

Cruise tourism – the environmental effects in the Baltic Sea

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<p>Cruise tourism has a growing impact on the environment in the Baltic Sea. This bachelor's thesis is written about cruise tourism's environmental effects in the Baltic Sea. Firstly, the aim of the thesis is to find out what actions are done by the cruise companies to reduce their negative environmental effects on the Baltic Sea. Furthermore, the author tries to find out what has driven the Baltic Sea into such a poor environmental condition and what are its biggest challenges.</p> <p>Secondly, the methodology of the research is presented. The chosen methodology in this research is a qualitative research methodology in order to gain the most precise and in-depth information about the actions done by the key Finnish cruise companies towards better sustainability of the Baltic Sea. Content analysis about Viking Line, Eckerö Line and Tallink Silja is conducted to find out the companies' environmental efforts towards the Baltic Sea. The themes of the content analysis are presented and the total research is based on those four themes.</p> <p>The results indicate that all of the three cruise companies are strongly contributing on the environmental work to reduce their environmental footprint and to improve the state of the Baltic Sea. Furthermore, the environmental considerations are very comprehensive, which shows how committed the companies are to gain better sustainability goals. Still, several issues need improvements, which are discussed in conclusion chapter.</p>	
<p>Key words Cruise tourism, environment, Baltic Sea, impacts</p>	

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1 Introduction

Baltic Sea is prone to many threats caused by anthropogenic activities practised by people who are living in the Baltic Sea region and its geographical characteristics. Thus, both natural and anthropogenic factors have impacts on the environmental state of the sea.

The author has chosen this topic for various reasons. First of all, the importance of the topic plays a remarkable role, as it is very actual at the moment and Baltic Sea is one of the most environmentally polluted seas in the world. Secondly, the author wanted to investigate the role of different organizations and companies in the protection towards the sea in order to see how much various companies are doing for improving the state of the sea. In addition, the author wanted to focus on the environmental impacts of cruise tourism on Baltic Sea because the cruise tourism has faced rapid growth in passenger volume thus, the amount of environmental impacts have raised as well. Thirdly, the deteriorating state of the sea is having wide impacts not only to the sea itself but also to the surrounding environment and its people. Thus, the author wanted to investigate the wide phenomenon as it is. Furthermore, the author herself is living in the Baltic Sea region, which has helped to realize the worsen state of the sea.

1.1 Aim of the research

The aim of the research is to explore the environmental impacts that cruise tourism causes to the Baltic Sea and what the main Finnish cruise companies do to reduce the negative environmental impacts towards the Baltic Sea. The thesis defines what kinds of effects are in question, what are the most important issues to concentrate environmentally on and what are the solutions to improve the situation to result in a healthy Baltic Sea. Additionally, the thesis provides information on how to maintain the growing of cruise tourism industry while improving sustainable development of cruise tourism in the future. The main concepts in focus for the thesis are cruise tourism, environment, Baltic Sea and impacts.

1.2 Research problem

The research problem will focus on the environmental impacts of cruise tourism on the Baltic Sea. Cruise tourism is a growing tourism form, which has many negative impacts on its surrounding environment, which have to be reduced in order to maintain the valuable Sea. The question is, what kind of efforts the main cruise companies are making in order to save the Baltic Sea from total destruction. The thesis will analyse the role and actions of cruise line operators towards the Baltic Sea. The maintaining problems are defined and the reasons behind them are being investigated. The deterioration of the Baltic Sea does not concern only the sea and its biodiversity itself but also the people living around it. The research focuses on diminishing the negative impacts in order to protect the Baltic Sea by developing sustainable ways to carry out cruise tourism. The thesis will compare the efforts of the main cruise companies towards the Baltic Sea environment and find out how the cruise companies could improve their environmental actions.

1.3 Structure of the research

The research is divided into six chapters. The introduction chapter is the first chapter, which provides a reader a good insight about the research question and a little bit about the analysis. It continues by explaining the problems that require investigation. The introduction chapter presents the aims as well.

The second chapter has the focus on the literature review conducted for the research. One of the main topics of the research is explained in order to provide a comprehensive understanding about the topics to the reader. First, it provides general information about the Baltic Sea. After it explains why Baltic Sea is so vulnerable Sea and prone to various problems, of which the thesis gives a small introduction as well. It further explains what are the main harbours in the region and the biggest environmental challenges of the sea including its values as well.

The literature review is continued in the third chapter, which has the focus on the second main topic of this research: cruise tourism. In this chapter the term 'cruise tourism' is explained along with its environmental impacts. The chapter gives a brief in-

sight on the history of cruise tourism and the cruise tourism today. It further explains the growth of the industry and the problems that the popularity of the tourism activity brings. In order to provide the reader with the understanding of the seriousness of the problem, the cruise tourism's impact on the environment is explained.

The fourth chapter of the report introduces the methodology chosen for this research. The qualitative research method will be explained in this chapter in order to understand the reasoning behind the chosen method. Furthermore, the qualitative content analysis will be introduced as a data collection method for this research. At the end of the chapter is explained the reliability and validity of the research. In addition, the author will present the means used for collecting and analysing the data.

The chapter five provides the reader an overview on the results of the research conducted. The results were collected by focusing on four different environmental themes that arise from the companies' websites and by analyzing the information provided on the websites. Hence, the conclusions about the companies' contribution to the environmental protection are made.

The last chapter includes conclusion, which is based on the results. The focus is on the analyzed data to provide the answers to the research question stated in the introduction chapter. The chapter provides a synopsis collected from the results and the author provides possible suggestions about how to improve the protection of the Baltic Sea. In addition, the author's own professional learning is being discussed at the end of this chapter.

2 Baltic Sea

This chapter provides a brief introduction about Baltic Sea in general. Furthermore, chapter two defines what Baltic Sea catchment area is and which countries form the area. The chapter continues by naming the main harbours in the Baltic Sea and illustrating it by map. Later this chapter determines what is the value of the Sea and what makes the Sea extremely prone to various problems. The latter part of this chapter discusses about the environmental challenges of the Baltic Sea.

2.1 Basic information

Baltic sea is situated in the Northern Europe. It is bounded by the Swedish part of the Scandinavian Peninsula, Northern Europe and the Danish islands. Baltic Sea is the youngest sea on the world. 10-15,000 years ago Baltic Sea emerged from ice masses. The Baltic Sea is surrounded by nine coastal states and some 85 million people are living in the area close to the sea. Baltic Sea has one of the most unique marine environments. (WWF 2014a.)

After the Black Sea, Baltic Sea is the biggest body of brackish water in the world. What makes Baltic Sea quite an exceptional sea is its low percentage of salt compared to the other seas but also the sea's low tides due to the small size of the Baltic Sea. However, the amount of the salt is varying inside the sea, for example the saltiest water is in southern part of the sea whereas in the Bothnian Bay there the water is the most low-salt. Because of its low saltiness, not many species are living in the sea. Even though there is not many species living there, the sea belongs to the only sea areas, which is home both for marine and lake fish. It situates close to the Black Sea, only the strait of Kattegat between Denmark and Sweden divides two seas of each other. The largest islands in the Baltic Sea are Gotland and Öland belonging to Sweden, autonomous region Åland belonging to Finland and Hiiumaa and Saaremaa under Estonian. (WWF 2014a; WWF 2014b.)

As the author mentioned, Baltic Sea is a quite small and shallow sea. Its surface area is about 377,000 square kilometers, which is easily bigger than Finland. The water volume is about 21 000 cubic kilometers. The average depth is about 55 meters, which is quite

shallow in the category of seas. Baltic Sea can be compared with the big lakes rather than oceans since it has many features typical for the lakes, for example the fact that the tides are low. However, the catchment area of the Baltic Sea is relatively big since there are over 250 rivers that end up in to the Baltic Sea bringing plenty of water with the stream. The latitude of the catchment area is almost four times bigger than Baltic Sea itself. That is one reason why Baltic Sea is prone to contamination since various substances that are harmful pour into the small sea from the broad rivers (Bäck 2010, 23-25). The catchment area of the Baltic Sea consists of the countries that run their ground and surface waters into the Baltic Sea. The surface area of the catchment area is 1 720 270 square kilometers. The coastal states of the Baltic Sea are Finland, Denmark, Poland, Germany, Estonia, Latvia, Lithuania, Sweden and Russia. In total, the catchment area reaches 14 countries. The Baltic Sea countries are developed countries where is practiced agriculture and forestry already for years. Those human activities increase the environmental threats towards the Baltic Sea (Baltic Sea Basin 2012). The countries in the Baltic Sea region are displayed below in the figure 1.

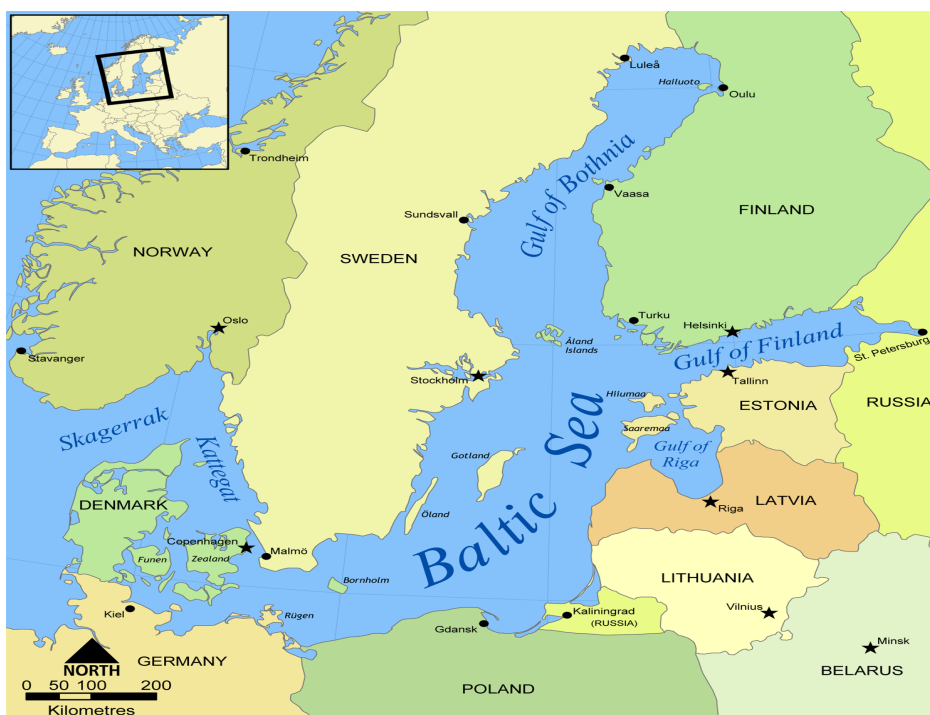


Figure 1. Map of Baltic Sea. (Google 2015.)

Baltic Sea is divided into three big gulfs: Gulf of Finland, Gulf of Bothnia and Gulf of Riga. The rivers bring the fresh water into the sea while the salty water is coming from the oceans. The Baltic Sea receives water not only from the rivers but also from North Sea through Danish straits. Those big water flows through the Danish straits are called pulses of salt water. However, it is quite rare that the salty water comes in in big amounts. As the water in Baltic Sea is stratified, the salt between the sea layers is not the same since in the seafloor there the water is saltier compared to the surface where the water is a little bit fresher. (Bäck 2010, 23-25.)

2.2 The main ports in the Baltic Sea

There are over 200 ports in the Baltic Sea region where over 300 international cruise companies visit every year. St. Peter Line and Norwegian Cruise Line are the examples of international cruise companies operating in the Baltic Sea. During one cruise many different ports are being visited (Uudenmaan liitto 2007, 10-11). The ports have various functions. Some of the ports work as a cargo, passenger, connections and multi-functional purposes. The biggest port in the Baltic Sea in 2013 was St. Petersburg (University of Turku 2013). Many ports in the Baltic Sea region have been expanded because of the requirements of the bigger size of the ships that have been constructed these days. (WWF 2010, 12.)

Cruising in the Baltic Sea region enables to explore the countries in Northern Europe and Scandinavia. There are numerous sights to see and cultures, languages and histories to explore. Some of the most popular Baltic cruise destinations are St. Petersburg in Russia, Riga in Latvia, Tallinn in Estonia, Gdansk in Poland, Helsinki in Finland, Stockholm in Sweden, Copenhagen in Denmark and Warnemunde and Rostock in Germany from where is easy to go to Berlin. What is more, lately Norwegian Fjords have gained popularity among cruise tourists. Stockholm and Copenhagen are most known ports of embarkation and debarkation for many Baltic cruises. All of those cruise tourism destinations are worth of seeing due to their historical sights and their unique languages and people. There are many cruise companies, which do not operate only in the Baltic Sea but also all over the world (Baltic Sea Cruise Basics 2015). As figure 2 indicates below, there are plenty of ports to explore in the Baltic Sea region. The picture shows the main functions of each port as well.

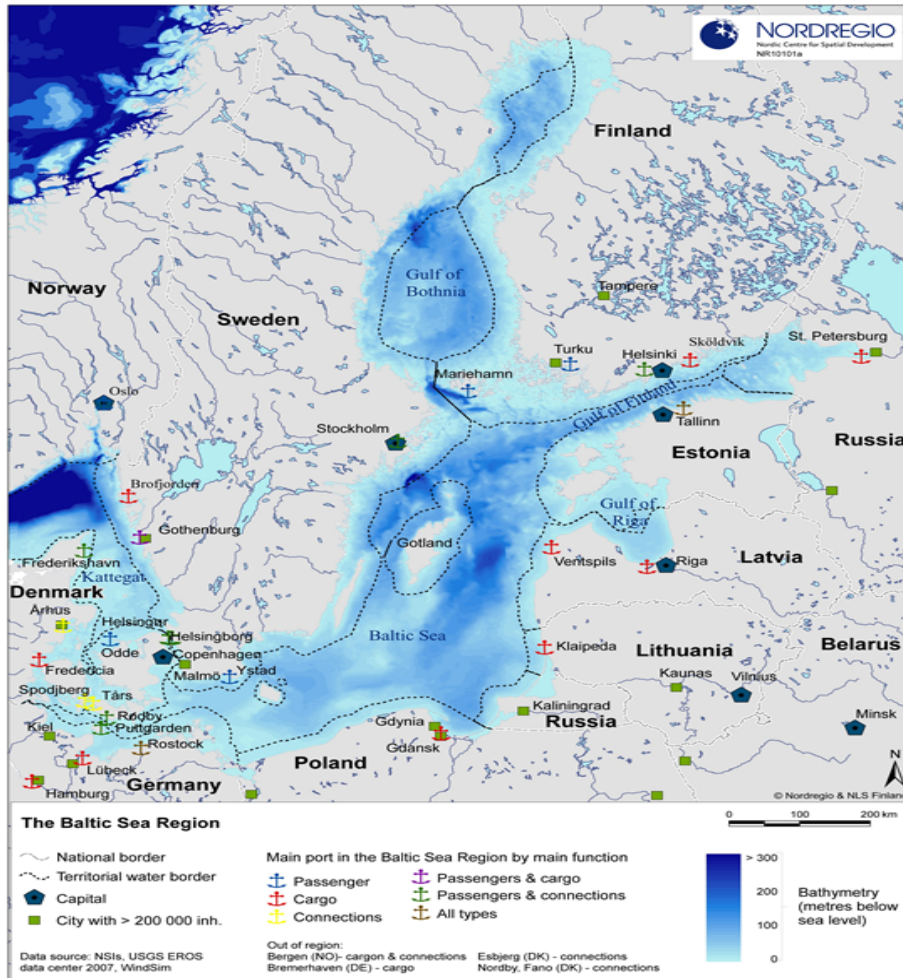


Figure 2. Main ports and bathymetry in the Baltic Sea Region. (Nordregio 2008.)

2.3 The value of the Baltic Sea

There lay various reasons behind the facts which make the Baltic Sea's worth extremely high and thus appreciated sea. First of all, the Baltic Sea region offers home for over 85 million people who are living in the sea area. Secondly, Baltic Sea belongs to one of the Europe's inland seas and it is ecologically very valuable sea. Thirdly, the Baltic Sea offers several activities for people including fishing, boating, spending cottage life, swimming and many other activities. Thus, it has a high cultural value. The Baltic Sea region offers a phenomenal range of UNESCO acclaimed sights (Cruise Baltic 2014a). Baltic Sea is a scene for every day life for people living in the region. What is more, the sea's ecosystem regulates the climate and destroys harmful substances. Additionally,

the sea transfers big amounts of water and nutrients from one place to another. (Bäck 2010, 12-14.)

The economic value of the Baltic Sea is remarkable as well. In general, the oceans contribute 63% of the services and goods that the world's ecosystems provide and over half of that amount originates from coastal ecosystems. The products include for instance medicine and minerals. (Bäck 2010, 14-17.)

Without the Baltic Sea there would neither be route for the cruise ships nor a place for many commercially important organisms to live. There have been measurements about the ecological value of the Baltic Sea in the eyes of people. Those measurements measure how much a person is ready to pay for improving the state of Baltic Sea for example of brightening the water in some extent. (Bäck 2010, 12-14; Baltic Sea Conference 2013, 1-2; Bricker, Black & Cottrell 2013, 186.)

The health of the Baltic Sea has long been viewed mainly as an environmental problem, but these arguments help make the case that it must be viewed as an economic and social concern as well. Failing to restore the health of the sea will not only impair the environment but also the possibility of creating many new jobs. (Baltic Sea Conference 2013, 7.)

2.4 The environmental challenges of the Baltic Sea

The Baltic Sea has experienced many environmental, economic and social changes during hundred years, which has a huge impact on the condition of the Baltic Sea. Cruise tourism and its environmental effects on the Baltic Sea have been a question for a certain time since cruise tourism is all the time growing industry, which poses a big threat to the Baltic Sea. The issue has raised discussion and several actions have been made to reduce the effects on the Baltic Sea. Many stakeholders such as politicians, organizations and citizens have been taking part in the projects and organized seminars, which improve the possibilities to fight against the negative effects and to actually make actions. Additionally, many coastal states have approved many national and international protection programs. (Prime minister's office 2009, 13.)

Baltic Sea is one of the most endangered seas in the world and the whole sea region is very sensitive. The reasons for the vulnerability of the sea are its slow water exchange and low salinity of the water. Moreover, the water of the sea is stratified which prevents the water layers from mixing correctly causing the lack of oxygen in the bottom of the sea. However, the bottom waters can reach the oxygen if the stream of saline water from the North Sea is big enough. Around the sea is living about 85 million people who are using the sea each on his own way and those human activities are a big burden for the environmental condition of the Baltic Sea. (Prime minister's office 2009, 13.)

As the author mentioned above, the proximity with people causes big environmental threats to the sea. Its marine ecosystem is the most threatened in the whole world. It suffers from overfishing which destroys many fish species. Not only fish but also other marine species get harmed by human actions caused by agriculture and industrial pollution. What is more, the sea is used as a route for maritime activities and it is classified being one of the busiest maritime transport routes. The problems caused by cruise ship activities on the seas are remarkable and need big effort to be diminished. (WWF 2014a; WWF 2014b.)

2.4.1 Eutrophication

Nutrient enrichment, in other name eutrophication, causes the biggest pressure on the marine environment of the Baltic Sea. It is the most serious problem in the Baltic Sea. The negative effects have spread to almost every area of the Baltic Sea including the marine protected areas. Eutrophication means that the sea is having too many nutrients on it such as nitrogen (N) and phosphorus (P), which can lead to the negative impacts on the ecosystem and it's functioning. Those nutrients end up to the sea for example with the sewage by the marine traffic but the biggest reason for the discharges is agriculture (Helsinki Commission 2009, 111). In the year 2005, the amount of nitrogen in the Baltic Sea caused by the shipping was 9% of the total airborne nitrogen deposition. However, most of the nutrients end up to the sea by waterborne load from the catchment area and the shipping has only 2% part of the total load of nitrogen it causes to the Baltic Sea. However, as the shipping increases, the nitrogen amounts will be rising

as well and it has been estimated that until 2030 the nitrogen load from shipping will raise about 50%. (Helsinki Commission 2009, 99.)

The consequences of eutrophication include also the increased formation of algae and phytoplankton. Later the algae will die and sink to the bottom of the sea where it gets destroyed and where it will consume the oxygen in the bottom. The more there is oxygen less areas in the bottom waters, the more there will be phosphorus, which leads to internal loading. The phosphorus increases the eutrophication because the phosphorus feeds it. After follows the lack of oxygen, which causes that the phosphorus dissolve into the water resulting in blue-green algae bloom. Decomposition of algae consumes oxygen, which again gives a boost to the release of phosphorus from the bottom. That is called vicious circle. The ways to reduce internal loading is to avoid any external loading from entering the sea, which is done with efficient treatment of wastewaters such as nitrogen and phosphorus. (Prime minister's office 2009, 15; Bäck 2010, 66.)

In addition, eutrophication may cause weakened reproduction among the fish species. Baltic Sea is extremely prone to eutrophication because its basin is stratified and shallow and the residence time of water is long. Eutrophication of the sea is caused by maritime activities and even the water movement caused by the ships increases the danger of eutrophication due to the circulation of the nutrients. The quality of the water has suffered a lot from the eutrophication. That occurs when the boats release the emissions of nitrogen oxides and sewage which result in emergence of nutrients and that causes eutrophication. In the summer time the emergence of the nutrients is the most evident resulting in algal blooms in the sea. What is more, in the summer time the amount of nitrogen oxide by the ships entering the Baltic Sea is 35-40% of the entire airborne nitrogen load that goes to the Baltic Sea. However, the eutrophication is not merely caused by maritime transport but also agriculture plays a huge role on that. (The Baltic Sea Environment and Ecology 2014, 55; Helsinki Commission 2009, 114.)

Additionally, eutrophication threatens the vegetation of the sea. First of all, the penetration of the light through the water column will be diminished, which restricts the depth penetration of several species such as eelgrass and bladder wrack. Secondly, the increased sedimentation may prevent the new specimen to settle on the seafloor and to

reduce the amount of substrates. Thirdly, the huge amount of nutrients during the vegetation period gives a boost to opportunistic species with short life cycles and fast development compared to perennial species with lower productivity. That results in a shift in community composition. What is more, the effect of eutrophication can be seen in the fish communities in loss of shelter and turbid water (Helsinki Commission 2009, 113-114.) The figure 3 below illustrates the problem of eutrophication in the Baltic Sea. As can be seen from the picture the alga has gathered as big loads to the coastal areas of the sea. The eutrophication threatens the Baltic Sea diversity.



Figure 3. Baltic Sea Eutrophication. (Helsingin yliopisto 2007.)

2.4.2 Climate change

Baltic Sea suffers from the climate change and the problems that it causes to the marine environment. One of the consequences of the climate change on the sea is that it warms up the sea, which causes changes in the ecosystem such as Carbon dioxide (CO₂) emissions and greenhouse gas (GHG) emissions that are caused by the ships. What is more, the air temperatures in the Baltic Sea region rise. The impacts of the warmer temperatures are that the ice cover of the Baltic Sea will melt at some extent causing the rise of the sea level, which results in floods and erosion, which again affects negatively to the tourism activities and coastal areas. As a consequence of the raised water temperatures, the Baltic Sea organisms get suffered from the changes. Especially vulnerable species for the melting of the ice is the Baltic ringed seal, which uses the ice as a place for reproduction. (WWF 2010, 30.)

Furthermore, climate change increases the risk of eutrophication since it for example causes the warming up of the surface of the seawater and increased amounts of fresh-water and decreased salinity, which leads to stronger stratification of the water and increased amounts of nutrients and again to the stagnation of the water and worsen levels of O₂. After that phosphorus release comes from the sediment, which creates more blue-green algae blooms and more turbid water. (The Baltic Sea Environment and Ecology 2014, 22.)

2.4.3 Overfishing

Baltic Sea is used a lot for fishing purposes due to the unique fishing species that live in the Sea. However, the amount of fish species is smaller in Baltic Sea compared to the North Sea for example. The most caught fish are Baltic salmon, Baltic herring, cod and whitefish. As a result, fishing is the main threat to the Baltic Sea fish species. The whole ecosystem suffers from overfishing and, sadly, fishing is often practised illegally, which causes huge damages to the sea. Overfishing has resulted in the death of plenty of Baltic salmon and the Baltic cod populations. The death of many predatory species such as cod, pike, salmon and grey seal increases eutrophication, nuisance species and ecosystem regime shifts since those species regulate the lower trophic levels. Fishing is a huge threat not only to fish species but also to seabirds and mammals since some fishing methods are so dangerous that they can catch almost any animal at any time. Bottom trawling is an example of that kind of fishing method (HELCOM 2010, 37-38). Furthermore, fish farming causes pollution load to the Baltic Sea (WWF 2014d).

Due to the concerning impacts of the overfishing, organizations and governments are acting along with the fish industries to achieve sustainable fishing practises and to support ecologically friendly fisheries. Luckily, today, fishing in the Baltic Sea needs a permission, which surely restricts the fishing in certain amount. (HELCOM 2010, 37-38.)

2.4.4 Oil pollution

Oil pollution caused by the ships may lead to a serious threat in the Baltic Sea since the sea is extremely prone to it since the water is cold and the sea is covered by ice for long

time in the winter time (The Baltic Sea Environment and Ecology 2014, 60). Maritime traffic is remarkable in the Baltic Sea region and the sea is one of the oldest routes for trading purposes in Europe. Along with the increased popularity of shipping, the risk for oil pollution has become more notable in the Baltic Sea area. What is more, Baltic Sea works as a route for oil exports from the Baltic States and Russia. Especially vulnerable area for the oil pollution is the archipelago including other coastal areas. (WWF 2014c.)

In the Baltic Sea area even one major ship accident takes place in a year. Especially now when the transport of oil in the Baltic has increased due to the huge demand for oil, the amount of accidents is increasing as well. Due to the unique characteristics of Baltic Sea, it is prone to the effects of international shipping which include numerous islands, slow water exchange, shipping routes that are difficult to navigate and long annual periods of ice cover. What increases the risk of oil accidents is that more than 100,000 tons of chemical tankers, oil tankers, containers and bulk carriers sail through the narrow straits of the Baltic Sea. Not forgetting the passenger ferries, which sail in the region. (WWF 2014c.)

The consequences of the oil accident are remarkable to the environment. The biodiversity and other areas may be threatened and the bigger damage takes place if the oil spills reach the shoreline and archipelago. The effects include for instance reduction in the amount of phytoplankton and zooplankton, hypothermia and intoxication suffered by the oiled animals and the problems for fish to reproduce. Luckily, most of the oil incidents in the Baltic Sea region are small accidental spills, though the effects are not minimized (Helsinki Commission 2009, 100). The States of Baltic Sea have improved their readiness to react to the oil spill accidents but the readiness for chemical spills is lower. (The Baltic Sea Environment and Ecology 2014, 63; WWF 2014c.)

2.4.5 Industrial and agricultural pollution

Baltic Sea is surrounded by nine coastal states. As a result, the industrial pollution is huge threat to the sea. However, many municipalities have started to pay more attention to diminishing the pollution level by better handling of waste. (WWF 2010, 21.)

Quite new threat for the Baltic Sea environment is the construction of wind farms situated in the offshore to produce energy (HELCOM 2010, 9). The pollution from the industries ends up to the sea via air emissions and as discharges into the water bodies, which later goes along with the river, airborne depositions or through direct discharges to the sea (HELCOM 2015). The impacts of the pollution are serious to the biodiversity and furthermore, nature conservations become difficult when there is poisons in the air. (WWF 2010, 21.)

Agriculture is the main reason for the nutrient inputs that end up into the Baltic Sea. Nutrients can change the quality of water gradually, which means that the negative environmental effects can be seen only after long period of time. Despite of many actions that have been made by farmers to reduce the nutrient loads ending up to the sea, the problem is not solved since for example the nature circumstances affect the amount of the nutrient discharges such as the amount of rainfalls. Heavy rainfalls increase soil erosion and cause leaching of nutrients such as nitrogen and phosphorus. Nitrogen and phosphorus are the most serious nutrient loads that can end up to the Baltic Sea by the agricultural actions. (Bäck 2010, 100-101; Prime Minister's Office 2009, 16-18.)

2.4.6 Hazardous waste

Hazardous waste is a serious problem to the Baltic Sea caused by cruise tourism. Baltic Sea belongs to the brackish water seas and those species that come from the saline ocean to the Baltic Sea are the most vulnerable to the hazardous substances (The Baltic Sea Environment and Ecology 2014, 61). Hazardous substances are pollutants that are toxic, bio accumulated, persistent, carcinogenic, mutagenic or toxic to reproduction. Hazardous substances are divided into environmental toxins, heavy metals, chemicals and household waste (WWF 2010, 21). Baltic Sea is extremely prone to those substances. Metals may be accumulated in animals and destroy them gradually and they can also settle in sediments for a long time. Several synthetic chemicals are bio accumulated, which means that they grow in the animal fat without breaking down. When an animal eats a contaminated animal, the chemicals are transferred to the healthy animal and if a healthy animal is again eating this contaminated animal, the effect will be even worse ('biomagnified'). (Leithe-Eriksen 1992, 64-65.)

The hazardous substances end up to the sea by atmospheric deposition and with the wastewaters that the industries and municipals discharge into the seas either directly or via rivers. The industries process the hazardous substances by emitting them during all stages of the production chain (Helsinki Commission 2009, 114). The waters that situate close to the industries are the most contaminated by the hazardous substances. (WWF 2010, 21.)

Cruise companies try to struggle with the air emissions they produce during the operation in order to provide the customers the cleanest possible environment. With the use of new and efficient technology, the cruise companies are striving for diminishing the air emissions of their ships. For instance several cruise companies have taken into use an exhaust gas scrubbers and monitoring devices. Furthermore, while the vessels stay in port, they are using shore-side electrical power in order to diminish the emissions. Cruise companies are using more environmentally friendly fuels as well such as liquefied natural gas (LNG) in order to reduce air emissions. (CLIA 2015.)

Some of the hazardous substances remain for a long period of time in the environment while others break down easily such as cyanide. The most dangerous substances that cause harm even with a low content to the Baltic Sea ecosystem are chlorinated organic compounds such as DDT (a pesticide) and PCB (a chemical used in industry) and dioxins. Those substances including many metals also remain long time in the Baltic Sea. Baltic grey seal and white-tailed eagle populations did collapse in 1970s because of those substances. (The Baltic Sea Environment and Ecology 2014, 60-61.)

What is more, heavy metals such as mercury, cadmium and lead concentrations in herring have been examined and attempts have been made to decrease them. Those metals are mostly used in industry processes. From HELCOM (Baltic Marine Environment Protection Commission - Helsinki Commission) countries, the annual amounts of heavy metal have diminished during 1990-2006 by 47% for cadmium, 45% for mercury and 86% for lead. In the year 2006, the waterborne heavy metal amounts to the Baltic Sea was 47,5 tonnes of cadmium, 10,8 tonnes of mercury and 274,2 tonnes of lead. (Helsinki Commission 2009, 115-116.)

TBT and TPhT are threatening the marine environment and mostly the lower trophic levels of the food web. TBT increases the vulnerability of the mammals by making them sensitive to diseases such as microbial infection. Anti-foulants such as tributyltin (TBT) and triphenyltin (TPhT) are used on ship hulls and after the use they are discharged into the sea. They may cause immediate effects on the organisms particularly at lower trophic levels of the food web. (Helsinki Commission 2009, 116-117.)

In the Baltic Sea, hazardous waste tends to accumulate into the marine food web, which may harm the ecosystem, especially many organisms such as predators. On top of that, the waste cause a danger for the health of people living in the coastal areas. (The Baltic Sea Environment and Ecology 2014, 60.)

Hazardous waste is solid or liquid waste. It includes for example certain batteries, lamp bulbs and waste from photo processing. Cruise ships have separate waste management for the hazardous waste. As the author mentioned above, hazardous waste in the sea can cause serious threat for the plants and animals but also to the humans. The best way to handle the hazardous waste is to be recycled or disposed. They can be for instance offloaded in the ports with the proper facilities and hazardous materials contractors. (Leithe-Eriksen 1992, 62-63.)

International Council of Cruise Lines (ICCL) has defined certain rules to handle hazardous substances. The waste process is done in order to separate out the hazardous substances for disposal and separate processing. For different types of hazardous waste, the ship companies have created different processing methods (Dowling 2006, 332-335). Some progress has made towards diminishing the hazardous substances but unfortunately every year new unknown hazardous substances appear. (WWF 2010, 21.)

2.4.7 Underwater noise

Underwater noise pollution and noise above the surface in the Baltic Sea region caused by the ships, fishing, construction and wind farms for example can harm the life of the marine animals. Especially the noise from the construction work may cause high sound levels. Animals for who the hearing is the most important sense, underwater noise can be a problem. The noise may distract the biological signals that the animal uses for

communication and location and the animals may be excluded for sometimes from their natural habitat when the noise period is long, causes stress or physical harm. What is problematic in noise pollution is that shipping noise is quite difficult to estimate. However, the bigger and older the ship is the bigger is the noise that it makes. The harm caused is not always obvious to the animals if the distance is long but in the long-term the biological signals are often distracted, which is called masking. Almost all the animals living in the Baltic Sea are suffering somewhat from the underwater noise since masking is very common in the marine environment. What is more, many freshwater fish species such as perch are often suffering from stress that the noise may cause to them. (Helsinki Commission 2009, 125-127.)

The effect that the noise has on the animals depends on how loud is the noise and how often the animal hears it but also the duration matters. Animals also react differently so some animals can be more harmed than the others. When an animal has suffered from the noise pollution the behaviour may change. The changes can include for instance changes in breathing, communication and in stress level. (Helsinki Commission 2009, 125.)

2.4.8 Direct physical effects on species and habitat

Plenty of human activities cause pressure on the species and habitat in the Baltic Sea. The most serious direct physical effect for the marine environment is the bottom trawling and particularly on the seabed. The Baltic Sea seabed is in a harmful condition. The damages to the seabed are caused also by coastal shipping, dredging and constructions on the seabed for example. When the seabed is being damaged, it changes the structure of the sediment and harms the species living in the bottom of the sea. Abrasion is one factor that damages the seabed. Bottom trawling for instance causes the abrasion as the fishing vessels destroys the seabed. The seabed recovers from the damages but it may take several years depending on the intensity level of the action. (HELCOM 2010, 28-29.)

Various kinds of development work have been implemented during the past years in the cities that surround the Baltic Sea. That makes the Baltic Sea extremely prone to pollution and other distractions. Numerous ports have been for example constructed

all around the Baltic Sea region. Often ports are the scene for accidents such as introduction of alien species and pollution for instance. Construction of the ports harms the seafloor, habitat and changes in coastal currents. The construction has for example caused problems in the spawning of herring and increased turbidity (Helsinki Commission 2009, 104-105). Furthermore, the noise that the construction work causes may disturb the species but also the tourism activities of the tourists. (WWF 2010, 18.)

2.4.9 Biocides

Maritime transport causes several threats to the Baltic Sea and to people living around the sea and most of the threats are caused by the various emissions that enter the sea by the cruise activity. The total range of the emissions consists of sulphur dioxide, greenhouse gases, ozone-depleting substances such as halon, chlorofluorocarbons, leaching of anti-fouling paints and volatile organic compounds. Those emissions are being discharged to the sea by the cruise ships. This results in long-term problems since the substances will end up to the bottom sediment of the Baltic Sea and to the catchment area soil. Those dangerous substances can move and thus drift into the food chain. (The Baltic Sea Environment and Ecology 2014, 60; Prime Minister's Office 2009, 36-37.)

Especially increasing concern is towards sulphur emissions from the ships. Sulphur emissions are extremely harmful for the crew of the ships but also to the people living around the Baltic Sea are threatened by the emissions. Due to the harmfulness of the sulphur there have been set many regulations on sulphur to reduce its content in fuel. In the year 2009 in the Baltic Sea area and in other Sulphur Emission Control Areas (The Baltic Sea, The North Sea, the English Channel) the sulphur content in fuel was 1,5% and the goal was to reduce it to 0,1% in the beginning of the year 2015. In the case of the sulphur content in fuel being 0,1% means basically that the fuel used in ships is gas oil (MGO). That is much more expensive than the heavy fuel oils with the higher content of sulphur. In order to reach the content of sulphur 0,1, it requires to moving from heavy fuels to light fuel such as to expensive gas oil. (Prime Minister's Office 2009, 38; Ministry of Transport and Communications 2009, 3-4.)

2.4.10 Biodiversity impacts

Baltic Sea biodiversity is a very sensitive area for impacts due to the small amount of species and low genetic variation (Helsinki Commission 2009, 153). Due to the sensitivity of the Baltic Sea, cruise tourism has quite huge impacts on the biodiversity of the Baltic Sea. What causes those negative effects are the oil spills, underwater noise, nutrients and the existence of alien species for example. There are several places in the Baltic Sea protected from the human impacts called marine protected areas (MPAs), which are the most trafficked areas thus most threatened. (Helsinki Commission 2009, 98-99.)

Changes in biodiversity have impacts on the oxygen levels and salinity in the deep basins of the Baltic Sea but the changes occur also as for the temperature of the sea surface. As a consequence, the ecosystem structure and distribution of species have changed. The impacts of cruise tourism are concerning the whole biodiversity and include many species: fish, mammals, birds, zooplankton, phytoplankton, habitat-forming species and many others. All of those are impacted by not only marine traffic but also many other human activities. Blocked waterways is a threat to fish, oil spills are a threat to birds, hazardous substances for mammals, eutrophication to zooplankton and phytoplankton and pollution to habitat-forming species. (Helsinki Commission 2009, 151-152.)

Reasonable amounts of algal blooms are bringing positive effects to the Baltic Sea but when the amount is excessive, the problems begin. Positive effects of algal blooms such as phytoplankton blooms are that they bring energy to the ecosystem. Whereas excessive algal blooms especially caused by bad algae such as cyanobacteria are one of the main problems in the Baltic Sea. During the time of excessive and harmful algae in the sea, the biodiversity is facing loss and organisms are in danger since the toxic of the algae threatens them (Helsinki Commission 2009, 113). The eutrophication has direct and indirect negative effects on the biodiversity. The most spread problems are turbid water, which occurs when the amount of planktonic algae exceeds among other planktonic organism, macroalgae, decreased amount of benthic habitats eelgrass meadows or oxygen depletion, which causes the death of benthic animals and fish. Oxygen depletion causes danger to the many seafloor animals. As a result, the biodiversity is re-

duced. Especially those animal communities that live in the seafloor reflect the condition of the environment. (Helsinki Commission 2009, 113.)

Without the pulses of the saltwater from the Danish straits, the oxygen would be consumed into the end at some point. The ending of the oxygen leads to various problems: dying of the seafloor species and the seafloor itself turns into a lifeless place. What is more, the seafloor releases nutrients into the seawater and the eutrophication gets a boost, which is called internal load of the Baltic Sea. Algal bloom appears as a result of the increasing amount of the nutrients in the seawater, which is considered as an increasing and serious problem in the Baltic Sea, which is getting worse because of the human activities in the sea. (Bäck 2010, 23-25.)

The eutrophication is not the only danger for the Baltic Sea biodiversity. Many hazardous substances are poisonous to many of the animals of the Baltic Sea. The impacts on the animals include the weakened health, problems in reproduction and poisoned fish eaten by humans. The problem of hazardous substances has got better compared to what it was 20-30 years ago but there is still need for actions. Besides the reduction of eutrophication, one of the positive effects of reducing the amount of nitrogen in the sea is that the quality of air would get much better. (Helsinki Commission 2009, 114.)

Marine dredging must be done in order to create new waterways or port for example. However, the dredging activity causes harm to the biodiversity and as a consequence, the most sensitive species have changed their place of living due to the dredging. Including disappearance of the species, the dredging causes turbidity. Additionally, what makes the dredging harmful for the environment is that when dredging old ports the sediments include toxic substances that are dangerous to marine species. Many actors have worked to diminish the negative effect of dredging by decreasing the material used and taking better care of the disposal process in the maritime area. (Helsinki Commission 2009, 102-103.)

Today, Baltic Sea is one of the mostly trafficked seas in the world. Cruise traffic is still increasing in the Baltic Sea, which causes environmental threats towards the sea. Additionally, the cruise ships are changing their size to even bigger and the amount of the

ships is also going up, which contributes more to the negative effects. That results in many threats to the ecosystem of the Baltic Sea, which is already now in a relatively bad condition. What causes the threats to the environment are the wastewaters of the ships but also the airborne emissions including other polluting factors. There are several regulations made by the national and international legislation that are monitoring that the ship's do not put their wastewaters in any place but certain distance away from the coastline. However, strategic planning and development must be more carefully implemented in order to increase the sustainable development of the sea. For this reason, the vessel wastewater regulations are getting stricter to diminish the problem. (Future trends in the Baltic Sea 2010, 4; Finland's Programme for the Protection of the Baltic Sea 2002, 7-8.)

3 Cruise tourism and environmental impacts

The beginning of the third chapter provides a brief introduction of the history of cruise tourism in order to explain the huge change that has happened in the cruise industry from early days to these days. After explanation of the history, the chapter provides the readers an overview of the state of cruise tourism today. In addition, the chapter three discusses the growth of the cruise tourism sector and growing popularity of cruise tourism among travellers and the traveller's preferences. At the end of the chapter the thesis focuses on sustainable tourism and the environmental impacts that the cruise industry produces.

3.1 History of cruise tourism

Cruise tourism is voyage that lasts over 60 hours and which is meant for leisure purposes. Cruise tourism does not differ much from any other tourism form except that it involves cruise ships. Generally it means that the passengers are carried from one place to another. Cruise tourism is a pleasant way to explore the destinations and the culture and people. Additionally, cruise tourism bring a lot of money for many destinations the cruise tourists visit. Ports of call are the place to unload the passengers when the ship has arrived to a destination. (Dowling 2006, 3; Uudenmaan liitto 2007, 8.)

The purpose of cruising has changed totally on 19th century. Before people travelled on seas because they were obliged to do that to carry merchandise and the ships were used only as a means of transport, a way of getting from one place to another. The purpose of the trip was the destination not the trip itself. First of all, what enabled and gave the visibility to cruising was the development of Peninsular Steam Navigation Company in 1837 and famous writer Charles Dickens experiences in the ship. Gradually cruising became more and more demanded by the people first by emigrants who wanted to move from Europe to United States and after for vacation purposes by wealthy people since cruising was not afforded by all. So the ships changed in style to meet the customers' requirements. (Thames & Hudson 2007, 13.)

Back in the 19th century, the destinations included the Canary Islands, the Mediterranean Sea, the Norwegian fjords and the Caribbean. As the cruising became more popular,

faster and bigger ships were created. At the beginning of the 20th century, cruising raised further its popularity among wealthy people and it became valued activity. What appealed first in cruising was that during the cruise, drinking and gambling was allowed to Americans while on land it was forbidden in the 1930s. After the destinations became the purpose of cruise ship tourism. As a result, the ships were created to be more luxurious and faster while its popularity among rich people increased. After competing with aviation industry and the negative effects of the Second World War on the cruise tourism, the cruising got a boost by having their unique routes and it became gradually accessible for everyone. (Thames & Hudson 2007, 13-15.)

3.2 Cruise tourism today

Cruising has changed compared to what it was in the earliest days. Nowadays people travel for pleasure and the ships are viewed as floating hotels where the purpose of the trip is relaxation. Today's cruise ships include plenty of activities and various facilities on board including wellness centers, spas with saunas, gyms, cinemas, tennis courts and good choice of restaurants. Additionally, some of the cabins are very luxurious with a window view or even balconies. There are ships of different sizes and different services, mega-ships and small and intimate boutique ships. Both of them have attractive advantages since the mega-ship contains all kinds of entertainment facilities but in the boutique ships the experience can be more intimate and unique since they can have access to more mysterious places where the mega-ships cannot access because of their big size. (Thames & Hudson 2007, 13-19.)

Today there are plenty of cruising destinations available for the tourists. Long time favourite destinations are the Caribbean and Mediterranean Sea due to the warm climate and unique culture but also the stable political situation. What is more, cruising in the Baltic Sea region has increased during the past years as the political situation has settled as well. What attracts tourists in cruising, is its versatile nature since in the cruise the person can choose what he wants to experience whether sense the nature, have fun, admire the cultures or just to relax. (Thames & Hudson 2007, 21.)

What affect to the choices of destinations of travellers is the culture, climate and above all, the political situation. People are looking for experiences that include admiring of

nature, culture or the purpose of cruising may only be to have fun with friends in the ship. Moreover, some people want to relax and escape the reality by taking part into cruise ship tour. The competition is hard between the ship companies due to the big demand for cruise tourism. The competition leads to increased marketing and promotion of the companies' brands as a best over other ship companies. The growth of this niche tourism sector has been huge and the development of cruise ships is phenomenal. (Thames & Hudson 2007, 21.)

Environmental impacts of cruise tourism gain all the time more attention as the industry continues it's growing. Product development and safety are also playing a huge role in the cruise industry. However, cruise industry has responded quickly to the new requirements that the environmental impacts cause and many cruise companies have changed their operations and development to match to the changes. Despite that, today there are still some areas that must be developed in order to reduce the effects and improve the state of the Baltic Sea. (Dowling 2006, 5.)

3.3 Size of cruise tourism

Despite of the bad economic situation, in the year 2013 and 2014, the amount of international cruise tourism visitors was 420 000 in Helsinki. Compared to the year 2012, the raise is 14 %. Several shipping companies have even raised their visits to Helsinki. The estimate is that the amount of cruise visitors will stay the same next year. Big part of Helsinki's international cruise traffic takes place in Hernesaari and Jätkäsaari in the West Harbour. (Visit Helsinki 2014.)

CLIA, Cruise Lines Internal Association, is the biggest cruise industry association in the world. It has predicted busy year for cruise tourism sector for the year 2015. In the year 2015, 23 million passengers are expected to travel by cruise that year. Today there are numerous amounts of ports to choose from, about 1,000 ports of call, and those ports are located in new and unique places near UNESCO World Heritage Sites. The growth of the cruise passengers is expected to be so remarkable hence CLIA's member cruise lines have 22 new luxurious ships coming in 2015 what is worth of more than 4 billion dollars. (CLIA 2015.)

Economically the year 2015 will be tremendous due to the raise of new ships and ports including expected growing passenger numbers and the effect will be global. Compared to the year 2013, the global economic output of the industry was over 108 billion euros, which means many new jobs and incomes. (CLIA 2015.)

According to the estimate of CLIA, due to the previous experience of the cruise travellers, they will continue travelling and 69% preferred cruise tourism to a vacation in the land. The focus in constructing the new ships of CLIA member cruise lines has not been in the size of the ships but the importance is in the design and services because the travellers value those mostly at the moment. Furthermore, what the passengers put value is on the luxurious ships, which can be seen on the growth of specialty cruises with 21% from 2009 to 2014. Majority of the cruise travellers find it most convenient to book their trip via travel agencies. (CLIA 2015.)

Unfortunately, cruise tourism is mostly concentrating in the destinations that have the diverse biodiversity, which means those areas are also the most threatened places. Those areas include Caribbean, the Mediterranean and today more and more popular cruise tourism destinations are in Asia and Australia since cruise travellers want to experience new exotic places. In 2015, 52 ships will provide 1,065 Asian cruises with capacity for 2,7 million passengers. That is why the cruise companies operating in those vulnerable areas must follow the restrictions to make sure they do not harm the unique ecosystems. However, in the year 2015, the most popular destination for cruise industry is still Caribbean. (CLIA 2015.)

Nowadays, Baltic Sea is also one of the most popular areas for cruise tourism. What is more, two new cruise ships are being built to operate in the Baltic Sea. In Helsinki, cruise tourism is being developed with the cooperation of Helsinki City Tourist & Convention Bureau, the Port of Helsinki and local service providers. Additionally, the Helsinki Cruise Network includes altogether 58 companies and other operators. The purpose of the Helsinki Cruise Network is to increase the visibility of Helsinki and Finland among cruise line destinations in the Baltic Sea. Cruise Finland is the marketing brand of the Helsinki Cruise Network. (Visit Helsinki 2013.)

3.4 Sustainable tourism

The concept sustainable development has arisen from two words and their convergence: environmentalism and economic development theory. The two words that are creating the word sustainable development are naturally development and sustainability. The development includes the importance of life quality and economic, social, cultural and political well being of the society. The sustainability means that a practise is maintained indefinitely and environmental carrying capacity is respected while ecosystem is being unharmed by the practises. Development and sustainability were put together to mean sustainable development, which means development that "meets the needs of the present without compromising the ability of future generations to meet their own needs". (Attfield 2003, 127.)

Sustainable tourism is defined as follows: "tourism that respects both local people and the traveller, cultural heritage and the environment". The idea is that both parties, locals and the traveller, get something positive from the travelling experience. The traveller should respect the host community along with their traditions and cultural heritage and try to understand them and be tolerant towards their culture. (Slideshare 2014, 7.)

The three parts of sustainability are social wellbeing, economic development and environmental conservation. Those three issues must go hand in hand for the world to be sustainable. What it means is that sustainable tourism does not take account only the environmental print but also the social and economic print of the tourism activity that it leaves on the environment. Environmental protection, social equity and economic prosperity are examples of the sustainable tourism goals. Furthermore, the importance of sustainability does not belong only to sustainable tourism but every tourism form should include sustainable behavior. One of the biggest challenges of tourism sector is to maintain economic growth, healthy environment and social welfare while the amount of tourists are rising every year (UNWTO 2011). In sustainable tourism there are always stakeholders involved working towards more sustainable tourism. (Slideshare 2014, 9.)

Sustainability means that society and its people are capable of meeting their needs without harming the surrounding environment. Higham (2007, 36) continues by stating

that sustainable tourism is not only categorized as one type of tourism type but includes different tourism forms as long as they foster the sustainable life style. The term also comprises tourism development, activity and management, which do not cause any social, environmental or economic harm to the surrounding life. The tourism is sustainable since the resources are not over-used and the environment remains untouched from the harmful tourism activities.

As the tourism has grown and its impacts on the environment are mostly negative, the questions about sustainability and environmental consequences of tourism have raised. Various views of sustainable tourism have been carried out. The main question of sustainability is that how the negative impacts of humans to the surrounding environment can be diminished. What is more, there has been discussion whether the tourism is used as a development tool, which means that it is used only for gathering government revenue. (McCool & Moisey 2001, 1-6.)

Preservation of biodiversity is the main concern in the sustainable tourism since it is relevant to livelihood. One of the most general ways to protect the marine biodiversity has been the creation of the marine protected areas (MPAs). Often those areas are the destinations for people who practice ecotourism. (Bricker, Black & Cottrell 2012, 188.)

3.5 Environmental challenges of cruise tourism

Cruise industry has its own environmental challenges, which the various companies and organizations have faced and tried to copy with to maintain an environmentally healthy environment that the passengers can enjoy. Wastewater, solid waste and oily bilge water are the three key challenges for the environment of the cruise industry. All in all, cruise ships are huge environmental polluters. They produce more carbon dioxide than the aircrafts. The waste that the ships produce consists of different kinds of pollutants. (Dowling 2006, 331.)

As the author mentioned before, cruise tourism is one of the fastest growing industries. New ship companies are arising but at the same time the environmental state of the seas are becoming worse and requiring actions in order to preserve the sea to the new generations. Spilling oil, leaving the garbage untreated and dumping garbage at sea

cause one of the biggest environmental threats to the ecosystem of the sea. Baltic Sea has become more and more vulnerable with the continuous increase of marine traffic in the region (Dowling 2006, 331). Especially vulnerable are the coastal areas, which are characterized by a very high biodiversity and what is more, that is the place for richest and most fragile ecosystems. (marbef 2013.)

3.5.1 Wastewater and litter

The cruise ships are producing two kind of wastewater: black water and grey water. Black water is sewage, which comes from toilets, infirmaries and urinals. The amount of black water that one cruise ship produces per day is huge: about 30,000-80,000 litres. Whereas grey water, which comes from the sinks, cleaning activities and showers, can include various substances such as detergents, food waste and oil and grease. Over 1 million gallons of grey water is produced in the 7-10 day cruise, which means the grey water is the biggest source of liquid waste that the cruise ship can produce. (Dowling 2006, 327-337.)

Wastewater causes severe problems ending up to the sea. Firstly, it creates nutrient in the marine environment. Nutrients again can result in algae and thus, start the eutrophication. Humans can be also threatened by the wastewater, which may contain bacteria and thus cause diseases. (Dowling 2006, 327-337.)

Many cruise companies have set rules for the handling of the black and grey water in order to minimize its negative environmental effects. For instance, the rule can say that it is prohibited to discharge wastewater less than 22,22 km from land. Several ships are also using technology, which enables the separation of the contaminants from the wastewater. What is more, several ships use the marine sanitation device, which prevents the discharge of untreated black water. Chemical processes are used to break down the black water. (Dowling 2006, 331-332.)

Cruise tourism provides litter in the marine environment. The litter may be hard to realize with the human eye because of its small size. Microscopic particles derive from for example plastic waste that degrades. The amount of microscopic particles changes from hundreds to a hundred thousand in a cubic meter of seawater. The biggest occur-

rence of micro-litter was spotted in the Gulf of Bothnia when at the same time the amounts were smaller in other basins. (HELCOM 2010, 31.)

3.5.2 Solid waste

Solid waste that is produced in the cruise ship includes various materials such as paper, glass, steel and aluminum cans, cardboard and kitchen grease for instance. The amount of solid waste that is produced by one passenger per day is about 1kg so big cruise companies must generate a lot of solid waste during the cruise. Solid waste poses a serious threat to the marine species such as fish, turtles and birds. The animals may also swallow the solid waste, which may cause a death of the animal. The countries that surround the Baltic Sea are making actions. Through IMO (International Maritime Organization), the Baltic Sea countries have agreed to a ban on throwing plastics to the sea, at any distance from land. Less strict rules are applied for example for paper, glass and metal for instance that can be discharged 40,23km from land. What makes the solid waste extremely dangerous for the environment is that it does not biodegrade easily or at all. (SOMS 2013, 83-84.)

3.5.3 Oily bilge water

Oily bilge water contributes the contamination of the sea. Oily water often leaks out from the ship's engine and machinery spaces and gets mixed with water in the bilge. For each 24 h of operation a large cruise ship generates about 8434 l of oily bilge water. In order to avoid dangerous conditions caused by oil vapors, the bilge spaces must be flushed and from time to time the water has to be taken out. Before the bilge is cleaned though, the oil has to be removed from the bilge water. The oil that is separated from the bilge water must be, according to the laws, passed through an oily water separator (OWS) before it is processed further. The oil that is separated from the bilge water can be used again or offloaded in ports if the ports have correct facilities for that. If the OWS is broken, the untreated oily bilge water can be discharged to the sea. However, the discharge of oily water to the sea is a threat to marine species. Especially diesel fuel is very poisonous to fish and seaweed. Besides, the oil spills may be extremely dangerous for shellfish and crabs in shallow sea areas such as in Baltic Sea, which is a small and shallow sea. Often the oil remains in the surface of the sea, which

is a place for the early development of the eggs of fish for instance. (Dowling 2006, 335-336.)

3.5.4 Alien species

Maritime transport is one cause for the introduction of alien species, which threatens the biological diversity. All the time new species are coming because of the increased marine traffic. What is more, these days it is even easier for them to stay alive due to the faster speed of the ships and bigger cargos. The alien species come from one marine ecosystem to another due to human activity. Since the early 1800s, around 120 alien species have moved to the Baltic Sea, of which around 70 have moved there forever. Most of the alien species come from North America, Black Sea and Caspian Sea. They may occur via ballast water and by attached to ship hulls. (HELCOM 2010, 26.)

The ecosystem is threatened by the alien species because they may prey on native species or eat their food and take their space. Several positive effects of alien species are also detected such as enrichment of the species of the Baltic Sea. Baltic Sea is favourable place for the alien species where they can spread out easily. This is due to the sensitive ecosystem of the Baltic Sea and the fact that Baltic Sea is not having many species so there is room for alien species. The most dangerous and known alien species are bay barnacle, fishhook water flea, red-gilled mud worm and conrad's false mussel. For example bay barnacle is already a part of the ecosystem of the Baltic Sea. (The Baltic Sea Environment and Ecology 2014, 58.)

4 Methodology

The research uses qualitative research as a research methodology. This methodology was chosen because it enables to gain the most precise and in-depth information about research problem: the actions done by the key cruise companies towards better sustainability of the Baltic Sea. Analysing the main cruise companies' websites enables to gather information about the actions they make towards the more sustainable Baltic Sea. The following chapter will describe what the attributes of the chosen methodology are, the explanation of the research process and how the methodology works as a research method in the research process.

4.1 Qualitative research

The research methodologies are divided into a qualitative research and quantitative research methods. Qualitative research method is defined by comparing it to the quantitative research and by finding the differences between the two methodologies. Both methodologies have certain features typical for them that make them recognizable. (Eskola & Suoranta 1998, 13).

Qualitative research methodology is a flexible in nature, which can be found as a positive or negative issue. The positive in that is that the research can be innovative which means the data collection process is freer. On the other hand, if the research is made to be innovative, it may have a lack of structure. Quantitative research is fixed thus the design of the research is fixed before collecting the data and it cannot be modified after the research is done and the data is collected (Silverman, 2000, 2). Moreover, statistical research techniques and complementing the survey or questionnaire are typical for the quantitative research, whereas the qualitative research is avoiding the statistical research since the researcher may be exploring the culture for example and thus the other ways to complete the research such as an observation and interaction with people are more suitable options (Silverman, 2000, 1). On the other hand, is the research that reliable when the results do not base on statistical data and numbers but observations for example?

According to Silverman (2000, 1-2), qualitative research is subjective since it is affected

by the researcher's political values, whereas the quantitative research is objective and value-free. What is characteristic for the qualitative research is that it does not need hypothesis to begin with but the least possible information expectations so the research is more like speculative when proceeding with the research, whereas the quantitative research normally begins with hypothesis. In the qualitative research the hypothesis comes from the data analysis. (Silverman, 2011, 60, 67.)

According to Silverman (2000, 3), there are five main methods used in the quantitative research: 1) social survey, 2) experiment, 3) official statistics, 4) 'structured observation' and 5) content analysis. Those are methods that can be utilized also in the qualitative research. There are also several varieties of a qualitative research. The different methods are divided into the four major methods: 1) observation, 2) analysing texts and documents, 3) interviews and 4) audio and video recording and transcribing. The methods are not always used individually but can be combined in the research and additionally, all of the methods can be used either in qualitative or quantitative research (Silverman, 2001, 11). However, the four methods are used differently in qualitative and quantitative researches. For example, observation in qualitative research is used to receive the understanding of the other culture, whereas in quantitative research the observation is used before framing the questionnaire. (Silverman, 2006, 19.)

One of the features of the qualitative research is authenticity. The researcher is tending to get as authentic picture as possible from the research topic for example from people's experiences. Reliability has less importance in the qualitative research (Silverman, 2001, 13). What is more, the qualitative research answers often to the questions how, why and what when describing the research phenomenon. (Silverman 2011, 17.)

Silverman (2000, 1) states that when deciding whether to use the qualitative or quantitative methodology, the researcher needs to think about what he wants to find out. He continues by saying that quantitative methodology is often used for instance when the researcher desires to investigate how people vote and a good way to find this out is to create social survey. Whereas, the qualitative research methodology may be the more appropriate choice when the researcher wants to investigate the everyday life or life history of people. Furthermore, it is relevant to keep in mind that qualitative and quan-

titative research includes many different ways of exploring things and the decision of the right research method is associated with the research problem the one analyses (Silverman 2005, 14). In my research I decided to use the qualitative research methodology and more exactly a content analysis because I wanted to gain a profound and extensive understanding of the actions made by the three main cruise companies in the Baltic Sea. (Silverman 2000, 1.)

4.2 Content analysis as a research method

Content analysis is a research method, which is used to analyze objectively different kinds of texts. The texts may include books, interviews, essays, discussions, articles, speeches, historical documents or newspaper headlines and several other communicative languages. In the content analysis, the researcher analyzes the meanings and relationships of the words in the text they are making a content analysis of and after they make conclusions about the content of the text. Content analysis includes both qualitative and quantitative approaches. The idea of content analysis is to get summarized picture of the analyzed text. What is more, it aims to create an oral and clear description of the phenomenon in order to alleviate the understanding of the text. The content analysis can be inductive or deductive. Content analysis has certain challenges such as concentrating only on the gathering of the information of the text without making any conclusions about that so the content analysis is not completely finished when only the information has been collected. Thus, it is relevant to quantify the gathered information and to turn it into results. (Tuomi & Sarajärvi 2006, 105-110.)

In the research the author analyzed the webpages of Viking Line, Eckerö Line and Tallink Silja. She investigated what it has been written in each of the companies' environment pages and reports when available. She divided the analysis into four different themes, each having questions concerning the companies' environmental effort towards the Baltic Sea. The topics of the themes were about the companies' environmental policy, efforts they make towards healthier environment, treatment of waste and atmospheric emissions. Those topics were chosen because they were seen relevant to the research. In the author's opinion selecting different themes help perceiving the general view of the company's environmental aspect and comparing the results between each of the companies.

The author started her research by concentrating into each of the ship companies' environment site in their home website with a certain theme related to the Baltic Sea environment. In the beginning of the analysis, the author got familiar with the existing material concerning the information in the companies' environment pages in the web and after she started to divide the information according to the themes. The topic of the research was chosen due to the own interest of the author and the general importance and actuality of the topic.

The data used in this research is based on the written material including books, articles, newspapers and rappers. The samples of the data are taken from the Viking Line, Eckerö Line and Tallink Silja environment website written in English and Finnish. The reason for selecting especially those three companies was that those were the three most well known Finnish cruise companies operating in the Baltic Sea region. Thus, those companies set a huge threat to the Baltic Sea environment.

The author chose content analysis as a research method because she found it most appropriate method for this research. First of all, in content analysis, the texts are summarized into clearer content. Thus, the author wanted to choose this method since her purpose was to explore the environmental pages of the three main cruise companies and pick up certain environmental themes in order to find out how the companies take care of the environment in their actions when they operate. The content analysis enabled the author to find out the most crucial points from the texts with relevant data that she handled and after made conclusions of those findings.

In total of 15 websites were utilized in this research. The websites are divided between Viking Line, Eckerö Line and Tallink Silja. Majority of the websites were those of Viking Line. All the tables provide the following information: title of the website, link to the website and the date of entry. Table 1 indicates the websites collected from the websites of Viking Line that were analysed in the research. Viking Line provided their environmental report as well that the author analysed. The amount of the websites was 11 in the table 1.

Table 1. Main cruise companies' environment websites utilized for the research: Viking Line.

Title	Links	Date of entry	Ref
Viking Line and Environment	http://www.vikinggrace.com/viking-line-environment/?lang=en	Feb 8, 2015	Viking Line 1
Legislation	http://www.vikingline.com/en/Investors-and-the-Group/Safety--environment/Environment/Legislation/	Oct 20, 2014	Viking Line 2
Environment	http://www.vikingline.com/en/investors-and-the-group/safety--environment/environment/ ,	Oct 20, 2014	Viking Line 3
Active environmental work	http://www.vikingline.com/en/Investors-and-the-Group/Safety--environment/Environment/Active-environmental-work/	Oct 20, 2014	Viking Line 4
Waste management	http://www.vikingline.com/en/Investors-and-the-Group/Safety--environment/Environment/Waste-management/	Oct 20, 2014	Viking Line 5
A commitment to environmental work	http://www.vikingline.com/Documents/download/2014-Miljo_ENG.pdf	Feb 8, 2015	Viking Line 6
No discharges into the sea	http://www.vikingline.com/en/Investors-and-the-Group/Safety--environment/Environment/No-discharges-into-the-sea/	Oct 20, 2014	Viking Line 7
No hazardous bottom paint	http://www.vikingline.com/en/Investors-and-the-Group/Safety--environment/Environment/No-bottom-paint/	Oct 20, 2014	Viking Line 8
Internal and external audits	http://www.vikingline.com/en/Investors-and-the-Group/Safety--environment/Environment/Internal-and-external-audits/	Oct 20, 2014	Viking Line 9
Environmentally conscious procurement	http://www.vikingline.com/en/Investors-and-the-Group/Safety--environment/Environment/Environmentally-conscious-procurement/	Oct 20, 2014	Viking Line 10
Energy consumption and atmospheric emissions	http://www.vikingline.com/en/Investors-and-the-Group/Safety--environment/Environment/Energy-consumption-and-atmospheric-emissions/	Oct 20, 2014	Viking Line 11

In table 2 it is presented the Eckerö Line web sites that has been utilized for this research. Eckerö Line did not provide any environmental report and there was found only one website providing information suitable for this research. Thus, the information was more limited in the website of Eckerö Line.

Table 2. Main cruise companies' environment websites utilized for the research: Eckerö Line.

Title	Links	Date of entry	Ref
Eckerö Line and the environment	http://www.eckeroline.fi/webapp/wcs/stores/servlet/Content_10151_10001_-1?page=index.php%3Foption%3Dcom_content%26view%3Darticle%26id%3D218%26lang%3Den-GB&smi=230&menuid=354,	Oct 24, 2014	Eckerö Line 1

Table 3 provides the websites of Tallink Silja that were examined in this research. The amount of the websites is 3. The environmental report was analysed as well.

Table 3. Main cruise companies' environment websites utilized for the research: Tallink Silja.

Title	Links	Date of entry	Ref
Environment	http://www.tallink.com/environment	Oct 28, 2014	Tallink Silja 1
We Engage	http://www.tallinksilja.com/documents/10192/7614783/2013_tallink_ecsr_we_engage.pdf/197e60fb-1377-49cc-818c-cab0cfa639ed	Feb 8, 2015	Tallink Silja 2
Welcome on board!	http://www.tallink.com/fleet	Feb 8, 2015	Tallink Silja 3

4.3 Validity and reliability

Validity of the research results and reliability gains plenty of attention in the measures of the content analysis. Reliability of the content analysis refers to the analysis that is stable and accurate. Reliability means that the analysed text can be as reliable now and in the future, which is called reproducibility. After the text has been analysed, the results must be made out of the analysis. The validity of the results means that these results correspond to the theory of the text. Additionally, the research is valid if it measures exactly what it was supposed to measure and if the research results are match the truth. However, it must be remembered that validity and reliability are defined differently whether it is a quantitative or a qualitative research in question. For example in the qualitative research, the researchers define reliability and validity with another words such as rigor, quality and trustworthiness. (Golafshani 2003, 597-604; Writing@CSU 2015.)

Reliability and validity are relevant terms in the research. They are related to each other but they have slightly different meaning. Reliability of the research means that exactly the same results are gained by different researcher with the same conditions, which is called repeatability. In order to ensure the reliability and validity of the research, the researcher takes several measurements. What is more, humans evaluate texts with different aspects and there are always certain changes due to people's aspect of things, thus the reliability of the research may be threatened. However, reliability of the research can be increased by describing profoundly the research methods and the whole process and comparing the theory with the author's interpretations. Reliability can be tested by using scales and pre-tested measures. (Silverman 2011, 360.)

Validity of the research means that the gathered results contain the requirements of scientific research method. The validity can be divided into internal and external validity. Internal validity is related to the experimental design of the research, which is found the most important value of validity before the results. As for external validity, it examines the results of the research with paying attention to other possible causal relationships. (Shuttleworth 2008.)

The validity of the qualitative research faces certain challenges. For instance one can have doubts about the truth of the research because the researcher has not handled contrary cases. What is more, the validity of the research may be suspected if the original form of the materials is not available. (Writing@CSU 2015.)

Validity and reliability of the research have an effect on the results. For example, if the research is valid and reliable, most probably the results will be more accurate. Triangulation is a term used in research, which is meant to increase the validity and reliability of the research results by using various ways to explore the situation. (Golafshani 2003, 597-604.)

In order to increase the reliability and validity of the research, the author have listed quotations of the main three cruise companies web sites utilized in the research in order to check the validity of the author's interpretations. As the results represent only three of the main Finnish cruise ship companies of all cruise ship companies in the

world and their actions towards the Baltic Sea, more research must be done in the future to find out what is required from the companies to make the Sea healthier. What could be done is to focus on the Caribbean cruise traffic and the effects on the sea since most of the cruise traffic takes place in the Caribbean. Further research would enable to get better picture of the actions by diverse cruise ships and also to define the usefulness of the actions made by the companies towards the environment and to see what could be done more.

5 Results

This chapter will focus on the analysis of the three cruise companies operating in the Baltic Sea, more exactly on the companies' environmental contribution and actions they have made for improving the state of the Baltic Sea. As explained in the previous chapter, the three companies chosen for this content analysis are Viking Line, Eckerö Line and Tallink Silja. The themes of this content analysis are divided into four different: what is the environmental policy of the companies, what do the companies do to improve the state of the environment, treatment of waste and atmospheric emissions. The results are based on the websites of the cruise companies and their environmental reports.

5.1 Viking Line

Viking Line is a Finnish shipping company grounded in 1959. Viking Line operates on the Northern Baltic Sea with a fleet of ferries and cruise ferries. The company has seven vessels: Gabriella, Mariella, Amorella, Rosella, Viking Cinderella, Viking XPRS and the new flagship Viking Grace. What is more, Viking Line offers various services including recreation, passenger and cargo carrier services on its vessels. (Viking Line 2015.)

The number of passengers in the Viking Line was 6 610 146 in the last year 2014. That was the best record of all times. Compared to the year 2013 the increase was 76 496. The increase is as huge as that due to the wide changes in improved traffic organization in the Helsinki-Tallinn route. (Navigator 2015.)

5.1.1 The environmental policy

Viking Line aims at practicing its operations in an environmentally friendly way. The company strives constantly for better results by decreasing the negative environmental impacts by training their staff, minimizing the pollution level and trying to get the customers to participate into their environmental work, as was stated in the company's web page:

Viking Line endeavours to provide seagoing passenger services in an environmentally sound way. By preventing pollution, training our employees on environmental matters and trying to engage our customers in our environmental work, our aim is to achieve continuous improvements and to reduce the environmental impact of our operations. (Viking Line 1)

Additionally, Viking Line acts according to the environmental legislation and international agreements and the company makes preliminary improvement plans for the environment in order to correspond the upcoming requirements, which was seen in also in the same page:

We run our operations in compliance with current environmental legislation and continuously implement preventive environmental improvements that will enable us to meet future legal standards as well. (Viking Line 1)

The most comprehensive international agreement of Viking Line is MARPOL 73/78 (The International Convention for the Prevention of Pollution from Ships), which is devised by IMO (International Maritime Organization) as stated:

The most extensive set of environmental protection regulations is the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), which was devised by the International Maritime Organization (IMO), a United Nations agency. (Viking Line 2)

Back to the year 1993, the organization of Viking Line and all its vessels were certified according to the International Safety Management (ISM) Code, which is seen below:

In 1993 Viking Line's organization and vessels were certified according to the International Safety Management Code (ISMC), which provides documentation to ensure that everyone in the organization carries out their agreed safety and environmental functions. (Viking Line 1)

The certification requires the company to take responsibility about its actions towards the environment and comply with the instructions, orders and legislation as seen below:

ISMC certification presupposes that we accept responsibility for the environmental impact of our operations and comply with directives, rules and legislation. The core of our environmental work is the environmentally sound management of residual products from our operations. (Viking Line 1)

Besides ISM code and MARPOL 73/78, all the Viking Line vessels are certified according to ISO 14001 standards:

The Group's Head Office, the subsidiary Viking Line Buss Ab and all vessels are certified in compliance with ISO 14001 environmental management standards. (Viking Line 2)

5.1.2 The environmental work

The environmental work of Viking Line is based on internal and external environmental investigation, evaluation of the environmental impacts of the vessels and informing about the environmental work:

To ensure that Viking Line meets environmental certification standards, continuous internal audits of its operations are conducted. (Viking Line 9)

By means of internal and external environmental research, impact assessments and reporting systems, we have developed environmental practices that go well beyond the directives, rules and laws governing passenger services on the Baltic Sea. (Viking Line 1)

Similarly, Viking line is working voluntarily and doing proactive work to minimize the negative environmental effects as seen below:

Our operations are also governed by the principle of caution and by voluntary preventive efforts in order to minimize environmental damage. (Viking Line 1)

Viking Line is doing all that to reach its aim, which is to serve the best possible and environmentally friendly experience to every customer of the company:

Our goal is to ensure that you, as our customer, are aware that Viking Line is an environmentally sound alternative when you select your mode of travel. (Viking Line 1)

Viking Line strives for environmentally friendly operations and by reaching that it is extremely committed and doing work, which is more than what is required in the rules:

Viking Line endeavours to provide seagoing passenger services in an environmentally sound way. Through a long-term, active commitment to the environment, the Company has developed environmental activities that extend beyond what is stipulated by the rules in force for passenger services on the Baltic Sea. (Viking Line 3)

Besides the loyal commitment to its work, Viking Line supports and co-operates with Baltic Sea Action Group (BSAG) in order to save the Baltic Sea:

Viking Line participates actively in the task of saving the Baltic Sea by supporting and collaborating with the Baltic Sea Action Group (BSAG). (Viking Line 4)

Their co-operation compasses several projects about new Baltic Sea action plan:

This collaboration will include practical projects in keeping with the overall objectives of the Helsinki Commission's new Baltic Sea Action Plan. (Viking Line 4)

Thanks to Viking Line's active work, it was awarded the Ports of Stockholm Environmental Buoy 2012 for building the first passenger vessel using LNG as its fuel and for inventing unique environmentally friendly solutions for the Viking Grace:

During the financial year Viking Line was awarded the Ports of Stockholm Environmental Buoy 2012 for having built the world's first passenger vessel in its size class that can run on LNG and for meanwhile developing several unique and innovative environmental solutions for the Viking Grace. (Viking Line 4)

Furthermore, Viking Line is taking environmentally friendly choices into account in their procurement. That encompasses the food in the vessels, which is chosen carefully to match into the company's awareness of the environmental protection:

Nowadays Viking Line chooses organically grown coffee as one element of its efforts to practice environmentally conscious procurement. When purchasing the seafood that is served on board its vessels, Viking Line follows the Swedish Environmental management Council's list of sustainable fish and shellfish stocks. (Viking Line 10)

5.1.3 Waste treatment

Viking Line is highly committed to recycling all its material in order to save the environment. The company's idea in recycling is that by recycling the materials, the less energy is needed compared to the energy use when acquiring new material from nature:

Recycling of materials is very helpful to the environment – greater recycling reduces our climate impact. It requires much less energy to recycle materials than to extract new ones from nature. Eco-cycles benefit the climate. (Viking Line 3)

As a result of loyal commitment of Viking Line, it recycles all the material used during its operations, which will end up ashore to be recycled, reused, burnt, handled in the landfill or composted, which is stated below:

All solid wastes generated aboard Viking Line vessels are brought ashore for subsequent recycling, reuse, combustion, depositing in landfills, composting or other waste management by an approved recipient. (Viking Line 5)

What is more, in Viking XPRS and Viking Grace have certain installations that enable efficient sorting and separate collection for the organic waste. For example in Mariella, all the organic waste is left to organic waste containers. After that the bio waste will be transported to the factory to turn it into biogas:

On the Viking XPRS and Viking Grace, equipment has been installed to make efficient sorting and collection of biowastes possible. On the Mariella, all biowaste is collected in receptacles. The biowaste is then transported to a digestion plant for production of biogas. (Viking Line 5)

More exactly, from Viking XPRS and Mariella, 311 tons of food waste was transported ashore to biogas production. 331 tonnes of food waste corresponds 24 000 cubic meters of biogas and again 24 000 cubic meters corresponds 27 000 liters of gasoline. Biogas production is environmentally friendly because it does not increase the amount of carbon dioxide in the atmosphere nor worsen the greenhouse effect as expressed below:

Viking Line brought ashore from the Viking XPRS and the Mariella a total of 311 tonnes of food waste, yielding 24,000 cubic metres of biogas. 24,000 cubic metres of biogas are equivalent to 27,000

litres of petrol. Biogas production neither increases atmospheric carbon dioxide levels nor contributes to the greenhouse effect. Biogas is thus usually described as carbon dioxide-neutral. (Viking Line 3)

Not only that, during 2012, Viking Line brought several waste of big amounts to be recycled ashore such as 10 tonnes of plastic, 8 tonnes of aluminium, 2,365 tonnes of used oils, 492 tonnes of glass packaging, 104 tonnes of scrap metal and 638 tonnes of paper and cardboard packaging. Recycling those wastes will save a lot of energy, trees and huge reductions in CO2 emissions as seen in the list below:

- *10 tonnes of plastic, which is equivalent to a 18 tonne reduction in CO2 emissions – comparable to driving a car 95,760 km on a motorway.*
- *8 tonnes of aluminium, which is equivalent to a 80 tonnes reduction in CO2 emissions – comparable to driving a car 425,600 km on a motorway.*
- *2,365 tonnes of used oils, which is equivalent to a 4,139 tonnes reduction in CO2 emissions – comparable to driving a car 22,019,480 km on a motorway.*
- *492 tonnes of glass packaging. When recycled glass is melted down to make new glass, the process consumes 20 per cent less energy than starting from sand, soda ash and limestone as raw materials. Glass packaging can be recycled any number of times without deteriorating in quality.*
- *104 tonnes of scrap metal. Recycling of steel, for example from food tins, consumes 75 per cent less energy than production from iron ore.*
- *638 tonnes of paper and cardboard packaging. Because of recycling, we do not need to cut down as many new trees. A tonne of recycled paper is equivalent to about 14 trees. Paper can be recycled around seven times. (Viking Line 3)*

MARPOL supervises that all the Viking Line vessels take care of the water discharges. The vessels are not allowed to discharge neither waste or bilge nor black water into the sea. Instead, all the wastewater is processed ashore:

Viking Line vessels discharge neither waste nor bilge water into the sea. In order not to burden the Baltic Sea with nitrogen, phosphorus and oil, the Company's vessels pump all their wastewater ashore, including bilge water. (Viking Line 7)

The rules have to be strictly followed by the vessels:

MARPOL regulates management of black and bilge water. Discharge of black and bilge water into the sea is permitted when the water meets certain specified criteria. (Viking Line 7)

5.1.4 Atmospheric emissions

Viking Line does active work to minimize its air emissions. For example to reduce sulphur emissions (SO_x), in the vessels of Viking Line it is used only low-sulphur fuel. Only in Viking Grace it is used liquefied natural gas (LNG), which does not include sulphur at all. On the other hand, diesel oil which contains 0,1 percent sulphur content by weight is used a pilot fuel in order to set fire to the natural gas:

Viking Line's vessels use low-sulphur fuel with a sulphur content of 0.5 per cent by weight, in order to reduce sulphur oxide (SO_x) emissions, except that the Viking Grace operates on liquefied natural gas (LNG). LNG contains no sulphur, but diesel oil with less than 0.1 per cent sulphur content by weight is used as a pilot fuel to ignite the natural gas in the engine. (Viking Line 6)

Restrictions have got more strict as for the permitted amount of sulphur in the diesel oil namely since the 2010 according to MARPOL 73/78, the sulphur content of the diesel oil in the vessels on the Baltic Sea could not exceed 1,0 percent by weight but now in 2015 the amount cannot exceed 0,1 percent by weight. Viking Line has to make actions to meet the new requirements as stated below:

According to an annex to MARPOL 73/78, effective from July 1, 2010 the sulphur content of marine diesel oil and fuel oil used by vessels in service on the Baltic Sea may not exceed 1.0 percent by weight. Viking Line vessels are thus well below the threshold level. The European Union's new sulphur directive, which goes into effect in 2015, lowers the threshold for Baltic Sea maritime services to 0.1 per cent sulphur by weight. Viking Line has begun preparatory work to meet the new standard. (Viking Line 6)

It is also very precise that when a Viking Line vessel spends more than two hours in the harbor, the oil used during the stay is diesel oil with less than 0,1 percent sulphur by weight:

All Viking Line vessels that are moored in port for longer than two hours use marine diesel oil with a sulphur content not exceeding 0.1 per cent by weight throughout their port stay. (Viking Line 6)

Similar to the reduction of the sulphur emissions, the nitrogen emissions are being reduced by inventing technical solutions to the vessels. To one of the vessels of Viking Line has been installed catalyzer and the other one has Humid Air Motor technique

(HAM). HAM is worldwide unique method that reduces nitrogen oxide emissions by lowering the combusting temperature of the vessel engines as stated in the following example:

To reduce nitrogen oxide emissions, reduction technology is used on two of the Company's vessels – catalytic converters on one vessel and Humid Air Motor (HAM) technology on the other. HAM is a globally unique method that reduces nitrogen oxide emissions by lowering the combustion temperature of vessel engines. This temperature reduction is achieved by adding vaporized seawater to the combustion process. (Viking Line 6)

All kinds of actions by Viking Line have been made in order to reduce the air emissions. One of the company's means to reduce not only the air emissions but also the noise of the vessels' engines in the port is to use land based electricity supply while on port in Helsinki or Stockholm:

Two of the Company's vessels now operate using a landbased electricity supply while they are docked during the daytime in Helsinki and in Stockholm. Using landbased electricity decreases emissions of air pollution and engine noise in ports and their vicinity. (Viking Line 6)

On top of that, Viking Line has an internal programme to diminish the exhaust gas emissions:

Viking Line has an internal programme to reduce exhaust gas emissions. In this programme, vessel operating staff and the Company's technical department are working to introduce fuelefficient methods of manoeuvring vessels. (Viking Line 6;Viking Line 11)

In order to clean the bottom of the vessels, Viking Line is using divers who brush the bottoms in an environmentally friendly way by using right techniques:

Instead of using environmentally hazardous tin-based paints on the bottoms of vessels, their hulls are brushed by divers several times each year. (Viking Line 8)

Viking Line has used an upgraded brushing method that was developed and patented by the DG-Diving Group. The upgrade involves collecting all growths loosened from the bottoms of vessels during brushing into a separate container, which is then brought ashore for further treatment. (Viking Line 6)

The products used in cleaning are meeting the specific standards to ensure they are environmentally friendly:

Purchasing and use of chemicals are governed by internal environmental standards. A list of products approved for use at Viking Line is being compiled at Group level. Environmentally friendly alternatives are used as far as possible. (Viking Line 8)

5.2 Eckerö Line

Eckerö Line is a Finnish shipping company founded in 1995. M/S Finlandia is the only passenger vessel of Eckerö Line that operates from Finland. The company operates between the Helsinki-Tallinn routes. Additionally, the company has one vessel for cargo operating the same route. (Eckerö Line 2013.)

Eckerö Line's passenger numbers have increased. The number of passengers of Eckerö Line's m/s Finlandia was 1,38 million in the year 2014, which is 21% more compared to the last year 2013. The increase is due to the new schedule and increase in the amount of daytime cruise options. (Turun Sanomat 2015.)

5.2.1 The environmental policy

Eckerö Line is taking seriously the environmental threats that it is causing to the surrounding environment. They are following the environmental legislation and granted by an environmental certifications, which is stated in the Eckerö Line's environment page:

Our operations conform to the current environmental legislation; our certification, granted by Lloyd's Quality Assurance, ensures continuous development work to decrease our environmental load. (Eckerö Line 1)

The text continues about the certifications by stating:

All of Eckerö Group, including Eckerö Line, has been certified as complying with the ISO 14001 environmental standard. (Eckerö Line 1)

In addition, Eckerö Line is setting goals to decrease the environmental effects of the company's actions by doing various development jobs as written in Eckerö Line's

page:

Our goal is for our operations to cause a minimal load to the environment; Eckerö Line conducts continuous development work to improve the management of waste products and emissions from its vessels. (Eckerö Line 1)

Besides that Eckerö Line has been certified several times, the company's employees have the responsibility to contribute to aiming at the common environmental goals as expressed in the web site of Eckerö Line:

Eckerö Line's environmental work aims to be a natural part of everyone's daily activities. Everyone in our organization is responsible for actively following and developing the environmental goals we have set for ourselves. (Eckerö Line 1)

5.2.2 The environmental work

The staff in the ships is trained to obey all the environmental norms that are applied in the Eckerö Line vessels. One of the most important parts of the training is the handling of waste:

All staff participates in our environmental work and carry the responsibility for the environmental targets relating to their work. One important topic in the compulsory training of new staff is the handling of waste products in their particular working places. All staff receives regular supplementary training for environmental work. (Eckerö Line 1)

Eckerö Line aims to be more environmentally friendly in many of its actions. They are for example focusing on development work, which aims to creating more environmentally friendly substances:

We take part in continuous development work with the target of exchanging the current chemical substances to more environmentally friendly ones. (Eckerö Line 1)

Today we do not use antifouling paints with toxic tin compounds to keep the hulls of our vessels clean. We scrub the hulls regularly, which causes both fuel consumption and waste emissions to be decreased. (Eckerö Line 1)

Eckerö Line is acting environmentally responsible as for purchasing materials. They are selling local food at the restaurants on board and avoiding the use of disposable dishes

as seen below:

When purchasing raw materials for the ships' restaurants, we favour locally produced foodstuffs. (Eckerö Line 1)

Our purchasers prefer producers with environmentally certified products and/or producers with active, properly managed environmental policies. We are taking definitive action to reduce the use of disposable dishes on our ships. (Eckerö Line 1)

5.2.3 Waste treatment

Eckerö Line takes the waste treatment seriously since the company is sorting all the waste that is produced in the vessels and not only the waste produced on board but also in land. The example is seen below:

We sort all waste produced by our operations on our passenger and freight vessels. Waste is produced in the passenger facilities, and the operation of the vessels causes it as well. Naturally, we also sort the waste produced in our land operations, i.e. in our chartered vehicle traffic, harbour operations, and our offices and storehouses. (Eckerö Line 1)

What is more, Eckerö Line is never letting the wastewater to the sea but it is brought to the wastewater plants to be treated. As seen in the below text:

We pump all wastewater ashore for municipal wastewater plants to treat. Therefore, the phosphorus and BOD7 concentrations in our wastewater do not cause any environmental load to the Baltic Sea. (Eckerö Line 1)

As a conclusion, it seems that the waste treatment is well organized in the Eckerö Line vessels and the company is aiming at making more environmentally friendly choices in their every day operations. This is seen below:

On the m/s Finlandia, waste is sorted as follows:

- *Waste fit for incineration*
- *Waste paper*
- *Waste glass*
- *Aluminium tins*
- *Scrap metal and hazardous waste*
- *Cooking grease*

- *Plastic waste*
- *Environmentally hazardous waste*
- *Waste oils*
- *Wastewater (greywater and blackwater)*
- *Purer water* (Eckerö Line 1)

5.2.4 Atmospheric emissions

Air pollution seems to be an important issue for the Eckerö Line since the company is contributing to the factors that are made to reduce the negative effects on the air.

Eckerö Line aims to minimize its air pollution by using more environmentally friendly fuel and by using more energy efficient solutions in its every day operations. This is stated in the web site in the environment page:

Factors important for the reduction of air pollution include the high quality of fuel and the energy efficiency of the ship and its equipment. In order to reduce sulphur oxide (SO_x) emissions, the main engine of the Finlandia uses low sulphur fuel (1% S), and the booster drives and the boiler use ultra low sulphur fuel (0.1% S). (Eckerö Line 1)

The new Eckerö Line ferry, m/s Finlandia aims to avoid emissions from going to the air and water with the objectives set by the CLEAN SHIP classification system's construction technique regulations. M/s Finlandia has for example received a new propulsion system to diminish the fuel consumption. As it is stated in the Eckerö Line's environment page:

The m/s Finlandia also targets the environmental protection objectives of the CLEAN SHIP classification system. The CLEAN SHIP construction technique regulations aim at the prevention of emissions into the air or the water, should an accident occur. The Finlandia has received a new propulsion system that reduces her fuel consumption. M/s Finlandia has a technique that turns the waste into heat and that heat is further used to warm the vessel. Finlandia also has had new waste heat boilers installed that recover the exhaust gas heat energy from the main engine and booster drives. The energy recovered is used for heating the vessel. (Eckerö Line 1)

Furthermore, Eckerö Line is using energy saving LED lights in its vessels:

As much as 90% of the ship's spotlights have been changed, and energy-efficient LED lights are now in use (Eckerö Line 1).

5.3 Tallink Silja

Tallink Silja Oy is a Finnish shipping company founded in 1957. The company is owned by Estonian AS Tallink Grupp, which is one of the biggest passenger and cargo shipping companies. The company provides high-quality mini-cruise and passenger transport services in the Baltic Sea region. On top of that, Tallink Silja offers cargo services. Tallink Silja has several routes on the Baltic Sea and it works under two names “Tallink” and “Silja Line”. (Tallink Silja 2015.)

In November 2014 Tallink Corporation had 647 222 passengers, which is 4% less compared to the last year 2013 November. What have caused the small decrease in passenger numbers are especially the changes in capacity in Sweden-Latvia route. (Tallink Silja Line 2015.)

5.3.1 The environmental policy

Tallink Silja has its own sea policy. The company’s aim is to decrease the pollution level with the high safety standards, conventions and legislation that are applied in the activities in the sea and shore. What is more, Tallink Silja is contributing in improving the methods that decrease the pollution including the use of equipment to minimize waste generation.

The company is 100% in in improving the state of the Baltic Sea since it follows all of the local and international regulations regarding the shipping fuel and as a result doing its best for gaining improvements:

The Company is following all local and international regulations concerning the fuel used for shipping in the Company’s operational area. The regulations in the Northern Baltic Sea area are one of the strictest and detailed ones in the world. (Tallink Silja 2)

For example, all the Tallink Silja vessels are operated in accordance with the MARPOL convention (International Convention for the Prevention of Pollution from Ships) as stated below:

Vessels are maintained and operated in accordance with the MARPOL convention (International Convention for the Prevention of Pollution from Ships) in order to ensure that air and sea pollution is

kept at the lowest practicable level. (Tallink Silja 1)

Additionally, Tallink Silja vessels have the international environmental management certificate, ISO 14001:2004, which is voluntary for companies:

Tallink`s ships and the subsidiary managing the technical operating of the vessels HT Ship management have the high level environmental certificate ISO 14001:2004 released by Lloyds Register. ISO 14001:2004 is a highly valued international environmental management certificate, voluntary for companies. (Tallink Silja 1)

Besides, Tallink Silja vessels have the certificates of prevention of oil pollution and sewage pollution. Some vessels have also garbage pollution prevention attestation since handling of garbage is highly supervised on the vessels. All those certificates are renewed from time to time to since they are valid only specific time:

All of our vessels have received all required international oil pollution prevention certificates. During their respective navigation periods, our vessels also hold valid sewage pollution prevention certificates. Handling of garbage on the vessels is regularly recorded and several of our vessels also hold a special garbage pollution prevention attestation. As the certificates are issued for limited periods, we regularly apply for the renewal of the certificates before their expiry. (Tallink Silja 1)

Tallink Silja takes overall care of its environmental footprint and it is setting a high value for the environmental issues. As seen below:

Tallink recognizes environmental protection and management as one of its highest priorities and that every effort is to be made to conserve and protect the environment from marine, atmospheric and other forms of pollution, including office based waste. (Tallink Silja 1)

As a result, all of the regulations are strictly followed to make sure the company operates safely with a minimum burden to the environment and the company is ready for any means that have a positive impact on the reduction of the waste it generates as stated below:

Tallink operates a zero spill to the sea policy and our objective is to eliminate the possibility of pollution at source by ensuring high standards of safety and awareness are maintained and that all relevant legislation and conventions are followed for both its sea and shore based activities. We are also committed to the continual improvement of methods used to carry out and achieve this objective, including the

use of equipment and practices that minimize waste generation. (Tallink Silja 1)

In the summary, Tallink Silja vessels follow the rules and regulation set by various organizations. By giving environmental knowledge to its employees, using environmentally friendly materials and actions from recycling to efficient waste management and choosing its partners carefully and prevailing discussions with important people, the company surely will achieve good goals towards sustainable development of the Baltic Sea:

Conclusively in order to assure the protection of the environment Tallink complies with mandatory rules and regulations, taking into account codes, guidelines and standard from maritime organizations; actively promotes environmental awareness by training and education of its employees; operates its office and ships taking into consideration the efficient use of energy and materials; wherever practicable, adopts the principles of re-use and recycling; requires that suppliers and contractors working under its direct control and affiliated companies apply environmental standards consistent with its own; participates in discussion with relevant authorities with a view to being aware of current environmental issues and topics and to develop measures to minimize risk to the environment; ensures compliance by undertaking regular inspections and audits along with the rectification of any nonconformity. (Tallink Silja 1)

5.3.2 The environmental work

Tallink Silja makes plenty of efforts to be as sustainable as possible in its operations in the Baltic Sea. The company is all the time looking for new environmentally friendly solutions in order to enable sustainable future for shipping by saving the Baltic Sea from negative effects of its daily operations.

Several ships of Tallink Silja have been painted again and the paint used in every ship is environmentally friendly:

Ships built before 2003 have been repainted with environmentally friendly paints; and in the case of all newer ships, the principle of environmental friendliness has already been adhered to in their construction. (Tallink Silja 2)

Similarly as for cleaning the ship, Tallink Silja vessels use mostly only environmentally friendly biochemicals in order to save the environment from bigger pollution:

The chemicals used on board ships to keep them tidy and clean are mostly biochemical and therefore also environmentally friendly. (Tallink Silja 2)

Additionally, Tallink Silja is selling some of its older vessels in order to represent environmentally conscious company with the newer vessels with more environmentally friendly planning:

The Company is up to selling or chartering some of the oldest vessels in the fleet to continue with even younger fleet as today. In 2013 the Company sold MS Adriatic Queen (former MS Vana Tallinn), which was the oldest passenger vessels in the fleet. (Tallink Silja 2)

All of the newer vessels purchased or ordered from shipyards, have modern machinery onboard enabling the vessels to operate on less fuel, cleaning wastewaters etc. (Tallink Silja 3)

Tallink Grupp has one of the newest fleet in the Baltic Sea area among the other shipping companies and that is why it is having the most environmentally advanced technology used in its vessels:

Since AS Tallink Grupp owns one of the newest fleet in the Baltic Sea in general, it is also the most environmentally friendly shipping company in the region. (Tallink Silja 3)

Thinking about the future and showing the loyalty to the environmental work, the company is a member of WWF. Additionally, the customers are highly appreciated in Tallink Silja and that is why the company keeps going on good environmental work as stated below:

To prove our point in protecting the sea's environment in this way, the Company has also joined the WWF (the World Wildlife Fund) agreement to continue this policy in the future. Increasing the awareness of our customers is also an important part of decreasing the amount of waste and wastewaters on board of the ships. (Tallink Silja 2)

5.3.3 Waste treatment

Tallink Silja is treating all its waste in order to save the environment. Firstly, the wastewater is never pumped into the sea. Instead, the black (wc waste) and grey (drain and gray water) water generated during the cruise is pumped only in the harbor into the

sewerage system of the city where it continues further to the handling of the wastewater treatment plant. Tallink Silja is applying zero tolerance as for pumping wastewater into the sea:

Wastewater is definitely also a problem for the Baltic Sea, as discharging wastewater into the sea is still officially permitted. The Company is cooperating with ports to leave wastewater and oily water from its ships at the harbor. (Tallink Silja 2)

What is more, Tallink Silja has its own equipment to clean the wastewater on board:

The wastewater is also cleaned on board with modern equipment. (Tallink Silja 2)

In all of the Tallink Silja vessels, the metal, plastic, glass, paper, bio and hazardous waste is correctly recycled. MARPOL convention, which is following the waste treatment and amounts, has also certain regulations for the waste treatment. Instead of bringing the mixed waste that is generated during the cruise to the landfill, it will be taken into the incinerator where the waste is turned into thermal energy. Tallink Silja recycles the waste oil that is generated in the vessels. The waste oil is delivered to the land to be handled and cleaned until it is ready to be used for example in heat power plants:

As much as is possible, used spare parts are handed over to certified manufacturers and most of the material is recycled and is largely used all over again in a new format. Therefore the cooperation partners who handle the waste from the ships are chosen very carefully. (Tallink Silja 2)

5.3.4 Atmospheric emissions

One of Tallink Silja's most important aims has been to reduce air emissions. To achieve that goal, Tallink Silja has chosen three areas to concentrate on:

For some time now, one of Silja's most important environmental challenges has been to reduce exhaust emissions more efficiently. This can be done in three ways: introducing cleaner fuels; switching to more fuel-efficient engines; or installing systems designed for more efficient exhaust emission control. Silja Line is making an effort to reduce the environmental impacts of its fleet in all three areas. (Tallink Silja 2)

In 2012, the fleet of the Tallink Silja has begun with a plan called the Ship Energy Efficiency Management Plan as stated below:

The fleet of the Company started designing and implementing the new Ship Energy Efficiency Management Plan in 2012. The SEEMP is an inseparable part of the Safety Management System and is required by MARPOL Annex VI. (Tallink Silja 2)

After renewing the Air Pollution Prevention Certificate in 2013 to keep up with the consumption of fuel of every Tallink Silja vessel, every ship has to present SEEMP:

As from 1st of January 2013 by renewal of the Air Pollution Prevention Certificate, every ship had to present a SEEMP. It is a totally new and even more detailed way of gathering information on fuel consumption. Energy Efficiency Operational Index (EEOI) is calculated taking into consideration the number of passengers, gross tonnage and different fuels used. (Tallink Silja 2)

The company aims at diminishing the impacts on the environment by the air emissions by reducing them by 5 percent. That requires several actions from the company including successful co-operation with ports as for electricity supply, effective operations, renewal of the fleet and monitoring as listed below:

- *Ongoing upgrade of the fleet – renewing technical solutions on board and selling/ chartering older vessels*
- *Optimizing operations (can negatively affected by complicated weather conditions such as long lasting ice or storm periods)*
- *Positive results from the cooperation with ports regarding the on shore electricity supply alternative*
- *Continuous monitoring: Overall fuel consumption is being monitored at all times – both the overall fuel consumption and fuel consumed to carry units of cargo or passenger. (Tallink Silja 2)*

Effective monitoring is, especially, one of Tallink Silja vessels key towards environmentally friendly goals since that way the whole fleet can be controlled:

The Company has followed monitoring and goals set for ISO 14001:2004 as well as an additional CO2 reduction plan. The base of all plans is a good and structured monitoring system, which observes the environmental performance of the whole fleet. (Tallink Silja 2)

Furthermore, as mentioned above, the fuel quality is under high control:

Constant monitoring of the fuel quality: Test probes are taken from every bunkering made – testing according to the plan. Only certified sellers are used for providing the Company with fuel. (Tallink Silja 2)

Diminishing the CO₂ emissions is one of the company's aims and to achieve that more and more ports must have the possibility to on shore power supply for the ships that stay in port for more than two hours:

If all vessels staying in port for more than two hours were connected to shore side power supply, there would be decrease of CO₂ emissions by 15%. In 2013 it was still possible only for M/S Romantika in Stockholm Port of Frihamnen. Continuous efforts are made in cooperation with other ship-owners and organizations to influence more ports to provide the on shore power supply. (Tallink Silja 2)

Another plan for the diminishing of the CO₂ emissions is to make correct trip planning regarding the prevailing circumstances before the departure of the ship from the port:

To minimise our carbon dioxide emissions our captains pay very close attention to route planning according to the current, wind and wave conditions at any given time. Ships crews taking into consideration the prevailing conditions wherever possible a significant difference to the amount of fuel used is made. (Tallink Silja 2)

Furthermore, the overall attention must be paid on the total planning of the route:

It is important that routes are planned efficiently, ensuring that the ships sail fully-loaded, and by planning the speed to ensure that the vessels maintain a constant speed from departure to arrival. (Tallink Silja 2)

In order to make sure that the ship hulls do not get totally covered by algae followed by many environmental problems during summer time, the annual cleaning processes by the company must be conducted:

Regular mechanical cleaning of the hull: Regular underwater cleaning of hull is made in summer months to avoid decrease in speed and increase in fuel consumption due to algae forming on ships hull in warm water. (Tallink Silja 2)

Furthermore, all of the Tallink Silja's newest vessels are using a new technology, which enables the use of exhaust catalyzer system. With the help of the new technology, Tal-

link has a possibility to reduce its environmental footprint by reducing for example the emissions of sulphur, nitrogen and carbon dioxide:

All our newest cruise ferries are designed to use operational exhaust gas catalyser system. The applicable air pollution level requirements are met and our vessels use the low sulphur content fuel. All new ships that are currently being built for Tallink have created possibility for us to be engaged into the developing and testing activities of the newest technology of exhaust gas cleaning system, which besides of the CO emissions are meant to lower also the NO_x emissions. (Tallink Silja 1)

Tallink Silja is choosing carefully the equipment for the maintenance of its engines:

Only authentic spare parts that are approved by engine manufacturers can be used when carrying out maintenance and repair works on engines. (Tallink Silja 2)

For achieving Tallink Silja's environmental goals, the company is co-operating with the organizations that provide scientific solutions:

In cooperation with scientific organizations as well as providers of technical solutions, new solutions are discussed and tested. (Tallink Silja 2)

The company seeks for cooperation with external partners for finding new, innovative solutions. The parties include universities, scientific organizations and producers of the technical solutions. (Tallink Silja 2)

5.4 Key findings of environmental efforts among Finnish cruise companies

As can be seen from the results, all of those three cruise companies are focusing on their environmental footprint and methods to reduce it. In the tables 4, 5 and 6 the author has summarized the efforts that Viking Line, Eckerö Line and Tallink Silja do to be more environmentally friendly in their actions. The results were collected according to the four environmental themes: environmental policy, environmental work, waste treatment and atmospheric emissions. Each of the company had their systems and policies to protect the environment. In table 4 it is presented the environmental efforts of Viking Line. The results are based not only on the websites of Viking Line but also on the environmental report of Viking Line.

Table 4. Efforts made by Viking Line towards the environment.

Viking Line	Efforts
Environmental policy	Training the staff, environmental legislation, (MARPOL 73/78), ISMC certification, ISO 14001 environmental management standards
Environmental work	Internal and external environmental investigation, voluntary preventive efforts, co-operation with BSAG, the first vessel using LNG (Viking Grace), environmentally friendly procurement (eco-friendly food)
Waste treatment	All material recycled ashore, efficient sorting for organic waste: organic waste containers, bio waste turned into environmentally friendly biogas, all wastewater pumped ashore
Atmospheric emissions	Use of low-sulphur fuel (LNG in Viking Grace), diesel oil, Humid Air Motor technique to reduce nitrogen emissions, land based electricity supply while on port, internal programme to reduce exhaust gas emissions, upgraded hull brushing method

The environmental efforts of Eckerö Line are presented below in table 5. As mentioned earlier in the methodology chapter, the information provided in the company's website was a little bit scarce compared to the Viking Line and Tallink Silja. However, the company is doing many efforts towards the Baltic Sea.

Table 5. Efforts made by Eckerö Line towards the environment.

Eckerö Line	Efforts
Environmental policy	Environmental legislation, ISO 14001 environmental standards, environmental certifications, training the staff, continuous development work, employees responsible for environmental goals
Environmental work	The use of more environmentally friendly substances, regular hull scrub, locally produced foodstuff
Waste treatment	All the waste sorted, wastewater brought to the wastewater plants, well organized waste treatment
Atmospheric emissions	Use of low-sulphur fuel, The CLEAN SHIP construction technique regulation, waste heat boilers in M/s Finlandia, use of LED lights

The efforts of Tallink Silja towards the environment are presented in table 6. The environmental report of Tallink Silja was investigated as well to gain more information for the research.

Table 6. Efforts made by Tallink Silja towards the environment.

Tallink Silja	Efforts
Environmental policy	Local and international regulations concerning fuel, MARPOL convention, ISO 14001:2004 environmental management standards, all required international oil pollution prevention certificates and sewage pollution prevention certificates, special garbage pollution prevention attestation, environmental protection and management as one of its highest priorities, zero spill to the sea policy, training the staff, mandatory rules and regulations
Environmental work	Repainted ships with environmentally friendly paints, biochemicals used, new more environmentally friendly vessels purchased, member of WWF
Waste treatment	All the waste treated, wastewater and oily water left at the harbour, modern equipment to clean the wastewater on board, waste turned into energy
Atmospheric emissions	Use of cleaner fuels, fuel-efficient engines, Ship Energy Efficiency Management Plan, Air Pollution Prevention Certificate, effective monitoring, renewing technical solutions, decrease of CO2 emissions by using on shore power supply, mechanical cleaning of the hull, operational exhaust gas catalyzer system, low sulphur content fuel, co-operation with scientific organizations: environmentally friendly equipment

6 Conclusions

The aim of the research was to find out the environmental goals of the Viking Line, Eckerö Line and Tallink Silja based on the information on the companies' websites. There were four different themes associated with the environmental protection towards the Baltic Sea. The themes included: The environmental policy, the environmental work, waste treatment and the atmospheric emissions of the companies. The themes were chosen according to the information provided in the companies' websites. The research problem encompassed the question what kind of efforts the main cruise companies are making for the protection of the Baltic Sea.

Many cruise companies are in charge of the bad environmental state of the Baltic Sea since they are the main polluters when operating daily in the sea. Many cruise ship companies have taken the responsibility of their actions and started to make initiatives that help to improve the situation in the Baltic Sea by preventing the bad environmental issues that are threatening the sea.

According to the results, the overall contribution of the three ship companies was comprehensive and positive. Between those three companies, there was no massive difference as for the protection procedures and actions and all seemed to be very committed to their environmental work. However, the websites of those three companies differentiated as for the amount of information provided in the websites as Eckerö Line did not provide any annual environmental reports whereas Viking Line and Tallink Silja both provided reports in their websites. Furthermore, Tallink Silja's environmental websites were not as wide and comprehensive as Viking Line's and Tallink Silja's websites.

Environmental policy of the companies was the first theme under the author's analysis. All of the companies seemed to be fully committed and comply with the rules and legislations about sea policy. However, there were several differences between the level of commitment as for following the rules and legislations. According to the author, the most positive results about the environmental policy got Viking Line and Tallink Silja. Both companies were operating in the accordance with the MARPOL convention and

both of them followed voluntarily international environmental management certificate, ISO 14001:2004. On top of that, both companies had several more certifications granted for them about the good environmental work. Eckerö Line, instead, was only complying with the ISO 14001 environmental standard. All of the three companies were doing certain development work such as training their staff to be more environmentally friendly in their actions. Besides training of the employees, Viking Line's customers were aimed to get involved into the company's environmental work.

Secondly, the author analysed the environmental work of each of the company. As a result, all those companies were making actions to diminish the effects of their operations. However, the differences in the amount of actions could be realized. All of the companies did actions towards healthier environment. Viking Line was extremely committed company, which was doing more than what was required in the rules and legislations. Besides that, the company was working in a proactive way. According to the websites, Viking Line was the only company among those three, which has been awarded about its productive environmental work. Both, Viking Line and Tallink Silja were members of some foundation, which works to achieve healthier Baltic Sea. Tallink Grupp had advantage of owing the newest fleet in the Baltic Sea since in its vessels including Tallink Silja, it was practiced the newest environmental planning. What is more, Tallink Silja used mostly the most environmentally friendly chemicals, biochemicals. Eckerö Line was found to be the least environmentally effective company among the three as for the environmental work. The two issues that appeared from Eckerö Line's web site as for the environmental work were that the company fosters locally produced foodstuffs and more environmentally friendly substances.

Thirdly, the author analysed the waste treatment of the companies. According to the results, all of the three companies had well organized waste treatment and all of them were recycling all their waste produced during the cruise. All the three companies were turning some waste into energy by creating biogas and thermal energy from the food waste. Additionally, Tallink Silja applied zero tolerance as for discharging wastewater into the sea. Both Viking Line and Tallink Silja had certain equipment installed to alleviate the process of waste treatment. Eckerö Line had well organized waste treatment since on one of its vessels, on the m/s Finlandia, everything is sorted separately.

The last theme handled the atmospheric emissions of the companies. According to the results, all of the three companies used fuel with low sulphur content. Tallink Silja was a company, which was contributing on the reduction of CO₂ emissions as well. Both Tallink Silja and Viking Line were using new technological solutions such as exhaust catalyzer system to reduce for example the amount of nitrogen. They also used electricity supply while staying on port. What is more, Tallink Silja had a proper plan to reduce air emissions by 5 percent, which included various operations. Tallink Silja was the one of the companies, which has structured monitoring system, which monitors for example the fuel consumption. However, Eckerö Line had effective energy saving methods such as the use of LED lights in the vessels and the use of a technique that turns the waste into heat, which is again used to warm the vessel. Eckerö Line was also using more environmentally friendly chemicals. In addition, Eckerö Line was following the aims by CLEAN SHIP classification system and its vessel M/s Finlandia had new propulsion system to reduce fuel consumption.

To conclude the results, even though the cruise companies are paying a lot of attention on the environmental side of their operations, there is still a lot to be done. However, the companies will surely come up with new solutions since people are appreciating more and more environment and looking for environmentally friendly options when they choose their means of travel for example. What is more, the cruise companies would benefit from the cleaner environment and sea and also new working places would be created in the Baltic Sea region. Thus, the companies are obliged to wake up and do more in order to be successful.

With the help of new advanced technology and solutions, achieving those goals is made to be possible. What is required from the cruise companies is to continue their line with highly commitment and also to continue creating new environmentally friendly solutions. What came out from the analysis was that the other company does some issues better than the one while the one company makes something else better. Thus, the companies' should increase the communication between each other in order to learn from each other. The discharge of the wastewaters of the ships should become illegal and every ship company should have capacity in the ports for the discharge of

the wastewaters of the ships. What is totally wrong done by the cruise companies is to advertise their cruises with healthy and beautiful pictures of the Baltic Sea while at the same time they only contribute to the negative impacts towards the sea. The companies should take the responsibility and voluntarily stop polluting the Baltic Sea. Those cruise companies that are operating in an environmentally friendly way should not co-operate with those companies that do not respect the environment.

The author has come up with certain suggestions for the cruise industry to be more sustainable. In order to increase the readiness to react for example to the cruise ship accidents, more attention could be paid to planning before and after the accident and think about how to minimize the possible accidents such as oil accidents. In addition, governments and organizations cannot overestimate the importance of better planning and well-organized strategies for the cruise industry. Stricter control could also be considered. Furthermore, the ship companies should invest their profit more to environmental conservation. In the author's point of view, the charges for cruise tourists about environmental services should be higher in order to decrease the amount of cruise travellers and to gain more profit. What is more, some instructions about sustainable use of marine environments could be considered for cruise travellers but also for tour operators market the environmentally fragile destinations. More and more eco-friendly solutions should be invented as well to decrease the environmental burden. It might take a long time before Baltic Sea reaches the status of a healthy sea since it has too many threats at the moment. Numerous efforts are required from many actors until Baltic Sea can be breathe with healthy lungs.

6.1 My own professional learning

The thesis writing process has been valuable experience for the author. It has enabled the author to immerse herself in an actual and extremely important topic that everyone should consider about. The author's professional skills such as time management and planning have improved and the knowledge that the author has gained through the process is remarkable and thus very beneficial for her future.

The thesis writing process has opened the author's mind about the existing problems that the Baltic Sea faces, not only due to the impacts of cruise tourism but due to many

other threats as well. The author has found the state of the Baltic Sea quite shocking and investigating the reasons for the bad environmental state of the sea has been interesting. Before starting with the thesis, the author was aware of the environmental problems that the sea faces, yet she did not know how bad the situation is and how many actors try to decrease the impacts.

The author was surprised on how many articles were published on the Baltic Sea and its environmental problems and how many different protection programs and reports there have been developed by various organizations. The amount of organizations trying to improve the state of the Baltic Sea was huge as well including many unknown organizations for the author such as HELCOM (Helsinki Commission) and IMO (International Maritime Organization). However, the literature on the topic was a little bit scarce while most of the literature was about cruise tourism impacts in Caribbean or in Mediterranean for example where the cruise tourism is the most practiced tourism form. Several videos were published about Baltic Sea and its weakening state, which illustrated more the environmental problems and the bad state of the Baltic Sea. As the problem is actual at the moment, a little benefit was gained through media as well.

Too many people ignore the problem of the deteriorating state of the Baltic Sea and the attitude of people should change in order to preserve the precious sea. However, it might take a long time before Baltic Sea reaches the status of a healthy sea since it has too many threats at the moment. Numerous efforts and efficient co-operations are required from many actors until Baltic Sea can breathe with healthy lungs.

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