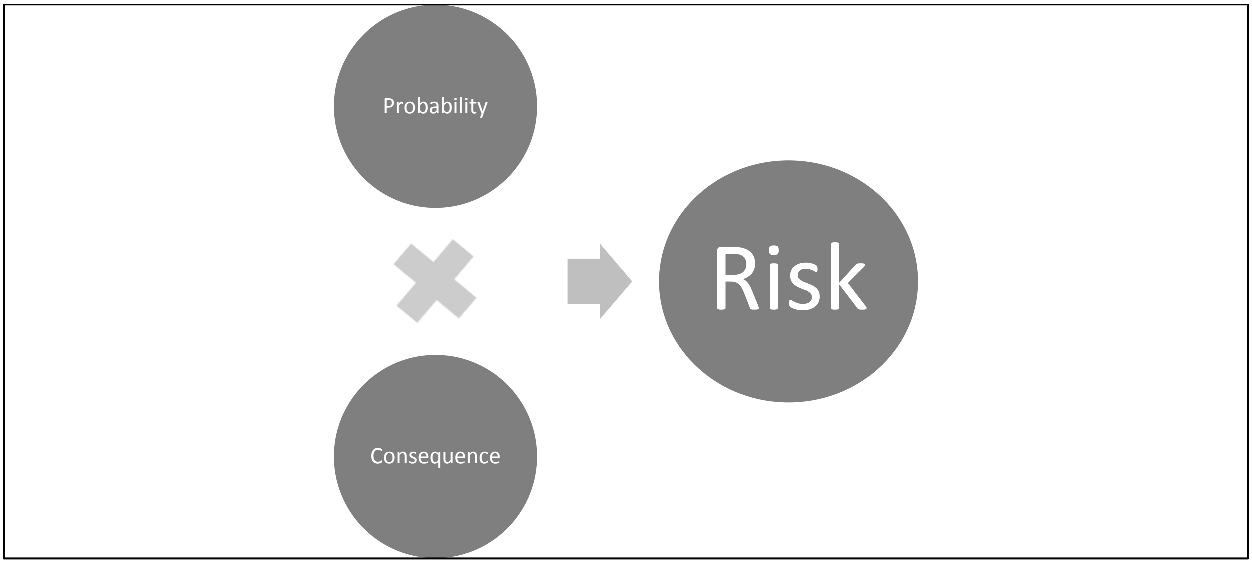

Figure 2.1: Definition of risk.
Risk is often portrayed as an events probability times the consequences of the event.

The following risk definitions have been found in sociological and psychological literature;

> "'Risk' is the probability of an event combined with the magnitude of the losses and gains that it will entail" (Douglas, 1992:40).

> "Risks are defined as the probabilities of physical harm due to given technological or other processes" (Lash and Wynne, 1992:4).

> "Risks are quantitative measures of hazard consequences that can be expressed as conditional probabilities of experiencing harm" (Hohenemser et al., 2000:169).

2.1 Hazard versus risk

There is large confusion regarding the difference between a hazard and a risk. The terms are often used interchangeably (also by Beck, see next chapter), also by the Management Plan and in this chapter I will try to clarify the differences between the two.

"Hazards are threats to humans and what they value, whereas risks are quantitative measures of hazards consequences that can be expressed as conditional probabilities of experiencing harm" Hohenemser et al (2000:168) argues. This explanation is probably more confusing than clarifying. A hazard is an "inherent property" (Langerman, 2009:51) of a substance. In other words it is something that is not possible to change from the substance. A risk on the other hand, is a term used to describe a certain process or situation which relates to the frequency of a hazard occurring and the severity of the outcome of that hazard (Langerman, 2009). In the case of LoVe oil is the hazard. The properties of the oil are not possible to change, the oil viscosity or density, cannot be changed. It is the oil spill that is the risk. The oil spill describes the process of releasing oil, and can explain the severity of the outcome.

Singley (2004) has made an equation (known as the Singley's equation) to explain the differences between hazard and a risk;

$$H+R=A$$

Where H is the hazard, R is the risk, and A is the accident. For a fisher a hazard can be the activity of deploying or hauling the gear. The risk is related to probability of that an accident shall happen under the operation and the potential consequences of the accident. There are two possible ways to mitigate the accident; the A of the equation. This can be done through changing either of the variables. The H can be affected by two methods; either by removing the H or by replacing it with another substance. A dangerous open hydraulic block can for example be less dangerous if it is closed. A physical barrier between the fisher and the gear under deployment might reduce the hazard. The other way to mitigate the accident is to change the R variable, which is the most common method. This is done by reducing the risk in some form. For instance, by introducing specific routines can help reduce the fishers' exposure to the hazard. For fishers who gut fish onboard the risk of cuts is serious and having a routine using specially made gloves are one example of reducing the risk. Another one is mandatory use of oil skin clothes with floating material that increases the possibility to be saved if the fisher falls overboard. Finally, one can say that "the toxicity of a chemical (its hazard) cannot be changed, while the exposure (the risk) can be modified. It is that exposure (or risk) portion" (Singley, 2004:15) that can be reduced. From this we can derive that for the fishers the oil represents a hazard for pollution, while it is the probability for oil spill and the system to reduce the consequences that represents the risk. With this in mind we continue with the risk theory.

2.2 Risk theory

Beck (1992) defines risk as "a systematic way of dealing with hazards and insecurities" (Beck, 1992:21). Risk, Beck says, "is the modern approach to foresee and control the future consequences of human action" (Beck, 1999:3). Continuing, Beck explain that risks are "uncontrollable, scientific, technical or social developments which were started long before their side-effects of long-term consequences were known" (Douglas, 1992:45). According to Beck risks have changed from being individual voluntarily hazards one could expose oneself to by choice, e.g. death at sea for a fisher, to more globalised, involuntarily hazards which are not possible to escape, e.g. pollution from the oil industry. According to Douglas (1992) Beck suggests that the modern industrial society has changed and the prior moral questions about the allocations of wealth, of goods, has changed into the allocation of risks. Beck argues that the risks we experience today, is a product of the industrialization, and we depend upon that technology in our daily life and can therefore not choose what risks we want to expose ourselves for. Before we accepted risks that were perceived as calculable and where the outcomes were seen as manageable (Zinn, 2008b) e.g. to smoke, to drive a car or to go out fishing. Today, the risks are more uncontrollable and where the outcomes are seen as precarious and uncontrollable by the individual, e.g. nuclear power plants, pesticides or oil spills.

Beck states that because the new modernity has to a large extent specialized itself, it comes with the likelihood of unfamiliar side effects (Bradley and Morss, 2002). Bradley and Morss (2002) continue, and argue that the 'new' society, according to Beck, creates negative consequences:

> "Science does not simply lead to progress; it has unpredictable side-effects that create risks and anxiety. Chernobyl, acid rain, the ozone hole, the reduction of biological diversity, traffic chaos, unemployment. (…) The more we know, the less we can be sure of what we know. The more experts we have, the more they contradict each other. The 'knowledge society' is also a 'risk society' where we live increasingly in a state of uncertainty. And the risks we face are more and more risks we have created for ourselves" (Bradley and Morss, 2002:513).

Beck argues that in the new society, the 'risk society' lay people can no longer determine consequences from experience, but they have to depend on the knowledge from experts (Bradley and Morss, 2002). Beck continues by stating that the consequences of the new risks are larger than they were before, and although the probability of an accident is small this does not compensate for the large consequences; "no matter how small an accident probability is held, it is too large when one accident means annihilation" Beck (1992:29-30) writes. This can be illustrated by the Exxon Valdez oil spill, Alaska. The probability of such a large oil spill is small, but the consequences were large and the Prince William Sound in Alaska is still not fully recovered from the spill. The Exxon Valdez oil spill will be elaborated on later in this thesis (see chapter 5.4.4). The Chernobyl accident[3] in 1986 is another example. The possibility of such an accident was low, but the consequences from the accident were great, and several are still affected by the accident. The consequences did not only affect Ukraine,

[3] The Chernobyl accident is the most severe nuclear accident in the world to date.

but proved that risks had become transnational. The distance between experience of an accident and the knowledge of the effects of accidents leads to a perception of lost control.

Risk is shaped by anticipation; the thought that a hazard may be a reality in the future. The risk has not yet happened, but is considered to be a threat, and therefore Beck (1992) state that the risks are already real today. Risks are something we want to prevent from happening and lie in the "projected dangers of the future" (Beck, 1992:34). In that sense, risk brings along a possibility that the future can be altered by human activities (Zinn, 2008a). But risk also has to do with perceptions; perceptions are influenced by "the imaginability and memorability of the hazard" (Slovic et al., 2000b:119). In other words people's perceptions of risks may not be valid, even for risks that are familiar. Their perceptions of risks become distorted because the memories of certain risks make it easier to remember; the effects of a certain hazard, e.g. birds smeared with oil are easier to remember than one fisher dying at sea. This is remembered even though the risk of dying at sea as a fisher is probably higher than the risk of oil spills.

Society appears to react "more strongly to infrequent large losses of life than to frequent small losses" (Slovic et al., 2000a:149). Society will therefore react more strongly to the deaths following a large ferry accident than to do something with the deaths among fishers'. Perception of risk is even more twisted as events that occur frequently are easier to imagine than rare events (Slovic et al., 2000b); people are therefore more likely to remember a car accident than an air plane accident. But it is more usual to be afraid of flying than driving; which can partly be explained by the perceived loss of control. Perception of risk is contradicting and personal; what constitutes risk for me might not be the same as that of my classmates.

2.3 The social construction of risk

Several sociological and anthropological studies have shown that perception of risk have their roots in social and cultural issues (Slovic, 2000). This view is called the social construction of risk (Johnson and Covello, 1987). Within the social construction the world must be viewed as socially made (Bradley and Morss, 2002). This view is justified through the fact that what we consider as risky are biased by our believes and our knowledge, Lupton (1999) argues. Gergen (1985) identify social construction as;

> "the process by which people come to describe, explain, or otherwise account for the world (including themselves) in which they live. It attempts to articulate common forms of understanding as they now exist, as they have existed in prior historical periods, and as they might exist" (Gergen, 1985:266).

An important factor of the social constructivism is that the world is shaped by our interaction with our cultural environment (Bradley and Morss, 2002). This implies that what is considered to be a risk is a social process and therefore the societies ideology help shape the perceptions of risk (Nelkin, 1989). In regards to that, risks are not absolute, but vary from places, societies and groups; and thus entails that risks are defined for special purposes and situations and as a result must be accepted by the relevant stakeholders (Stahl et al., 2003). Risks are therefore not static; the construction can change according to negotiations through social interactions and consequently what constitutes a risk will evolve over time (Lupton, 1999). In other words, it is the involved that decides, or constructs, which risks of a particular project they believe to be true or real;

> "The choice of risks to worry about depends on the social forms selected. Each form of social life has its own typical risk portfolio. Common values lead to common fears (and, by implication, to a common agreement not to fear other things)" (Douglas and Wildavsky, 1983:8).

The media is considered to be the greatest channel of risk communication (Nelkin, 1989), and accordingly they shape laypeople's perception of risk. According to Brastad et al. (2004) 99% of the respondents in a survey had used media as a source to gain information regarding oil- and gas activities in LoVe. Stallings (1990) portray the media as the "most significant actor in the social construction of risk" (Stallings, 1990:80). The media select which events to report from, by selecting who to interview and how they interpret the events. There has been found a relationship between increases in negative opinions toward controversial technologies and the increased media coverage of such technologies (Stallings, 1990).

But, when agreeing that risk is socially constructed one also agrees that elimination of risk is impossible (Stahl et al., 2003). Stahl et al. (2003) suggest that "identifying and controlling risks should not lead to a sense of security. Because risk is a social construct, risks can appear and disappear and they require constant consideration" (Stahl et al., 2003:20). Risks are thus never constant, but change according to discussion of events that change the taken-for-granted outcomes; for instance if a bridge collapses (Stallings, 1990). Risks are not constant also because there is large disagreement between groups, societies, and individuals "over what is risky, how risky it is, and what to do about it" (Douglas and Wildavsky, 1983:1). And because of this disagreement there is no single concept of risk, but many different concepts of what constitutes risk.

Since what constitutes risk is a social process, in other words it is subjective, nothing and everything can be a risk; it all depends on the analysis of the danger (Lupton, 1999). To the contrary, if risks are considered to be objective, accordingly it also embodies characteristics that it is possible to completely control the risks (Stahl et al., 2003), and therefore the risks can be eliminated. There are several examples of risks thought to be eliminated, but proved only to be a false sense of security, where the most classical is the one of the

> "*Titanic*, where the new ability to control most kinds of leaks led to the understocking of lifeboats, the abandonement of safety drills and disregard of reasonable caution in navigation" (Douglas and Wildavsky, 1983:196).

Another example is the Three Mile Island nuclear reactor meltdown in March 1979. Prior to the accident many local opponents

> "were not permitted to raise questions about citizen evacuation in the event of a serious accident because such an event was defined by mainstream risk assessors and hearing officials as virtually impossible" (Johnson and Covello, 1987:85).

Risks are "intrinsically uncertain" (Nelkin, 1989:97). Because of this it is very difficult to know whether or not one is doing enough to prevent a hazard from happening, and even after a hazard has occurred one questions how much more action could have been done in order to prevent the damages (Douglas and Wildavsky, 1983). But what is considered to be an acceptable risk? That depends on a number of factors; possible alternatives, values, beliefs.

But because risk is a social construct it will not be possible to find one acceptable risk level for the society.

2.4 Living with risk: ignorance and denial

In order to live with risk it is necessary to ignore some of the risks one is faced with; "No person can know more than a fraction of the dangers that abound. To believe otherwise is to believe that we know (or can know) everything" (Douglas and Wildavsky, 1983:5). Lupton (1999) explain that denying risks is a kind of "psychological self-protective mechanism" (Lupton, 1999:62) in order to attempt normality. In a classic study, Poggie (1980) found that fishers' often do not acknowledge the risks they are faced with and consequently ignores or denies the dangers they are subjected to. One must choose which risks are worth attention and concern (Johnson and Covello, 1987). But, the risks that are chosen are not necessarily the ones that have the statistically and/or scientifically highest risk, this take place because risk is socially constructed (Johnson and Covello, 1987). For instance in the United States one of the main causes of health risks are automobile accidents, but the population are mostly concerned with the risks of cancer due to industrial pollution (Johnson and Covello, 1987).

Because risk is socially constructed there will be different opinions on what constitutes risk. The fishers see oil activities in LoVe as a risky activity, but the oil and gas industry[4] does not see it as a risk; "each takes the arguments of the other to be self-preserving and therefore false" (Douglas and Wildavsky, 1983:9). But because risks are subjective there will not be a 'right' and 'wrong' answer on what is a risk; they are all 'true' (Lupton, 1999). According to Beck (1999), risk and trust are intrinsically connected. A study found that publics perceptions of risk (e.g. an oil installation/supertankers) are based on judgments on the trustworthiness of the experts and institutions that are supposed to control the risky objects (e.g. the OD), instead of on the object of concern; if there will be an oil spill (Bradley and Morss, 2002).

Poggie (1980) argues that there are evidence to suggest that fishers in response to their perceived risk engage in ritual behavior to avoid danger. This ritual behavior can consist of certain taboos that embodies themselves in certain activities or phrases that should not be

[4] The arguments of the different stakeholders will be dealt with later (see chapter 5.3).

performed or expressed; for example that they should never leave port on a Friday, bring women onboard, don't whistle on board etc (Poggie, 1980). It was also suggested that longer fishing trips seem to increase the fishers' "perceived risk and perceived non-control" (Poggie, 1980:127). He also found that day trips ranked high on personal enjoyment, independence and on income in relation to short or long trips at sea (Poggie, 1980). The fishers' seemed to tolerate long trips at sea because the economic return outweighed the social and cultural costs; e.g. the loss in family- and social life (Poggie, 1980).

Slovic et al. (2000a) found that risks whose severity was seen as uncontrollable also was perceived to be dread, catastrophic, difficult to prevent, fatal, inequitable and involuntary. Involuntary risks are also less acceptable than voluntary risks (Nelkin, 1989). The perception of risk is also influenced by the sense of control; the more control one has over the risk, the less severe the risk is believed to be (Stahl et al., 2003). The fishers accept a high personal risk because they believe they are in control of the risks they face (see Figure 2.2).

As can be seen from Figure 2.2 below, people are willing to accept higher risk of a hazard if the control is perceived as high, and vice versa. This can be illustrated by fishers' activities. As will be illustrated later (see chapter 6.1) life as a fisher can be considered to be a high risk activity. But, the fishers agree to the high risk because they believe that their perceived control is considered to be high.

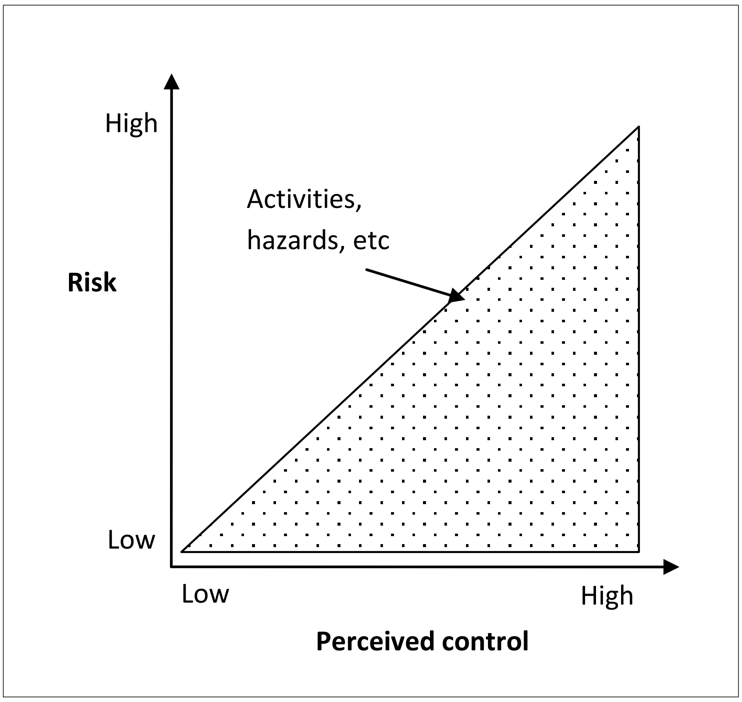

Figure 2.2: Hypothesized relationship between risk and perceived control in the environment. People are willing to accept higher risks, hazards (showed as black dots) when their control is perceived as high (Inspired by Finucane et al., 2000).

When deciding on accepting risks one must weigh the benefits; the potential gains, with the potential disadvantages. Will the benefits of the oil industry outweigh the potential disadvantages of the industry? It is ultimately up to the decision makers to figure out whether the benefits of oil in LoVe; e.g. increased national profits, extended effects such as increased employment opportunities, outweigh the possible risks to other industries; oil spills and the following consequences. Increased benefit seem to increase the acceptability of risk (Nelkin, 1989). But the risks need to be judged according to safety. In the pioneer stage of a new technology they are premature, and it takes a while before experience with the technology accumulates and faults can be alleviated, and "the fewer the trials and the fewer mistakes to learn from, the more error remains uncorrected" (Douglas and Wildavsky, 1983:195).

As a summary risk is influenced by; ability to imagine, culture, perceived control, experience, acquired knowledge, media, choice and degree of voluntariness. In order to answer the research questions it was necessary to design a research strategy; a methodology.

3 Method – How to study risk

The study will be a qualitative study using primary and secondary data, the latter being the most important. The qualitative method to answer research question is done through exploring social actors' meanings and their interpretations of life (Blaikie, 2000). As I am not concerned with counting and measuring, which is the quantitative technique to answer research questions, the qualitative method will be the best for this purpose. The secondary data will provide the information needed, while the primary data will add to and highlight the information found in the secondary data.

This study is basically a literature and document study. Due to the subject's importance and relevance there are reports and documents being published on a regular basis, together with newspaper articles and television reports. Although I have tried to keep myself up to date on the topic it is not possible to read everything. I have selected what I find most important and what seems most relevant for my study. In addition to this, due to the multidisciplinary composition of the thesis there are several limitations regarding subjects that have been elaborated. For instance are there several reports regarding the lethal and dangerous levels of toxicity of oil to components of the ecosystems which have not been elaborated on. This is just one example of many on topics related to oil and gas activities in LoVe that could be mentioned in a thesis like this.

The majority of the literature used is in Norwegian, since this is an English written thesis citations have had to be translated. The majority of the translations are done by me, for some more intricate ones I have asked for help from friends with good knowledge on the matter. However, any incorrect translations are my own responsibility.

Due to the time restrictions there was no time for a long and profound field work in LoVe. The possible period for fieldwork was the summer of 2009. Due to the summer holiday, it was only a small number of people available for interviews.

3.1 Designing research questions

Blaikie (2000) writes that "social research is the use of controlled enquiry to find, describe, understand, explain, evaluate and change patterns of regularities in social life" (Blaikie, 2000:35). I will not do the daunting task of all those described above, but use some of the objectives to answer my research questions. Blaikie (2000) argues that all research questions can be reduced to what, why and how questions. My research questions are why and what questions. Why questions are concerned with understanding and explaining, while what questions are descriptions of social phenomena. According to Blaikie (2000) to describe is to "provide a detailed account or the precise measurement and reporting of the characteristics of some population, group or phenomenon" (Blaikie, 2000:72). This kind of research tries to find out about how something has happened, at a particular time or over the course of time. This how can be a change in social relationships, or portray a phenomenon. For my case the description will be to portray the fishers' perception of the oil industry throughout time; from the start in the North Sea to the debate regarding if and when to open up the areas in LoVe, with emphasis on the latter.

To understand is to "establish reasons for particular social action" (Blaikie, 2000:72), while explaining is to "establish the elements, factors or mechanisms that are responsible for producing the state of or regularities in a social phenomenon" (Blaikie, 2000:72). Explaining is to make clear how something happens. To put it briefly, the explanation produces understanding (Blaikie, 2000). Explaining a certain phenomena makes it easier to understand why someone does what they do.

The researchers are debating whether or not explaining and understanding are two different words with the same meaning (Blaikie, 2000). However, there are some minor distinctions; explanation is thought to be done by researchers who look at a phenomenon from the 'outside', while understanding is thought to be done from the 'inside' (Blaikie, 2000). Explanations that are produced from the 'outside' look at the phenomenon, while the understanding tries to interpret the actions of the social actors from the 'inside'.

3.2 Choice of research strategy

Research questions are answered by using one or more of the four research strategies; inductive, deductive, retroductive and abductive. The research strategies provides a 'cook book'; a step by step logic on how to answer the research questions. In the following I will only address, inductive and abductive, as they are the strategies used in this thesis.

The inductive research strategy aims to establish some universal generalizations and use those generalizations to explain patterns of social life. It is about describing patterns on basis of observations and data. The strategy starts with the collection of data and continues with analyzing those data. From the analysis generalizations are developed and these generalizations should be used to explain aspects of social life. This research strategy is good for answering what questions. This strategy is thought to be done using our senses; we should look at the world with fresh eyes. This is because induction is based on a perspective called positivism. Positivism is a philosophy founded on the fact that the only authentic knowledge is based on actual sense experiences. The objective observations, made from sense experiences, should become theoretical statements of the world (Blaikie, 2000). 'Laws' are supposed to be derived from the observations made, and these laws should be tested further. The numbers of observations made are crucial since "the plausibility of any general law is proportional to the number of instances of it that have been observed" (Blaikie, 2000:103). However, consistent findings can make generalizations, but can never prove something to be true (Blaikie, 2000). As a result the status of the knowledge produced from the generalizations will always be subject for revision.

The abductive research strategy can be seen as the opposite of the inductive; instead of the researcher describing the world, in the abductive strategy it is the actors themselves that are supposed to explain how they interpret their world. The abductive strategy is related to interpretive sociology and anthropology and is not about finding patterns, but to understand meaning and perceptions. However, induction can be a step in an abductive strategy. The strategy aims to describe and understand social life through the eyes of the actors themselves. Through everyday language and actions knowledge are derived from the social actors that they use in the "production, reproduction and interpretation of the phenomenon under investigation" (Blaikie, 2000:100). The phenomenon under investigation is the oil versus fish debate for the fishers' in LoVe. This research strategy is purely used in the social sciences and is a new strategy with few users. The strategy tries to find out why people do what they do by asking the people in question. The motives, interpretations, meanings and intentions are shaping peoples actions and are central in the strategy. This is the opposite of what the inductive strategy does. The social world the actors have produced and reproduce through mutual knowledge, rules, norms, symbols and actions are the concerns of the abductive research strategy. It is from the fishers' themselves I will attain the knowledge on how they perceive the risk in LoVe. According to Blaikie (2000) "social reality is regarded as the product of processes by which social actors together negotiate the meanings for actions and situations" (Blaikie, 2000:115-116). Because of this there is no single social reality, but there are several social realities that are changing through time. There is not any 'true' social reality, but "each social reality may be 'real' to its inhabitants" (Blaikie, 2000:116).

The abductive research strategy involves constructing theory from everyday activities; what Blaikie (2000) is referring to as the abduction. This abduction is done by describing certain activities and meanings and from then deriving to concepts that can form an explanation of a problem (Blaikie, 2000). In this case the abduction will refer to the process of understanding how fishers' perceive risk, and then explain why they perceive risk as they do.

3.3 Data sources

My thesis is a qualitative study using primary, secondary and tertiary data. Primary data are data generated by the researcher, which in this case is, me. An interview conducted by the researcher will be a primary data source. Secondary data are data generated by another researcher, while tertiary data are collected and analyzed by another researcher. The three different types of data sources are divided into quantitative data and qualitative data (see Figure 3.1).

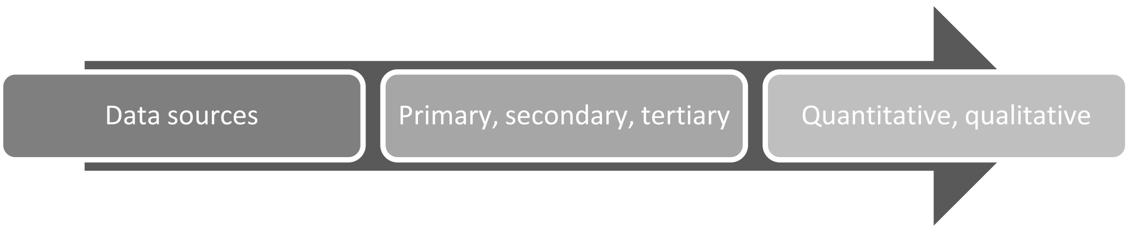

Figure 3.1: Data sources and the selection of them (Blaikie, 2000:184).
The data sources were selected from a relevance to the research topic where the selection of the secondary data came first. As information from the secondary sources lacked certain information that could explain the research questions possible interviewees were selected. The sources are mainly qualitative as that is the best method of answering the research questions and quantitative data will be used as additional information highlighting certain issues.

3.3.1 Document analysis

In order to achieve the proposed goal, a mixture of the tree types of data sources will be made use of. The main source will be primary and secondary data, while tertiary sources will only have limited use. The primary data will consist of interviews I have performed and will be elaborated on in the next chapter (3.3.2). The secondary data is of significant importance as this thesis will primarily be based on analysis of documents. According to Kvale (1997) analysis is to divide something into pieces or elements.

The topic, oil and fish in LoVe are currently a “hot potato” and consequently the literature on the topic is vast. New literature, including reports and documents, are being published often, and there are weekly, if not daily newspaper articles and television reports being released about the topic. In this thesis I have included literature that is relevant for my study. This includes literature regarding fishers’ meanings and perceptions. Although it is not possible to describe all the literature in this chapter I will refer to the most important ones here.

Important documents include parliament reports which include the Management plan for the Barents Sea and the sea areas off Lofoten (MD, 2006), and the sub reports that were written for the management plan (OED, 2003, Aaserød et al., 2010, Brude et al., 2003). The sub reports take account of fisheries activities, environmental descriptions (Føyn et al., 2002), mapping of vulnerable areas (HI and NP, 2003) and the effects of oil and gas activities on the fishing industry and the environment; fish, sea birds, sea mammals, corals, etc. The majority of these reports have been written by the IMR, the NP and the Fisheries Directorate.

The 6th KonKraft[5] report, which is the oil and gas industry’s own contribution regarding oil and gas activities in the north, is another important document. The report give the petroleum industries own view of the possible oil and gas activities and possible scenarios for extracting the resources.

Reports regarding fishers’ life, especially with concern to their risk is dealt with in SINTEF reports. These reports include Health Environment and Safety (HES) in the small scale fleet

[5] KonKraft was founded as cooperation between the oil industry and the governments to increase competiveness for the Norwegian oil and gas industry. KonKraft is cooperation between the Norwegian Oil Industry Association (OLF), Federation of Norwegian Industries, Norwegian Shipowners’ Association and Labor Organization Norway. They are considered to be a lobbyist organization and have for instance worked to reduce taxes in the oil industry.

(Aasjord et al., 2006, Hanssen et al., 2006) and the fishing vessel as a future workplace (Aasjord et al., 2005).

I will also take use of other master theses; Hansen (2006) thesis regarding on why becoming a small-scale fisher is relevant for the analysis. Other master theses will be used in the background chapters; including Stamnes' (2009) thesis on the debate about oil north of Stadt and the thesis about the different stakeholders and their arguments in the oil versus fish in LoVe, written by Johansen (2008).

In addition to the literature mentioned above I will also take use of newspaper- and journal articles, books, and encyclopedias.

3.3.2 Interviews

The secondary data will be supplemented with primary data. The primary data will consist of interviews I have carried out with relevant people, both as private persons, and also as representatives for their organization.

The research interview is according to (Kvale, 1997) an interview with the aim of collecting descriptions of the interviewees world of life. The interview course can be divided into different processes; planning, the interview itself, transcribing and analyzing. The process commenced by finding interviewees that would be relevant for my thesis and that was possible to interview. The people I have interviewed have been located in Svolvær, Lofoten and in Bergen. In other words I had to conduct the interviews during my holidays in two different periods. I spent a week in August 2009 in Lofoten interviewing a government official at the Fisheries Directorate, a fisher and an environmentalist. In addition to those, during Christmas when I was home in Bergen I interviewed a former fisher and a researcher at the IMR. Due to the limited time, and the fact that the interviews had to be conducted during the holiday, especially in Lofoten, I have had limited access to relevant candidates to be interviewed, and I consider this to be a limitation of the study. But, all the interviewees are relevant for the thesis; they are in relation to the oil and fish debate in Lofoten or have knowledge of fish and oil or experience in co-existence of fishery activity and oil.

The planning continued by making a guide for the interviews with questions that I wanted answers to. The interviews were semi-structured and thus questions changed during the interview by rephrasing, deleting and adding questions as I felt necessary. The interviews were tape recorded, and was transcribed afterwards, and then analyzed.

3.4 Limitations, strengths and weaknesses of the study

The findings are a product of the literature on the topic, and the literature on the topic regarding fishers' risk perception is not extensive. Though the topic has been regarded by HES measures in several reports elaborations on the fishers' own perception of risk are narrow. The literature available is more concerned with fishers' perception and believes of risk towards oil and less on the perception of risk regarding the occupation. This is a consequence because the current debate is concentrated with the fishers' perception of the oil industry. However, I believe that the literature I have taken advantage of is good and extensive enough for a study of this size. For instance, several of the reports that have been made use of are studies conducted by a well recognized research institution.

As mentioned, due to the time constraints the numbers of interviewees are few, I have therefore had to rely mainly on documents to answer my research questions. Increasing the number of respondents could strengthen the findings, but it could also change them, although I find that unlikely. I have treated the fishers as part of a group, though they are also individuals. The study makes a general conclusion about the fishers' perceptions, and only makes a few reminders that fisher's are different and therefore also can have different opinions about the oil industry, which was apparent during the interviews.

The definition of risk (see Figure 2.1) that several apply can be argued is a scientific approach, where the parties that will face the risks are left out of the equation. Although useful for some purposes, the scientific approach to risk leaves out the affected parties. Peoples' perception of risk is shaped by their acquired knowledge and experience with the hazard in question, therefore scientific and statistical approaches to risk are not useful and understandable for lay people. The scientific approach to risk is therefore not a good way to communicate what risks are and what it will entail for the ones exposed to the risk.

This chapter has made an account of the research strategy for the thesis. Before answering the research questions it is necessary to make a description of LoVe as an area; its resources, history and important issues that can explain why oil in LoVe is controversial.

4 Lofoten and Vesterålen – characteristics, resource and activities

Lofoten and Vesterålen[1] are located north of the Arctic Circle in the county of Nordland (see Figure 4.1). The area consists of several islands of different size and is made up of 11 municipalities (see Figure 4.2) and with a population of 53 668 (2009). The area is considered to be the country's most important fishing area.

Figure 4.1: Map of Nordland county.
Map of Nordland County with Lofoten and Vesterålen (Tornado Adventures). The fjord between LoVe and the mainland is Vestfjorden, which is the most important spawning ground for cod.

LoVe is the main fishing ground for what is considered to be the largest cod stock in the world; the catch of spawning North East Arctic Cod, also referred to as skrei. According to Ryvarden (1981) the Lofoten fishery and the area Lofoten is almost synonymous. There are also fisheries for other commercially important species like the herring, haddock, saithe, greenland halibut and redfish in the area. Fishing is still an important livelihood in the area and generates a substantial income, see Figure 4.2. As can be seen from Figure 4.2, Lofoten and Vesterålen altogether has a catch value of more than NOK 1 billion. The small island of Røst with only 67 registered full time fishers (see Figure 4.7) has a catch value of more than NOK 150 million.

Figure 4.2: Inhabitants, catch value and catch amount in LoVe.
Number of inhabitants (SSB, 2010), catch amount and catch value (2009) per municipality in LoVe (Fiskeridirektoratet, 2010).

	Municipality	Number of inhabitants	Catch value (in 1000 NOK)	Catch amount (tons)
Lofoten	Vågan	9 023	63 162	6 823
	Vestvågøy	10 674	180 773	18 781
	Flakstad	1 369	60 939	5 558
	Moskenes	1 130	72 943	6 851
	Værøy	761	73 583	6 587
	Røst	612	150 006	12 637
Vesterålen	Andøy	5 002	187 327	19 058
	Bø	2 789	35 026	3 059
	Hadsel	7 981	140 698	16 073
	Sortland	9 819	101 665	10 585
	Øksnes	4 438	237 564	25 177
Total		53 598	1 303685	131 189

Vestfjorden between LoVe and the mainland has attracted fish, sea mammals and sea birds in vast numbers for a long time. The area is also considered to be one of the most prospective oil and gas areas on the Norwegian continental shelf.

4.1 Resources and environment in Lofoten &Vesterålen

4.1.1 The ecosystem

LoVe is located in the Norwegian Sea, on the gateway to the Barents Sea. Despite being north of the Arctic Circle the climate is relatively warm. This is due to the Golf Stream bringing warm Atlantic water, passing along the Norwegian coast, and northwards into the Barents Sea. Every second two million tons of Atlantic water streams into the Barents Sea (Gjøsæther et al., 2009). Because the area is a shallow sea area, the warm water vertically mixes with the cold arctic water which brings nutrients from the deep up to the euphotic zone where it can be consumed by the plankton in the lower part of the food chain. The plankton can be found in enormous abundance during the spring bloom, and the plankton is then eaten by larger zoo plankton where the *Calanus finmarchicus*, also known as Cal-fin[6], is the most important of them. Over eighty percent of the zoo plankton in the south western Barents Sea is compounded by this specie (Føyn et al., 2002). The species is important as food for many of the fish stocks and some of the sea mammals in the area.

LoVe holds oceanographic and topographic features, and the strong currents in the area lay the foundation of a rich fauna containing both corals and sponges. The largest known cold water coral (CWC) reef is Røstrevet[7] located in Nordland VI (see Figure 5.2), south of Røst. The reef is the largest Lophelia[8] reef complex found in the North Atlantic. The reef was discovered in 2002 and is 100 km^2 [9] (Freiwald et al., 2004). The CWCs are slow growing at a growth rate of 4-25 mm a year; in comparison with its warm-water reef cousins which can grow up to 150 mm a year (Freiwald et al., 2004). The cold-water corals can live up to 8 000 years, similar to the warm-water corals.

The cold-water coral reefs are hot spots with high biodiversity surrounded by areas with low biodiversity, and the disappearance or damage to these can affect the biodiversity of the reefs as they are thought to work as scattering areas for the surrounding fauna (Fosså et al., 2000). The reefs are also considered to be key areas for certain species (Fosså et al., 2000) (see

[6] There is no common English name of the species, and according to a PhD student (studying the species) a group of American scientists have used this name.
[7] Trawling was prohibited at Røstrevet (Røst reef) from 4 January 2003. Several reefs along the Norwegian coast are protected from trawling and this was done after the IMR estimated that 30-50% of cold-water corals were partially or totally damaged by bottom-trawling. See also Freiwald et al., 2004.
[8] *Lophelia pertusa* colonies are found on North Sea oil installations at depths greater than 50 m and with a year-round influence of Atlantic water. See Freiwald et al. 2004 for more.
[9] This is approximately the size of the island of Manhattan, New York.

Figure 4.3) and coral reef areas are considered by fishers' to be good fishing places for long line and gill nets (Fosså et al., 2002). Husebø et al. (2002) found that catches of especially redfish where higher in coral habitats than in non-coral habitats, although not statistically significant, the catches of tusk and ling were also higher in coral habitats. Wolf fish, monk fish and greenland halibut have also been observed on the reefs (Freiwald et al., 2004). Recently scientists from the Institute of Marine Research discovered more coral reefs outside Lofoten and Vesterålen, including the relatively unusual specie *Isidella lofotensis*, which is proposed to be a Norwegian responsible species[10] (HI, 2010).

Freiwald et al. (2004) considers bottom trawling and hydrocarbon explorations as the largest threats to the cold-water corals. Bottom trawling has already damaged Norwegian coral reefs substantially[7] (Fosså et al., 2002, Freiwald et al., 2004), whilst there are large knowledge gaps in the effects of hydrocarbon exploration; some find studies have found severe effects from drilling activities (Freiwald et al., 2004) while some studies find corals in close proximity to oil installations[8].

Figure 4.3: Redfish and Lophelia.
Redfish (left) are often spotted on *Lophelia pertusa* reefs (Telnes, 2006b). Close up of the Lophelia coral on the right. CWC reefs are considered to be good fishing places (Telnes, 2006a).

The area also has a large difference between tidal water, and can create whirl pools several places, where the whirl pool Moskstraumen is most famous because of the status as the

[10] There is no common definition of "responsible specie" yet. Although there are different proposals to a definition, they have in common that Norwegian responsible specie is species endemic to Norway, or species that has a majority (at least 25%) of the European or World part of the stock in Norway.

world's strongest whirlpool. These different habitats, the oceanography and the tidal waves have made the area to one of the country's most productive areas.

4.1.2 Biodiversity of Lofoten and Vesterålen

The high production in the sea area attracts several species to the area, both harvestable and non-harvestable. These species can be divided into three groups; fish, sea-birds and sea-mammals. The most important of these are the fish, for its economic importance, but the two other groups are also important; as parts of the ecosystem and as a contributor to the ecotourism industry in the area.

Since the early beginning people have made use of the resource and fishing was and still is an important livelihood. For more than a thousand years the area has been home to the Lofoten fishery; a winter fishery for the spawning North East Arctic Cod (see Figure 4.4 left). Early in the year the fish starts its journey from the Barents Sea into Vestfjorden, between LoVe and the mainland, to spawn. The distance from shore and the high abundance make it is easy to catch the fish. This fishery has been a lifeline for the area and Grytås (2009) refers to the fishery as "the most abundant seasonal fishery in the world" (Grytås, 2009:9).

Figure 4.4: NEA Cod and NSS Herring.
The North East Arctic Cod (left) is an important species for the Norwegian fishery (Telnes, 2001). The second most important fishery is the one targeting the Norwegian Spring Spawning Herring (right) (Telnes, 2004).

The North East Arctic Cod, *Gadus morhua* (See Figure 4.4), is a predatory, benthic fish and is caught mainly by bottom trawl. The sexually mature cod, the skrei, starts its journey in the

Barents Sea to spawn along the Norwegian coast in the beginning of the year. The most important spawning ground for the cod is LoVe, and the eggs are spawned pelagic during February to April. In early May the fish larvae hatches and the majority of the larvae are located in Vestfjorden and Vesterålsfjorden. 90% of the larvae diet consists of the zooplankton Cal-fin. The eggs and larvae are transported by the coastal current towards Finnmark and further into the Barents Sea, where the fry gathers on the bottom in late fall. The cod stays in the Barents Sea until it reaches sexual maturity at the age of 6-7 years before it returns to the spawning grounds. First time spawners release approximately 400 000 eggs, while the oldest release up to 15 million eggs (IMR).

The cod is the most important harvestable fish resource in the area and it is also the largest cod stock in the world (Gjøsæther et al., 2009). The average catch value for the last 10 years has been NOK 3 billion (Gjøsæther et al., 2009). There has been a significant overfishing for this stock, but this has been declining as preventing overfishing have been a management aim. The fishery is considered to be sustainable and in 2009 the agreed total allowable catch (TAC) was 525 000 tons. The cod is a shared resource between Norway and Russia (see chapter 4.2.2), the Norwegian quota was 221 000 tons in 2009 (Gjøsæther et al., 2009).

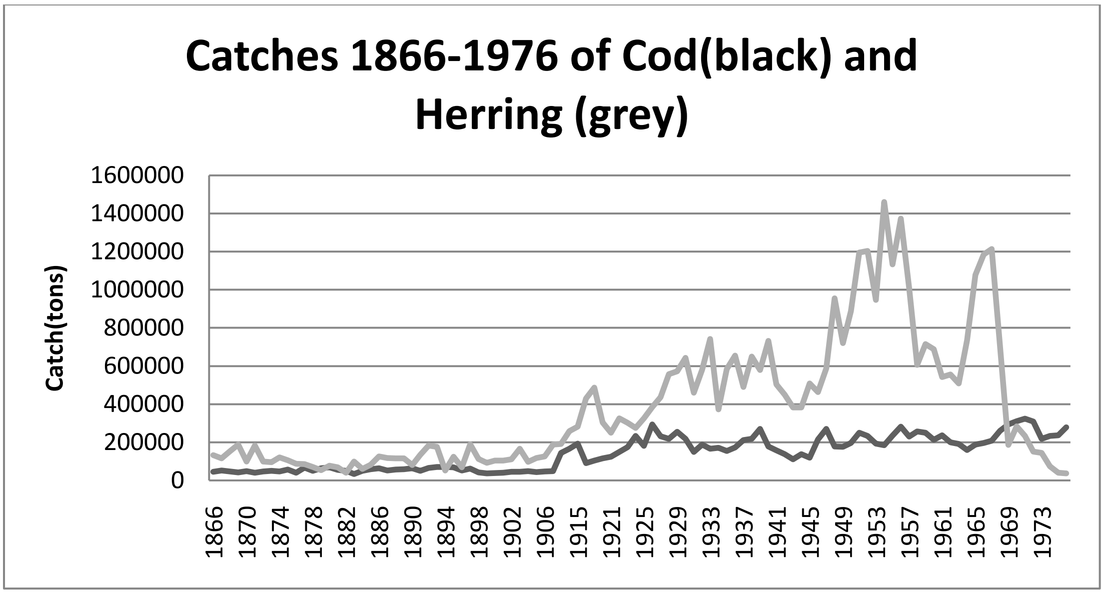

Figure 4.5: Catches of cod and herring (1866-1973).
Norwegian catches of cod (black line) and herring (grey line) from 1866 to 1976. When the modernization of the fleet began in the early 20th century the catches increased for both species, but especially for the herring. This increase in catch eventually resulted in the collapse of the herring stock in the late 1960's (Fiskeridirektoratet, 2010).

The haddock, *Melanogrammus aeglefinus,* is a common by-catch in the bottom trawl cod fishery. It has a similar spawning pattern as the cod; most important spawning ground is Tromsøflaket north of LoVe, and it spawns approximately a fortnight later than the cod. The haddock is also a shared resource and the Norwegian catch was approximately 71 000 tons with a value of NOK 837 million (Gjøsæther et al., 2009).

The second most important fish resource is the Norwegian Spring-Spawning Herring, *Clupea harengus* (see Figure 4.4 right). The herring spends the winter in Vestfjorden and in January it starts its migration to the spawning grounds alongside the Norwegian coast, where Møre on the north-western Norway, Nordland and Vesterålen are the most important grounds. The eggs are released on the bottom where they hatch after roughly three weeks. The larvae drift along the coast towards the Barents Sea where they arrive in early summer. The herring reaches sexual maturity at the age of 3 to 4 years old, and then they start the journey from the Barents Sea along the coast and spawn, before migrating into the Norwegian Sea to feed on Cal-fin. As with the other species mentioned, the herring is also a shared stock. The Norwegian quota for 2008 was 925 980 tons, and had a value of approximately NOK 2,5 billion. The herring is caught by purse seiners and the stock is considered to be in a good condition (Gjøsæther et al., 2009).

In the LoVe area there are also fisheries for saithe, redfish, and greenland halibut.

The high abundance of fish at different times of the year attracts sea mammals where the most important are the killer whales (see Figure 4.6) and the minke whales. The killer whale feeds mostly on herring and thus follows the herring's migration patterns. When the herring gathers in Vestfjorden during the winter there have been sights of over 500 killer whales in the same area (Føyn et al., 2002). The minke whale is a baleen whale which feeds on plankton and herring and is the most common whale in Norwegian waters. The minke whale enters into Norwegian waters during the summer to feed. There is a limited fishery for the minke whale and the quota in 2009 was for 885 whales. First hand value in 2007 was approximately NOK 24 million (Gjøsæther et al., 2009).

The abundance of fish attracts sea birds as well as sea mammals, and LoVe is home to many seabirds: the puffin (*Fratercula arctica*)[11] (see Figure 4.6), the common guillemot (*Uria aalge*), the razorbill (*Alca torda*), the northern fulmar (*Fulmarus glacialis*) and the gray sea eagle (*Haliaeetus albicilla*)[11] are just some of them. Røst, the outermost island in Lofoten, is home to almost 20% of the Norwegian coasts' nesting sea bird stocks (Larsen, 2009). Almost eight percent of the world stock of puffins are located on Røst and on the neighboring island Værøy (Larsen, 2009). LoVe is the core area for the world's most dense population of gray sea eagles. The bird stocks have decreased for decades and several species are red listed. Bird- and whale watching is a popular tourist attraction in LoVe.

Figure 4.6: Whale- and bird watching is a popular tourist attraction in LoVe.
The killer whale (left) is a predator for the herring and follows its migrations (Alnes, 2008). The islands of Røst and Værøy is important for the puffin (right), which is also called the parrot of the sea (Pedersen, 2007).

4.2 History and management

4.2.1 The history

The first mentioning of the Lofoten fishery was in Egil's Saga, which relays events from 800 A.D. Ever since then the fishery has provided important goods and income for the settlement in LoVe. Many migrated to the area from the rest of the country to take part in the "most abundant seasonal fishery in the world" (Grytås, 2009:9), and in the top year 1895 there were 32 600 people participating in the fishery. In the beginning of the 18th century they fished with hand line, but later long line and gill nets were introduced to the fishing ground and the new gear soon became a problem for the fishers' who did not use the gear. In 1753 a law was introduced banning the gill net and long line fishers' from the grounds. Nonetheless, the

[11] Is, according to fugler.no, a Norwegian responsible specie.

fishers did not comply with the laws because they could not (Rogne, 2004) and hence they forced through new, more just regulations they could live with (Jenssen, 1984). Soon, the gill nets and long lines were allowed after all. The conflicts of the different gears resulted in a law from 1816; the "Law of Order" that implemented fixed areas for the different gears. The intention of the law, to reduce gear conflict, was fulfilled, but it also made the fisher dependant on the merchant; the væreier, to get access to the best fishing grounds. The shanty, where the fishers' spent the night, was owned by the merchant. The rent of the shanty was relative to the attractiveness of the fishing ground; the better the fishing ground the higher the rent was. Consequentially, many poor fishermen and newcomers had almost no chance of participating in the Lofoten fishery. The fishers' dissatisfaction with the Law of Order resulted in the emergence of the "Free Law" of 1857. The new law had few restrictions and "the invisible hand" through free competition should create "harmonious conditions on the fishing grounds of Lofoten" (Jentoft and Kristoffersen, 1989:358). But it was evident that the law was too free and the protests against the 1857 law culminated in the Trollfjord Battle in 1890[12]. The fishers' argued for stricter regulations and suggested that they themselves should manage the fishery; a co-management system (Jentoft and Kristoffersen, 1989). As a consequence the "Lofoten Law" of 1897 was made. The law "represented something entirely new in fisheries legislation" (Jentoft and Kristoffersen, 1989:358). The aim of the law was to let the fishers take part in deciding the rules of the fishery. Jentoft and Kristoffersen explain:

> "The law contained rules for the organization of the fishermen. All gear groups, together with representatives of the public control force, where to meet to establish the rules for conduct of the fishery. The members of these regulatory committees were to be elected and among the captains. Their mandate was to decide on territorial borders and on what kind of gears were to be admitted to the fishing grounds. (…) The outcome, however, was that the fishermen were granted the authority to make rules about the fishery, as well as the authority to decide which gears were to be allowed to operate in the fishery" (Jentoft and Kristoffersen, 1989:358-359).

[12] The Trollfjord battle happened in the Trollfjord arm in the municipality of Hadsel in 1890. The fjord was closed due to ice, and four steam trawlers made it in and closed the entrance of the fjord with nets. The ice had kept the small scale vessels from fishing in the fjord and the steam trawlers claimed payment if they wanted to fish. The battle has been used as an historic example of northern Norwegian coastal fishers' battle versus the powerful capital in the industry.

The Lofoten Law worked successfully for more than 90 years before minor changes were done. Today hand line, long line, gill nets and danish seines are allowed, while trawl and seines are still banned in the area (Holm et al., 2000).

During the 19th century the fishers used rowing boats with square sails, which were unpredictable in bad weather; on the 25 January 1893, 119 people died in a storm in the Lofoten fishery (Grytås, 2009). The yearly report from the Lofoten control wrote that "some human lives will always be lost by the Lofoten fisheries, but the year 1893 was by far not the worst" (Grytås, 2009:17). Eilert Sundt, a researcher, started collecting statistics over the number of deaths and accidents in the fisheries. He found that for men; one in four over ten years would die in the waves in Tromsø stift[13] (Grytås, 2009). This was three times as high as Bergen or Trondheim. This started a discussion on how to decrease the number of deaths in the fishery. One of the tools to decrease the risk was to build decked boats, which also grew in size. Another tool to decrease risk was the introduction of the engine, and the first motorized fishing vessel came to Lofoten in 1905 (Jenssen, 1984). In the beginning the engine was thought to scare away the fish, but when this assumption was disproved the motorization grew rapidly from 1910 (Pharo, 1983). The motorization increased the abilities to maneuver the vessels which led to increased order on the fishing ground (Jenssen, 1984). New research also made it possible to get weather forecasts sent by the telegraph to the fishing villages which made the life as fisher more predictable. Further on the power block and echo sounding equipment made it easier to find and catch fish. All the new technology that was introduced helped to reduce the fishers' risk (Pharo, 1983). The consequences of the implementation of the new technology have increased the catches, while the number of fishers' and vessels has decreased during the last hundred years and the reduction is also evident from the last decades (see Figure 4.7 and Figure 4.8).

[13] Tromsø stift = Nordland, Troms og Finnmark.

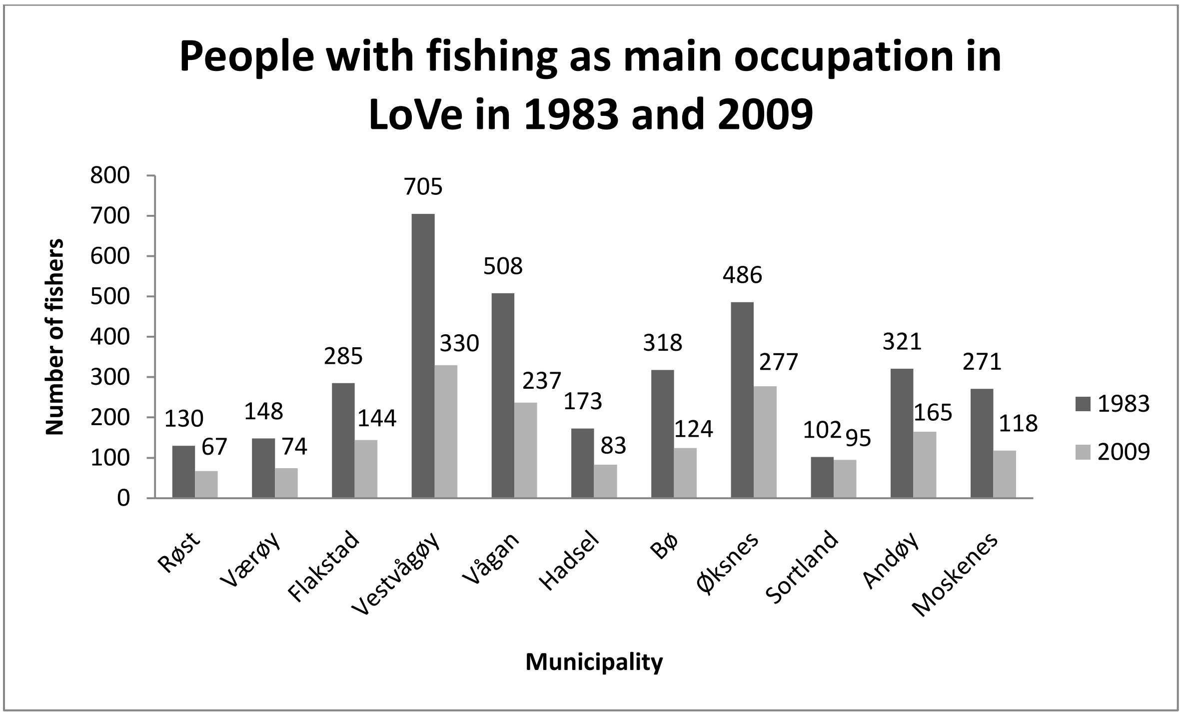

Figure 4.7: People with fishing as their main occupation in LoVe.
People with fishing as their main occupation in the different municipalities in LoVe for 1983 and 2009. The number of fishers' has been reduced drastically, also in the last decades. (Fiskeridirektoratet, 2010).

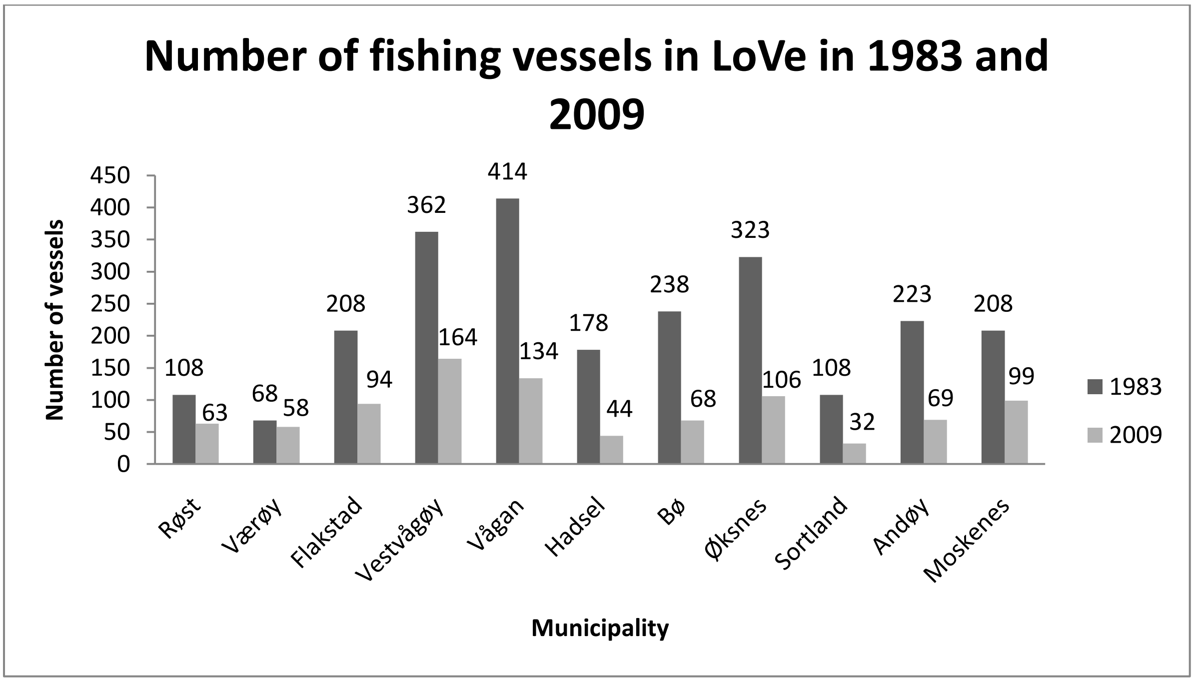

Figure 4.8: Number of fishing vessels in LoVe.
Number of fishing vessels in the different municipalities in LoVe for 1983 and 2009. LoVe has also experienced the national trend of reduction in vessels (Fiskeridirektoratet, 2010).

In 2007 there were only 10 575 people that had fishing as their main occupation in the whole country (SSB, 2009). For Nordland this number was 2 802 (SSB, 2009), but there are still fishers' migrating to LoVe to fish. Figure 4.9 displays the number of participants, fishers' and vessels, in the Lofoten fishery in 2000. As can be seen from the table the counties in close proximity to LoVe are the ones with most migrating fishers', although there is a substantial distance between the counties farther away from LoVe, such as Vest-Agder and Rogaland, fishers' also migrate to LoVe to fish during the Lofoten fishery.

Figure 4.9: Participants in the Lofoten fishery (2000).
Participants in the Lofoten fishery in 2000 divided into county and gear group (Adapted from Fiskeridirektoratet, 2000).

County	Danish seine	Gill net	Long line	Hand line	Total number of vessels	Total number of fishers'
Vest-Agder	0	9	0	1	10	31
Rogaland	0	7	0	1	8	36
Hordaland	1	19	0	1	21	45
Sogn og Fjordane	1	38	0	1	40	192
Møre og Romsdal	4	57	0	27	88	225
Sør-Trøndelag	1	45	1	44	91	169
Nord-Trøndelag	2	28	0	12	42	111
Nordland	88	495	178	334	1095	2280
Troms	9	64	1	10	84	186
Finnmark	4	8	3	4	19	54
Total	110	770	183	435	1498	3329

Nordland, Troms and Finnmark have approximately 10% of the inhabitants in Norway, but has nearly half of all the registered fishers in Norway (OED, 2003). Today there are only 5 767 vessels nationwide participating in income producing fishery, while Nordland has 1 507 of those (Aaserød et al., 2010).

Due to Lofoten's more than 1000 year old history of fishing for skrei and its important natural resources it is listed on the UNESCO tentative list proposed to become a World Heritage Area. The Ministry of Environment (MD) together with the municipalities of Røst, Værøy, Moskenes, Flakstad and Vestvågøy has applied and Lofoten is considered by the following criteria:

- "iii: to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared
- viii: to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features
- ix: to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals;
- x: to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation" (UNESCO, 2010).

Although this process seems to have stopped for a while, these criteria can be said to represent the special natural and cultural values we find in Lofoten[14].

4.2.2 200 mile EEZ and the joint Norwegian-Russian Fisheries Commission

On the 1 January 1977, the 200 nautical mile[15] Exclusive Economic Zone in pursuant to the third UN Convention on the Law of the Sea (UNCLOS) from 1975 was established in Norway (see Figure 4.10). With the introduction of the EEZ the coastal states had the right to the resources within the EEZ, and at the time 99% of the world catch of fish was taken within the 200 nm limit (Hønneland, 2006). Before the introduction of the EEZ several countries had built up a large foreign fishing fleet fishing outside other countries' 12 nm fisheries borders. With the introduction of the EEZ a large redistribution of the access to fisheries resources took place. According to Tamnes (1997) the introduction of the Norwegian EEZ resulted in increased cod and herring stocks. The continuation of the UNCLOS agreement resulted in exclusive rights to "explore, exploit, preserve and manage the natural resources in the zone, both in and on the sea bed and in the sea areas above" (Hønneland, 2006:10). The rights also meant that the states had the responsibility to manage the resources in a sustainable manner

[14] There are indications that the World Heritage application, although finished, has been stopped.
[15] 1 nm=1 852 meter.

(Hønneland, 2006); for instance the states should regard scientific advice when agreeing on a TAC for a certain fishery.

Figure 4.10: The Norwegian EEZ.
Map displaying the Norwegian Exclusive Economic Zone, the fishery zone around Jan Mayen and the fishery protection zone around Svalbard (fisheries.no).

In 1975 the joint Norwegian-Russian Fisheries Commission was established. The commission was a continuation of the existing management efforts that was already started with the North-East Atlantic Fisheries Commission (NEAFC) (Hønneland, 2006). The joint Norwegian-Russian Fisheries Commission was to agree on a mutual management of the fisheries resources in the Barents Sea. The commission should agree on measurements in order for the "preservation and rational exploitation of the marine living resources" (Hønneland, 2006:12).

The commission manages cod, haddock, capelin, saithe, greenland halibut, redfish, blue whiting, shrimp and the king crab and sets a TAC for each of the species in accordance with the advice from primarily the International Council for the Exploration of the Seas, ICES, together with IMR and its Russian counterpart; Polar Research Institute of Marine Fisheries and Oceanography (PINRO). The commission manages the fisheries through output regulations and technical measures; e.g. in the trawl fishery for cod and haddock and shrimp it is necessary with a sorting grid and catch of capelin should not exceed the minimum length of 11 cm (Hønneland, 2006).

Because the fish stocks are managed jointly with Russia, the effects that the stocks are exposed to within the Norwegian waters; whether that is tainting from oil, overfishing or something else, will affect the Russian fisheries as well, and vice versa. In other words; when regarding oil and gas exploration outside LoVe, the most important spawning area for the main stock, the cod, it is not just the Norwegian fisheries one must have in mind, also the Russian fisheries.

4.2.3 The management plan for the Barents Sea and the sea areas outside Lofoten

The holistic management plan of the marine environment in the Barents Sea and the sea areas off Lofoten, also known as the Management Plan, was published in 2006. The plan is a comprehensive and integrated ecosystem approach to management (Olsen et al., 2007). The plan should clarify issues and make visible the future risks associated with activities, and the possible effects on competing actors. It works as a knowledge producer and a risk management tool for the current oil and gas discussion in LoVe. The objective of the government is that this is the first in a series of ecosystem approach management plans, the future plans will deal with the Norwegian Sea and the North Sea.

The management plan came as a result of anticipated increase in activity for the area in the future. The area is important for the fishing industry, but also for activities such as sea transport, which is expected to increase after the opening of gas fields on the Russian border of the Barents Sea. Oil and gas activities are also expected to increase within the time frame of the Management Plan; towards 2020.

The Management Plan was also a result of the acknowledgement that the biological and physical elements in the ecosystem affects each other, directly and indirectly (Sunnanå et al., 2009). This should also include human activities and the effects humans have on the environment. The aim of the plan was to ensure long-term value to mankind from the ecosystem (Olsen et al., 2007). But, during the work with the plan large knowledge gaps were uncovered (Olsen et al., 2007), which have resulted in funding to increase knowledge for certain areas. For instance received MAREANO (Marine Area Database for Norwegian Coasts and Sea Areas), SEAPOP (Seabird Populations) and mapping of possible oil and gas deposits increased funding. MAREANO is supposed to map the sea bed in the management plan area and is a cooperation with IMR, NGU (Geology Surveys of Norway) and the Norwegian Hydrographic Service. So far the project has discovered several new coral reefs in the LoVe area (HI, 2010) and new species[16]. SEAPOP is a surveillance and mapping program for seabird populations, and is done in cooperation between NINA (Norwegian Institute of Nature Research), NP and Tromsø Museum[17].

The management plan will be up for revision later this year.

This chapter has dealt with resources, activities, history and management in LoVe. So far fishing has been the main industry in the area, and has been supplemented with a large tourism industry that has utilized the environment and the biodiversity in LoVe. Now the oil industry is moving into the area, with both expectations and resistance.

[16] For more about MAREANO, see www.mareano.no.

[17] For more about SEAPOP, see www.seapop.no.

5 A risky business? Oil in Norway and LoVe

" "Oil *is* almost like money" " (Yergin, 2008:xv, original emphasis).

The income from the oil and gas fields on the Norwegian continental shelf has shaped the Norwegian society and has made Norway the best country to live in (UNDP, 2009). This can partly be explained by the welfare system with free medical care and a free educational system. This is expensive, and future state budgets rely on income from oil and gas fields that are yet to be found (KonKraft, 2009).

Since the start in 1969 the oil has generated approximately NOK 3 850 billion in net income to the state (Nordvik et al., 2009). The revenues from the oil, mainly generated through a tax system, see

Figure 5.1, has financed the Norwegian welfare system. The petroleum export of NOK 600 billion[18] is fifteen times higher than the export value of fish (Nordvik et al., 2009).

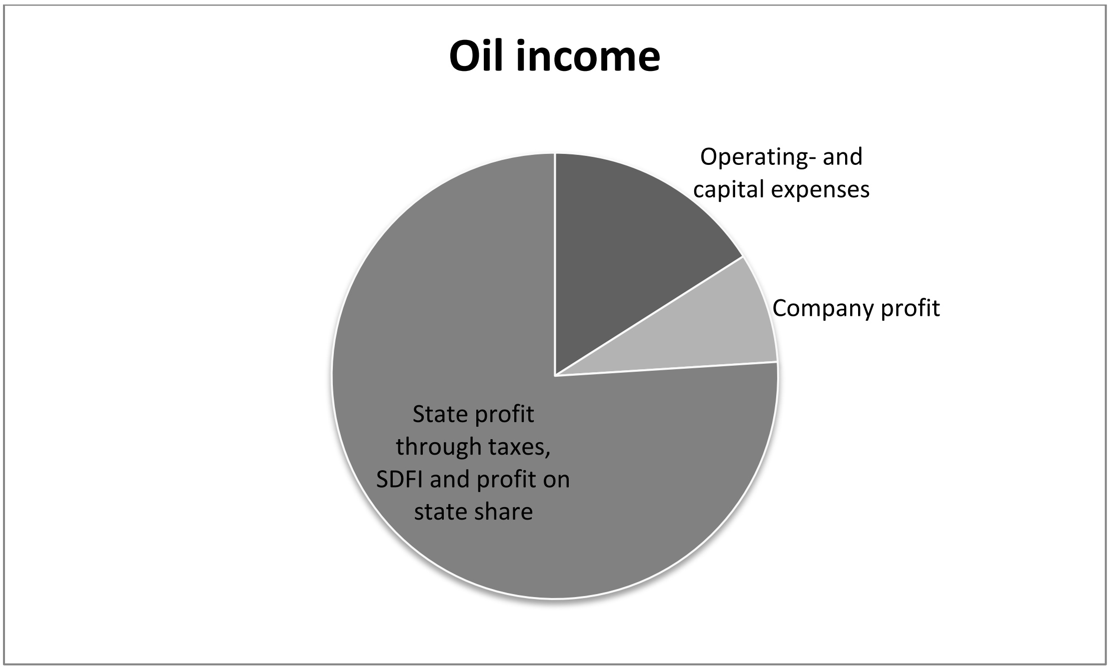

Figure 5.1: The oil income.
The money from the oil and gas activities goes primarily to the state through taxes. In the case of an oil barrel being sold for NOK 500, NOK 380 would go to the state; the people (Inspired by Alsvik, 2009).

[18] Numbers from 2008.

So far, approximately 38% of the total hydrocarbon resources on the Norwegian continental shelf have been extracted (Nordvik et al., 2009). But, it is more than ten years since the last large oil field was found (Alsvik, 2009) and with a decreasing oil production the oil companies, with Statoil in the forefront, have started looking for new prospective areas to exploit. The areas outside LoVe, also named Nordland V, Nordland VI, Nordland VII and Troms II (see Figure 5.2) are judged as the most prospective areas that have not been opened for exploration yet.

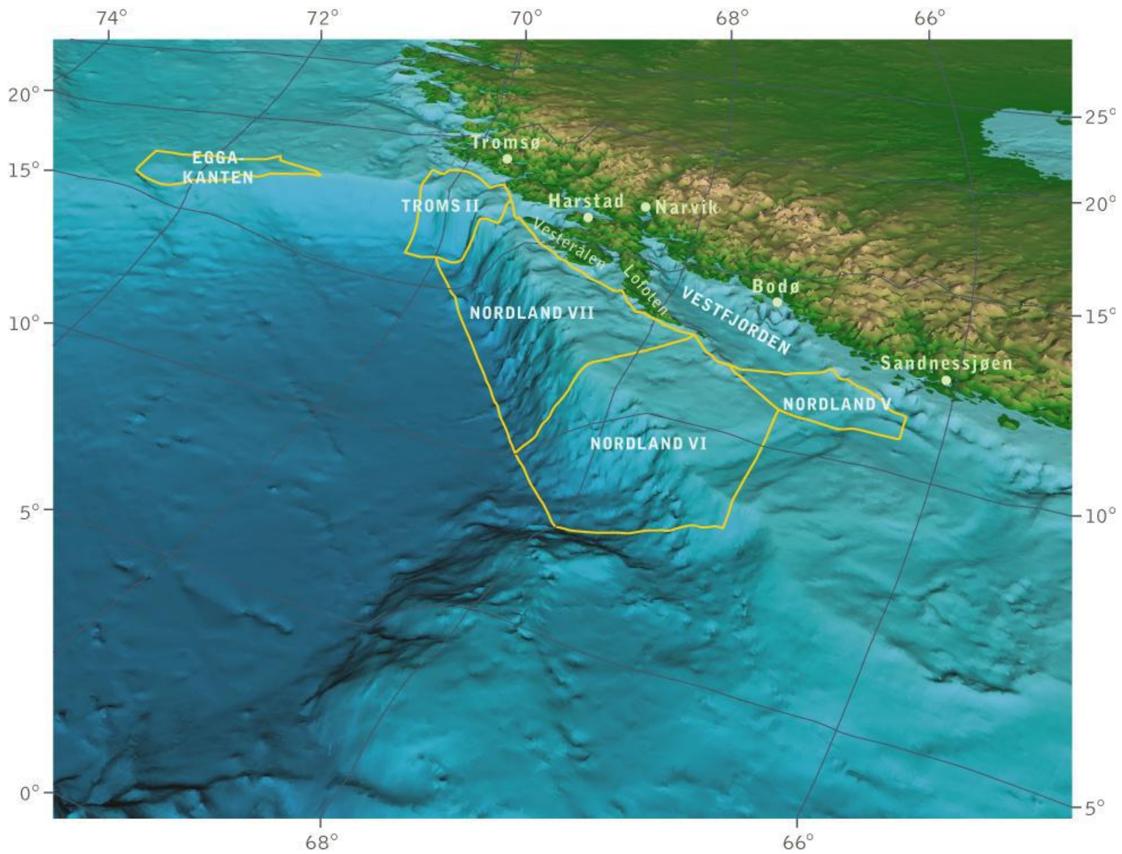

Figure 5.2: Bathymetry map of LoVe.
Bathymetry map of LoVe with the oil industries name of the area; Nordland V, VI and VII and Troms II (Oljedirektoratet, 2010:8). It is estimated that Nordland VI will have the largest resources.

In order to understand the current events the Norwegian oil history is needed to be portrayed briefly.

5.1 Norwegian oil history

In 1958 the Geological Surveys of Norway expressed that there were no indications that it would be possible to find oil, gas or coal on the Norwegian continental shelf. This changed in 1959 when a gas field was discovered outside Groeningen, Holland. The discovery led to the conclusion that also the Norwegian continental shelf could hold petroleum resources.

In 1965 the Norwegian Sea borders were settled according to a center line principle between Norway, Denmark and Great Britain. But this agreement was only valid up to Stadt[19]. After this divide, the first round of licenses to test drill in the North Sea was granted, and a year later the first test drilling begun. Nevertheless, after more than thirty test drillings with no commercial findings the outlook for oil and gas was no longer as positive. Phillips Petroleum's manager in Norway had a clear message; no more wells should be drilled (Yergin, 2008). The change occurred when the large oil field Ekofisk in the North Sea was found by Phillips Petroleum in 1969, which Phillips later said was only due to good fortune (Yergin, 2008). Ekofisk started production in June 1971, and is still producing. The field was expected to have an oil production of 212 000 barrels[20] a day, and a gas production of 2,5 billion Sm^3 [21] in 2009 (Nordvik et al., 2009).

There was an increased interest in the shelf after Ekofisk was discovered, and it soon became apparent what oil could signify for the country. Already in 1970 the county committee of the three northernmost counties, Nordland, Troms and Finnmark, wrote to the government to encourage them to open up the shelf outside their counties for oil and gas search (KonKraft, 2009). This did not happen, but it was a core element for the government that the entire country should receive the benefits from the oil and gas activities. It was clear from the beginning that the government should play a central role in shaping and building a Norwegian oil industry, and as a result Statoil was founded by the parliament in 1972 to attend to the states interests (Stamnes, 2009).

The foundation of Statoil was a result from one of the 'ten commandments' for the development of the petroleum industry in Norway that was created in 1971. The

[19] The border between the North Sea and the Norwegian Sea is approximately at Stadt, which is located close to the 62° latitude.
[20] 1 barrell=159 liters
[21] 1 Sm^3 gas=35,135 SCF (standard cubic foot). 1 SCF=1m^3

commandments also stated that "the development of a petroleum industry has to be done under necessary consideration of existing business activity and nature and environmental protection" (Nebben, 2009:16). In other words it was important that existing activities at sea, e.g. fishing, should be taken into consideration and not be hampered by the oil and gas activity. One of the commandments also mentioned oil and gas activities north of 62.latitude; the oil and gas activities should take place as to satisfy the particular sociopolitical relations in northern Norway (Nebben, 2009). Although the participation in the fisheries was declining post-war, the fisheries were still an important livelihood in the area.

In 1977 Norway developed a 200 nm EEZ; north of the 62.latitude. This made it possible to start oil and gas activities in the northern waters; in the Norwegian Sea and the Barents Sea. However, this was also the time when the environmental movement was taken into consideration and international oil spills increased the awareness of the harmful aspects of the oil. Consequently many opened their eyes for the negative sides following oil, not only the positive ones. The debate soon became a question of oil or fish, not both, and the fishers were skeptical to the new industry moving northwards. But, according to Stamnes (2009) there were a number of political provisions in the Norwegian petroleum politics "that made it very unlikely that the areas north of Stadt would not be open. In reality it soon became a question *when* those areas would open up" (Stamnes, 2009:32, original emphasis). In 1977 the majority of the Parliament agreed to start oil and gas activities north of Stadt, but the largest oil spill in the Norwegian history to date[22] was to delay this opening.

On the 22 April 1977 an uncontrolled blowout occurred during maintenance work on the Bravo platform at Ekofisk. The blowout continued for 8 days, as there was no Norwegian equipment or expertise available that could stop the blowout. Subsequently the Red Adair company was flown in from USA to stop the blowout. 12 700 m^3 [25] of oil was released into the sea. Fortunately the spill did not hit shore and consequently the effects of the spill were less than anticipated; only minor effects on marine life was found (SFT, 1993, Egedahl, 2006). There were several oil spills during the seventies which brought the effects of the oil on the environment on the agenda. In Norway a minor spill from a vessel in Varangerfjorden,

[22] March 2010.

Finnmark resulted in 10 000-20 000 dead seabirds[23]. The spill showed "that even a marginal spill could create large damages, as long as it happened during the worst possible time" (Stamnes, 2009:37).

In 1980 the Parliament opened for test drilling north of Stadt and three licenses were given, all of them to Norwegian companies. The relationship with the neighbor in the east, the Soviet Union, was also part of the delay, and a reason why only Norwegian companies was given permissions. A year later gas was found on the Snøhvit[24] field on Tromsøflaket north of Hammerfest. However, the controversies continued, especially with regards to the fisheries, resulting in closing of the northern areas. Despite many controversies Snøhvit was opened in 2002 by the Parliament after conducting an Environmental Impact Assessment (EIA) of the area. The controversies were partly due because the field was located in an area thought to be more environmentally sensitive, than the areas previously opened (Nebben, 2009). Areas close to Snøhvit had a high fishing pressure and a spawning area. The relationship with the fisheries was important and the oil industry soon found out that co-existence was crucial in order to gain support for increased oil and gas activity (Stamnes, 2009).

5.2 Expected oil and gas resources in LoVe

Today the Skagerrak area, coastal areas of Nordland, Nordland VI and VII, Troms II and the Barents Sea north are closed for oil and gas exploration (Olje- og energidepartementet, 2007). But, Norwegian oil politics have, as shown in the previous chapter, historically been relying on new areas to be open and explored to keep the extraction rate high. The Norwegian oil production is decreasing and with no large findings in the last ten years (Alsvik, 2009), new areas are needed to keep the production rate. The areas outside LoVe is considered to be the most prospective areas and the Norwegian OD estimated this area to contain approximately 20% of the undiscovered resources in the Norwegian Sea (KonKraft, 2009). This is approximately 1,5 billion barrel oil equivalents[25], although Statoil has estimated this to be 2 billion (KonKraft, 2009). KonKraft[5] on the other hand, estimates the resources to be 3,5

[23] The oil spill occurred during the fishery for capelin in 1979 and the spill was so small that although vessels and airplanes looked for it they could not find it.
[24] Snøhvit= Snow White
[25] Oil equivalent (o.e) is a measure to make oil, gas and LNG on the same measurement (SSB, 2010). 1 Sm^3 oil=6,29 barrels oil=1,0 Sm^3 o.e. 1 Sm^3 NGL = 1,0 Sm^3 o.e. 1 000 Sm^3 gas = 1,0 Sm^3 o.e

billion barrels (KonKraft, 2009). The most recent estimate from the OD (2010), based on the seismic activity that has been undertaken from 2007-2009, expects there to be 202 million Sm^3 o.e. in the area. This is 1 270 million barrels[20] o.e. to a current net value of NOK 600 billion and a gross sale value of approximately NOK 1 800 billion (Oljedirektoratet, 2010). With an expected 43% of the total resources Nordland VI has the largest expectations, while Nordland VII has 21% and Troms II has 20% and Nordland V has 4%.

However, all of the estimates are highly uncertain and cannot be verified before test drilling has been performed.

5.3 The debate – actors and arguments

Because of the areas important resource a debate have emerged where the participants can be divided into three groups; the oil industry, the fishers and their industry and the environmentalists[26]. In the following I will give a brief description of each of the groups' arguments.

5.3.1 The oil and gas industry

The oil industry is obviously in favor opening up the areas outside LoVe for oil and gas activity. They argue that the Norwegian oil production is decreasing and in order to keep the high state revenues and the welfare system new areas need to be opened up. The oil industry sees Norwegian petroleum resources as a part of the solution to the problem of global warming. They argue that the alternative to oil and gas is more polluted coal and even though there have been large investments in renewable energy the world will still need fossil fuels for decades to come (KonKraft, 2009). In addition, they state that the access to energy is necessary to prevent poverty, and the demand for energy is expected to rise and they believe that oil and gas can help fulfill this demand (KonKraft, 2009). The oil industry also believes that forty years of petroleum activities in the North Sea with very few spills, and none of them with significant harmful effects, is an advocate for opening up new areas. Alsvik (2009)

[26] For a more comprehensive look of the debate, actors, stakeholders and arguments, see Johansen, 2008. Johansen has more groups and my divide is done due to the regards of this thesis.

argues that without new findings on the shelf, in 10-15 years a large portion of the state income will disappear. Norway has become extremely reliable on the oil and the production sky rocketed early on; the complete opposite of what the intentions was in the beginning. A report from the Parliament in 1974 stated that the Norwegian economy and society should not become "addicted to oil" (Ryggvik, 2009:146).

Some also argue that oil and gas activities in the area can help the current depopulation trend in the area and that there will be extended effects such as increased public income, employment and profitability for new developments in the area (Johansen, 2008). But, even within the oil and gas industry there are some that disagree that the areas outside LoVe should be opened for activity; Det Norske Oljeselskap ASA. They argue that LoVe is an area "with great symbolic value and (…) it would only take a small and insignificant oil spill to ruin the image of the oil and gas industry" (Johansen, 2008:63). They believe that it is better to have an extended opening of the Barents Sea instead of opening up the controversial areas, which they regard the areas outside LoVe to be.

5.3.2 The environmentalists

On the complete opposite side of the oil industry are the environmentalists; WWF, Bellona Nature and Youth etc. They argue that Norway has to limit their dependency on oil and rather concentrate on carbon friendly renewable energy. In common with their opponents, the oil industry, they have a global perspective on oil and gas activities in LoVe. They argue that in order for Norway to limit its emissions it is not possible to extract more oil and gas on the continental shelf. The environmentalists argue that the 40 years of oil and gas production in the North Sea has not gone without consequences. Elisabeth Sæther from the environmental organization Bellona writes that "in the North Sea the oil industry has had the right to pollute for 40 years" (Sæther, 2009). They argue that although there have only been two major spills, Bravo in 1977 and Statfjord A in 2007, the oil industry has still polluted the sea areas. They argue that produced water with dangerous chemicals and dispersed oil, cuttings and cement has been discharged and has had effects on several fish stocks. They also believe that the extended effects of a development will be less than what the oil industry argues (Johansen, 2008).

With oil industry in the area there will be possibilities of oil spills. Some argue that because of the natural conditions in the area; strong tidal currents, pebble beaches, darkness and frost the current oil prevention will not be effective. With a vulnerable habitat and the proximity to shore the oil industry will threaten the biological life in the area. Finally, they believe that LoVe has large possibilities to develop renewable energy instead of the polluting oil and gas.

5.3.3 The fishers

Unlike the oil industry and the environmentalists, the fishers and their organizations have not been that prominent in the debate. They are in the middle of the two and have a more local, regional and national focus than their counterparts more global focus. They agree with the environmentalists that the area is vulnerable and that the important fishing areas should be closed for petroleum activities, this includes the areas outside LoVe; Nordland VI and VII and Troms II. They believe that in the case of an oil spill the consequences will be large for their industry. An oil spill at the worst possible time, e.g. in the spawning period for cod or herring, can result in lower catches, and worst case; closing of the area for fishing. The fishing industry exports their products and consequently relies on a good environmental profile to sell it abroad. The oil and gas industry can distort the picture of the environmentally friendly, pristine Norwegian fish. An oil and gas development in the area will demand appropriate locations for the development; areas that today are used by the fishing industry. They argue that during the most important seasonal fisheries, particularly the fishery for cod, the areas outside LoVe is fully utilized, which Høyvik (2009) explain is the 'western movie principle'; The town is not big enough for the both of us. In other words the areas outside LoVe are not big enough for both oil exploration and fisheries. The fishers argue that there are no areas to compensate for the possible loss in fishing time and place if a possible development is realized.

The seismic activities that the OD has executed outside LoVe the last summers have not decreased the fishers' reluctance towards the oil and gas industry. Johansen (2008) argues that it is the seismic activity rather than spills the fishers' are most concerned about. The fishers claimed that the fish disappeared after the seismic activity and a fisher, Mikal Steffensen from Vesterålen, claimed that it took three months before the fish returned (Vinding, 2009).

Another fisher, Rolf Arne Jacobsen, claimed that "dead fish float on the surface after the surveying ship have done their research" (Fouchè, 2009).

5.4 Vulnerability

Vulnerability is defined by the management plan as "a species or a habitats ability to maintain its natural state in relation to exterior, often human induced effects" (MD, 2006:28). The management plan lists the following as important criteria to assess how vulnerable an area is;

- That the area has a large production and a concentration of species
- That the area has a large occurrence of vulnerable or threatened habitats
- That the area is a key area for Norwegian responsible species, threatened or vulnerable species
- That the area has important national or international stocks of specie(s) all year round or during part of the year (MD, 2006).

5.4.1 What makes Lofoten and Vesterålen vulnerable?

The Institute of Marine Research and the Norwegian Polar Institute has concluded that Lofoten, Vesterålen and Røstbanken is a vulnerable area (HI and NP, 2003). This is the conclusion because the area fulfills almost all the vulnerability criteria on the list above. The area has a large production of species and a large concentration of species, which includes fish, sea mammals and sea birds. The second criterion is also filled because of several threatened species, both fish and birds. Both species of redfish; Deep-Sea Redfish and the Golden Redfish are listed as vulnerable[27], the puffin is listed as vulnerable, while the common guillemot is listed as critically endangered (Kolås et al., 2006). The area is also home to marine life of "significant international importance" (Forsgren et al., 2009:8), which is the final criteria on the list. The area is a key area for Norway's most important renewable resources and it is in this area human induced effects will have the largest effects on the ecosystem (HI and NP, 2003). As a conclusion the IMR/NP writes:

[27] Listed according to the International Union for Conservation of Nature (IUCN) criteria's in the Norwegian Red List.

> "The area Lofoten - Røstbanken -Vesterålen is important not only in relation to biological diversity, but also because it is the location for many different life cycle stages, such as spawning, growth of juveniles, and winter habitat for commercially important fish species, as well as sea mammals and seabirds. The area's high biodiversity is due to benthic flora and fauna of great value, in addition to fish, sea mammals and seabirds. Since the area is essential for spawning, growth periods, and as a winter habitat, significant proportions of the total stocks for the different species are concentrated in the area during the different parts of the year. Consequently, during the entire year the area is of great value for different components of the ecosystem, and possible negative effects, regardless the time of the year, can cause severe impacts, possibly throughout a longer time-span" (HI and NP, 2003:55).

A new report from the NINA concludes that an oil spill in the Lofoten-Barents Sea area is likely to have larger consequences than further south in the Norwegian and North Sea (Forsgren et al., 2009). According to the report the food web interactions in the Barents Sea are top-down controlled, and studies suggest that these kind of systems are vulnerable to trophic cascades, which can represent a form of biological instability and result in irreversible effects (Forsgren et al., 2009). They agree with the conclusion of the IMR and NPI and highlight the concentration of species, the high production, the threatened species and the important habitats in the area.

It should also be pointed out that both Forsgren et.al. (2009) and the IMR and NP (2003) concludes that there are knowledge gaps in the information of the biological interactions in the area and a limited knowledge of the effects of oil on arctic ecosystems. They argue that the knowledge gaps need to be filled and that it is necessary to follow a precautionary approach to oil in LoVe.

As mentioned previously LoVe is a major fishing area where the fishing for the two most important species takes place at different times of the year. The fishery for cod is especially important for the small scale fleet as the fish is easy to catch because of the proximity to shore. This has resulted in a high abundance of small scale fishing vessels (see Figure 5.3). Nordland has the highest number of small scale vessels in the country, with 781 vessels up to 10 meters in length, 414 between 10 and 10,99 meter and 243 vessels from 11 to 14,99 meters

(Fiskeridirektoratet, 2010). The targeting fish stocks in LoVe are in a good condition, but a similar ecosystem have experienced collapses of what was the most important cod stock in the world.

Figure 5.3: Small scale vessels.
Small scale vessels in the port of Røst. The vessels are targeting the Skrei in the Lofoten fishery of 2010 (Lyngmoe and NRK, 2010).

5.4.2 Example; North West Atlantic Ecosystem

The fisheries induced changes in the North West Atlantic ecosystem, outside the coast of Canada and USA, are shown as an example of a vulnerable marine ecosystem. For the last forty years there have been dramatic changes in this ecosystem; the large fisheries resources are now nearly gone. The ecosystem has a similar trophic web as the Barents Sea; a simple web with few, but high abundant species. The cod was an important species and with the technological change during the 1930's the efficiency in the fishing fleet increased and the stocks rapidly diminished. Because so many large fish had been removed the fish lost its importance in the predator-prey interaction in the system. Non-commercial species increased in abundance because of lack of predators, which was followed by an increase in the invertebrates, especially the urchin, which was the main cause of the decrease in the kelp forests. This changed again when the urchins were exploited in a commercial fishery and the crabs took over. There are no signs of the cod coming back or of a change in the current system.

> "This example shows how effects in one part of the ecosystem (overfishing of large fish) result in changes in other components (increase in the urchin stock results in decreased kelp forests). Combined with excessive influence from the fisheries (overfishing of the urchins) this has resulted in an ecosystem with a completely different composition, structure and characteristics than the original" (Sunnanå et al., 2009:15).

The example above shows how an ecosystem can change over time, and in the system they do not have the full picture of the changes and it is still an unanswered question why the stock of large fish is not increasing (Sunnanå et al., 2009). Since the LoVe ecosystem is similar to the one I have described above, one can conclude that because we do not know exactly how the interactions work we cannot predict what will happen in the future. The ecosystem based management plan for the Barents Sea and the sea areas outside Lofoten was made because of the acknowledgement of the effects and interactions within a system (see chapter 4.2.3). When adding a new variable; in the case of LoVe this will be oil; the uncertainty of our knowledge is further increased. In regards to oil it is necessary to look at it in a long-term perspective (Olsen, 2010b); if oil is extracted there will be activity for decades.

There are also examples of collapses of stocks in the Barents Sea as well. The capelin, *Mallotus villosus*, is important as feed for many of the species in LoVe; cod, herring, whales and sea birds. The capelin stock has collapsed three times the last 20 years, and the reason is thought to be strong year classes of herring (Gjøsæther et al., 2009, Sunnanå et al., 2009). The capelin collapse in 1986 resulted in slower growth and delayed sexual maturity for the cod because of no alternative feed (Sunnanå et al., 2009). The collapse also affected the harp seal (*Phoca groenlandica*), minke whale and the common guillemot.

The herring has also experience collapses (see Figure 4.5). During the late 1960's the herring collapsed because of overfishing and a poor recruitment due to years with cold water, and a moratorium was set in effect until the beginning of the 1980's. The moratorium on the herring increased the stock, and a further increase came in 1983 because of warm water and a good recruitment. This resulted in the collapse of the capelin in 1986, as mentioned above. The herring collapse also had "catastrophic effects" (Stamnes, 2009:24) on the puffin population at Røst. Stamnes (2009) argues that the herring collapse and its consequences resulted in an approach to manage multiple species, a predecessor to the ecosystem approach to management. It is not possible to affect the natural processes and fluctuations, but the knowledge of them can make the effects smaller (Sunnanå et al., 2009).

5.4.3 Oil spills; course of events, properties, effects, likelihood

When oil is spilled into marine environments it undergoes a number of processes, physical and chemical, that either keeps the oil on the sea surface or make it disappear. Eventually all oil will be removed, but how long it will stay depends on a number of factors;

- The amount of oil spilled
- The oils physical and chemical characteristics
- Climate
- Weather and sea conditions.

The density, volatility, viscosity, pour point[28] are characteristics that explain the properties of the oil. The chemical process that spilled oil undergoes is known as weathering. The process begins by oil being spread immediately after the spill, then some of the oil will evaporate and waves and turbulence will disperse the oil, this continues with the dissolution of the oil (ITOPF, 2002). The oil can continue the process and take up water and can create water-in-oil emulsions, known as emulsification[29], and this process will reduce the rate of the other weathering processes (ITOPF, 2002). The process ends when micro-organisms start the biodegradation process. The more liquid an oil is, the easier it will spread, and as the oil becomes spread the cleanup will be more difficult, as oil recovery systems only have a short width of only a few meters (ITOPF, 2002).

Oil spills can effect fisheries directly by killing or tainting fish or directly affect gears or fishing operations, or indirectly through ecosystem disturbance, (IPIECA, 1997). The effects from different spills are very different, and in some cases the spill can have large

[28] The temperature below at which the oil will no longer flow. Under this pour point, the oil will change from a liquid to semi-solid.
[29] This has happened in the Gulf of Mexico BP oil spill.

consequences, e.g. Amoco Cadiz outside of France in 1978 where 221 000[30] tons of crude oil was spilled[31], and Braer, Shetland in 1993 when 84 700[32] tons oil were spilled[33] (IPIECA, 1997). Some spills can have few consequences, like the Bravo spill mentioned previously.

Many simulations of possible oil spills have been carried out outside LoVe, and it is a very difficult task to simulate oil spills. In the event of an oil spill the drift and persistence of the oil depends on the properties of the oil, of the place the oil is released, size of the spill, weather and sea conditions. In other words, most of the simulations will end up with different conclusions. For example, Bergsli et al.(2009) uses a probability estimate of a blow out when test drilling to be 1,54 blow outs per 10 000 test drillings, and in the case of a blow out; 45 out of 92 simulations the oil will hit shore (Bergsli et al., 2009:20). Another study concludes that depending on development level[34] blow outs of 10 000 to 50 000 tons can statistically happen between either every 1200th year, 1700th year or 4600th year (Johansen et al., 2003). An important aspect that should not be forgotten is that even though a spill is estimated to occur once every e.g. 300th year, it is just as likely that the spill can happen tomorrow as in 300 years (Johansen et al., 2003).

5.4.4 Example; Exxon Valdez

Most of what the researchers know about oil spills in high latitude marine ecosystems comes from studies following the Exxon Valdez spill (Forsgren et al., 2009).

On the 24 March 1989 the oil carrier T/V "Exxon Valdez" ran aground on Bligh Reef in Prince William Sound in Alaska. 36 000 tons[35] of oil was released into "a topographically, varied, biologically rich, and poorly known, high latitude marine ecosystem" (Paine et al., 1996:198). Eight weeks after the spill the oil had reached 750 km from the original spill site

[30] 221 000 tons= 1 619 930 barrels (www.tu.no).
[31] The effects of Amoco Cadiz was direct killing of fish and disturbance of reproduction and growth in bottom living fish, and some tainting in fin-fish.
[32] 84 700 tons= 620 851 barrels (www.tu.no).
[33] No major mortality was seen, but the fisheries were affected by tainting and contamination of equipment. See IPIECA, 1997 for more information.
[34] The larger the development the more often a blow out is possible to occur. The first estimate is for development level 3, the next for development level 2 and the last for development level 1. See Johansen et.al 2003.
[35] 36 000 tons of oil=263 880 barrels (www.tu.no).

and had contact with 1 750 km of shoreline on its way (Wolfe et al., 1994). Today, over 20 years after the spill, the scientists are still debating the effects. The area has been intensively studied since the spill, "but the more the scientists have learned, the less they realize they understand how different species have been affected" (Struck, 2009). Some species are listed as recovered, and some have not[36]. The pink salmon, which supported an important Alaskan fishery, was listed as recovered in 1999 (EVOSTC). But due to the large natural variations the effect of the spill has been difficult to estimate. After the spill the catches of pink salmon have been within the range from 1,3 million fish three years after the spill to 11,6 million fish in 2007, while before the spill a catch of 23,5 million fish was reached in 1984 to only 2,1 million fish in 1988.

Another important fishery in the area was the one targeting pacific herring (*Clupea pallasi*), a species listed as not recovered (EVOSTC, 2009). The spill hit at the time of the spawning for the herring in the area (Peterson, 2000) and this fishery provided for up to fifty percent of the income of Cordova[37] fishermen (Struck, 2009). The herring experienced the lowest recruitment ever recorded in 1989, but the crash was not detected before 1993. But, the low recruitment is not sole responsible for the herring fishery being unrecovered. The herring populations in the area have been fluctuating. But Thorne and Thomas (2008) argue that the herrings' direct contact with the oil, and the resulting premature hatching, low larval weights, reduced growth and elevated abnormalities was caused by the oil spill, consequently the spill is partly responsible for the crash in 1993 and the still unrecovered stock. The commercial fishery for herring has been closed for the better part of the time since the spill, and the stock is still too low for the fishery to be opened (EVOSTC, 2009).

It was not only fish that was impacted by the spill. More than 1000 sea otters were killed, an estimated number[38] of 250 000 seabirds deaths, including carcasses of 21 000 murres[39] (EVOSTC, 2009, Peterson et al., 2003)[40]. Shortly after the spill several killer whales disappeared from the Prince William Sound (Peterson, 2000, EVOSTC, 2009). It was

[36] See the Exxon Valdez Oil Spill Trustee Council webpage, http://www.evostc.state.ak.us/recovery/status.cfm, of a comprehensive list of the species state of recovery.
[37] Cordova is a small city located on the east side of Prince William Sound, Alaska.
[38] It is estimated because population decline was evident, but many carcasses were not found. This may be because the birds sink in the water when they die.
[39] Murres, genus *Uria*, is the American name for the common guillemot.
[40] See also Paine et al. 1996.

believed that their lungs was seared by the toxic fumes from the oil, and they died (Struck, 2009, EVOSTC, 2009). The carcasses were not found, probably because killer whale carcasses are known to sink, and autopsy was not possible in order to confirm their suspicion. The missing whales have never been seen or photographed[41] since the spill (EVOSTC, 2009). However, some argue that the disappearance due to oil is "speculative" (Paine et al., 1996:217). According to Paine et al. (1996) a study found that the likelihood of losing more than six members of a killer whale pod if the pod contained 29 members was only 2,3%. The Prince William Sound was home to two different pods at the time of the spill; AB pod and AT1. The AT1 is a transient pod and feeds on marine mammals. This pod lost several members and there are no signs of recovery of the pod, due to no successful recruitment to the pod since the spill, and it is a possibility that the pod will become extinct (EVOSTC, 2009). The AB pod has a slow growth and their recovery will probably take at least another decade (EVOSTC, 2009).

The Exxon Valdez oil spill is the only large spill in a high latitude ecosystem. Since the spill several studies have been carried out, and there are still studies being conducted, many of them by the Exxon Valdez Oil Spill Trustee Council (EVOSTC), which was formed to oversee the restoration process. The studies are funded by the US$ 900 million civil settlement that came after the spill in 1991 from Exxon Corporation. The Exxon Valdez oil spill is useful for LoVe today because of the parallels that can be drawn between the two places. The Prince William Sound had a thriving ecosystem with similar species, e.g. herring, killer whale, and common guillemot, and characteristics as LoVe has today. Exxon Valdez, and the studies from the spill, are used as background information for the IMR (Olsen, 2010b).

The chapter has shown that oil spills can have severe and long term effects, although Norway has escaped this. Norway has strict environmental demands regarding the oil industry which people are counting on, but there have also been proof of oil spills occurring in countries with just as strict environmental policy for the oil industry, e.g. the Montara oil spill off the coast of Australia in 2009. Recent events, both national and international, show that the fishers' have grounds to be skeptical to the oil industry.

[41] The knowledge of the killer whale individuals comes from photographing, which started in 1984.

6 Why are the fishermen so skeptical?

According to Aasjord et al. (2005) being a fisher is the most dangerous occupation in Norway. The occupation is characterized by a lot of freedom and excitement, but also insecurities and risks. They perform hard physical labor, which frequently involves the use of dangerous gears and equipment, and large parts of the time they do this in harsh and sometimes changing weather conditions (Aasjord et al., 2005). Although Norway is a developed country and the vessels are fairly new and hold the best available technology, being a fisher is still a dangerous and risky occupation. Several fishers die each year in Norwegian fisheries, within all the different fleet sizes. Between 1998 and 2003 61 people died in the Norwegian fisheries while 1 949 people were injured (Aasjord et al., 2005). 2008 was the first year in history no one died at sea in Norway (Grytås, 2009). The fishers face risks from multiple positions; social, physical, economic, technological, territorial and political. Estellie Smith (1988) argues that the risks today are not what they were before the modernization of the fleet. A new prioritizing of the risks is necessary; from the risks of consequences of bad weather and poor vessels, to risks regarding economics, politics and new technologies. Several of the risk factors that previously could be dealt with by the fishers are now transferred to other actors. Before they relied on their gut feeling to find out where to fish; today this is decided by their echo sounder or sonar. Before they used man power to get to the fishing grounds with oars, today the engine does the job. Before they could fish as much as they liked for as long as they liked, but today this is regulated by a management system with different controls and regulations; TAC's, IQs, mesh size, gear size, number of nets/hooks, by-catch regulations and so forth. Many aspects of the fishers' lives are now controlled by technology or through the management system by other people than themselves. With changing biological, environmental and economic conditions the fishers' life have the possibility of shifting rapidly.

6.1 Risks

The diverse risks that face the fishers' today are different and can be divided into social risks, economic and technological risks and territorial risks.

6.1.1 Social risks

The social risks are faced onshore. The fishers' face being estranged by their family because of long periods away from home (Estellie Smith, 1988). Even though many members of a fishers' family help with onshore work the distance between members of the family can be large (Estellie Smith, 1988). Previously, the occupation was necessarily not just work that involved only the fisher, but the whole family (Hansen, 2006). Before it was a necessity that the family helped with the fishing, and today the youth are part of the Lofoten fishery by cutting tongues off the cod.

6.1.2 Economic and technological risks

Out at sea the fishers' face multiple dangers; everything from falling objects, trapping, injuries and in the worst case; death. Previously the fishers' gutted the fish onshore; today this is done onboard the boats at sea. The unstable environment the sea presents increases the risk, and balance is therefore a key quality for a fisher. The moving base augments the risks of getting cut and injured; especially fingers and hands are vulnerable. From 1998 to 2002, 340 injuries on fingers were reported, while the hand had 153 reported injuries (Aasjord et al., 2005). Main groups of physical injury from 1998 to 2002 were:

- sprains and strains of muscles and joints; 388 reported injuries,
- cuts; 327 injuries,
- fractured limbs; 201 injuries (Aasjord et al., 2005).

Many fishers' experience problems with the back and knees; in the same time period as above there were 198 reported injuries to the back (Aasjord et al., 2005), and long term injuries are many in such a cumbersome and harsh occupation. Fishers leaving the occupation because of long term injuries and work related accidents have large consequences for the profession, and as a result the fishers stretch their own limits in order to stay at sea, which again makes life as a fisher a short one because they wear out more easily (Aasjord et al., 2005).

According to Aasjord et al. (2005) there is a significant portion of under-reporting small injuries; cuts, bruises, sprains etc., at sea because they are regarded "as part of the profession". It is also thought that wear and tear injuries are under-reported because the fisher is under the impression that "it will pass" (Aasjord et al., 2005). The fact that there are such significant amounts of under-reporting of injuries proves that being a fisher is an even more dangerous occupation than already suggested.

The economic and technological risks are multiple, and they often go hand in hand. The changing conditions for the fisher make it difficult to know when to invest in new gear, equipment and vessels. As a New England fisherman articulates:

> "… and whether I should repair what I got or go into hock to buy new. And If I do buy new, what kind? Should I get what everyone else has so I can learn how to use it from them or get help from them when something goes wrong – or should I get something better to get an edge on the others? I do the second, I'm liable to outsmart myself and get something too complicated for me or anybody around to understand" (Estellie Smith, 1988:33).

Since the fish is not a static resource the quotas change between different years and consequently the income fluctuates. The prices are not static either and depend on the market situation for the fish. In Norway the sales organizations have helped the fishers to more stabilized prices, but these can fluctuate even though; as experienced during the financial crisis. The risk the fishers experience in the day to day life have resulted in high insurance premiums and expensive loans (Hansen, 2006, Aasjord et al., 2005). The fishers also experience that new regulations require new and better equipment, hence also new expenses. Alf, a 37 year old fisher, stated that:

> "It seems like someone always comes up with new things the fishing fleet need to have, and they say it doesn't cost much, only NOK 2-3 000 each boat a year. All these small expenses result in high expenses in the end" (Hansen, 2006:39).

Another fisher agreed;

> "There are new regulations and orders we have to familiarize with all the time. The old one is not good enough, so it has to be revived, and that usually costs a lot. It seems like they find new gizmos that you just need to have" (Hansen, 2006:39).

The small scale coastal fleet has the last years been through a process of replacement of many of the old vessels. The building of the new vessels have resulted in poor quality at sea and stability issues and numerous times the outcome have been a dangerous work environment (Hanssen et al., 2006). This has taken place because the vessels have adapted to the management system that regulates the access to the fishery; the so called paragraph ships (Hanssen et al., 2006). Under a certain length the vessels do not need to go through inspections from the Norwegian Maritime Directorate, which the vessel owner, and in many cases this is also the fisher, has to pay. To keep the costs at a minimum the vessels have increased their width instead of length. The instability issues and the poor qualities at sea results in unfavorable movements in the vessel which again can result in sea sickness, loss of balance and wear injuries in the joints for the fisher (Hanssen et al., 2006). These consequences can result in more injuries and deaths at sea for the fishers'.

The technology that has been taken in use by the fishers during the modernization has increased the safety on board and has also made the life as fisher easier. According to Aasjord et al. (2006) many small scale vessels who have ran aground are caused by the fisher working with the fish on deck, while the vessels are on autopilot towards shore. In addition, the Norwegian Maritime Directorate believes that the navigator chairs on small scale coastal vessels have become too comfortable. Due to this, they argued that there is an increased risk of the fishers' falling asleep. An insurance company confirmed this; they had registered more than thirty vessels that had ran aground, and almost all of them was due to the fisher falling asleep in the navigator chair (Aasjord et al., 2006).

Adapting new technology has increased the possibility of being out at sea in bad weather conditions. The GPS and chart plotter have made it possible for fishers to go out and fish without needing to see where they are going; a fisher said that "in theory you can paint the windows black and you will still get back and forth and do what you need to do" (Hansen, 2006:58).

6.1.3 Territorial risks

The fishing grounds have received several competitors for the space they use. The continental shelf areas are multiple use zones (Estellie Smith, 1988), and the fishers face competition from a number of sources; commercial shipping, recreational fishing and boating and other form of industries. In LoVe the competition is further increased due to the narrow continental shelf (see Figure 5.2). In Norway aquaculture has been a major competitor for sea areas and as the oil and gas industry are moving closer ashore, as a new competitor in the case of LoVe, for the space the fishers are utilizing.

It is not only risks that come with the occupation as a fisher. There are a lot to gain as well. In comparison to jobs ashore the wages are high for a few months job at sea. The occupation is also perceived as "free"; "no one checks up if you're smoking inside or take a beer during working hours" (Hansen, 2006:59). Many also perceive it to be exciting and some argue that this is because it is not an A4 life; when they go out to sea they do not know what to expect; the unexpected makes the fishers' lives more challenging (Hansen, 2006).

6.2 Living with risk; how to cope?

As illustrated above, being a fisher is a very risky occupation. The fishers on small scale vessels; up to 12,9 m length, has a risk of death between 2-2,5 each year per 1000 man labor years (Aasjord et al., 2005) (see Figure 6.1). The deep-sea fishing fleet does not have the same risk of deaths at sea as the small scale fleet, but have a risk of 26 injuries per 1000 man labor years (Aasjord et al., 2005). There is a larger risk of injuries in the deep-sea fleet than in the small scale fleet, while the small scale fleet has a higher death risk than the deep-sea fleet.

Figure 6.1: Risk of injuries and death.
Fishers' injuries, deaths and risk for deaths and injuries in the different fleet sizes (1998-2003) (Inspired by Aasjord et al., 2005).

Vessel group (length of vessels)	Man labor years 1998	Deaths/injuries	Risk/1000 man labor years (deaths/injuries)
Small scale (up to 12,9 m)	1841	33/138	2-2,5/12,49
Coastal (13-27,9m)	4428	17/510	0,64/19,20
Deep-sea (over 28 m)	8046	11/1240	0,23/25,69

6.2.1 Ignorance and denial

The fishers do not seem to acknowledge the high risk of their profession. According to a survey[42] done by the Norwegian Maritime Directorate the small scale fleet; between 6 and 10,6 meters, had grave faults and defects on up to 67% of the vessels (Aasjord et al., 2006). The survey revealed that 45% of the vessels lacked life rafts, 30% did not have an approved life buoy and 33% did not have survival suit controlled by approved company (Aasjord et al., 2006).

The high risk life of the fisher has been regarded by HES related measurements in several papers[43]. However, the fishers seem to ignore the HES measurements implementations in the fleet despite the risk they surround themselves with daily (Aasjord et al., 2005). But, as mentioned in the theory chapter, risk sometimes has to be ignored in order to cope with life. This can be if the benefits of a certain activity are seen as significantly larger than the possible consequences of that activity. Driving a car has been used as an example of this; the benefits of the car; getting around easily at the time the driver prefers, are perceived as such a large benefit that one ignores, denies or forgets, the possible outcomes of driving; accidents and the subsequent consequences; injury, or in the worst case, death. For instance, in 2009 214 people died in traffic accidents in Norway, and this is the lowest number of deaths since 1955 (Trygg Trafikk, 2010). But since deaths from car accidents are small and frequent, society do not react as strongly as if it was a large and infrequent loss (Slovic et al., 2000a).

Aasjord et al. (2005) draw the connection between the driver and the fisher; both actors close their eyes to the risk they are exposed to, and this is essential to do in order for them to continue the activity as driver/fisher (Aasjord et al., 2005). A fisher cannot contemplate the dangers that surround him all the time at work, if so; he would not be able to work. If the thought of drowning is considered to be one out of various possible outcomes of one day at work it would not be possible for the fisher to go to work. In order for them to continue being a fisher they need to ignore many of the risks they face each day. The New England fisher, as mentioned previously, has elaborated on this:

[42] Question survey done in 2005. The survey was sent to 5 316 fishers' on fishing vessels ranging from 6-10,67 m. 2 214 fishers' responded.
[43] See Aasjord et al, 2005, Aasjord et al. 2006, Hansen et al. 2006.

> "You can really worry or fret about things like bad weather, getting caught in a steel cable or things like that – personal risks. But it don't do no good to worry about what you can't do anything about. Nobody plans for that and if it does happen it's either bad luck or something stupid you deserve to get wrapped for" (Estellie Smith, 1988:33).

Aasjord et al. (2005) argues that the fishers try to tone down the risks they are constantly faced with in order to carry out their duties, and can be explained as part of a strategy for mastering the occupation. Poggie (1980) found that fishers he interviewed ignored or denied the dangers of their occupation. He argued that they repress their awareness of the dangers of their occupation. This is in accordance with Douglas and Wildavsky's (1983) and Johnson and Covello's (1987), theory; it is necessary to ignore some risk in order to continue with certain activities. Aasjord et al. (2005) elaborates this by arguing that HES related measurements can in fact come in conflict with the basic cultural ideas the fishers' are surrounded by; the freedom, the individuality and their masculinity. With only a total of 572 female fishers' in Norway (Fiskeridirektoratet, 2009) it is safe to say that being a fisher is a masculine occupation. Douglas and Wildavsky highlights the cultural idea and argues that the risks chosen by groups to be important are reflected by their "beliefs about values, social institutions, nature and moral behavior" (Johnson and Covello, 1987:viii). The fishers' social construction of risk can be explained by the culture they are a part of. Aasjord et al. (2005) mentions an example of fishers who use safety ropes are called dog[44] by their co-workers. The under reporting of injuries can also be explained by the culture amongst the fishers (Aasjord et al., 2005). The fishers, in agreement with the fisher mentioned earlier, seem to associate safety with rules, demands and regulations the government order them to have or get, and which increases their costs (Aasjord et al., 2006), and not with minimizing the risks they face.

6.3 Oil activity and fishing

Ever since the oil industry entered into the shelf there has been issues regarding its existence and especially of its co-existence with the fishers. Andresen and Underdal (1983) writes that:

> "Even though the Norwegian exclusive economic zone has an extent that allows multiple users and multiple activities, the rapidly expanding oil industry has in some

[44] In this particular case the Norwegian buhund was mentioned as the example of a dog.

manners created problems and changing operation conditions for other users. Especially has the fishery industry felt that the oil industry demands its space (…). Norwegian governments have therefore become increasingly confronted with the challenge of developing a policy for co-existence and adaptation between traditional and new users of the sea areas" (Andresen and Underdal, 1983:9).

The fishers have been fishing in LoVe for centuries and except for the "closing of the commons" in the 1990's there have been few disturbances that have altered the fishers' seclusion. The oil industry is the first to interrupt the fishers' solitude and the oil industry are also perceived as a threat to their livelihood, and consequently the oil activities are also a threat to the fisher.

The oil industry "present pollution and stock displacement hazards" (Estellie Smith, 1988:35). The two fishermen's organizations; the Coastal Fishers' Association and the Fishermen's Association, are against oil and gas developments in Nordland V, VI, VII and Troms II. They argue the same as the IMR; that the area is vulnerable. The IMR dissuades oil and gas developments in the area because of the proximity to shore, the biological resources in the area and because of the knowledge gaps regarding the consequences of oil in arctic environments. Because the area is regarded as vulnerable a possible oil spill in the area *can* have significant consequences for the livelihoods of the fishers. An oil spill during the spawning season can harm the eggs and larvae because they have no own movement and therefore cannot remove themselves from the spill. But a spill can also have long-term consequences as seen after the Exxon Valdez oil spill; e.g. there are still oil from the spill in intertidal and sub tidal sediments in the area (Hjermann et al., 2007). The vulnerability of LoVe increases uncertainty in the area and consequently also the risk for the fishing industry. The uncertainty is a recurring issue and the expression; "you are negative to something you are uncertain about, that is the safest" (Brastad et al., 2004:39) can illustrate the attitudes toward the oil industry. According to a survey[45] it was a common attitude among the respondents in Lofoten to have the opinion of they know what they have, but they do not know what they will get in the future (Brastad et al., 2004).

[45] Survey done in 2002 that interviewed 35 people in Lofoten. The persons were not representative for Lofoten, but chosen because of an attachment to the topic of oil, fisheries and tourism through positions and interests.

6.3.1 Area conflicts

At the time of the large seasonal fisheries, especially the fishery for skrei, the fishing grounds are intensively utilized and therefore the fishing grounds will be exploited at a maximum. According to Aaserød et al. (2010) in the case of an oil development with safety zones it will not be possible to compensate the loss of fishing ground somewhere else since the areas already are fully utilized, this is in particular regards to the large seasonal fishery with passive gears; the long line and gill net fishery. Figure 6.2 displays the importance of the different fishing grounds in LoVe. During the entire year the area is important as fishing grounds for different species (see Figure 6.3).

Figure 6.2: Importance of the fishing grounds in LoVe.
The importance of the different fishing grounds and the possible effects of an oil spill differentiated on a scale from 1 to 4, where 1 is not important to the fishery/oil spill will have no effect on fishing and 4 is very important for the fishing/oil spill will have large effects on the fishery (The table is inspired by the tables on page 41 and 67 in Aaserød et al., 2010).

	Importance of fishing ground/effects from oil spills	
Area:	**January – June**	**July - December**
Nordland V	4/4	2/3
Nordland VI	4/4	3/3
Nordland VII	4/4	3/3
Troms II	4/3	3/2

The areas high importance for the fishing industry became apparent when the OD was planning to shoot seismic in the area. There are fishing activities all year round and it was therefore difficult to agree on a suitable time. Figure 6.3 displays the fisheries activity during the different months in the year. The area has different fisheries all year round, although not with the same intensity.

Figure 6.3: Fishing activity in LoVe.
The fishery activity for the different months in LoVe (Aaserød et al., 2010).

Month	Fisheries targeting:
January	Cod, saithe and haddock
February	Cod, saithe and haddock
March	Cod, saithe and haddock
April	Cod, saithe and haddock
May	Cod, saithe and haddock
June	Greenland halibut, saithe and haddock
July	Greenland halibut, saithe and haddock
August	Saithe and haddock
September	Herring, saithe and haddock
October	Herring, saithe and haddock
November	Herring, saithe and haddock
December	Herring, saithe and haddock

During the three last summers the OD has been shooting seismic in the area to increase the knowledge of the possible resources in the area. Many fishers opposed the seismic and argued that the fish disappeared from the area. Due to the knowledge gaps of the effects of seismic shooting on fish the IMR on behalf of the OD initiated a study for the seismic shooting in Nordland VII (see Figure 5.2), outside Vesterålen, during the summer of 2009. The IMR together with hired fishing vessels studied the catches of greenland halibut, redfish, saithe and haddock. They started 12 days prior to the shooting, continued throughout the 38 days of shooting and carried on for 25 days after the shooting was terminated[46]. There was clear evidence that the fish reacted to the sound from the air guns, the IMR stated in the following report (Løkkeborg et al., 2010). This happened either by an increase or a decrease in the catches. The decrease in catches was explained by fish moving out of the area, especially in regards to the saithe, while the increased catches was explained by an increase in the fish's swimming activity, which can be a symptom of a stress reaction; e.g. the catches of redfish and the gill net catches of greenland halibut increased during the seismic shooting (Løkkeborg et al., 2010) (see Figure 6.4).

[46] For a complete description and comprehensive results see Løkkeborg et al., 2010.

Figure 6.4: Fish catches during seismic shooting.
Mean catch rates (number per fleet for gill net and number per tub for long line) for fish species in the period before seismic shooting, during the shooting and after the shooting (Løkkeborg et al., 2010). The seismic shooting was performed from 29 June to 6 August 2009 in Nordland VII.

	Before seismic	During seismic	After seismic
Greenland halibut (gill net/long line)	41/63	95/53	70/56
Redfish (gill net)	174	323	251
Saithe (gill net)	60	49	49
Haddock (long line)	49	37	35

The seismic activity that has been carried out so far has been prepared in order to chart the possible oil and gas resources in the area. But it is important to remember that seismic activity will also be necessary during the oil and gas activities to map the remaining resources and can though be an additional source of area conflict between the two industries. But measures to minimize the conflict can be implemented, which today include area and time constraints to the seismic shooting and the inclusion of a skilled fisher on board the seismic vessel. There have been attempts to find a minimum distance to the seismic vessel for fishing during seismic shooting but the different government agencies and stakeholders have not agreed (Norges Fiskarlag, 2009).

6.3.2 Oil spills; effects on the fisheries

The worst case scenario is an oil spill in the area. This was obviously emphasized by the interviewees (Rabben, 2010, Eilertsen, 2009, Olsen, 2010b, Wahl, 2009, Linchausen, 2009). But the Norwegian oil industry has only experienced a few oil spills and the risk of an oil spill from the oil industry is considered to be fairly low. According to the MD (2006), even though there would be oil and gas developments in LoVe the next oil spill is more likely to come from a vessel than an oil installation. The Norwegian oil spills that have had consequences have come from vessels and not the oil industry. The only large spills from the oil industry are the Bravo blow out and the rupture of the pipe at Statfjord A. There is agreement that the Bravo spill did not have consequences for the fisheries (SFT, 1993) and the IMR could not detect any significant effects of the Statfjord spill in 2007 (Grøsvik et al., 2008). During the last year there have been two oil spills in Norwegian waters and both of them have been from vessels that ran aground; July 2009 "Full City" outside Langesund and "Petrozavodsk" in

May 2009 at Bjørnøya[47]. Even though evidence and documents advocates that the next spill is more likely to come from a ship than the oil industry's activities, it does not seem that the actors in the debate take this into account.

So far all the reports that contemplate oil spills in the case of oil activities in the area assess the risk of oil spills to be low; the most recent report concur to this conclusion (HI, 2010). The same report however, considers the consequences of a possible oil spill to be grave because of the areas vulnerability. But it should be noted that the effects from spills in the area will have different effects depending on the location of the spill; it seems that spills located in Nordland V and VI will experience larger consequences than spills in Nordland VII and Troms II (HI, 2010).

A possible oil and gas development will have large effects for the fishing industry in the area. Although oil spill risk is seen as low, possible oil spills will affect the fishers through destruction of gear and a possible loss of income. The Norwegian seafood industry relies on the consumer's perception of good products from a clean, natural and pristine environment. This view will be distorted in the case of an oil spill. 71% of people asked in a survey done in Lofoten believed that oil and gas developments in LoVe will be negative for the fishing industry, another 55% meant that oil and gas activities should not be allowed in LoVe out of consideration to the fishing industry (Brastad et al., 2004). In addition, 70% judged oil and gas activities in LoVe as a gambling with the fisheries resources (Brastad et al., 2004).

6.4 A threat

The fishers see oil in LoVe as "oil or fish", not "oil and fish" as the oil industry want it to be. The oil industry increases the risks for the fishers with their presence by shooting seismic, oil spills, competition of areas and employment. The fishers' perceive seismic shooting as a threat to the resource base they rely on. If the catches decrease with seismic activity the fishers' have to compensate the loss by fishing at different times or in different places. This can decrease the profitability of the fleet or the vessel. The space competition will transfer fishers to other areas, areas that often are fully utilized. This can create intra specific

[47] Bear Island

competition among the fishers' and reduce the profitability for the fishers. The competition for employment can threaten fishery as an industry and since fishery is a decentralized industry, it can have effects on the population in the remote districts.

Oil spills are important and seen as the worst case scenario regarding oil activities in the area. However, the fishers and other relevant parties seem to keep in mind the fact that the risk of oil spills is low and therefore emphasize more on the area conflict. The area conflict has so far also been the most prominent because of the seismic activity in the area. Emphasize on the area conflict was observed during the interviews and is also evident in media articles. It has been evident during the interviews that the fishing industry sees the oil industry as a major competitor for employment. The oil industry can offer high wages and good working hours. The fishers' fear that with oil and gas developments in the area there will be less fishing activity and they also argue that the extended effects of possible oil and gas developments in the area will be less than what the oil industry expects.

6.5 Relationship between theory and reality

Risk according to the fishers can be explained by three different concepts; construction of risk, perceived control and knowledge.

6.5.1 Construction of risk – a paradox

The social construction of risk implies that certain risks are chosen because the stakeholders, the community, the group, or in this case; the fishers, signify that this certain activity is risky. The fishers' as a group have common values, those lead to common fears and also a common agreement not to fear other things (Douglas and Wildavsky, 1983). Since risk is socially constructed, what is considered a risk can change through the course of interaction, increased knowledge, negotiations and so forth. It should also be noted that within a group, within the fishers, there is large disagreement over what they consider is risky and how risky it is. For instance it has been implied that members of the fishers' organizations are in favor of oil in LoVe, although this is not something they can say in public.

But the activities chosen to be risky are not necessarily the ones with the statistically and/or scientifically highest risk. This is obvious in regards to fishers. They underestimate the personal risks in their profession because it is necessary; the denial of risks is a “self-protective mechanism” (Lupton, 1999:62). Whilst the fishers underestimate their personal risks, they overestimate the dangers of the oil industry. Experience from oil activities in the North Sea suggest that the risk of an oil spill is low and this is also confirmed by reports. The underestimation of personal risks and the overestimation of the oil risk can be seen as a paradox; the fishers concentrate their energy towards the statistically less significant risk (oil activities), while ignoring the statistically higher risk (personal risk). The risk is constructed as larger than it actually is.

It should be noted that perception of risk are influenced by the “imaginability and memorability of a hazard” (Slovic et al., 2000b:119). This was evident during the interviews as every interviewee mentioned either the “Petrozavodsk” or the “Full City” spill.

6.5.2 Control

Previously the fishers controlled their own life; they decided when to go fish, where to fish, how much to fish, and how it should be fished. Today this is changed. The ‘closing of the commons’ resulted in a management system with regulations that decides for the fishers when they can fish, how to fish, how much to fish and what to fish. The control has in a large sense switched hands; from the fishers to researchers, managers and politicians.

In order to explain further it is necessary to remember back to the figure displaying the hypothesized relationship between risk and perceived control from the theory chapter. Groups/individuals will accept high risk activities if control is perceived as high, and the other way around; one would accept a low risk activity when control is perceived as low. The figure from the theory chapter is similar to the one below, but the activities in question, fishing and oil, have been added (see Figure 6.5). Explaining fishers’ behavior from the figure, the fishers accept the personal risks, the risks from the occupation, because the perceived control is considered to be high among the fishers’. Even if the general experience is that the risk for an actual accident is rather high compared to other types of employment in Norway. On the other hand, for oil activities they are not willing to accept what they regard as a high risk because the fishers' sense of control is perceived as low, although risk in regards to oil activities is by experts regarded as low. The sense of control is imperative because people are more acceptable to voluntary risks than involuntary risks; the fishers' personal risk is a choice; it is a risk they expose themselves off voluntarily, while the oil is an involuntary risks. The higher the perceived control people have over the risk, the less severe the risk is believed to be (Stahl et al., 2003).

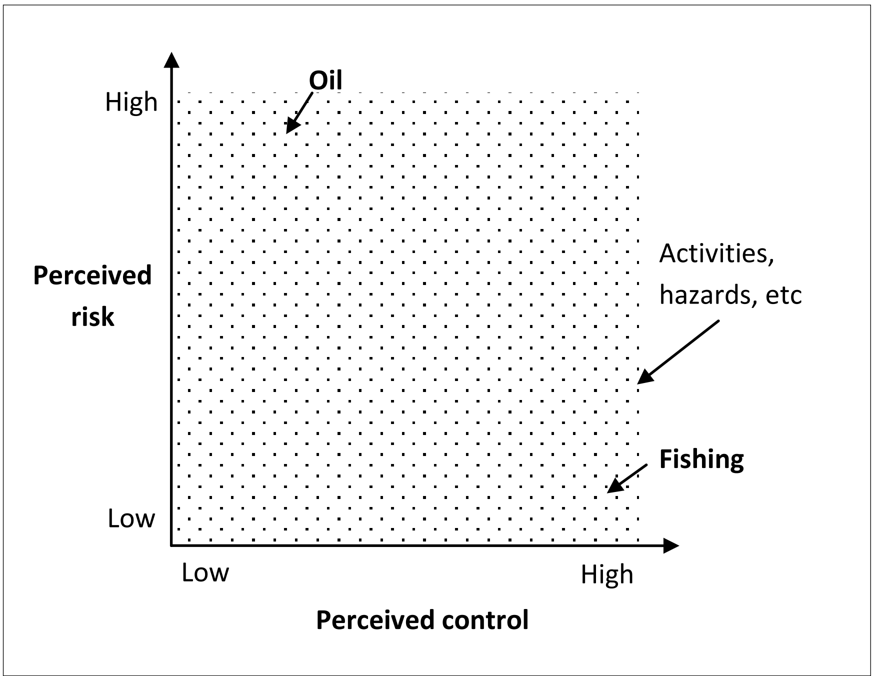

Figure 6.5: Fishers' perceived risk and perceived control.
The fishers' accept a high risk because they experience perceived control to be high. The fishers' however, perceive the oil industry to be a high risk activity, and because they perceive the control of the oil activity to be out of their hands, they are less willing to accept the risk.

But, although the risk of an oil spill is considered to be low, the consequences are considered to be high. Beck argues that the small risk does not compensate for the large consequences, which the fishers' organization agrees with.

6.5.3 Knowledge

Perfect or full knowledge is not possible to attain and the more we know, the less we know that we know. Bradley and Morss argue similarly:

> "The more we know, the less we can be sure of what we know. The more experts we have, the more they contradict each other. The 'knowledge society' is also a 'risk society' where we live increasingly in a state of uncertainty" (Bradley and Morss, 2002:513)

The increase in knowledge, which is attained to reduce uncertainty only seem to increase the uncertainty; "more and better knowledge often means more uncertainty" (Beck, 1999:6). This was acknowledged by the researchers from EVOSTC; the increase in knowledge have resulted in increased uncertainty regarding how different species have been affected by the spill (Struck, 2009). The uncertainty, or the lack of knowledge we do not know that we lacked, results in more fear associated with the activity in question; oil. The IMR have advised against oil in LoVe partly because of the knowledge gap in regards to oil on fish, especially on the fish's early life stages. This is also highlighted by NINA (Forsgren et al., 2009). The IMR argues that the precautionary approach should be taken into consideration because of the knowledge gap.

7 Risky businesses; oil versus fish

> "As long as we are going to be using this stuff we are going to be spilling it. It goes with the territory" (Struck, 2009).

7.1 Oil and fish; a mixed blessing?

> "We can't only survive on air and love" (Eilertsen, 2009).

The oil and the fish business are risky in different ways; the fishers experience personal risks while the oil industry presents a collective risk which has the potential to affect not only the oil industry itself, but the ecosystem as a whole. For the fishers it is the voluntary risks versus the involuntary risks. The risks the fishers face are multiple and diverse ranging and it can be argued that the risks have changed due to the technology change which resulted in the fishers being replaced by machines, resulting in fewer fishers' and fewer vessels' (Johnsen et al., 2009) (see Figure 4.7 and Figure 4.8)**.** Some believe that the number of fishers will decrease even more if there will be a yes to oil because of the employment competition from the oil industry. One interviewee believed that without the oil the fishers' social position in the society would be higher than it is today (Rabben, 2010). This he argued was due to the high wages and much free time in the oil occupation.

The risks the fishers are facing have evolved throughout the modernization. Although new technology has made the fishers' life easier the risks have not faded away. The risks have changed and in some terms new developments has in some ways increased the risks; e.g. the paragraph vessels and the too comfortable navigator chairs (see chapter 6.1.2). The changing of the risks come in the shape of responsibilities regarding the need for profitability through the operation of the vessel; "running a business, controlling finances and investments, and understanding fishing legislation" (Johnsen et al., 2009:20).

In relation to fishers and other activities in LoVe the new modernization risks come in the shape of a threatening oil industry that the fishers fear will both hamper the resources they rely on and partly occupy their fishing grounds. For the fishers the threat or hazard is there today, the risks are therefore already real, according to Beck. The worst case scenario for the fishers, illustrated by the Exxon Valdez oil spill, hampered the fisheries resources for the local fishers and an oil spill can therefore also affect fishers in LoVe. The uncertainty regarding the risks and the knowledge gap in the possible consequences of it results in a fear of the activity; it is better to be safe than sorry.

Because risks (or the perception of risk) are socially constructed anything and everything can be a (hazard) risk, but it also entails that what constitutes risks' can have individual differences. This was evident when several affected fishers accepted the OD's buy out arrangements after the seismic shooting. Their action can indicate that some fishers are reluctant to oil more of economic reasons than of fear or risk perception. Nevertheless it should be noted that is has been implied that fishers not affected by the seismic applied for the buyout arrangement and was granted economic compensation. Wahl (2009) argued that the buyout arrangements from the OD was a proof that co-existence is not possible to achieve; since they are getting compensation because fishing and seismic activity cannot be performed at the same time. Also known as the western movie principle; the town isn't big enough for the both of us (Høyvik, 2009).

The construction of risk results in an acceptance of the high personal risk the fishers expose themselves to personally because they believe they are in control of it. While the fishers will not accept an activity they consider to be uncertain and risky, although the risk of their worst case scenario, the oil spill, is minimal, the consequences will be major for the environment in LoVe. The current oil spill in the Gulf of Mexico illustrate that although large scale oil spills are unlikely to take place, they can happen. The risk can never be eliminated. The Gulf of Mexico oil spill is an example of an accident that, according to Beck's, would mean annihilation for the fishers and the resource the fishers rely on.

As mentioned previously (see chapter 5.4.3), the numbers displaying when an oil spill statistically will happen and how large it statistically will be are not definite and they are theoretical. The statistics are numbers displaying how and when it may happen, not when it will happen. It can just as happen today, tomorrow or as in two hundred years.

Although LoVe is the most important fishing area, there are other areas where the fishers live in harmony with the oil industry. In the North Sea there has been oil and fish for more than 40 years without major conflicts. As some of my informants pointed out the oil industry has not been a problem, but an opportunity to diversify the business also into supply or stand buy activities. This option might not currently be regarded as relevant by the fishers in LoVe. But the opinions differ whether or not the oil industry has managed to co-exist with the oil industry. Rabben (2010) argued that co-existence in the North Sea was mainly a result because the worst case scenarios the fishers' was portrayed had not occurred. However some, especially the environmentalists, argue that the poor condition of some of the fish stocks in the North Sea is affected by pollution from the oil industry in the area (WWF Norge, 2002). While the Norwegian and Barents Sea are considered to be clean waters, the North Sea are subjected to different forms of pollution and a high human activity in its vicinity. Some of the fish stocks in the North Sea are in a bad condition which was illustrated as the researchers advised to stop the fishery for North Sea Cod in 2009 (Gjøsæther et al., 2009). It is difficult to say if the oil industry in the North Sea is the main cause of the condition due to many other factors that can influence the conditions in the sea and for the fish (Olsen, 2010b). But it is reason to believe that the arguments about negative effects have some impact in the debate about LoVe. Particularly because LoVe is considered to be vulnerable.

This vulnerability might further increase due to natural variations or climate change. Variations are already visible as there are evidence of changed migration patterns for both cod and herring (HI, 2010). The cod and herring has not moved into Vestfjorden during spawning as done previously but instead remained on the west coast of LoVe. If the recruitment becomes poor for some key species in the area the vulnerability will increase. A possible oil spill during years of poor recruitment, where the fish stocks are located in smaller areas during spawning, has the potential to affect the early life stages of the fish (Olsen, 2010b).

The oil activity does not only affect the environment through seismic activity and acute oil spills, but also by releasing produced water and whirling up sediments (Olsen, 2010a). Produced water, which contains components of oil, is released into the environment during oil activity. When placing installations on the sea bottom it can whirl up sediments and mud that can cover sponges and corals (Olsen, 2010a). Olsen (2010a) argues that for instance for herring, who lay its eggs benthic, need a certain grain size in order to spawn and whirling sediments have the possibility to diminish the spawning area, possibly for a long time. The vulnerability of LoVe and the proximity to shore is the main reason IMR says no to oil in

LoVe. It is also worth noting that they manage oil activities in a strict manner with the "precautionary approach and a worst case scenario" (Olsen, 2010a:44) in mind. The long distance to shore, in the case of the North Sea, gives time to limit a possible spill from hitting shore. When the oil reaches substrate it is more difficult to clean up. The Bravo spill caused minor effects because the oil was moved around in the waves where the microorganisms weathered the oil, instead of it reaching shore (Olsen, 2010b). In the North Sea there is a 'safety zone' because of the long distance to shore. Because of the narrow continental shelf in LoVe the oil has a short distance to shore (see Figure 5.2 and Figure 7.1) there is no such safety zone there.

In addition to direct negative impacts from an oil spill on both natural environment and economy, the important seasonal Lofoten fishery has been carried out for centuries and is both a material and symbolic element in the area's identity. Many seem to believe that this picture will be threatened by the oil industry. The present importance of the fishing industry in the area and its visibility to people adds fuel to the symbolic value of Lofoten. The 'brand' Lofoten, especially made use of by the tourist industry, is marketed from the perspective of the fishing area with fishermen's shacks and a pristine environment. The oil will distort LoVe's original image and become impure and blemished. However, there is a considerable oil industry in the North Sea without this stamp on the fish products caught in that area. When oil risks are considered in reports the symbolic value and the cultural identity of the area is not taken into deliberation, which it should. It is important to understand the symbolic and cultural function of the fishery for fishers and residents in LoVe when communicating risk. The oil industry has said that they need to take the locals into consideration and acknowledging LoVe as a symbol is therefore a natural consequence.

Brastad et al. (2004) argued that their respondents had a romantic image of the area and that the oil would threaten that picture, which was what Bjørnstad (2009) wanted to resign from. Fishing is seen as the pre-modern activity while oil is the modern activity. Bjørnstad argues that LoVe also needs something to live from in the future, and the tourism industry and a declining fishing industry cannot 'save' the area. A highlighted argument by the oil advocates in the debate is that the oil industry can offer young people incentives to stay in LoVe through the extended effects and the following employment opportunities. However, the extended effects depend on the resources and the type of development. The developments with the most significant extended effects are also often the most expensive alternative. The different developments are not a menu one can choose from, but will depend on factors such as type and size of the resource in question (KonKraft, 2009).

The government's[48] aim is that the country should unite being a large petroleum producer and exporter and still be a leading country as an example in environmental issues (MD, 2006). The oil industry argues that it is not either or, oil or fish, it should be a mixed blessing. However the fishing industry is reluctant to take their view. The fishing industry is important for the settlement in the area and is also a subsidiary aim with the fisheries management; which the large small scale fleet in LoVe can be evidence of.

The oil industry in Norway has always relied on new areas being opened up for exploration. It is therefore noteworthy that areas with commercial findings have always been opened for exploration in the past. Gaute Wahl, the leader of one of protest groups against oil in LoVe, argued that it is more likely that Nordland VII and Troms II will be opened for exploration after the revision of the Management Plan later this year and he noted that Statoil had made the same point (Wahl, 2009). The seismic shooting during the summer of 2009 emphasized on those areas and the revision of the knowledge base also concluded that oil spills in those areas will have less effects than in the areas further south; Nordland V and VI (HI, 2010). This might indicate a compromise for the two industries, a 'Winnie the Pooh' solution (Haugstad, 2010); the fisheries may have Nordland V and VI closed for petroleum, while Nordland VII and Troms II may be opened for the oil industry (see Figure 7.1). This solution is worth noting as a World Heritage status will prevent new developments for oil transport to land to be visible (Hamnes and Helgesen, 2010). The oil industry sees a World Heritage status as the worst threat to oil in LoVe (Hamnes and Helgesen, 2010). The application was original due to the MD in December 2009 and to be sent before the application deadline in February 2010, but the Lofoten council[49] asked the MD to delay the process until the new Management Plan was due. Although the application is not sent, as it is still under preparation at the Directorate for Nature Management, the Minister of Environment in Norway, Erik Solheim (The Socialist Left Party), says that it is his aim to stop oil in LoVe and that the UNESCO application will be sent as soon as possible (Solheim, 2009)[14].

[48] The Government is a collaboration with the Norwegian Labor Party (35,4 % of the votes at the election in 2009), The Socialist Left Party (6,2%) and the Centre Party (6,2%).
[49] Lofoten council, Lofotrådet, is a inter municipality cooperation agency for the mayors in Lofoten.

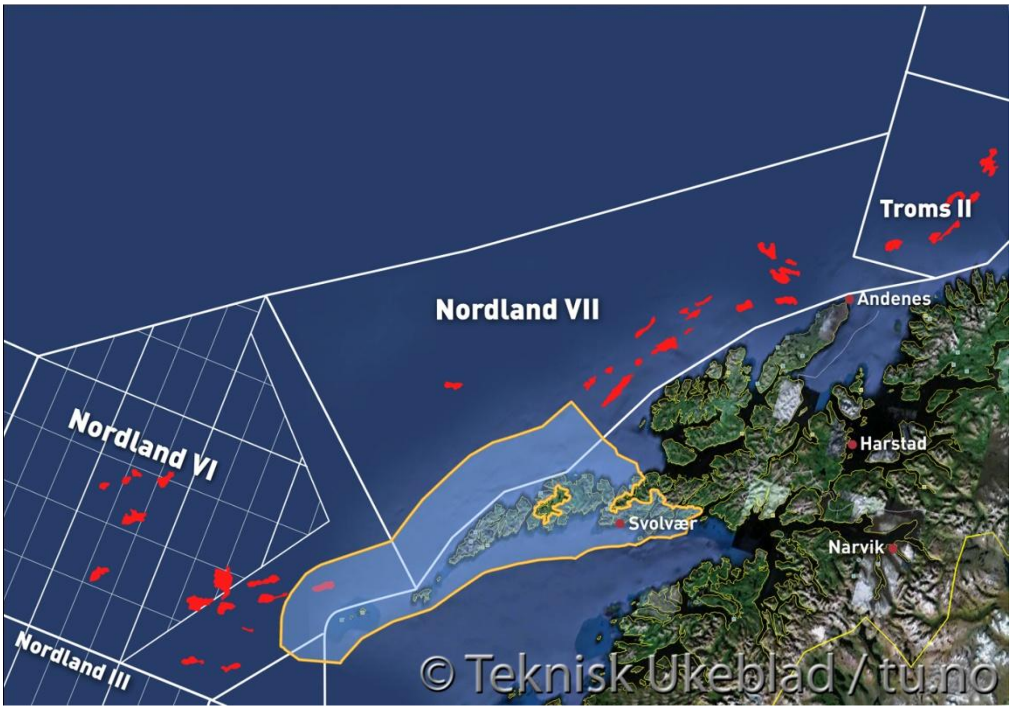

Figure 7.1: The 'Winnie the Pooh' solution.
It has been suggested to open Nordland VII and Troms II for the oil industry, while leaving the most important fishing areas, Nordland VI, for the fishers'. The most prospective oil and gas structures are marked in red, while the World Heritage Area is circled in yellow (Teknisk Ukeblad, 2010). It is also visible that the prospective fields are located close to shore.

As with other oil and gas explorations in the country, the revenues and developments are supposed to be a blessing for the entire country. As future state budgets rely on income from oil and gas fields not yet found, new areas have to be opened up for exploration. We are so dependant of the technology that uses oil we therefore have to extract more oil, as Beck could have said it. However, the Bravo spill led to a delay of the areas in the Norwegian Sea being opened. It has already been mentioned that the oil spill in the Gulf of Mexico is an advocate for stopping oil in LoVe. With regards to the strong historic tradition of co-management in LoVe (Jentoft and Kristoffersen, 1989) (see chapter 4.2.1) maybe it is worth introducing oil and gas activities in fisheries dependant area to a co-management approach, where the decisions made have a broad and legitimate basis both in the country and among the most affected stakeholders. If the stakeholders feel that they lose all control, they will probably not be willing to accept what they regard as a too high risk. The oil industry will not benefit from being regarded as an alien in this area.

The agreement between Norway and Russia about the disputed area in the Barents Sea might speed up the processes for more oil and gas development in the Barents Sea. It is reason to believe that new debates will occur. Therefore, more knowledge about how people construct risk is also necessary.

8 Conclusion – what lessons have we learned?

What are the lessons we have learned through this study. I will summarize them in revelation to the research questions.

(1) Considering that being a fisher is already a risky occupation, which risks do the fishers' face today?

The fishers' face risks ranging from their personal and social risks to economic, territorial and political risks in the shape of injuries, death, missed social life, increased importance of profitability and the competition of areas they utilize. Since the modernization of the fishing fleet the risks' have changed. Although similar as before the risks are more concerned with the need for profitability and other competing actors utilizing the same areas as the fishers'. The new technology has increased costs and new actors, like the oil industry competes for a limited space.

(2) What makes the oil industry and its operations more threatening for the fishers'; their lives, the occupation and the industry they are a part of?

The oil is considered as threat to the fishers' because they have the possibility to hamper the resource they rely on through the risk of oil spills, pollution, and the consequences of seismic shooting and loss of fishing grounds. The threat is also influenced by the fishers' loss of control of the oil activity.

(3) Considering that the fishers' seem to accept a high personal risk, what makes the fishers' so reluctant to accept the oil industry in the area?

Because risk is socially constructed it leads to the paradox that the fishers' perceive the risks following oil activity as too high, while they seem to underestimate their personal risks. The reason why is probably because they feel that they have the experience and training to control the personal hazards and dangers, as a matter of fact fishers have lived with these risks for thousands of years, while the risks related to modernization are perceived as uncontrollable, unknown and partly alien.

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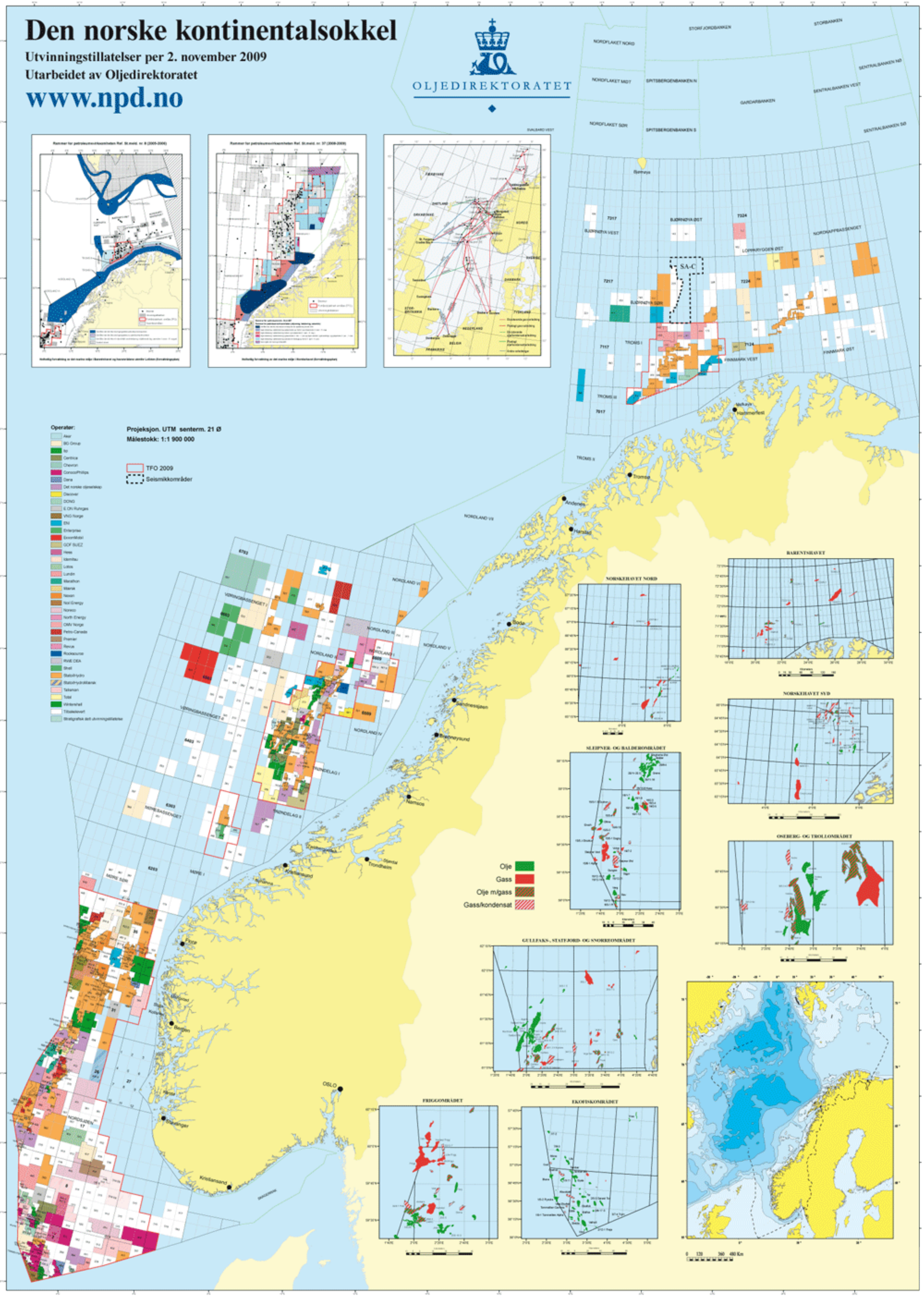
10 Appendix

10.1 The Norwegian Continental Shelf (Oljedirektoratet, 2009a)



10.2 The Norwegian Continental Shelf – The Norwegian Sea (Oljedirektoratet, 2009b)