MAREA

Deliverable D.T2.2.2

Regional tools for assessing feed-backs and trade-offs between marine ecosystem and anthropocentric systems

Part 2: Cultural Services Assessment: Summary of cultural service survey and social media

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Introduction

In addition to developing a regional tool together with WP4 (see customized social-economic models in Deliverable D.T4.2.1 and the methodology and user guide of the models in Deliverable D.T2.2.1 and Output O.T2.2.1), the working package 2 (WP2) also conducted a survey to assess feedbacks and trade-offs between the marine ecosystem and anthropocentric systems. The survey was designed to explore recreational and cultural services provided by the Baltic Sea and their links to environmental quality. Therefore, the questionaries cover topics including the important sites of the Baltic Sea, the most visited sites of the Baltic Sea, their visiting behavior to their most visited site along with questions related to travel costs, distance to the most visited sites, the recreational and cultural activities conducted at the most visited sites, and a series of questions regarding the observed environmental condition of the most visited site. The content of the questionnaire can be found[1]: https://query.eharava.fi/3724?lang=en#.

The collected data from the survey are usable to explore the relations and potential trade-offs among different cultural services, the relations between cultural services and environmental conditions, and evaluate different monetary (e.g., values of recreational services) and non-monetary values related to the Baltic Sea, etc. In addition, the survey was also designed to collect data that are possibly usable for ecosystem accounting, which is also a framework that can apply to reveal the feedback and trade-offs between the marine ecosystem and anthropocentric systems (UN, 2021, see Deliverable D.T2.1.1).

WP2 focuses on exploring the relations and possible trade-offs among diverse cultural services and environmental conditions based on the survey results in Output O.T2.2.2, which provide a basis to test methods of linking the cultural services to the ecosystem condition and extent accounts in other continuous projects (e.g., Biodiversea LIFE-IP). This derivable summarizes the basic survey results and indicates the future direction of analysis data in terms of assessing feedback and trade-offs.

Survey on recreational and cultural activities related to the Baltic Sea

Summary of the survey

The survey was carried out in three countries: Latvia, Estonia, and Finland from December 2021 to February 2022. The questionary was constructed in a map-based survey tool, HARAVA-pro license from Sitowise Oy and sent by the market research company, Suomen OnlineTutkimus Oy (in English: Online Research Finland Ltd), through their online consumer panel. The survey was provided in English (all

[1] The link of the published version of the questionnaire was closed to prevent more data come into the database. Here just provide the link of the test version for Finnish survey to show the content of the questionnaire.

countries), Finnish and Swedish for Finland, Estonian and Russian for Estonia, and Latvian and Russian for Latvia. The whole adult population (ages 18-80) was set as the survey target, which was representative sampled based on age, gender, and region population of each country. 2811 respondents (1140, 840 and 831 for Finland, Estonia and Latvia, respectively) answered the survey in total, and the respond rate are approximate 29%, 40% and 33% for Finland Estonia and Latvia, respectively. Descriptive statistics of the survey data matched reasonably well with the national statistics (see Table 2 to Table 4). Therefore, the survey could be regarded as a representative sample of the whole adult population in the three project countries.

In the survey, the respondents were given a chance to point out their most visited site and other important sites at the Baltic Sea on a map. Table 1 summarizes the results regarding the visiting to the most visited sites. The number of visits to the most visited site was the highest in Estonia, while travel costs were the highest in Finland as expected. If the survey results are generalized to the whole population for the three countries, Finnish adults spend around 1300 million € yearly on visits to the Baltic Sea. Estonian adults spend 295 million € and Latvian adults spend 235 million €. However, this is probably an underestimation as these questions were related only to the most visited sites and so expenses from other visits are excluded.

Table 1 Descriptive statistics related to the visiting to the most visited site of the Finnish, Estonian and Latvian surveys

	Finland	**Estonia**	**Latvia**
Number of respondents	1140	840	831
Average number of visits per person per year (SD)+/	11.7 (40.4)	14.7 (35.4)	10.3 (24.0)
Average stated travel costs (TC) per visit (SD) in EUR+	38.1 (89.5)	23.3 (42.7)	18.5 (48.8)
% of respondents that visited the coast or marine of Baltic Sea in the past 3 years	67.3 %	82.7 %	82.5 %
Estimated total visits for the adult population (18-80) of the country per year+/	34.35 million	12.67 million	12.70 million
Estimated TC for the adult population of the countries*+/	1308 million	295 million	235 million

+ Overestimated from a national accounting scope as the visiting and the cost to the places outside the national sea have not excluded

/Underestimated as only the visits to the most visited sites are included

*This is based on the stated TC but not the estimated TC we used in the travel cost model, which included opportunity cost of travelling time and estimated based on distances and different travel modes

Below a summary of other kinds of visiting results for each country is given. In Latvia, 831 people responded to the survey. Out of all respondents, 48 % identified as male. 96 % of the respondents had visited the Baltic Sea in their lifetime, whereas 82 % had visited the Baltic Sea in the last three years. The average number of visits to the most visited site was slightly higher for male respondents. Around 91 % of the site visits started from home and 73 % of all site visits were done with a private car. Students and part-time workers tended to visit the Baltic Sea the most, as the average number of visits was the highest in those groups. Out of education classes, those respondents whose highest form of education was vocational school visited the Baltic Sea the most on average.

In Estonia, the number of respondents was 840, and 48 % identified as male. 96 % of the respondents had visited the Baltic Sea in general, and 83 % had visited it in the last three years. Female respondents visited their most visited site more frequently than male respondents. Of all traveling modes, walking and driving were the most common. 42 % of the respondents had walked and 43 % had driven to their most visited site at the last time they visited. 92 % of the respondents started their visit from home. Of all occupation classes, those respondents who were retired or were employed visited the Baltic Sea most frequently.

In Finland, the sample size was larger, with 1140 people. 48 % of all respondents identified as male. 95 % of the Finnish respondents had visited the Baltic Sea in their lifetime, but only 67 % had visited in the last three years. This difference to the other two countries might be explained by the fact that the area of Finland is larger than in Estonia and Latvia. Many of the largest Finnish municipalities and popular summer home destinations are located inland further away from the coastline of the Baltic Sea, so recreational visits and other visits often take place in locations that are also inland. Around 92 % of the respondents answered that they started their visit from home and around 42 % of them visited the site by private car. There were no notable differences in the average number of site visits between men and female respondents. Self-employed respondents visited their most visited site most frequently. The average number of visits was the highest for those respondents whose highest level of education was university or polytechnic.

The descriptive statistics of social-demographic characteristics of the survey respondents and their comparison to the national statistics are compiled in Table 2 - Table 4.

Table 2 Demographic characteristics in the Latvian survey.

LATVIA	**Survey results**			**National statistics**	
n = 831	mean / %	min	max	mean / %	Reference
Age	40.37	18	79	42	Official Statistics of Latvia (2022)
Household size	2.9	1	10	2.26	Official Statistics of Latvia (2022)
Employment rate	73 %			64.2 %*	Official Statistics of Latvia (2022)
Monthly income	873 €	400 €	6000 €	1040 € (before taxes)	Official Statistics of Latvia (2022)
Higher education	47.4 %			33 %*	Official Statistics of Latvia (2022)

* Based on ages 15 - 74

Table 3 Demographic characteristics in the Estonian survey.

ESTONIA	**Survey results**			**National statistics**	
n = 840	mean / %	min	max	mean / %	Reference
Age	40.96	18	80	40.8*	Statistics Estonia (2022)
Household size	2.78	1	13	2.89***	Statistics Estonia (2022)
Employment rate	71.5 %			70.1 %*	Statistics Estonia (2022)
Monthly income	1147.25 €	400 €	6000 €	1553 € (before taxes)	Statistics Estonia (2022)
Higher education	44 %			41 %**	OECD (2019)

* Based on ages 15 – 69
** Based on ages 25 – 64
***from 2011 population census

Table 4 Demographic characteristics in the Finnish survey.

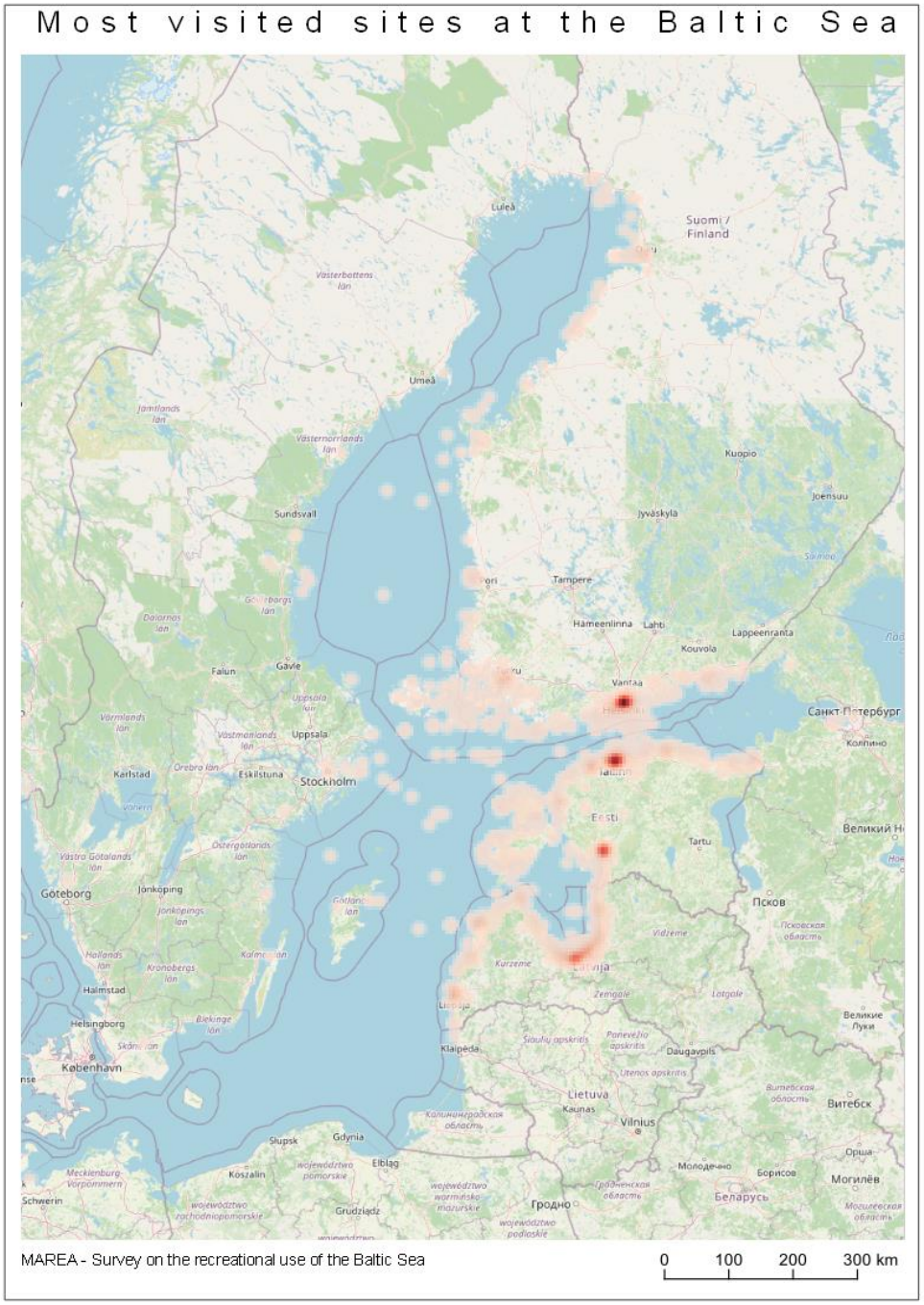
FINLAND	**Survey results**			**National statistics**	
n = 1140	mean / %	min	max	mean / %	Reference
Age	45.30	18	80	43.4*	Statistics Finland (2022)
Household size	2.19	1	12	1.96	Statistics Finland (2022)
Employment rate	66 %			62 %**	Statistics Finland (2022)
Monthly income	2402 €	500 €	12000 €	3595 € (before taxes)	Statistics Finland (2022)
Higher education	45.4 %			24 %***	Statistics Finland, 2022

* Based on ages 15 - 74
** Based on ages 15 – 69
*** > 15 year old

Most visited places & important sites

Summary

Figure 1 and Figure 2 show all the map answers that were marked as points in the survey. In total, 3462 map points were gathered from all three questionnaires. 2122 points were marked as important sites and 1340 for the most visited sites in the past three years. Figure 1 shows the entire Baltic Sea and Figure 2 is zoomed in to show the areas of the Gulf of Finland and Gulf of Riga, where most of the sites were plotted. In both figures, heatmaps for the most visited sites of the respondents are shown in red colour and the important sites to the respondents are shown in blue colour. In most cases, the respondents plotted both important sites and the most visited sites near the most populated areas. In the Finnish survey, the map answers were somewhat clustered in the southern part of the country. However, in the Baltic countries, whole coastal areas were covered. Especially the most visited sites were clustered near population centres. Some of the map points were clearly inland. This could be due to operational errors since some respondents reported having difficulties in answering the map questions with their devices. For further anlysis of the data, some of these points may need to be excluded.



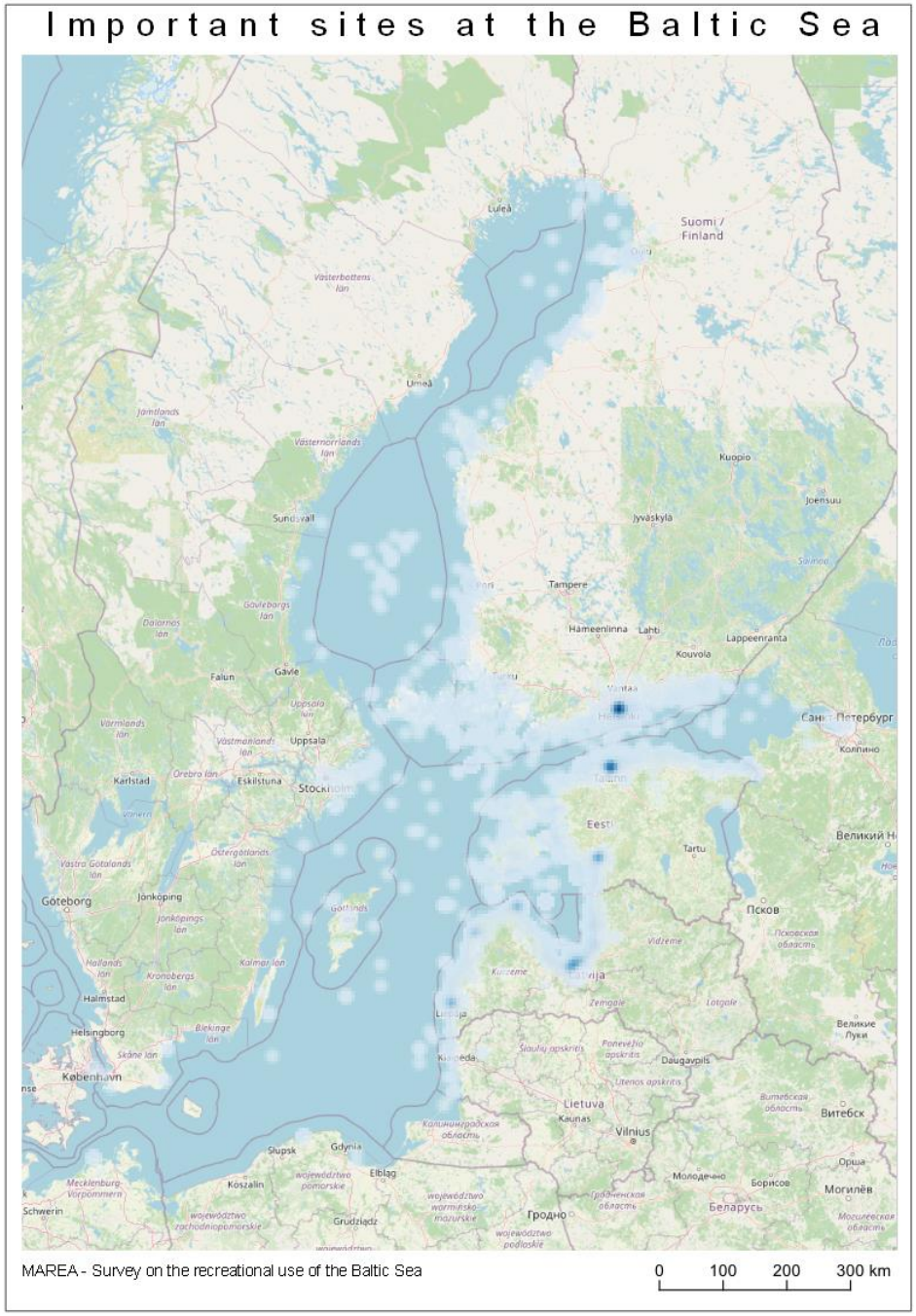
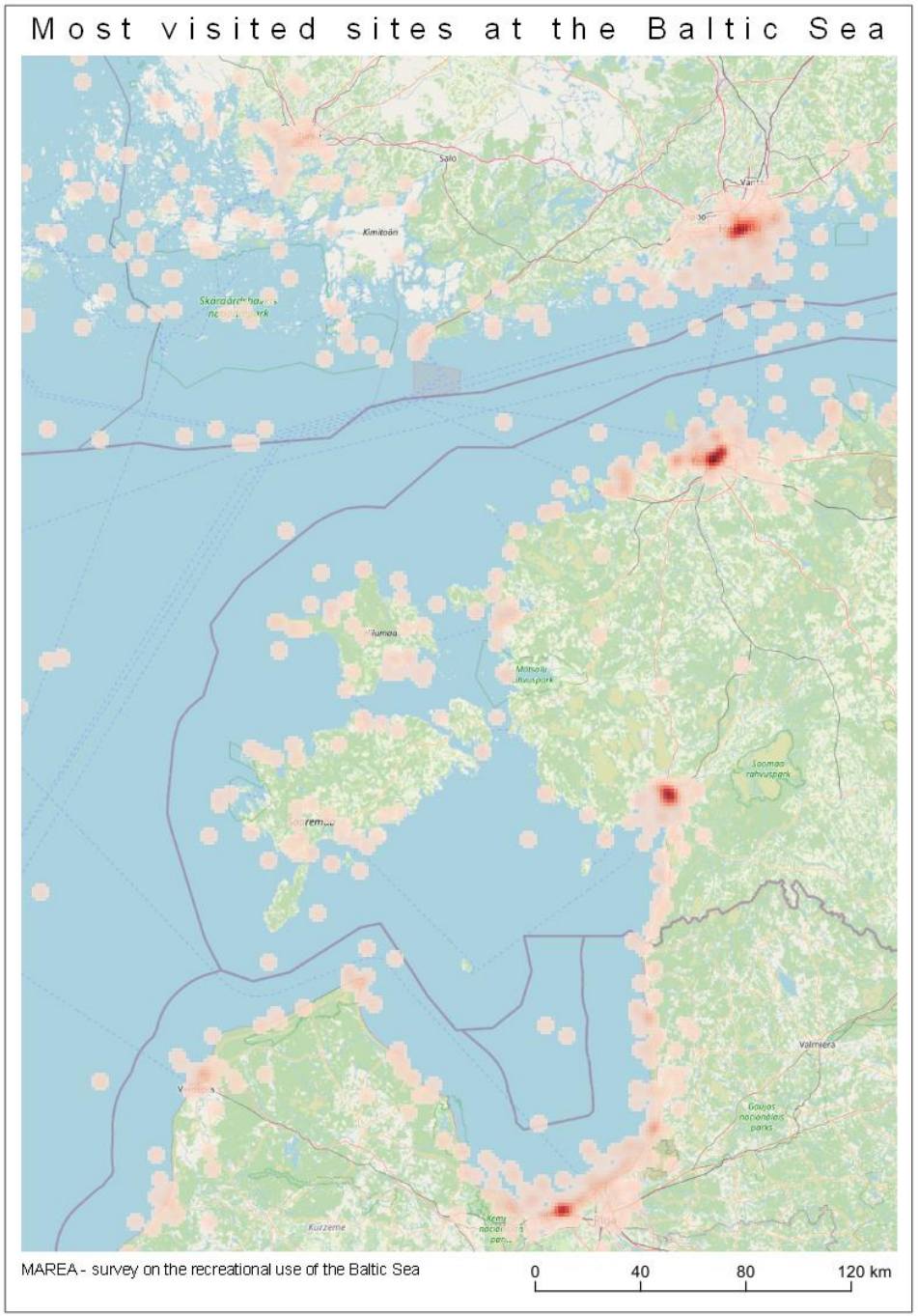


Figure 1 Most visited sites (left) and important sites (right) from the survey data



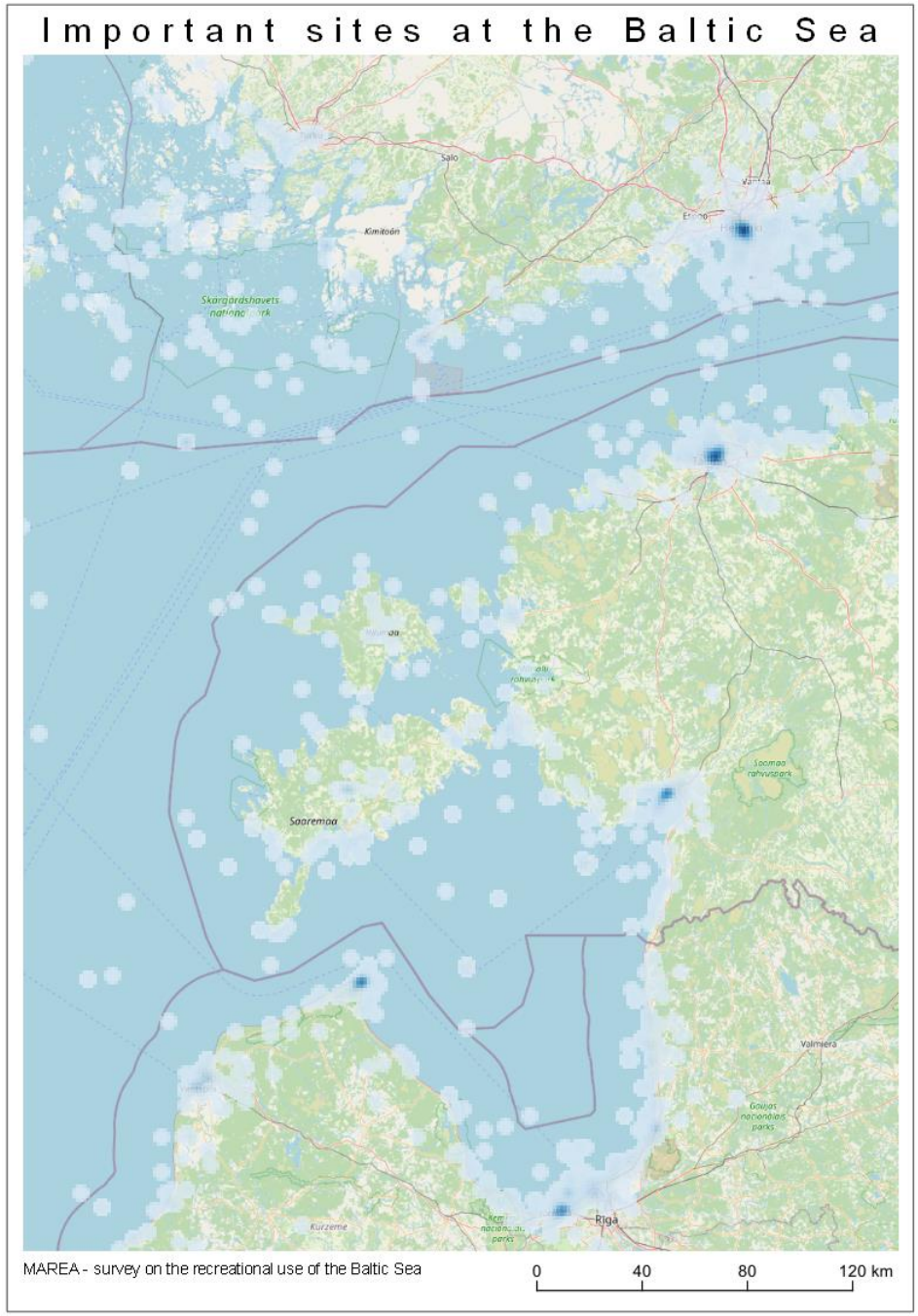


Figure 2 Most visited sites (left) and important sites (right), zoomed in to Gulf of Finland and Gulf of Riga

Motivations and the reasons of most visited/important sites

The respondents were given an option to explain their marked points in the following questions when they marked the most visited sites and the important sites:

1) Why is this your most visited site?
2) Why is this site important to you?

They could describe them with open answers, which were analysed with simple word-searching algorithms. The most common words found in the analysis are graphed below. Results from these questions were mostly similar in all countries. From Figure 3-Figure 5, Finnish, Estonian and Latvian answers are presented in treemap charts. The size of the squares in these charts indicates that the word was more commonly found in the data. In all three countries, words related to close to the site or home were among the most common in the question "Why is this the most visited site?". For instance, words similar to home were found in 16 % of all open answers to this question in Finland (Figure 3). Also, words that pointed out to friends or relatives were especially common in this question. In the question "Why is this site important to you", words related to home and words that could be categorized as memories/childhood stood out in the data. Words related to the beauty of the site or scenery were important in both questions. The word cottage was often mentioned in Finnish answers, especially in the first question.

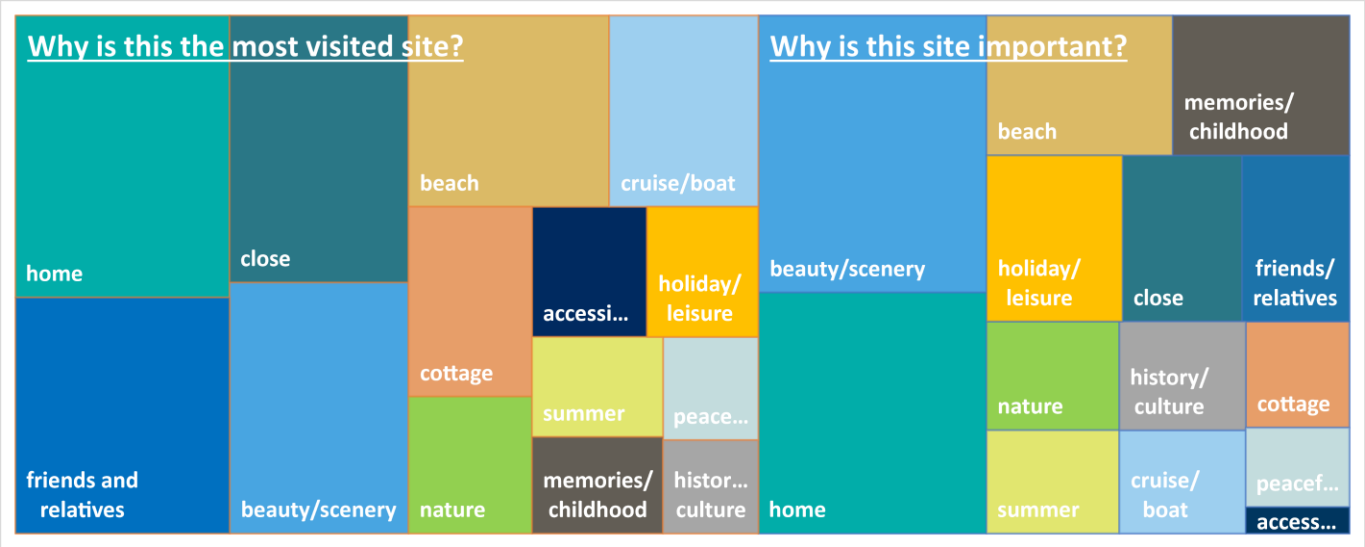


Figure 3. Motivations to visit the Baltic Sea in Finland

Motivations to visit the Baltic Sea were similar in Latvia (Figure 4) and Estonia (Figure 5). Home, close to the site and friends and relatives were often important in the open answers. Words "summer"

and “beach” were often used in Estonian responses, and also words related to “cottage” were common, unlike in the Latvian data.

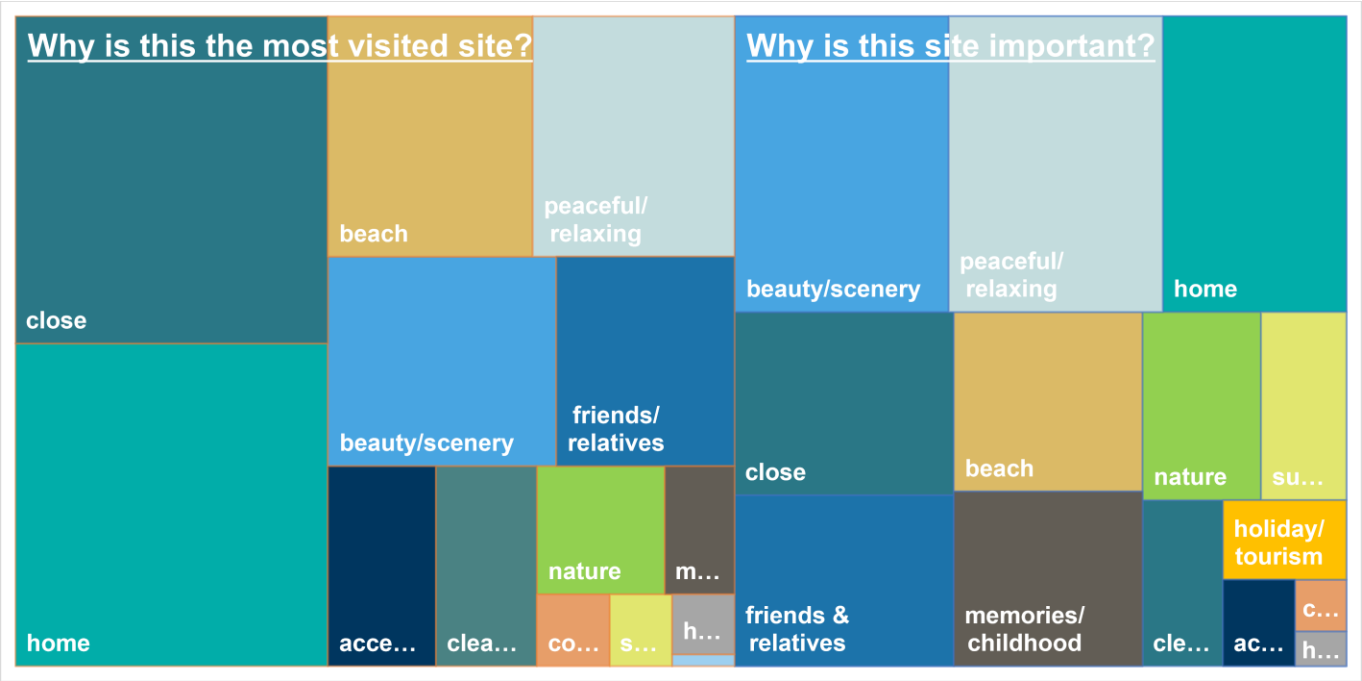


Figure 4. Motivations to visit the Baltic Sea in Latvia

In Latvia (Figure 4), words related to accessibility or cleanliness of the site were somewhat important, as around 5 % of all open answers could be classified to these categories in the question “why is this the most visited site?”. Less significant words that are not properly shown in the figure are “cottage”, “summer” and “history/culture”.

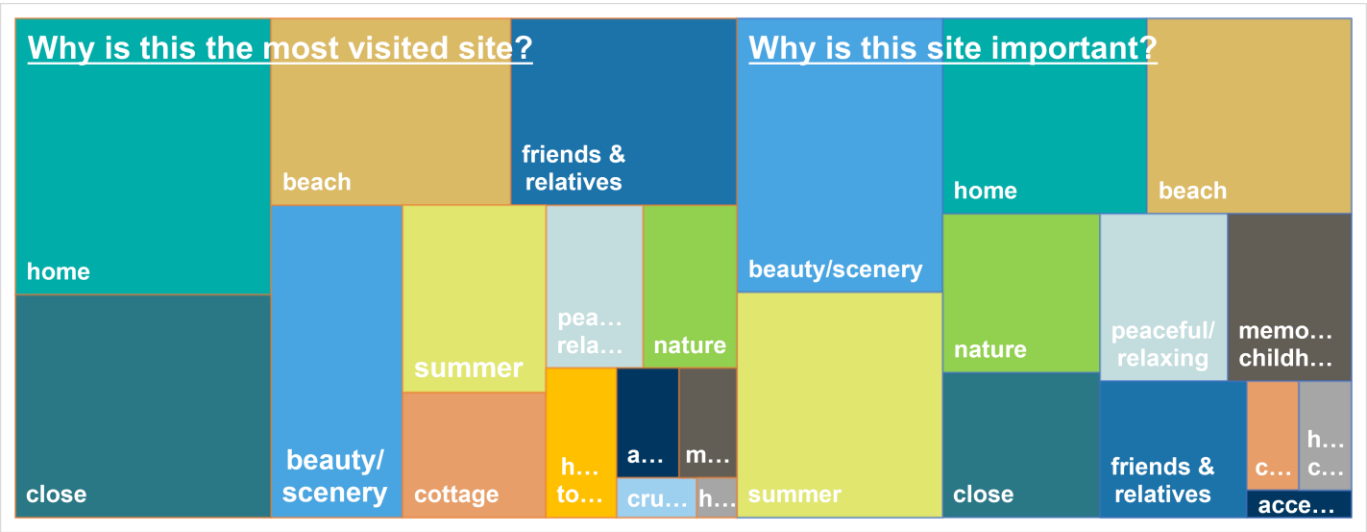


Figure 5. Motivations to visit the Baltic Sea in Estonia

In Figure 5, words “holiday/tourism”, “accessible”, “cruise”, “memories/childhood” and “history/culture” are not shown fully, but they were not among the most found words in the searches. All of them appeared in less than 5 % of the open answers.

Cultural ecosystem services and non-monetary values

One motivation for carrying out the survey in the MAREA project was to gather information on the views of the respondents and to evaluate the use of cultural ecosystem services and the non-monetary values of the Baltic Sea. The questionnaire included questions about culture, spiritual and aesthetic values, concern about the state of the Baltic Sea and the most practiced recreational activities.

Concern and connection to the Baltic Sea

Based on the survey results, it is clear that the respondents feel a connection to the Baltic Sea in all three countries and are concerned about the state of it. The respondents were mostly strongly or partly agreeable with the statement “I am concerned about the status of the Baltic Sea”, which is shown in Figure 6. In addition, more than 50 % of the respondents in all countries were strongly or partly agreeable that their most visited site had a special meaning to them or a group of people.

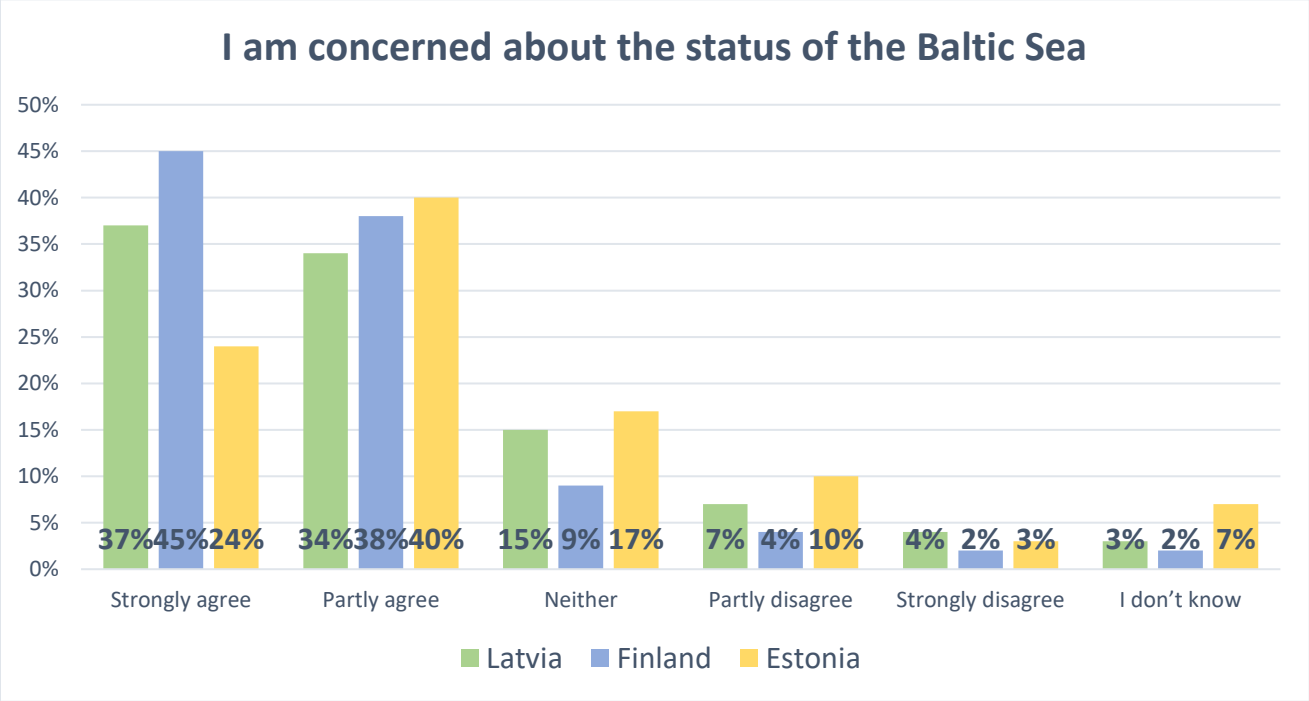


Figure 6. Concern about the state of the Baltic Sea in Latvia, Finland, and Estonia

Summary of Cultural Services

Aesthetic or ecological values were also clearly important to the respondents of the survey. These showed up as the most important in the questions related to favoured activities at the most visited site and open answers. In all countries options “enjoying scenery” and “enjoying sounds” were among the most answered statements in all countries in the questions about recreational habits. Based on the survey it seems that spending time on the beach might be more important in Latvia and Estonia than in Finland. Likewise, swimming does not show up in the most practiced recreational activities in Finland. The most practiced recreational activities are shown in Figure 7.

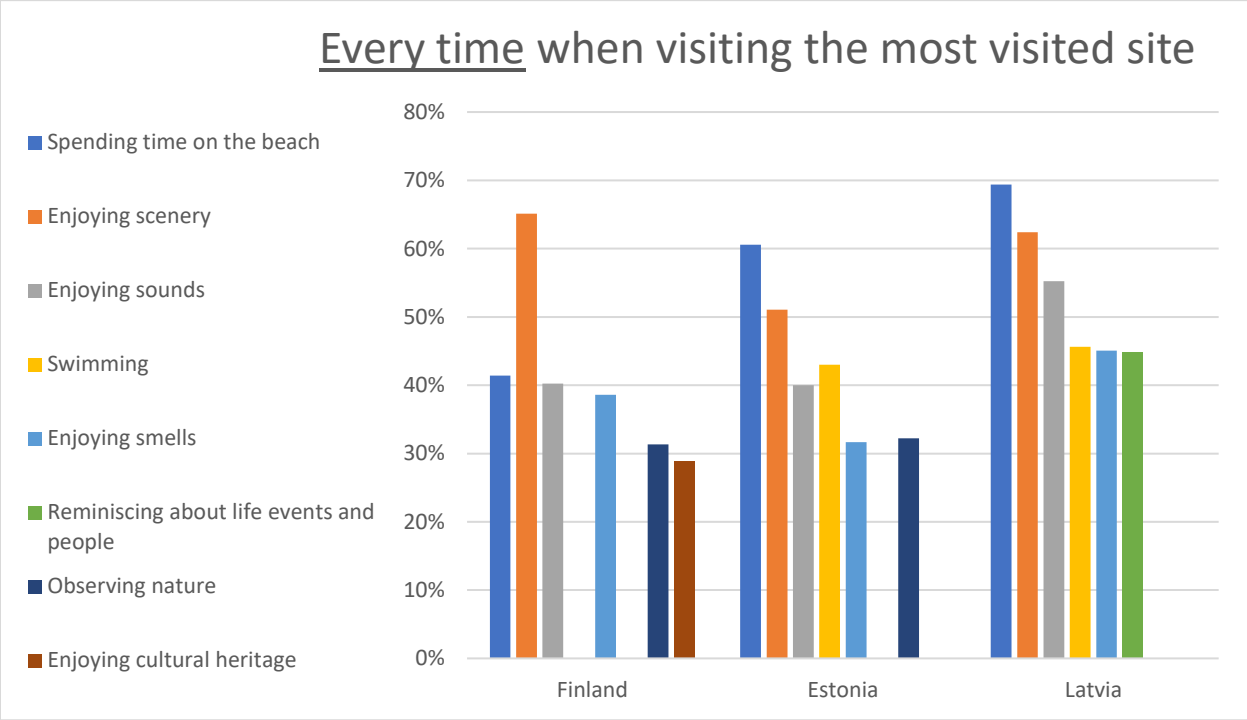


Figure 7 How often do you do the following activities when you visit the site? Every time when visiting the site

Baltic Sea in popular culture and literature

The survey results reveal that many of the respondents have read literature, listened to music and watched movies related to the Baltic Sea. Especially this was shown in the questionnaires of the two Baltic Countries. For instance, over 70 % of the respondents in Estonia and Latvia had seen movies or plays that take place in the Baltic Sea. Over 50 % had read non-fiction books that are set in The Baltic Sea. In Latvia, as many as 80 % of the respondents had listened to music that mentions the Baltic Sea. Answers in questions related to popular culture and literature are illustrated in Figure 8-Figure 10.

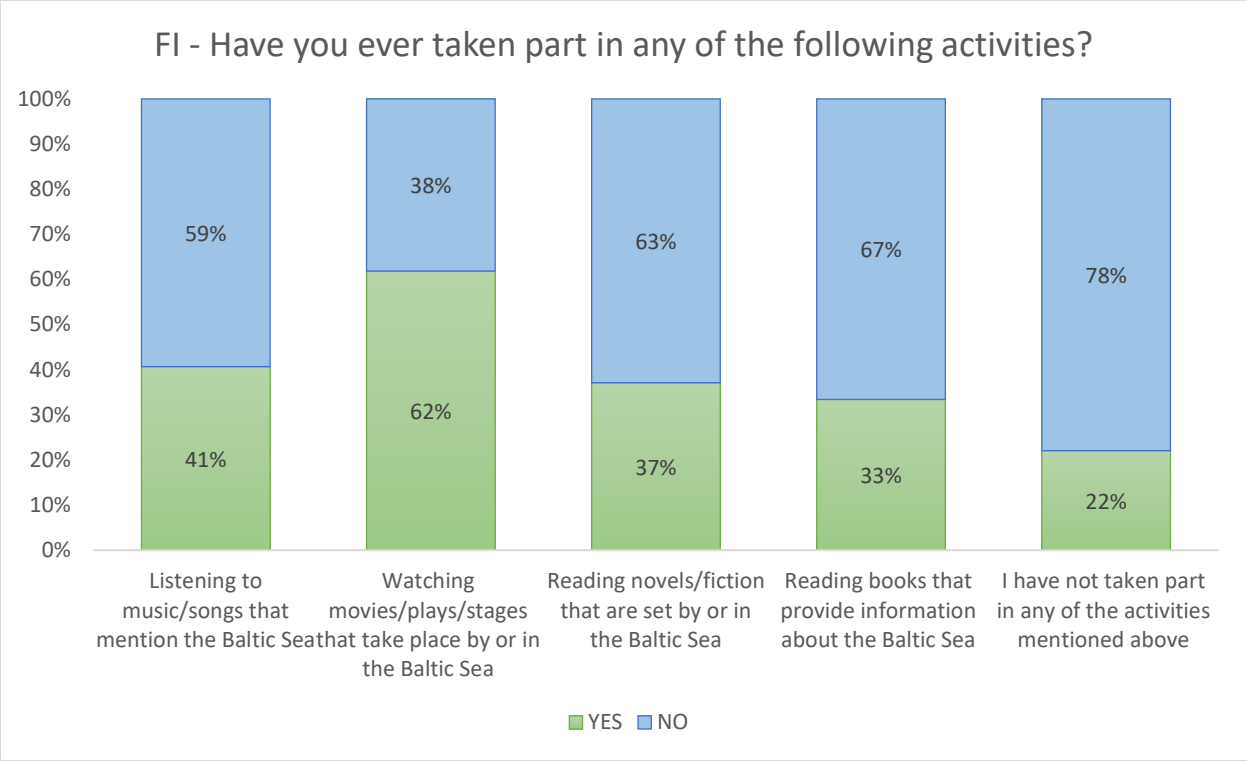


Figure 8. The occurrence of Baltic Sea in popular culture, literature, or arts in Finland

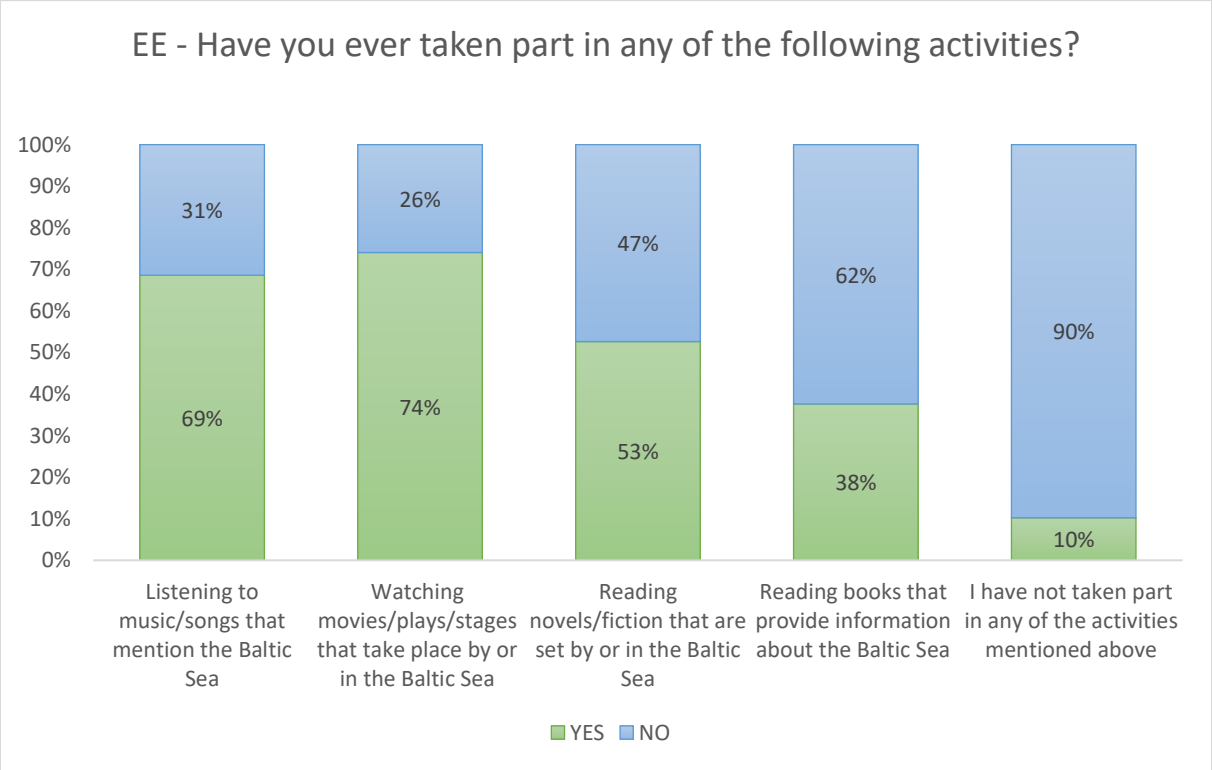


Figure 9 The occurrence of Baltic Sea in popular culture, literature, or arts in Estonia

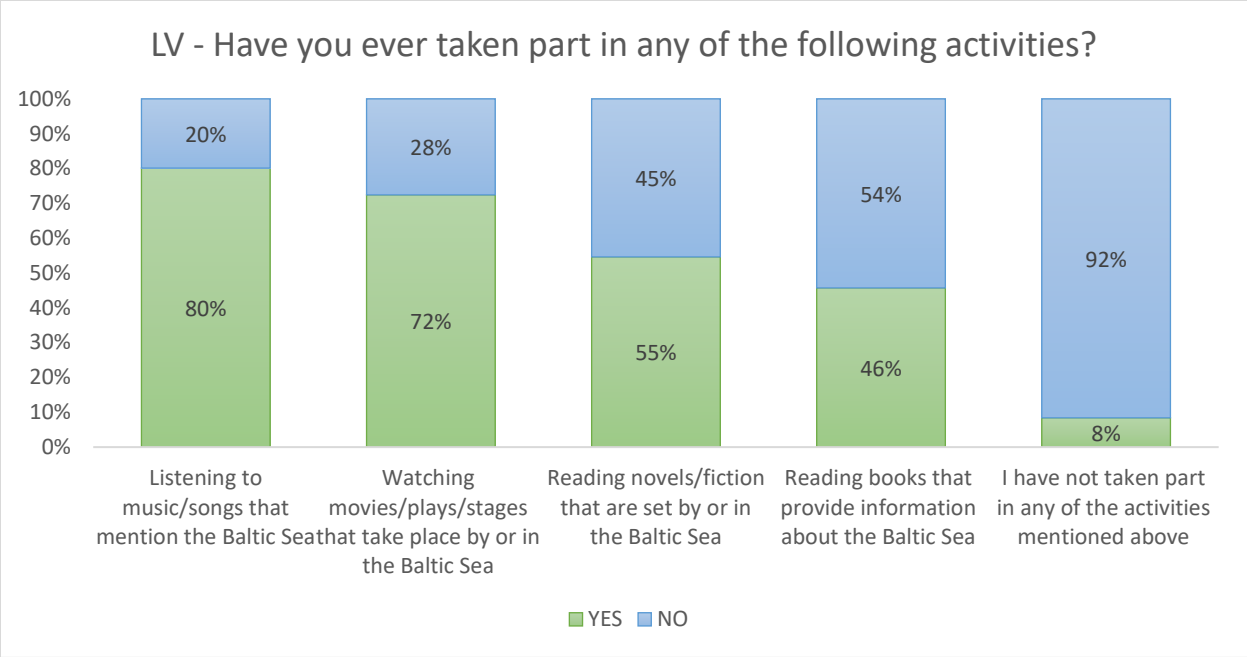


Figure 10. The occurrence of Baltic Sea in popular culture, literature, or arts in Latvia

Social media

The work on using social media data for cultural ecosystem service mapping was continued utilizing the previous findings in WP1 on the current situation of data mining on social media platforms. The aim was to produce a test case using social media data and compare it to the MAREA survey results.

The legal framework of copyright, especially the status of national implementation of the DSM directive, and data privacy issues to ensure both user privacy and copyrights were considered when reviewing potential social media platforms. In the current legal situation, the national Finnish implementation of the DSM directive still pending, the social media site Flickr was chosen as the most potential platform. Existing publications and other information on data mining were reviewed and potential tools identified, but due to time constraints the work did not proceed into the data acquisition phase. However, the information gathered will be valuable in future research and the work on these themes will be continued in other projects such as Biodiversea LIFE-IP and OBAMA-NEXT.

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