Whale Watching Feasibility Study
Lofoten – northern Norway, Survey 2013

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Introduction

Background

The Lofoten Islands in northern Norway attract a large number of tourists each year but there are currently limited options for these tourists to experience the local marine wildlife, including whales and dolphins. A questionnaire study to investigate the perceived potential for whale and dolphin watching as part of wildlife tourism related activities on the Lofoten Islands and the adjacent Vestfjord was conducted by the International Fund for Animal Welfare (IFAW) and Ocean Sounds between September 9th and October 15th 2013.

Information about the facilities available in the region, and local interest in potentially starting whale watching were gathered as well as data on whale sighting rates and distribution patterns. In addition to observations from local mariners and fishermen, people were also asked about sightings from land. Further questions investigated public opinion on how planned oil exploration activities would influence tourism on Lofoten.

Previous surveys by Ocean Sounds

Ocean Sounds is a private organization that is dedicated to the research of marine animals, public education, and conservation of the marine environment. Ocean Sounds has its base in Henningsvaer, a small fishing village in the Lofoten Islands. The idea of Ocean Sounds began to be realized in August 2005 by founder and biologist Heike Vester with the purpose of combining research with education and art. Research from 2005 – 2013 that monitored the occurrence of marine mammals in the Vestfjord showed distribution patterns of a number of different species related to time of the year and prey abundance. These results were used as baseline data for the presented feasibility study.

The Vestfjord is the most extensive fjord of Norway, is more than 140km long and opens to the Atlantic at the western end at the island of Røst and on the mainland south of Bodø and ends in Narvik in the east. Ocean Sounds research area was spread from the mainland at Landegod to Tysnes and on the Lofoten side from Å to Lødingen. The home port was Henningsvær, which is located more or less in the middle of Lofoten and on islands adjacent to the Vestfjord. Some research was also conducted on the outside of Lofoten into Hadselfjorden or towards Nappstraumen and back to Henningsvær.

In total 13 species of marine mammals were encountered: 3 species of seals (harbor seal, grey seal and the walrus), European otter, Harbor porpoises and Atlantic white sided and white beaked dolphins, Killer whales, Long-finned pilot whales, Minke whales, Humpback whales, Fin whales and Sperm whales.

In addition many different species of sea birds were encountered in the Vestfjord including sea eagles, puffins, fulmars, auks, guillemots, cormorants, sea ducks, terns, gannets, grey geese and several species of gull.

Table 1. Peak seasons for each species observed and areas where they have been seen most (derived from Ocean Sounds surveys 2006-2013).

Name	Time	Group size	Location	Behaviour
Fin whale	June-August	1-2	mid-fjord	feeding on plankton
Humpback whale	June-August	1-2	mid-fjord	feeding on plankton
Minke whale	April-September	1	100m line	travelling, shy towards boats
Sperm whale	June-July	1-2	mid-fjord > 200m	foraging on squid
Killer whale	April-September, December-February	5-25	close to coast, Øksfjord	feeding on salmon & mackerel, or herring
Long-finned Pilot whale	all year, peak May-September	10-200	mid-fjord > 200m	foraging on squid
Atlantic white sided dolphin	June-September, sometimes November-January	6-100	Raftsundet, Vestfjord	highly mobile
Atlantic white beaked dolphin	June-August	5-8	close to coast	highly mobile
Harbour porpoise	all year round, peak August	1-4	local, mid-fjord or near coast	shy, not easy to approach with boat
Grey seal	May-August	5-8	haul-out islands close to H-vær	shy, boat has to keep a distance
Walrus	May-June	1	males	does not care about people or boats
Harbour seal	September-November	1-2	feeding around H-vær	shy, difficult to get close
European otter	all year round, peak August	1-3	local population	shy, difficult to get close

The present study aimed to gather additional information on cetacean sightings around the Lofoten Islands. We focused on the area around Svolvær, Leknes and Reine where the majority of data were collected. Additional information was gathered from Moskenes and Laukvik areas.

Purpose of the study

Tourism on Lofoten is well developed with broad and diverse activities, see Destination Lofoten (http://www.lofoten.info/?id=1847223262). However, tourism activities at sea are few, with mostly fishing and sea eagle tours. In addition the tourism season is short. Most tourists visit the Lofoten islands during summer and the main season is from middle of June to middle of August. Whale watching could potentially expand tourism activities and the duration of the tourist season.

Thus a whale watching business might represent an economic opportunity for towns of Lofoten which are otherwise experiencing a gradual and constant migration of human resources. Moreover the Vestfjord is a region strongly associated with fishing and whaling. The purpose of the study was to evaluate the potential for whale watching in the surveyed area as an opportunity for local communities to develop marine based wildlife tourism.

The viability of a whale watching industry relies on the collection of information about the frequency of cetacean (whales, dolphins and porpoises) sightings in the area. The questionnaire survey, conducted from the 9th September to the 15th of October, was intended to provide some information on local sightings of cetaceans.

Materials and Methods

The study was conducted using a questionnaire. Questions asked included species variety, frequency of sightings, and occurrence of cetaceans on a five year temporal scale (2009-2013), seasonal variation, spatial distribution and additional information on seals. The spatial distribution was assessed using a map of the Vestfjord and respondents were asked to circle areas where they thought cetaceans were more likely to be encountered and crossing areas for seal distribution (if possible with species specified).

The main target for this survey was fishermen and people going to sea on a regular basis for sightseeing business or pleasure reasons. But people who had not been at sea (and/or have seen whales) were also interviewed to get an overall attitude towards whale watching. A total of hundred and ninety one questionnaires were collected. Svolvær/Vågan and Leknes/Vestvagøy were the main places surveyed.

Interviews were conducted in person. Places where interviews were performed comprised harbours where fishermen were likely to be found, the centre of a town, and the main tourism offices in Svolvær (Destination Lofoten) and a meeting in Moskenes, tourist operators with boats and shops.

Six volunteers in three groups interviewed fishermen, people employed in the tourism sector, including boat safaris, fishing trips, hotels, camping places, boat rental places, restaurants, museums, aquariums; as well as municipality officials, ferry operators, boat owners and boat operators (on the pier) and other people in the area from Svolvær to Á in the far west of Lofoten. We separated the area into 3 regions with three volunteers working from Svolvær to Stammsund, one volunteer from Leknes to Ramberg, with the third team working out of Reine to Å.

Limitations and Strength of the survey

One of the limitations encountered during the survey was the relatively short time available for gathering a good sample of questionnaires. Also, the time the survey was conducted coincided with the end of the tourism season and no fishing activity. This means it was more difficult to find people working in the tourism sector and fishermen to interview. In addition bad weather made interviews on open streets difficult.

The strength of the survey was the possibility to interview people directly and in Norwegian. The volunteers all spoke fluent Norwegian or were Norwegian and from the area, we could also cover a large area during the whole period, gathering few questionnaires but from a large variety of places and people.

Results

Overall frequency of whale sightings

The frequency and consistency of whale sightings is probably the main issue with respect to potential whale watching. The questionnaire attempted to measure this in two semi-independent ways, firstly by asking people what proportion of trips they saw one or more whales on and secondly by how long since they had last seen a whale. The latter question is less informative but believed to be less subject to bias.

Table 1 shows assumptions of quantitative estimates attached to the categories used in the questionnaire. These should be considered as rough estimates (within the possible range) but the overall conclusions would be unlikely to change with different estimates.

Table 1. Numerical values assumed for categories

Number of trips per year Category	**>100**	**50**	**20**	**<20**
Assumed value	120	50	20	10
How many trips have one or more whale	**Most**	**Around half**	**A few**	**None**
Assumed value	0.75	0.50	0.10	0
How many weeks since you last saw a whale	**<1**	**1 to 2**	**2 to 4**	**>4**
Assumed value	0.5	1.5	3	6

The assumptions made in Table 1 would lead to the estimates shown in **Table 2**.

Table 2.

Respondent grouping	Estimated average trips per year	Estimated whales per trip	Expected number of weeks between whales (based on sighting rate)	Estimated average number of weeks between whales (based on question how many weeks)	Ratio of expected to estimated weeks since last sighting
Operators of tourism trips (n=18)	83	0.20	3.1	5.4	0.58
Fishing (n=14)	112	0.23	2.0	5.1	0.40
Respondents reporting seeing whales most trips (n=7)	73	0.75	1.0	3.3	0.29

The ratio of expected/estimated number of weeks since seeing a whale is an indicator of relative bias in the reported sighting rate. This estimate is subject to a number of assumptions but if estimated whales per trip were unbiased would be expected to be around 1. Values less than one suggest respondents over estimating their reported sighting rates. The results in table 1 would suggest that fishermen tended to overestimate their reported sighting rates more than tourism operators. Respondents who reported seeing whales on most trips were most likely to overestimate, suggesting that differences in sighting rates could be attributed to biased reporting rather than visiting areas that were more likely to have whales or maintaining a more effective lookout.

Summary of whale sightings

Minke whales and killer whales are reported regularly in the Vestfjord with killer whales being the most frequently sighted. Whales appear to be sighted on up to 20% of trips to sea, with a higher sighting rate for dolphins/porpoises. Respondents were consistent that there were more whales in summer than winter with no visible inter-annual trends.

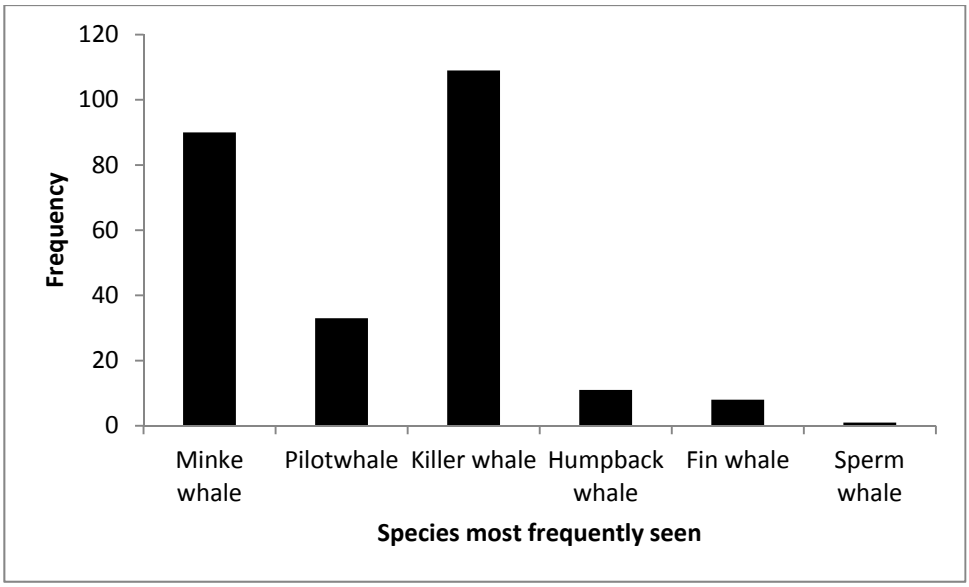


Figure 1. Whale species most frequently seen. Harbour porpoises were seen most often (N=165) followed by killer whale (N=109), minke whale (N=90) and dolphin (N=69) sightings.

Inter-annual variation in whales seen

In order to investigate variation between years, people were asked to give the year where there had encountered most whales and the year with the fewest. The results (Figure 2) suggest no clear patterns in years with fewer or greater sightings rates. A similar question was asked to asssess seasonal patterns. These responses show clear seasonal patterns with more whales in summer and fewer in winter (Figure 3).

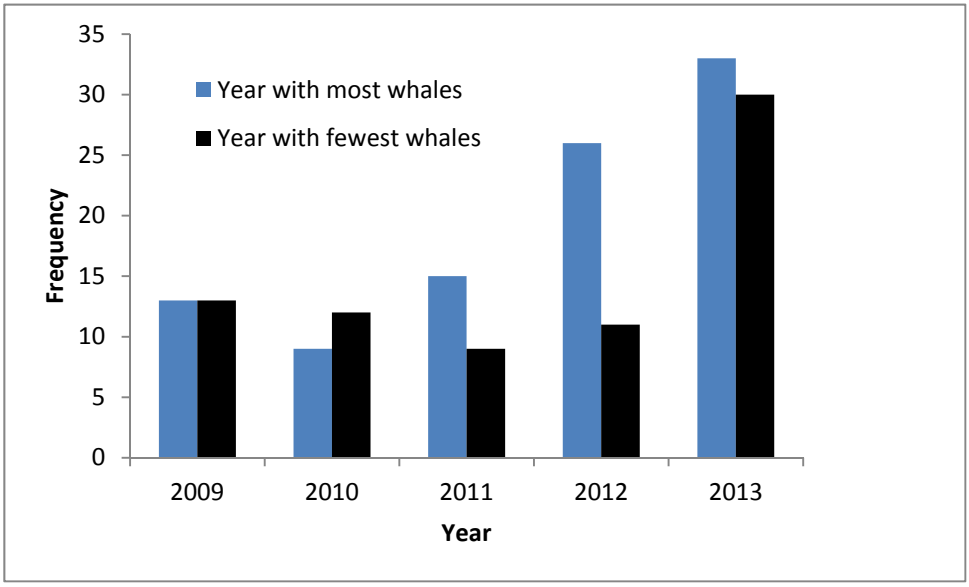


Figure 2. Frequency of reports for the year with the most whales and the year with the fewest whales.

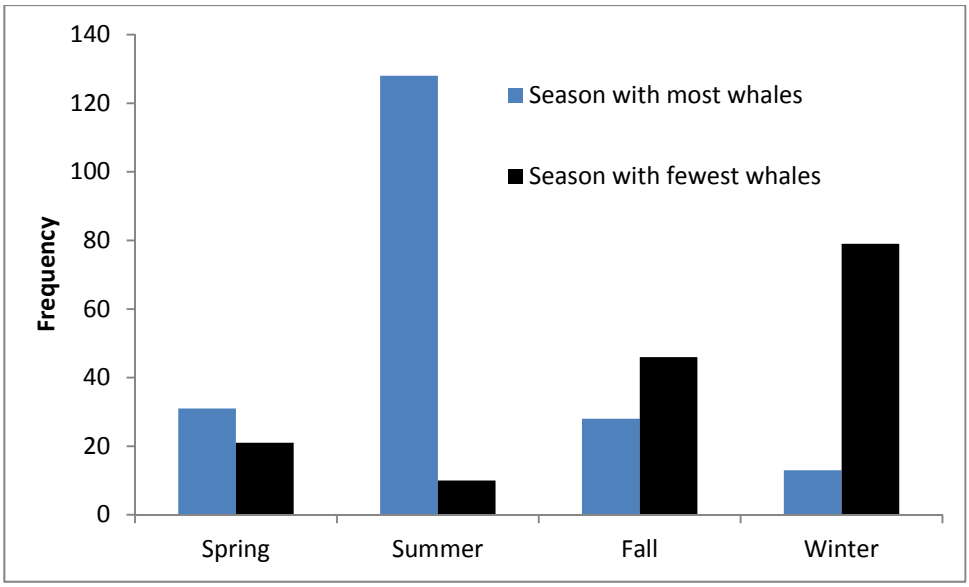


Figure 3. Frequency of reports for the season with most and fewest whales.

Sightings of dolphins and porpoises

69 of respondents (36%) reported having seen dolphins. Of these, 14 reported seeing dolphins more often than whales. A much greater number (165) representing 88% of respondents reported having seen porpoises. Of these 77% (127) reported seeing porpoises more often than whales

Association with seabirds

Around 94 (67%) of respondents who gave an opinion said that groups of birds gave a strong indication of the presence of whales.

Sightings distribution

Using a map of the Lofoten Islands and the Vestfjord respondents were asked to circle areas where they had experienced high sighting rates.

Ports of departure for fishermen and sightseeing operators included Svolvær, Kabelvåg, Laukvik, Henningsvær, Stammsund, Ballstad, Napp, Flakstad, Reine, Moskenes and Å. The majority of responses indicated areas within the Vestfjord as the most likely places to spot whales but in some cases areas outside and far out the fjord were reported.

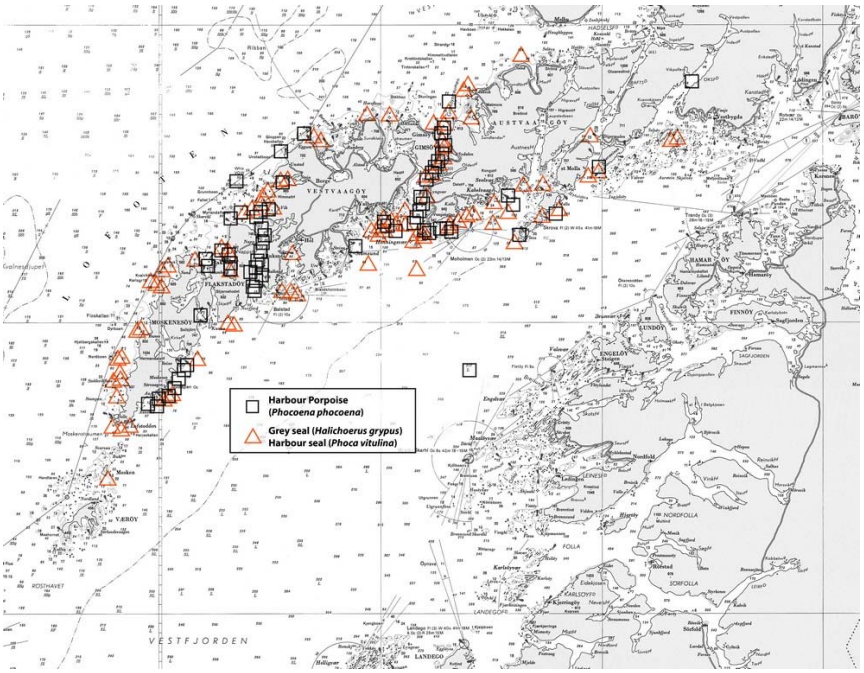
In 93 cases respondents were not able to point out any specific areas within the map. Thus, a total of 98 maps were considered.

We separated sighting in basically two groups of species, a) local species that also can be seen from land, such as harbour porpoises and seals and b) whales and dolphins that occur more offshore.

Of the total only 92 maps reported seal sightings. The areas with most seal sightings were on small islands around Reine, outside of Moskenesøy and close to Henningsvær.

Areas with sightings of harbour porpoise were identified on 66 maps with the highest density of sightings inside Gimsøystraumen and Nappstraumen.

Figure 4. Distribution of harbour porpoise *(Phocoena phocoena)* (N=66) and seals *(Halichoerus grypus and Phoca vitulina)* (N=92) either seen from boat or land as derived from survey questionnaires.



Figures 5. Distribution of Killer whales (*Orcinus orca*) (N= 132) in the Vestfjord and Lofoten from 2009-2013 as derived from survey questionnaires.

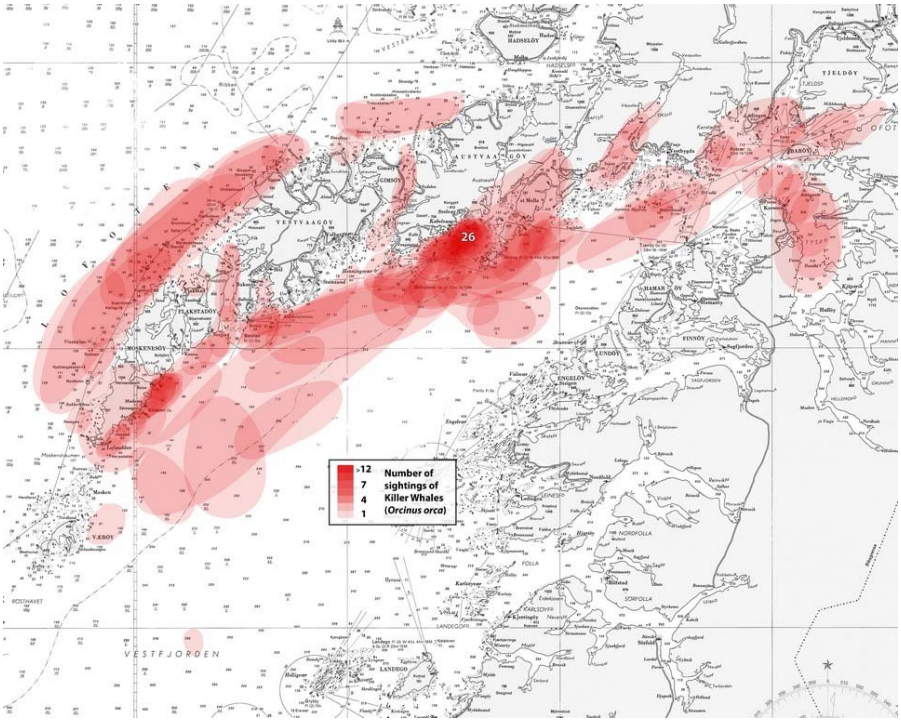


Figure 6. Minke whale *(Balaenoptera acutorostrata)* (N= 69) distribution in the Vestfjord and around Lofoten as derived from survey questionnaires.

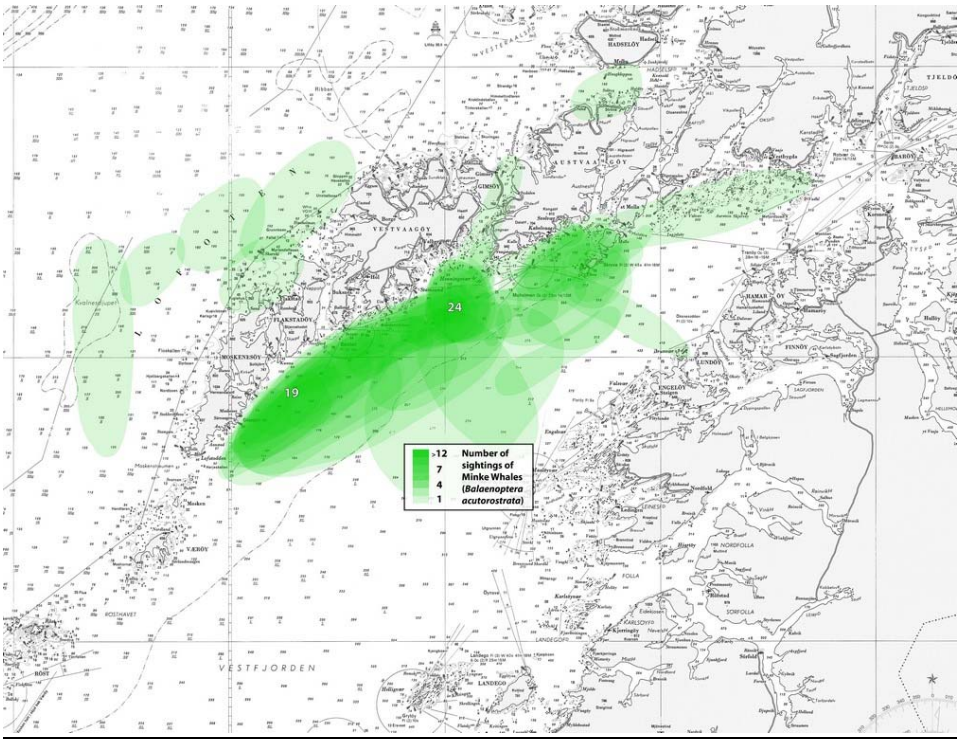


Figure 7. Pilot whales *(Globicephala melas)* (N= 11), Humpback whales *(Megaptera novaeangliae)* (N= 2), Sperm whales *(Physeter macrocephalus)* (N= 1), Fin whales *(Balaenoptera physalus)* (N=2) and Atlantic white sided dolphins *(Lagenorhynchus acutus)* (N= 2) distribution as derived from survey questionnaires.

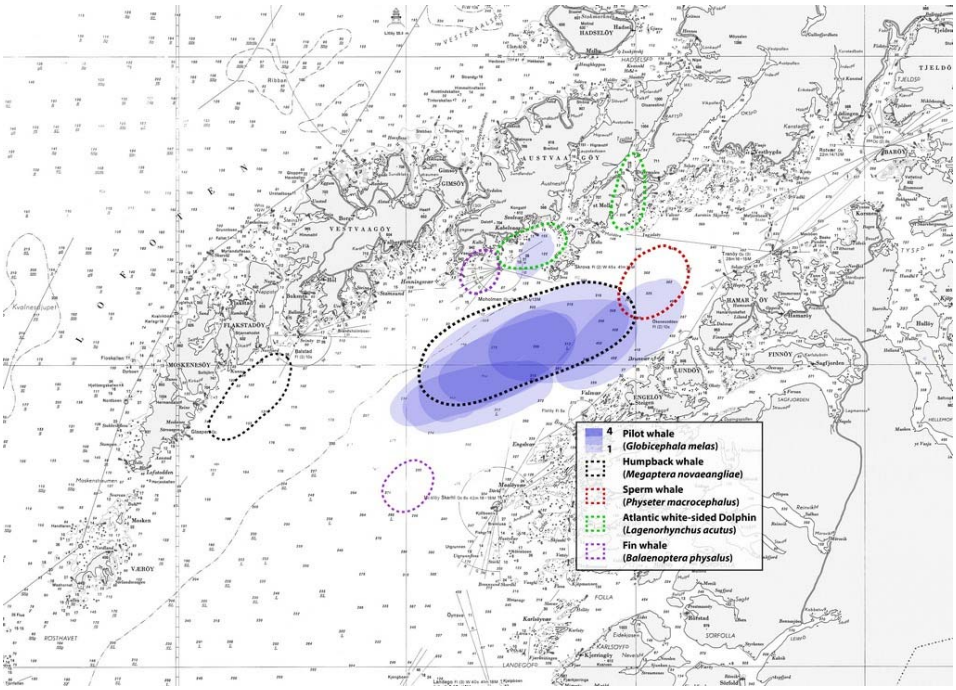
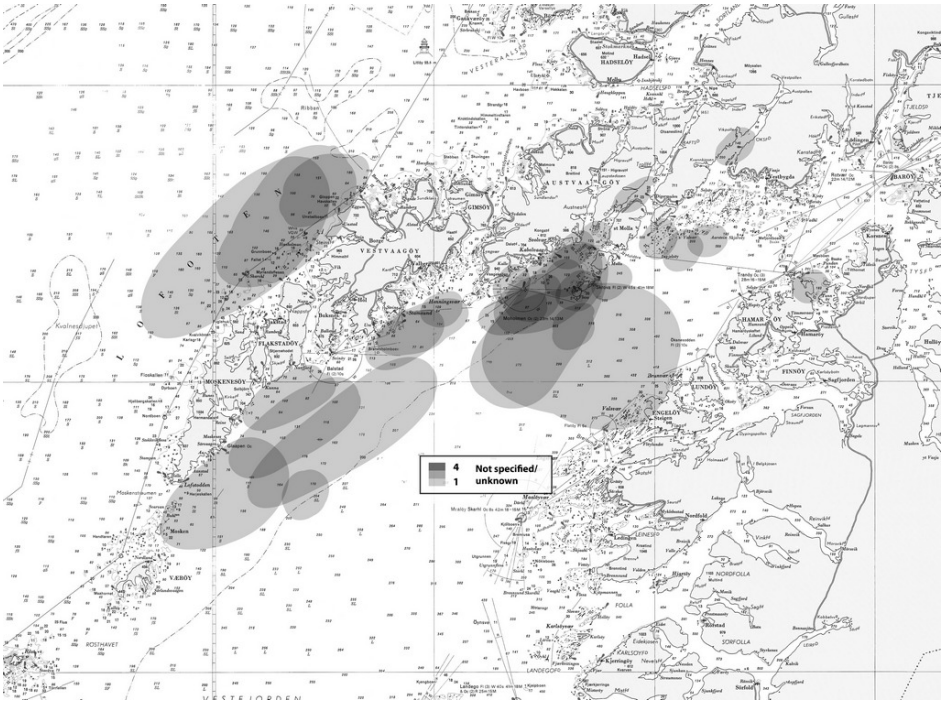


Figure 8 Unidentified whales distribution as derived from survey questionnaires.



Concluding remarks

From the present survey it appears that sighting frequency of cetacean species around Lofoten Islands and the Vestfjord is not particularly high. It might be expected to see whales on around one fifth of the trips. However, results also suggest an overestimation in sighting rates, particularly by fishermen.

Local species like harbour porpoises and seals can easily be seen from land. One consideration could be to establish watching points on land for these species or a whale and seal route through Lofoten islands. This could increase the popularity of the area as tourist destination and indirectly add to the tourism revenues particularly if observation areas could be integrated with the National Tourist Routes (http://www.nasjonaleturistveger.no/en). This possibility could be investigated in more detail through land based surveys in the most promising locations during summer months 2014.

The cetacean species most often spotted were minke whales, orcas and pilot whales. Humpback, fin and sperm whales have only rarely been reported. Orcas have been seen chasing fish close to shore and have been spotted from land.

Despite the relatively low overall sighting frequencies the maps do suggest some areas where it seems more likely to spot whales. These would be the most likely areas for a potential whale watching activity from a sightings rate perspective.

However, confidence in whale watching success in Lofoten is damaged due to former bad experience (e.g. colapse of orca safaris after the herring changed its migration route in 2007). Presently herring and killer whale abundance during winter months is higher further north around Tromsø and Andfjorden and the whale watching business there is flourishing. This shows the financial potential and importance for nature based tourism during periods when killer whales are present over several seasons.

In the Vestfjord, whales, dolphins, seals and many species of birds can be seen all year round. However, the survey shows that there are peak occurrences and the best season for whale, seal and bird watching is during the summer months from May-September. Different species have different behavior and some small

local species can be seen from land or close to land with small boats (seals, otters and harbor porpoises). Other species require longer distance travels and longer search efforts, but those species are more popular to view, such as killer whales, or pilot whales. In comparison with other whale watching places (e.g. Andenes), whales are less predictable and no "whale sighting guarantee" can be given. On the other hand, the Vestfjord is more protected and when whales are present they may not require such a long trip to sea. In addition, the landscape of the Lofoten is spectacular to view from the sea. Thus it is recommended to focus on educational marine wildlife tours rather than purely on whale watching tourism.

Oil and gas developments in the Vestfjord

Over 90% of respondents were aware of the plans for further oil and gas exploration and development in the Vestfjord. Of these, 78% thought that there would be some negative impact (Figure 9).

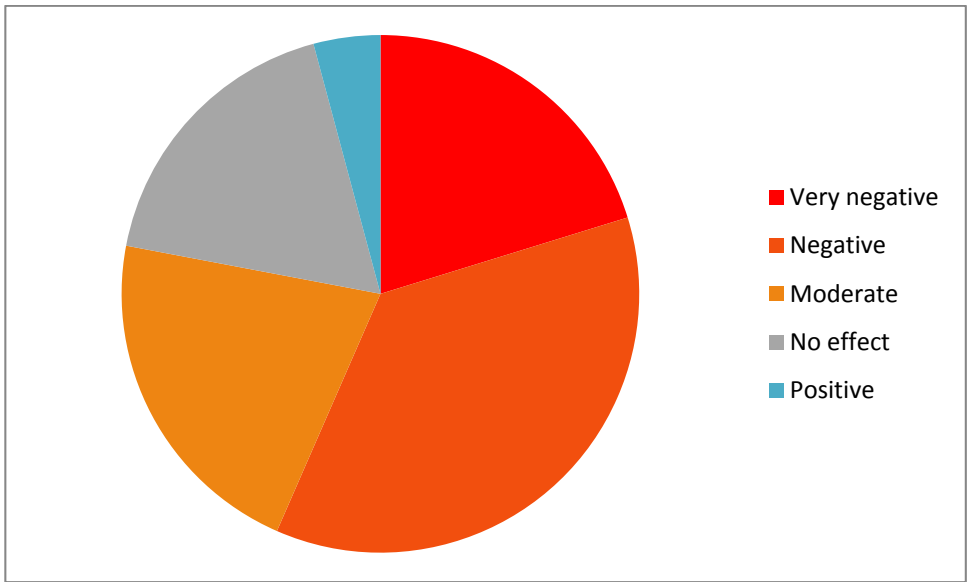


Figure 9. Proportion of respondents who believed oil and gas developments would affect toursim.

Recommendations

Despite the low sightings rates, 138 (77%) of respondents stated that they believed there was potential for whale watching. Hence there may be possibilities for whale watching in the Vestfjord in combination with other marine based tourism or land based for porpoises and seals. 38 (22%) respondents expressed an interest in working with whale watching.

The ports of departure thought to be suitable for these activities include Svolvær, Henningsvær, Laukvik, Ballstad and Reine.

Any prospective whale watching business would benefit from more detailed survey data than can be provided by a simple questionnaire survey. The Vestfjord is a large area which has seen shifts in the marine environment. Therefore any whale watching would need to be adaptable to change and also use all available techniques to find whales. The use of hydrophones may help locate some species. In addition, establishing a reporting network of scientists, fishermen, ferries and other boats in the Vestfjord would help to locate marine mammals and monitor their distribution.

Acknowledgments

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