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The Price Tag of Oil Spills: Valuing Temporal and Spatial Stability to Prevent Environmental Damage from Oil Spills from Ships

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Abstract

Oil spills from ships can cause environmental damage along shorelines as the oil will float and eventually reach the shoreline. This damage threatens marine life. Further, it influences the recreational experiences on the beach and other marine activities. Thus, it creates a temporary loss of welfare. Ecosystem services do not have a market price but do possess a value. This study conducts econometric analyses of two existing contingent valuation data sets of similar oil spill environmental damage scenarios from 2015 and 2020. The benefit transfer methods used are the unit transfer with income adjustments and different specifications of the value function transfer, both temporal over a five-year period and spatial. The results contribute to improving the validity of the cost-benefit analyses of measures to reduce the occurrence of marine oil spills from ships. The study finds that the different payment methods have an unexpected outcome as the willingness to pay for the 2020 data set is much higher than expected. It shows that a budget constraint affects the willingness to pay for one-time payments if the damage scenario is extra-large and gives a policy recommendation to avoid a high number of protest bidders. Further, the study could not prove an expected Covid-19 pandemic effect on people's willingness to pay.

Contents

Abbreviations

WTP Willingness to pay

CV Contingent valuation

ES Ecosystem Service

VSL Value of a Statistic Life

TEV Total Economic Value

1 Introduction

Norway has the third-largest coastline in the world and the longest in Europe, spanning about 58,133 km (Oishimaya, 2020)[1]. Ecosystem services related to the coast and waters have always played a vital role for people living along this coast, whether on the mainland or one of the numerous islands. Ecosystem services are defined as "the benefits people obtain from ecosystems." Humans are dependent on these services, which include food, water, and timber, but also floods, wastes, and cultural services. (Millennium Ecosystem Assessment, 2005, p.5). A study concluded that there is a negative trend on planet earth with regards to biodiversity and ecosystems-, and that human activity is responsible for this trend (NOU 2013:10, p.9).

Both cultural identity and industries are influenced by the waters surrounding the kingdom of Norway. Fishery and tourism are two examples of industries that benefit from a clear coastline. In 2018, a total of 130 million tons of goods were transported by sea in Norway, with transport to domestic harbours accounting for 44% of this. The Norwegian Centre for Transport Research reports that the amount of goods transported via ships measured in tons is increasing. (Haukås, 2019). Emissions from ship traffic can affect the quality and health of ecosystem services located at the shoreline.

In 1989, the Exxon Valdez tanker grounded outside the Valdez oil port in Alaska and released 33,000 tons of crude oil into the sea. The environmental damage that followed led not only to the death of many marine mammals and sea birds, but also to a loss for the fishing industry which is vital for Alaska (Olerud & Solbakken, 2021). While the welfare during the last year was estimated to be USD 100 million for fishery and USD 4 million for recreation, it became clear that the overall perceived welfare loss for society was much larger, provoking a scientific debate about existence values[2](Lindhjem et al, 2014). The UN Sustainability Goals have been set to ensure that this negative trend; in particular, goals 12 and 14 highlight the need to conserve and use the oceans in a sustainable way and ensure sustainable consumption patterns (United Nations,2015).

This thesis examines the non-market value of preventing environmental damage from oil spills from ships. Its main aim is threefold: i) testing the validity of benefit transfer techniques for temporal and spatial transfer of the Norwegian populations' willingness-to-pay (WTP) to avoid marine environmental damages of oil spills from ships, ii) analyzing the impact of different payment frequencies (annual in 10 years versus one-time payment), and iii) analyze the effect of i) and ii) on aggregate welfare estimates of environmental

[1] This includes islands as well. Canada has the largest shoreline in the world., followed by Indonesia. See Oishimaya (2020) for more information.
[2] Also called passive values

damages from oil spills from ships for use in cost-benefit analysis. This thesis consists of five chapters. First, it explains the basic objectives of the study and the study's relevance. This also includes research questions and a literature review. Chapter 2 outlines the theory used for this thesis. The following chapter explains the methodology and framework. Chapter 4 presents the data and survey results. The next chapter contains the results and a discussion of the analysis, while Chapter 6 provides a conclusion and recommendations for policymakers.

1.1. Background

All public projects in Norway with an investment above NOK 750 million are subject to the Ministry of Finance'-'s quality assurance scheme. In the early stages of the project, the responsible government agency must perform an assessment that will serve as the basis for quality assurance. This assessment includes a cost-benefit analysis (The Norwegian Agency for Public and Financial Management, 2018, p.45). Such analyses map, highlight and compare the consequences of regulations and measures for society and are therefore important for decision making for policymakers and other authorities' decision-making. The cost-benefit analysis mostly uses monetary values, which form the basis for calculating a project's socio-economics profitability to calculate the socio-economic profitability (Norwegian Coastal Administration, 2021, p.15). Different cost aspects are analyzed to determine the consequences of public projects. While some factors, such as construction materials and project planning costs, have a market price, others do not. In environmental economics there are several established procedures to determine the monetary value of biodiversity and ecosystem services. One procedure is contingent valuation, where affected households are asked about their WTP to achieve or preserve an environmental common good or service. However, the public debate about sustainability and clean nature ignores that the WTP for avoided oil spills might have increased. As Boardman et al. point out, there has been an increased interest in the environment and scientists have improved their understanding of the symbiosis between human well-being and environmental intervention (Boardman et al., 2014: 423). However, it is not an easy task to put a value on the environment.

Different methods can be used to value environmental quality and ecosystem services. The main classification is stated preferences (SP) and revealed preferences (RP), both of which value individuals' preferences. For example, RP can reveal the value of an economic entity for a change in the quality of an environmental good or service that has characteristics of an actual behavior in an existing market. (Navrud, 2016, p.8). An example would be the cargo on a boat.

Few environmental economic valuation studies have been conducted in Norway or been used directly in socio-economic analyses (Lindhjem et al, 2014: p.27). An example of a study that has been conducted is the Value of a Statistic Life, which is estimated as the amount of money an individual is willing to pay to prevent a fatal accident such as a traffic accident. (NOU 2012:16, p. 152). The Norwegian government has published guidelines on cost-benefit analyses, both on a general basis and for different sectors, to help decision-makers determine which measures to use. The Coastal Administration has published an updated guideline on cost-benefit analysis in 2021, presenting principles for assessing the measure's effects on ecosystem services and willingness to pay as a *relatively new method* (Coastal Administration 2020, p. 145). The focus on non-use values in their official guideline shows the progress of this method and its increased acceptance in environmental economics.

A 2015 survey was designed to provide unit values for transferring values for preventive measures in cost-benefit analysis, for a planned new revision of the guideline related to the coastal area in Norway. The project ran from 2012 to 2016 and was funded by the Norwegian Coastal Administration. Two surveys were conducted; the first was a pilot study in 2013 that had 2,525 respondents, and the main study was conducted in 2015 and had 5,575 respondents. The aim was to find unit values for WTP per household for ES of oil spills from ships in different regions in Norway (Navrud, 2020, p.9). A follow-up survey was conducted in 2020 by NORSTAT; it had 1,010 respondents.

1.2 Existing Literature on the Topic

This section explores the literature relevant for valuing the non-occurrence of oil spills and the expected outcomes of time-series data for contingent valuation studies related to coastal and marine ecosystem services.

Lindhjem et al. (2014) present the results of the pilot study conducted by the Coastal Marine Authority in 2013. The contingent valuation study aims to find the WTP for households affected by a hypothetical oil spill along the Norwegian shoreline and is a predecessor of the two studies analyzed in this thesis. They examine different samples of the Norwegian population and ask about the WTP to avoid different damage scenarios that vary geographically and in size. They test the validity of the study through multiple regression analysis. The study finds that results differ geographically, in size, and seasonally with average WTP for the four selected regions increasing as expected with the damage level. The range varies from NOK 1,000 – 1,300 up to NOK 2,000 – 2,400 per household for a 10-year period (Lindhjem et al.,2014, p.33). Interestingly, respondents from northern Norway had a higher WTP than respondents from other parts of the country.

Emissions from ship traffic can cause environmental damage along the coast, which can cause welfare losses to the people and industries dependent on the coast. Losses included in the cost-benefit analysis are often related to monetary values, for example, material damage to a ship or cargo. In a Vista report from 2016, Lindhjem et al. document the process of arriving at calculation prices that will reflect environmental welfare losses that can be avoided by local and regional measures, for example by improving fairways. Their study examines four different levels of quality improvements regarding to contaminated sediments in the water which would affect the ecosystem along the shoreline. The survey design is based on a representative case along the coast and was used in five different communities across the country. They found their results ha good, determining that WTP increases along with the size of the improvement. The report uses the CV method as a framework to determine how much people are willing to pay to ensure welfare gains and thus a positive change in an environmental service. On average, the WTP for small, medium, large, and extra-large levels of environmental improvement is NOK 850, 950, 1,200 and 1,700, respectively. The survey asked about a lump-sum payment. (Lindhjem et al,2016, p. 6).

Navrud et al.'s study (2016) focuses on the loss of marine ecosystem services from oil spills. They point out that there is a formal requirement in Norway to conduct a cost-benefit analysis for projects that fulfill specific requirements. It is crucial to include the right monetary value in these assessments. Further, there are temporal differences in ES systems, and the value of the ES changes in line with the separate phases that occur once the change has occurred. In the first phase, the ES will experience a temporary reduction in the ES flow, corresponding to interim welfare loss, or damage costs. In the case of an oil spill, the ES service will thus be reduced drastically, but will then start to recover. During the restoration phase, damage costs will decrease until full recovery is reached. During this process, the ecosystem service will work as usual in accordance with the seasons. Since the area of welfare loss can be measured, it is useful to consider it when comparing the outfalls of different scenarios in an analysis, for example, active restoration versus the absence of active restoration (Navrud et al., 2016, p.5). Intending to establish unit values for the benefit assessment, the Norwegian Coastal Administration (NCA) funded a set of CV studies along the Norwegian coast. It claimed to find the WTP of regional populations in addition to the national one, since there might significant variations. To find the aggregate social benefits of oil spill prevention measures, the number of respondents is also relevant (Navrud et al., 2016, p.6). The study builds on experience from previous CV surveys related to oil spills. A notable example is Carson et al.'s 1992 study on the Exxon Valdez oil spill. They conducted a large pilot study consisting of three regional subsamples and one national sample. Figure 1 below presents a damage/loss table to explain the different scenarios (Navrud et al.,2016, p.10).

Figure 1

Damage/loss table used in CV study describing the four scenarios from oil spill damages in a CV study

	With measures	Without measures			
	Present conditions	**Small loss**	**Medium loss**	**Large loss**	**Very large loss**
Damage to birds					
	The area is an important breeding, migration and wintering ground for seabirds. The bird populations are in good condition.	The bird populations are in good condition. In total **1000** dead birds	The bird populations recover after **1** year In total **7 500** dead birds	The population of common eider is locally endangered. Other bird populations recover after **2** years In total **20 000** dead birds	The common eider and common murre populations are locally endangered. Other bird populations recover after **4** years. In total **50 000** dead birds
Damage to seals					
	Parts of the area are important to seals. The seal population is in good condition	The seal population is in good condition In total **10** dead seals	The seal population is in good condition In total **40** dead seals	The population of harbor seal recovers after 2 years In total **150** dead seals	The population of harbor seal is locally endangered In total **300** dead seals
Damage to coastal zone					
	The area is very important for recreation and outdoor life The area has a large cold-water coral reef, rich marine eelgrass meadows and a valuable natural environment	**5** km of coastal zone consisting of *bare rock shores and beaches* soiled with oil Affects land and water based outdoor life Affected areas can be used as normal after **6** months	**30** km of coastal zone consisting of *bare rock shores and beaches* soiled with oil Affects land and water based outdoor life Affected areas can be used as normal after **1** year	**150** km of coastal zone consisting of *bare rock shores and beaches* soiled with oil Affects land and water based outdoor life Affected areas can be used as normal after **3** years	**400** km of coastal zone consisting of *bare rock shores and beaches* soiled with oil Affects land and water based outdoor life Affected areas can be used as normal after **5** years
Damage to other marine life					
	Fish and shellfish in the area	Can be harvested as before. Safe to eat seafood Spawning areas for fish are unaffected	Can be harvested as before. Safe to eat seafood after **1** year Spawning areas for fish are unaffected	Fish, shellfish, mussels and seaweed should not be eaten until **3** years after the spill Spawning areas for fish are unaffected	Fish, shellfish, mussels and seaweed should not be eaten until **5** years after the spill Spawning areas for fish are unaffected

Note. From Navrud, S., Lindhjem, H. & Magnussen, K. (2016). Valuing Marine Ecosystem Services Loss from Oil Spills for Use in Cost-Benefit Analysis of Preventive Measures. Forthcoming in Paulo A.L.D. Nunes, Pushpam Kumar, Lisa Emelia Svensson, Anil Markandya (eds.) 2016: Handbook on the Economics and Management for Sustainable Oceans. Edward Elgar Publishing, Cheltenham.

The study finds that the mean WTP of households over 10 years increased according to the size of the damage scenario, as expected. The internal scope test of the survey was passed as WTP increased along with scenario sizes. It also finds that the WTP for Northern Norway was higher than for other regions and reflects on reasons for this difference, such as the relation to the fishing industry - since many households in northern Norway are connected to this industry. The study discusses the study methodology and presents the results. The final survey had the following outcomes: 1) Calculated the mean WTP per household to avoid different levels of damage and ES loss for the five regions. 2) Determined the existence of temporal stability, including answers from same respondents only. 3) Set out the percentage of positive WTP, real zeros, and protest answers. 4) Determined what explains WTP to avoid small, medium, large, or extra-large losses in ecosystem services from oil spills (Navrud, 2020).

1.3. Problem Statements and Hypothesis

Comparing identical studies from different years reveals changed preferences over time. As geopolitical areas have changed, the study reveals preferences of regions of Norway after the merging of several counties. The first problem statement of the thesis is to find non-use valuation estimates with the help of the CV method. -Two data sets are available to find Norwegian households' total and mean WTP to prevent oil spill in four scenarios. The oil spill site is the Troms area for the population interviewed in northern Norway and the Oslo Fjord for the population interviewed in eastern Norway.

This study investigates the WTP for a theoretical oil spill in the Troms area in Northern Norway. Troms was a county in the northern part of Norway which merged with the county of Finnmark in 2020 to become a new county named Troms and Finnmark. In the northeast, the county borders Sweden and Finland, and in the northwest, it borders the North Sea (Thorsnæs, 2021).

This study aims to test the validity and reliability of benefit transfer techniques for temporal and spatial transfer of the Norwegian populations' WTP to avoid marine environmental damages from ship's oil spills. It further seeks to analyze the impact of different payment frequencies as the data is based on questions regarding WTP for a 10-year payment period and a one-time payment.

The study conducts an econometric analysis of two existing contingent valuation data sets of similar oil spill environmental damage scenarios from 2015 and 2020 and interprets the results with regards to best practice guidelines and existing literature on the topic. Since the data is from two different years, the study conducts a benefit transfer. It discusses different benefit transfer methods and uses a unit value transfer with income adjustments. The value transfer includes both temporal, which is over a five-year – period, and spatial ones, including population from both northern Norway and eastern Norway.

Table 1

2015 versus 2020 Survey Characteristics

	2015	**2020**
Data provider	TNS Kantar	NORSTAT
Oil spill site	Northern Norway/Troms and Oslo fjord	Northern Norway/Troms and Oslo fjord
Response format	Payment Card	Payment Card
Payment vehicle	One-time payment	10-year period

Both studies used the response format of the payment card, asking where individuals to choose a monetary amount from a list of possible options. This format is one of three main formats and was first introduced

by Mitchell and Carson in the early 1980s[3] (Boyle, 2017, p.102). This study uses thee results from the payment card questions to answer the first two research questions:

1 What is Norwegian households' mean WTP to avoid environmental damage from a ship's oil spill in 2015?

The study analyses northern and eastern Norway with a sample that representing all regions of Norway. The number of completed surveys per household corresponds to n= *5,575* for 2015 and *n = 1,010* for 2020 for all regions. The number of completed surveys for the regions is a fraction of *n,* but validity tests were used to determine their significance. The surveys posed specific questions related to WTP, asking households to state their preferred WTP for four damage scenarios: small, medium, large and extra-large damages.

2 What is Norwegian households' mean WTP to avoid an environmental damage from a ship's oil spill in 2020?

The 2015 study asked households to state a WTP amount based on a one-time payment, and the 2020 study asked about an annual payment over a 10-year period – it would be reasonable to expect that the amounts for the one-time payment are much higher. Therefore, the hypothesis is related to this expectation. **When asked for a WTP amount over 10 years in a CV study, the amount is expected to be smaller than for a one-time payment**. The hypothesis will be regarded as true if there is a significant difference with the right signs.

3 How does the different payment vehicle influence the outcome from 1) and 2)?

It is a realistic assumption that survey respondents are subject to budget constraints, especially for the one-time payments. A household may like to contribute a much higher monetary amount than available. This effect is believed to be more relevant for every increase in the scenarios, resulting in a lower curve than expected for the extra-large damage scenario in 2015. **Therefore, the study hypothesis that the WTP for the extra-large scenario in 2015 does not increase proportionally as much as for the other scenarios.**

4 What is the difference in mean WTP of avoiding environmental damage from oil spills from 2015 to 2020?

[3] The other two formats are open-ended questions, where individuals are directly asked to state an amount and dichotomous choice, where the choice lies between an interval of possible yes- or no- answers that state an particular amount. See Boyle (2017, p.103) for more information.

The results from the first two research questions will show if the outcomes are as expected and what could have caused possible differences. The study will conduct a regression analysis controlling for when the study was conducted to determine whether this is significant or not.

5 How do socioeconomic factors explain Norwegian household's WTP to avoid environmental damage from oil spills?

Table 2

The Expected Outcomes of WTP Effects

	Expected sign
A younger age (18-44) affects WTP negatively	-/+
Male gender affects WTP negatively	-
Higher income affects WTP positively	+
University education affects WTP positively	0
Being a member of an environmental organization affects WTP positively	+
Active use of the area affects WTP positively	+

Young people often do not have the same amount of income as people with many years of work experience. Therefore, their income is expected to be lower, affecting their WTP. However, young people, in particular, seem to have increased awareness of environmental issues, and thus this study adds a positive sign to the expectation. The expected outcome could thus be positive or negative. The study also expects men to have a lower WTP than women. This is because, in both surveys, there is a higher percentage of women in environmental organizations: In the 2015 survey, 4% of men were members of an environmental organization, as opposed to 6% of women. In 2020, 6 % of men were members of an environmental organization, as opposed to 85 of women. See Appendix 4.2. The study also expects members of an on environmental organization to have higher WTP amounts than non-members.

6 How do the differences in survey participants affect the different outcomes from 4)?

As different institutes conducted the studies, it will be interesting to see if their composition of randomly selected survey participants differs from each other and from the Norwegian population, - and if this influences the results.

7 What is the coronavirus pandemic effect after correction?

The five-year period between the two surveys included the global Covid-19 pandemic, which caused millions of deaths and forced governments to impose regulations on a public and private level worldwide.

The Norwegian government also imposed regulations on everyday life, closing restaurants, day-care services, and schools and making health institutions adjust to new routines, equipment, and prioritize. As of April 2022, Norway reported 1,425,462 Covid-19 cases and 2,932 deaths related to the virus(Norwegian Institute of Public Health, 29.04.2022). In 2020, there were some questions related to the pandemic, leading to the next research question:

The survey participants from 2020 were asked if they would state the same WTP amount had there been no pandemic. **Since there have been many restrictions and uncertainty, my hypothesis is that the pandemic has negatively affected the WTP.**

2 Theory

An economy aims to maximize its social welfare with the limited resources it has. This chapter gives as overview over the theory relevant this study. It begins with an overview of how the valuation of environmental goods is embedded in the theory of welfare economics. Then, the use of WTP for value both Use Values and Non-Use Values when the quantity or quality of an environmental good changes is described. Further, the classification of environmental valuation techniques is presented with the Contingent Valuation method and its use in detail, including criticism of the method.

2.1. Welfare Economics

The basis for cost-benefit analysis is welfare theory, where an individual's utility U_i is subject to the prices of market goods $\boldsymbol{p}$ as well as the individuals' income Y_i and environmental goods *Q*, which are measured in quantity and quality. The smallest economic entity used is defined per household[4]. Then, the analysis measures what household *i* is willing to give from their income - Y_i to experience a quality increase in the environmental good of one unit[5] from $Q_0$to Q_1. When a household uses an amount of income Y_i to pay for such a quality increase, there is less available income to consume other goods and services. The equation below shows this relationship:

$$U_i\ (p, Q_0, Y_i\ ) = U_i(p, Q_1, Y_i - WTP_i) = U^0 \quad (2.1)$$

The household is willing to pay a monetary amount to receive the effect of an improvement without losing its total welfare utility.

The WTP shows what an economic entity is willing to pay to achieve an improvement in a public good from $Q^0$to Q^1 (Navrud, 2020). In this case, the public good is an environmental good. Public goods can also include public health or cultural heritage (Navrud 2020, CBA Main steps 1-4).

Welfare economics claims to find circumstances that allow people to state a preference towards one allocation of resources compared to other options. This ranking of alternatives comes with an ethical note. From a utilitarian point of view, social welfare consists of the weighted average of the total utility levels, namely the utility for society as a a whole (Perman et al., 2011, p. 7). Economists attempt to find a solution

[4] Household is used as the smallest economic entity for environmental goods and services, whereas the individual is the smallest economic entity for health effects related to the environment. See Navrud (2016, p.2) for further information.

[5] An increase of one unit is equal to the term *marginal increase*

for ranking alternatives that do not have a social welfare function. Vilfredo Pareto developed the notion of economic efficiency, also called the Pareto optimality, in 1897. It states that an allocation of goods is Pareto-efficient if it is the only allocation that can make at least one person or unit better off, without making any other person worse off.

2.1.1 Net Benefits

Once a project or policy has positive net benefits, there is the possibility of finding side payments that make at least one person better off without making another person worse off. WTP is then used to valuate policy outputs, whereas opportunity costs provide the values for the inputs. After analysts value all impacts, the sign of the net benefits is either positive or negative. A positive sign indicates that it is possible to compensate those who would lose from the policy or project sufficiently, so that nobody is worse off in the end. In other words, only projects or policies that are Pareto- efficient should be executed.

2.2 Cost-Benefit Analysis

A CBA is used as a framework for measuring efficiency and calculating whether a decision-makers should support a project. The economic term *net social benefits* is useful to measure the value of a policy in monetary terms.

$$NSB = B - C \tag{2.2}$$

The social benefits *B* minus the social costs *C* equal the *net social benefits*. These benefits are relevant because the CBA aims to include benefits and costs that are related to the whole society rather than individuals only. Different economic approaches exist to measure the extent of government intervention when a market failure occurs. Analysts use CBA to show that their approach is superior to other approaches. There are four main types of CBA-, shown in the table below

Table 3

Main Types of Cost-Benefit Analysis

Name	Description
Ex-ante	Commonly used as standard CBA. Conducted in the early phase of a project, it helps determine if the project should be continued
Ex-post	Conducted at the end of a project. Costs are already sunk, but the analyses determine the learning purposes and effect of intervention

In medias res	Performed during a project to monitor progress and influence decisions
Comparing ex-ante with ex-post (or in medias res)	Mostly used for learning purposes

Note. Adapted from (Boardman et al, 2014, p.2).

The objective of CBA is to allocate resources more efficiently. The implementation of new projects or programs creates a change in social surplus. A CBA analysis must then define and estimate the size of these changes (Boardman et al, 2014, p. 67).

The equation below shows the choice problem people have when they want to maximize utility but face constraints due to budget constraints and the limited amount of non-market goods.

$$\max_{x} U(X, Q) s.t. P * X \leq y, Q = Q^0 \quad (2.3)$$

In this equation, *U* stands for utility, *X* denotes the market goods of amount of n, and Q is the level of non-market goods. They are subject to $P = (p_1, 2, \dots, n)$, which is the sum of all market goods that individuals choose to buy. This might differ due to budget constraints and preferences. The non-market goods are rationed. *X* is dependent on the level of income (y) and the price of the market goods and non-market goods, which are not unlimited *Q;* (Flores, 2017, p. 29).

2.3. Total Economic Value

The total economic value is a concept that measures an individual's WTP for receiving an ecosystem service without reducing the level of wellbeing or utility of the individual. It is defined as the sum of use and non-use values. When an oil spill occurs, the loss of the use value is high in the first years but diminishes in the following years because of measures such as active restoration (Navrud 2021, pp. p.6).

2.4 Non-market Valuation

Revealed preference studies and stated preference studies are the main classifications for primary valuation studies. Both can be direct and indirect. Revealed preference studies include direct responses to changes, for example the travel cost method (indirect) or replacement costs (direct). Stated preferences are hypothetical. They include choice experiments (direct) where affected households can choose between two preferences and contingent valuation study (CV) where households are asked for their WTP or willingness to accept a certain condition. The data from this thesis uses data from CV studies.

2.4.1. The Valuation of Ecosystem Services

Ecosystem services are "the benefits people obtain from ecosystems" (Millennium Ecosystem Assessment, 2006). A study concluded that there is a negative trend on planet earth with regards to biodiversity and ecosystems, and that this trend is caused by human activity. (NOU 2013:10, p.9). To classify and calculate those services, CBA manuals are used. Besides the general CBA manual from the Norwegian Ministry of Finance, sector-specific guidelines are available. This study relies on the guidelines published by the Norwegian Coastal Administration. The first study evaluates the ES loss occurring from ships' oil spills along the Norwegian coast. It also questions the position of ES in cost-benefit-analysis, asking whether ES values should be included in CBA and be used more extensively than they currently are (Navrud et al. 2016, p. 2). The Norwegian ES classification places ES services under cultural services (NOU 2013:10, p. 134, figure 5.2). The most relevant values include recreation, aesthetic use, and cultural heritage. Cultural services can further be divided into educational and scientific, aesthetic, recreational, and existence and bequest. Educational and scientific are use values, and existence and bequest are non-use values.

2.5 Two different Welfare Measurements

CV studies use two welfare measurements: willingness to pay and willingness to accept. However, when designing a questionnaire, researchers must choose one measurement. They can then formulate the question to determine either the amount of money a person is willing to pay to avoid a change in the quality of the stated environmental good or service (WTP) or the willingness to accept such a change (WTA). Another factor to consider when deciding which welfare measurement to use is whether the policy is good or bad. If it is good, then utility increases and $U^0 < U^1$, and vice versa if it is bad.

This study uses WTP to avoid an event. The approach of using WTP and WTA works well when the utility changes are clearly positive or negative (Flores, 2017, p.37.) An oil spill is clearly a negative event.

3. Methodology

This section discusses the method used to analyze data from the studies.

3.1. Contingent Valuation Method

The contingent valuation method uses surveys and stated preferences to find the value for non-market goods. Together with choice experiments, it is the most used valuation method in this field. Even though there was a lot of skepticism in the beginning,[6] mostly due to its hypothetical character, the method has gained momentum and is widely used today. One milestone includes a publication from Mitchell and Carson in 1989 that presented a detailed prescription for conducting a CV analysis. Further, the National Oceanic and Atmospheric Administration presented a blue-ribbon panel in response to the controversy surrounding the claim to natural resources that the Exxon Valdez oil spill damaged. Exxon supported a 1993 publication by Hausman which criticized the CV method, and the National Oceanic and Atmospheric Administration managed to elevate the credibility of the CV method by providing guidelines and recommendations concerning the design and obtaining reliable outcomes (Boyle, p.85). Johnston et al (2017) present best practices and contemporary guidance. They support use of the CV method over the choice method for estimating oil spill damages (Johnston et al., 2017, p.333). What follows is a basic formal summary of the economic connections and steps necessary to conduct a CV study, following Boyle (2017).

The development of the survey design is crucial as welfare estimates can be affected by survey design choices and data analysis stages. In the beginning, researchers should derive a theoretical model of the values they are going to estimate. There is usually a baseline and several alternatives. The theoretical model is designed with regard to the differences between these alternatives and how an increase or decrease in quality or quantity will affect the outcome.

The value of protective measures to prevent damages caused by oil spills can be defined using the formula from (2.1):

$$v(P^0, Q^1, y) = v(P^0, Q^0, y - WTP) \tag{3.1}$$

Here, *v* defines the indirect utility function, *P* is the price of the uncontaminated ecosystem service, and *y* stands for income. *Q* stands for the water quality, where Q^1 represents the reduced quality due to the oil spill and Q^0 stands for the current water quality or the quality with preventive measures. The status quo is the condition Q^0. All other factors in the indirect utility function are assumed to be constant. In this model,

[6] Scott (1965) made the famous notation "Ask a hypothetical question and you get a hypothetical answer" (Boyle, p. 84).

the interest is that of protecting water from oil spills so that $Q^0 > Q^1$. The difference here would be a passive use value that would represent a change in the water quality ΔQ.

Three components are relevant when defining values for CV studies: First, the item valued must be described thoroughly, including conditions with and without the item. Secondly, a statistical analysis of the CV responses requires a definition. Lastly, a definition makes it possible to interpret value estimates for decisionmakers.

Uncertainty with regards to changes in current and future conditions makes it difficult for economists to identify and model Q^0 and Q^1. Below is a formula that defines the value for the reduced possibility that water becomes contaminated, whether from oil spills or other factors:

$$\pi_1 v(P^0, Q^1, y - op) + (1 - \pi_1) v(P^0, Q^0, y - op) \quad (3.2)$$
$$= \pi_0 v\,(P^0, Q^1, y) + (1 - \pi_0)\, v(P^0, Q^0, y)$$

Here, π describes the probability of reduced water quality. $\pi_0 > \pi_1$. π_0 marks the probability of no reduced water quality for Q^1 if a policy is absent, and π_1 marks the probability of no reduced water quality for Q^1 if a policy or measurement is in place. *Op* stands for option price or WTP to reduce the possibility of reduced water quality. The option price is the value of p, which makes the individual indifferent between the status quo level of utility and the new expected utility. In this case, *op* is used as a measure to compensate for the surplus when there is uncertainty (Flores, p.49). So, OP and WTP is the largest amount that can be obtained to increase the probability that the current water quality will not decrease. This is relevant because the description of the change to be valued extremely important for the CV study to succeed. Current conditions are described as well as theoretical outcomes from scenarios. (Boyle, p.88). Both increased information about environmental quality and internet surveys that present the information clearly have led to more realistic outcomes of CV studies. The step after valuing the change is to identify the affected population. Many studies use the boundaries set by politics, such as counties or countries. The location of the population is also relevant as distance from the relevant event might influence the values (Boyle, p.90).

After choosing a data collection method, researchers should consider the sample size since there is a tradeoff between an acceptable level of statistical precision and the budget. The standard error or WTP can be used for this purpose:

$$se_{\overline{WTP}} = \frac{\sigma}{\sqrt{n}} \quad (3.3)$$

Here, *n* is the number of completed respondents from the survey, *and* σ is the standard deviation. When the value for *se* is high, a larger sample size is required to achieve statistical precision. When the value for

se is low, the sample size can be smaller to achieve the same precision level. When budgeting for CV surveys, one should also consider that the response rate is less than 100 %.

Both baseline and new conditions and new conditions are relevant hen describing the condition to be valued. Further, information about how the change is going to be implemented is important. Other important steps include selecting a payment vehicle, determining a time frame for the payment, and designing the questions for the study, including a response format. The CV studies presented in this thesis used a tax with different time frames, the 2015 study used a one-time payment, and the 2020 study used a payment period over 10 years. The response format used was the payment card, introduced by Mitchell and Carson in 1981 (Boyle, p. 103).

3.1.1. Data Analysis

The study conducted the data analysis of the payment card questions with the help of econometric analyses, deriving the WTP using equations.

After defining the items to be valued as in (3.1) and (3.2), the study calculated the log of WTP:

$$log(WTP_i) = x_i'\alpha + e_i \tag{3.4}$$

Here x_i' is defined as a vector of the arguments which influence an individual's WTP and α stands for the preference coefficients of the estimates. The standard error term e_i is expected to have a normal distribution. The explanatory variables are selected using economic theory and will also affect the outcome of WTP in different grades.

In the payment card model, respondents chose the maximal amount of one from many intervals, which might not represent their true WTP, but only the fraction where their true WTP is embedded. These true values are defined in (3.1) and (3.2) and were defined by Cameron and Huppert in 1989.

The possibility that interval on the payment card model WTP_i will fall into the interval that has been chosen is defined as

$$\Pr(WTP_i \in [\$B_{1i}, \$B_{ui}] = \Pr(\frac{log\$B_{1i} - x_i'\alpha}{\sigma} < t_i < \frac{log\$B_{ui} - x_i'\alpha}{\sigma}) \tag{3.5}$$

With the true values WTP_i^t being inside the interval $[\$B_{1i}, \$B_{ui}]$. *1* stands for the lowest amount in the interval, and *u* stands for the amount that is next to the highest on the payment card with *t* as the standard normal variable. It is then possible to define WTP as

$$E\ (\log(WTP)) = x'\ \hat{a} \tag{3.6}$$

Where â represents the estimates coefficients. Another method to define WTP is by

$$E(WTP) = \exp(x'\,\hat{a})\exp\left(\frac{\sigma^{2}}{2}\right) \quad (3.7)$$

Which describes the use of inserting mean values for *x* to determine WTP. This equation inserts specific levels of elements that relate to each respondent from the survey, predicts their individual WTP, and then calculates the mean WTP.

Reliability studies are used to ensure the validity of value estimate. Both reliability and validity are crucial for an accurate outcome of CV studies. Values can change over time, and while some studies use test-retest stability measures, this was not the case for the two CV studies analyzed in this thesis. Scope tests can be used for this purpose; they ask if respondents are willing to pay more if the item change is larger (Boyle, p. 120).

In summary, CV studies face both trade-off issues and limitations. They use an empirical valuation method that requires a high set of skills.

3.2. Econometric Analysis

This thesis focuses on econometric analysis of the CV studies as appropriate empirical method. It uses an Ordinary Least Squares estimation (OLS) of a model with time series data and panel data. The study needs to show that the model satisfies the OLS assumption, beginning with the error term, which should be uncorrelated with the explanatory variables. Further, the researcher must make functional form decisions during the design process. Some variables ae presented in logarithmic form, and dummy variables are created to correctly include numerical values that do not have a quantitative meaning. These dummy variables can then be included in the analysis. The original model is estimated and modified using a sensitivity analysis. As panel data is used, two years are pooled in a standard OLS analysis. As some results of the analysis might be not as expected, it is tempting to try different methods that might lead to an outcome that matches expectations. However, this should be approached with caution as it might lead to data mining, which violates the assumptions of the econometric analysis (Woolridge, 2012, p. 613).

In econometrics, the nature of data is typically nonexperimental. The first part of the data analysis is done using cross-sectional data. After the two data sets have been merged, the material is transformed into panel data.

OLS is a technique that estimates linear relations between a dependent variable and several independent, or explanatory variables. It is the most widely used regression technique. The term *least square* refers to the fact that the parameters of the regression equation are found by minimizing the sum of squares when

deviating the dependent variable (University of British Columbia, 2022). Woolridge (2012, p. 24) defined a simple regression model:

$$y = \beta_0 + \beta_1 x_{1i} + \cdots + u_i \quad (3.8)$$

Where the parameters are β_0 and β_1 and $\{(x_i, y_i): i = 1, \ldots, n\}$, with a random sample of size n. The error term is u_i. To understand the effect of parameters on the WTP of households, the study regressed WTP on the explanatory variables in the analysis part and then interpreted the results. Note that this occurred after the transformation to panel data.

3.3. Panel Data Regression

As the dataset includes the same cross-sectional data over multiple periods, the study classified the dataset as panel data set. The main difference from usual OLS regression models is that there is a need to control for effects for all households within a certain time. A typical panel data regression specification is

$$y_{it=} \beta_0 + \beta_1 x_{it} + \beta_2 D_i + \beta_3 D_t + u_{it} \quad (3.9)$$

Where β_2 stands for the individual fixed effects and β_3 for the time-fixed effects, which represent the coefficients from the dummy variables D_i and D_t. When the effects of D_i are allowed to be correlated with the explanatory variable, the regression model is defined as a fixed effects model (FE) or random effects (RE) model. It is preferable to assume a FE model due to the consistency of the estimate as the estimates from RE are only consistent when the true underlying model is FE. (University of British Columbia, 2022).

Panel data sets are especially useful for policy analysis focusing on controlling for time-constant unobserved features, for example location or groups of people or households, which are possibly correlated with the explanatory results of the model (Woolridge, 2012, p. 425).

3.3.1 Validity

After transformation from wide to long data, STATA needed to get the information that the data is to be classified as panel data. It is necessary to check for the scenario variables where one of the scenarios is held as baseline, since it is of categoric character. Panel data is also called longitudinal data and describes a data set which has time-series information for each of the characteristics that are cross-sectional. It can for example consist of different geographical units, or wage rates that are collected over a period of years. The main difference to a pooled cross section is that the same cross-sectional units are described over a certain time frame (Woolridge,2016, p. 9).

3.4 Log-function

There are four existing log transformations for the simple model from formula (3.8). One is the linear case with no transformations, the second is the linear-log model, the third is the log- linear model and the fourth is the log-log model. Studies use the natural logarithm with the base $e \sim 2.71828$ to transform the values. Logarithmic transformations are used to manage existing non-linear relationships between independent and dependent variables. They can also be used to achieve a more realistic level of skewness, which moves towards normal distribution. (Benoit, 2011, p. 2).

For this study, the log-linear and the log-log model are relevant.

The log-linear model is defined as

$$logY_i = \alpha + \beta X_i + \varepsilon_i \tag{3.10}$$

Which interprets the estimated coefficient $\hat{\beta}$ as follows: If *X* increases by one unit, an increase in *logY* of $\hat{\beta}$ can be expected.

In a case where the logarithm transforms both the dependent and independent variables, the equation becomes

$$logY_i = \alpha + \beta logX_i + \varepsilon_i \tag{3.11}$$

Economists also use the term *elasticity* to describe this. The equation shows the expected percentage Y if X increases by some percentage (Benoit, 2011, p. 4).

3.5. Benefit Transfer Methods

In the case of existing data material for one or more valuation studies for an environmental good, there might be a possibility to transfer either via study site or policy site. This is relevant because there might be budget constraints or time constraints. Further, there is a growing number of data sets available, for example, on the Environmental Valuation Reference Inventory (EVRI) platform on the website www.evri.ca. This platform provides the most complete database of environmental valuation studies, with more than 4,000 studies from all over the world, including Norway. Benefit transfer is conducted via three main methods, namely unit value transfer, transfer through a WTP function and meta-analysis (Navrud, 2016, p. 15).

Benefit transfer methods used in this thesis are unit value transfer with regards to income adjustments and different specifications of value function transfer. The transfer is temporal over a five-year period.

3.5.1 Unit Value Transfer

This method concentrates on transfers of average WTP values, based on the change in quality or quantity of an environmental good. Corrections can be made if the values such as the income level or differences between participants or places change.
This thesis corrected the WTP for 2015 using a Statistics Norway tool, the Consumer Price Index calculator. This correction was necessary to make the 2015 and 2020 results comparable. Appendix 3 -Unit Transfer provides an overview.

3.6. Data Preparation

This section explains the adaptations applied to make the data sets comparable and follow best practice standards.

Since the data is taken from two different sources, it is natural that the population in each data set has different features. For example, the population size in the 2015 data set is 5,575 while the population in the 2020 data set is 1,010. This difference should be considered when identifying reasons why outcomes may differ. The smaller the population, the larger the error terms for example. In general, the larger the population sample, the better.

Even though the 2020 survey design is very similar to the 2015 dataset, it has some differences with regard to the choice alternatives in the questionnaire and data coding. For example, there are more variables in a numeric format, which require less alteration from string to numeric than for the 2015 data.

The first step was conducting calculations for WTP values. The researcher opened the Stata.do files provided by TNS Kantar for 2015 and NORSTAT for 2020 and started to load them into the software.

The data for 2015 was available through an Excel file, so the Excel file was imported into the software. The first was to check the number of observations. The 2015 observations had to amount to 5,575, but the number of observations displayed was much higher. This discrepancy occurred because the data was not filtered for completion. Once the filter was applied, the total number of observations was as expected: 5,575 for 2015 and 1,010 for 2020.

The regions in the 2015 data set needed to be merged to comply with the 2020 definitions for eastern Norway and northern Norway. Since this thesis only examines the preferences for populations based in Nnorthern Norway and eastern Norway, the population areas needed to be merged. In the spring of 2017, the government decided to reduce the number of municipalities in Norway by 15%, from 422 to 358 during the so-called Municipal Reform. It also reduced the number of counties by approximately 42%, from 19 to

11 (Hansen and Tjernshaugen, 2021). Thus, the 2015 survey participants' areas needed to be updated and merged to make them comparable to the 2020 data set (see Appendix 4.1).

Table 4

Regions Before and After the Municipal Reform of 2017

	2015	**2020**
Eastern Norway	Østfold + Akershus + Oslo + Hedmark + Oppland + Buskerud+ Vestfold + Telemark	Viken + Oslo + Innlandet + Vestfold and Telemark
Western Norway	Møre og Romsdal + Hordaland + Sogn og Fjordane + Rogaland	Møre and Romsdal + Vestland + Rogaland
Southern Norway	Aust-Agder+ Vest - Agder	Agder
Mid-Norway	Sør-Trøndelag og Nord-Trøndelag	Trøndelag
Northern Norway	Troms + Finnmark + Nordland	Troms and Finnmark + Nordland

3.7. Payment Card Method

The survey used the payment card method which is widely used in the literature and follows the best practice rules. Participants are asked to state an amount that reflects their WTP for each of the four scenarios. Since the amount is within an interval, researchers can only be sure that their stated amount is within that interval. However, the amount could lean towards the upper end, the lower end, or somewhere in the middle. Thus, the researcher then calculated the midpoint estimates for each interval. The amount zero on the lower end of the interval remains zero. The next interval begins with an amount of NOK 10. If one calculates the midpoint of the interval between zero and 10, this could lead to false results. Participants were also asked also if they were sure about the amounts they stated. Since some changed the initial amount after this question, this study also accounted for this change. It was also possible for all the scenarios to state an amount that was not within the interval, and participants directly typed it into the questionnaire.

3.8. Testing for Statistical Significance

To test whether the results of the two groups are statistically significant, the researcher conducted t-tests in Stata. A mean comparison test for each sample site and each scenario was conducted. The null hypothesis tested is that the difference between the groups is equal to zero (Stata Corporation, 2021, rttest). A two-tailed t-test is required to determine this. When given the observed value of the t-statistic, one could ask for the smallest significant value at which to reject the null hypothesis. The answer to this question is known as the p-value for the test. The p-value is obtained by calculating the probability that at a random variable

with x degrees of freedom, is larger than the critical value for the test (Woolridge, 2014, p. 118). Since it is a probability, its value must be between zero and one (Woolridge, 2014, p. 119). If the p-value for the population is $p \leq .05$ or $p \leq .01$, then the data can be categorized as statistically significant at the 5% level or 1% level.

If the standard deviation for a method is unknown, it is standard to calculate the empirical value from the actual observations. The confidence intervals and hypothesis testing use t-values which can be looked up in a table in the statistical literature. A t- distribution is symmetrical and becomes narrower as the degree of freedom increases. The t-distribution will be normally distributed once the degrees of freedom are infinite (Helbæk, 2018, p. 77). The degrees of freedom are the sum of the observation number minus two, since there are two groups tested.

It is also important to examine the p-values since they show the lowest significance level which still rejecting the null hypothesis (Woolridge, ch.4, page 118). A p-value lower than 0.05 signifies the results as statistically significant, while one higher than 0.05 signifies no statistical significance. When the value is higher than 0.05, the null hypothesis is rejected, and the alternative hypothesis is accepted. (McLeod, 2019).

The study tests for t-values to determine if there is significant difference between the groups. As the number of degrees of freedom *df >100*, the normal approximation applies (Woolridge, 2014, p.119) It is thus possible to apply the rules of thumb with regards to t-distribution (McLeod, 2019):

|t-ratio|>1.645 – statistically significant at 10% level

|t-ratio|>1.96 – statistically significant at 5% level

|t-ratio|>2.576 – statistically significant at 1% level

4. Data

4.1 Survey Design

This section describes the design of the two studies analyzed in this thesis. Two comparable contingent valuation studies from 2015 and 2020 were conducted to provide unit values for transfer and use in CBA for preventing oil spills from ships. This was done by a contingent valuation survey conducted by TNS Gallup for Vista Analyse in 2015. The Norwegian Coastal Administration funded the project, which lasted from 2012 to 2016. The pilot study consisted of 2,525 households and the main study of 5,575 households. This thesis uses the data from the main study. The data was gathered through focus groups, one-on-one interviews, and a soft-launch internet survey. The results should be used to provide unit estimates of WTP per household for theoretical oil spill scenarios in five coastal regions in Norway and calculate the total economic benefits (Navrud, 2020). Together with the costs of preventive measures, it would also be possible to calculate the net present value (NPV). The damage function approach was used to design questions from the survey.

NORSTAT for Menon Economics AS provided the 2020 data as part of the research project Coast Benefit, which lasted from 2016 to 2021 and was funded by Miljøforsk. Its main objective was to increase knowledge about environmental protection and trade-offs related to economic projects that affect Norwegian coastal ecosystems. Relevant actors could then use the improved knowledge about the impact of non-market valuation in the coastal for better decision making which balances environmental, political, and other stakeholders' needs (Research Council of Norway, 2021).

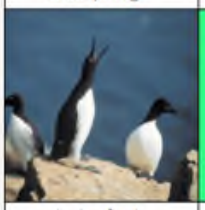
Oil spills from ship have environmental impacts because the spills damage nature. This damage leads to reduced environmental service. The study classified the loss of environmental using five levels of severity: no damage, small, medium, large, and exceptionally large ES loss. It presented these five damage levels via a damage table that showed the number of killed birds, seals, ocean life, and affected coastal areas in kilometers. It also showed the time expected to counter the loss in years. Since households were given a choice, one could argue that the survey design equals a choice experiment. However, the survey design cannot be considered a choice experiment since the attributes presented were not dependent on each other.

Appendix 1 and Appendix 2 present the web versions of the two surveys.

A damage table provides a graphic representation of the four different scenarios. The base scenario status quo represents the current situation and provides measures. Then, the four different damage scenarios are presented. Each scenario lists information about the damage to birds, seagulls, coastal zone, and other sea life.

Figure 4.1

The damage scenario table for northern Norway from the 2020 survey

	Med tiltak	Uten tiltak			
	Dagens tilstand	**Liten miljøskade**	**Middels miljøskade**	**Stor miljøskade**	**Svært stor miljøskade**
Skade på fugl					
	Området er viktig hekke-, trekk- og overvintringsområde for sjøfugl. Har vært nedgang i sjøfugl siste år, men bestander i hovedsak i god forfatning	Fuglebestandene i hovedsak i god forfatning I alt **1500** døde fugl	Lomvi lokalt utrydningstruet Øvrige bestander tilbake til normalt etter **1** år I alt **15 000** døde fugl	Bestanden av krykkje og lomvi lokalt utrydningstruet Øvrige bestander tilbake til normalt etter **2** år I alt **50 000** døde fugl	Bestanden av krykkje og lomvi utrydningstruet i Norge Øvrige bestander tilbake til normalt etter **4** år I alt **120 000** døde fugl
Skade på sel					
	Området er viktig for sel. Selbestandene i god forfatning	Selbestandene i god forfatning I alt **30** døde sel	Selbestandene i god forfatning I alt **100** døde sel	Bestanden av selarten steinkobbe lokalt utrydningstruet I alt **500** døde sel	Bestanden av selarten steinkobbe utrydningstruet i Norge Øvrige arter tilbake til normalt etter 4 år I alt **1000** døde sel
Skade på kystsone					
	Rikt ravinelandskap og dypvanns koraller Området er viktig for rekreasjon og friluftsliv for fastboende og tilreisende	**5** km kystsone bestående av *svaberg og strender* tilsølt med olje Påvirker landbasert og vannbasert friluftsliv Berørte områder kan brukes som normalt etter **6** måneder	**30** km kystsone bestående av *svaberg og strender tilsølt med* olje Påvirker landbasert og vannbasert friluftsliv Berørte områder kan brukes som normalt etter **1** år	**150** km kystsone bestående av *svaberg og strender* tilsølt med olje Påvirker landbasert og vannbasert friluftsliv Berørte områder kan brukes som normalt etter **3** år	**400** km kystsone bestående av *svaberg og strender* og fiskevær tilsølt med olje Påvirker landbasert og vannbasert friluftsliv Berørte områder kan brukes som normalt etter **5** år
Skade på annet liv i sjøen					
	Området er viktig gyte- og internasjonalt viktig oppvekst- og beiteområde for flere fiskeslag	Kan høstes som før Trygt å spise sjømat Gyte- og oppvekstområder for fisk ikke påvirket	Kan høstes som før Trygt å spise sjømat Gyte- og oppvekstområder for fisk tilbake til normalt etter **1** år	Fisk, skalldyr, skjell og tang bør ikke spises før **3** år etter utslippet Gyte- og oppvekstområder for fisk tilbake til normalt etter **3** år	Fisk, skaldyr, skjell og tang bør ikke spises før **5** år etter utslippet Gyte- og oppvekstområder for fisk tilbake til normalt etter **5** år

Note. See Appendix 1 for more information.

The damage scenario for seals in the 2015 survey states that in the baseline scenario, the seal population is in a good condition. The small damage scenario lists 30 dead seals, while the extra-large damage scenario lists about 1,000 dead seal which would classify the Harbor seal as endangered not only in the local area, as it is for the large damage scenario, but for all of Norway.

Figure 4.2

Photograph of Harbor Seal

Note. Photograph "Steinkobbe". By Andreas Trepte, 2021, in Store Norske Leksikon,https://snl.no/steinkobbe licence: CC BY SA 2.0.

4.2 Mean WTP

Before beginning the econometric analysis, it was necessary to determine the mean WTP. This determination occurred before merging both datasets. The researcher conducted the WTP calculations for both surveys independently; however, variables were made comparable with regard to future merging. The data for 2015 was mostly in string format, which is common for words, so in many cases, the researcher converted the values into numeric ones to enable further calculations and comparability during the merging process.

4.3 Benefit Transfer

For 2015, the data was adjusted to changes in the Consumer Price Index (KPI), and the 2015 values were djusted to correspond to the 2020 values. The Statistics Norway *priskalkulator* tool shows the worth of 100 Norwegian Kroners from past years using the current worth. The basis for the calculator is the Consumer Price Index, which Statistics Norway also publishes. The amounts were adjusted from *"average 2015"* to" average *2020"*. The result is a change in the price of 12.2%. All monetary values were affected and thus it

was necessary to create new values for all amounts that included WTP and household income values. See also Appendix 3.

4.4. Protesters and Outliers

Participants stated zero for many reasons. Lindhjem et al. (2014) propose to remove respondents who state a WTP above 2 %of their household income (Lindhjem et al, 2014, p.33). Further, the household income needed to be converted into midpoints, since the income was reported in intervals, and the amount of household income could either tend toward the lower end or the higher end of the scale or be somewhere in the middle. However, not all participants wished to state their annual household income. The question then arose about these households in the data set. This was solved by taking the average household income for the various parts of the country and replacing them where participants did not provide the values. It would not be correct to call these "missing values" since there was a value that belonged to that specific state.

After adjusting for price changes, respondents who stated an amount above 2% were removed from the survey. This amounted to 6 % of all observations from 2015, with the highest number of removed observations within the extra-large scenario. The observations from 2020 yield the exact same number: 6 % were removed, with the highest number within the extra-large scenario.

The next step was to remove protest respondents. Lindhjem et al. suggest keeping real zeros and keeping only those replies that state the reasons as being unable to afford for the desired utility change or having positive use value. The ones that state varied reasons are not "real zeros" and are thus removed. (Lindhjem et al., 2014, p.33). The questionnaire provides participants with a variety of reasons for choosing zero WTP. It includes tax reasons, lack of trust to authorities, and other ethical reasons. Chapter 4.9.4 provides a detailed overview.

4.5. Merging of Datasets

The next step was to prepare several variables for merging. This required attention as variables and data types need to comparable, and it was more challenging to use these data sets compared to time-series data from the same institute.

The socio-economic factors with common outputs were changed from string to numeric data, and some re-coding was required. An example is the data on education. Participants could choose between seven

outcomes, with one option for vocational education. In the 2020 data, there was no rubric for vocational education, only the number of school years. Further, the variables for higher education were different in this latter data set. This discrepancy was solved by creating only two groups for this data, university education vs. no university education. Several dummy variables ensured the possibility of merging, which was then done via the append function in Stata. This function merges datasets in a vertical manner, which means that data from one set is in use as observations from the other dataset are added (STATA corporation, 2021). After merging, the working file was then used for analysis and regression. A dummy variable made it possible to easily filter for 2015 or 2020 data.

Information about the distance from the coastline would have been interesting to compare, but unfortunately, the 2020 data did not ask for that information.

5. Results

This section presents an overview of survey results, including an overview of descriptive statistics. Main characteristics and differences are highlighted and discussed with regards to the influence of survey outcomes. It will also shed light on the effect of the pandemic on WTP as the 2020 survey contains questions related to covid-19.

5.1. Socioeconomic Factors

Average socioeconomic factors were determined to ensure comparability of the results of both studies. Some re-coding in the merging file, such as dummy variables for gender and age, was necessary to ensure combinability between the two data sets.

Table 5

Socioeconomic Factors

Variables	**Variable description**	**Sample**	
		Full15 (%)	Full20 (%)
Male (-)	Male participants	51	54
Hhincome (+)	NOK/ year, midpoint values excluded protesters and <2%	746,693	736,437
uni_education (+)	Participants with university education	36	60
Age (+)	Average age	51	58
Use (+)	Have been using the area actively in the last 12 moths	28	3
Member_environment (+)	Are member of an environmental organization	5	7
Regions	Northern Norway	14.49	21.78
	Eastern Norway	34.17	41.88
	Mid Norway	11.93	11.29
	Western Norway	33.49	15.94
	Southern Norway	5.92	9.11

Table 5 shows that the population from the 2020 sample is slightly older and consists of more men than in the 2015 sample for northern Norway and Eastern Norway. Interestingly, the mean household income slightly decreased from 2015 to 2020. As both having a male population and older age are expected to influence WTP positively, the researcher expects the household income to be higher than for the 2015 sample. There is, however, a difference in the educational level in the two studies. Since the education

choices for the questionnaires differed, the researcher grouped education only into two categories to ensure comparability. For example, the 2020 data set did not provide an option to choose tertiary or vocational education. Further, university education was measured using different years and various levels. The percentage of people with higher education was much higher for 2020; the researcher expected this to influence the WTP in a positively[7].

To evaluate whether the sample is representative of Norwegian society, the researcher compared the samples from the two studies with the population of Norway.

Table 6

Population vs Survey Characteristics

Variables	**Variable description**	**Norway**		**Sample**	
		2015 (%)	2020 (%)	Full15 (%)	Full20 (%)
Gender[8]	Male	43,82	44,51	51	54
	Female	56,18	55,49	49	46
Income	Average household income	891,317[9]	879,300[10]	746,693	736,437
Education	Participants with university education	32,2	35,3[11]	36	60
	Participants with no university education	68,7	67,8	68	40
Age groups	18-29	16,01	15,68	16	12
	30-44	20,54	20,09	21	13
	45-60	21,00	21,3	28	13
	60+	20,54[12]	22,1	35	62
Regions	Northern Norway	9,4	9,16	14.49	21.78
	Eastern Norway	42,58	43,16	34.17	41.88
	Mid Norway	8,72	8,76	11.93	11.29
	Western Norway	25,67	25,36	33.49	15.94
	Southern Norway	13,62	13,59	5.92	9.11

[7] See Table 7 Descriptive statistics all variables obtained from the survey data for more information.
[8]Data on gender and regions is collected for people older than 18.
[9] Adjusted with Consumer price index from Statistics Norway: The price increase from 2015 to 2020 is 12.2%. The original value for 2015 is NOK 794,400.
[10] See SSB (2022c)
[11] See SSB (2022a)
[12] See SSB (2022b)

This table clearly shows that the age distribution in the surveys differs from that of the general population. This difference is especially notable for the older population in the 2020 sample. However, the survey population does not account for children aged 0-17, while they are included in the official population statistics. Regardless, a high percentage of survey participants are from the age bracket 60+. Further, women are underrepresented in both the 2015 and 2020 surveys. Whereas male participants account for more than 50% of participants in both the 2015 and 2020 studies, the population values are 44% for 2015 and 45% in 2020. As this thesis analyses northern Norway, the survey participants are overrepresented for both years, especially 2020: While about 9% of the population aged 18 or older lived in Northern Norway in both 2015 and 2020, this figure is is 14% in the 2015 survey and 22% in the 2020 survey. Further, the figure shows that the eastern Norway population is underrepresented in the 2015 study, as it is about 8% less than the average population of eastern Norway. All regions in the Municipal Reform were accounted for as the researcher applied a filter when creating the export of statistics from the SSB. Lastly, there is a difference in the average income per household. Even though values from both Statistics Norway and the surveys are per household and before taxes, survey participants seem to have a much lower household income than the average population.

5.2 Descriptive statistics

Table 7 is a tabulation of the survey data material that was used to analyze the two surveys.

Table 7

Descriptive statistics of all variables obtained from the survey data

Variables	**Variable description**	**Sample[13]**						**Testing difference between 2015 and 2020**		
		Full15	Full20	East15	East20	North15	North20	p-value[14] [15] Full	p-Value East	p-Value North
		n=5,575	n=1,010	n=1,707	n=350	n=808	n=220			
WTP[16]	mean WTP for all four damage levels in NOK (panel data).	1,270 (3,807)	1,643 (2,748)	1,212 (1,806)	1,806 (3,109)	1,517 (4,018)	1,949 (3,001)	<0.001***	<0.001***	0.0064***

[13] Mean (standard deviation); Dummy variables in %
[14] Significance levels *10%, **5%, ***1%
[15] Welch's two-sample t-test for differences in means and Chi-test to find p-values for categoric data
[16] WTP is calculated as the midpoint of the range in the payment card

	mean WTP for small damage	645 (1,219)	1,173 (1,987)	609 (1,182)	1,285 (2,238)	757 (1,439)	1,364 (2,152)	<0.001***	<0.001***	<0.001***
	mean WTP for medium damage	859 (1,431)	1,309 (2,025)	815 (1,390)	1,394 (2,181)	991 (1,552)	1,631 (2,390)	<0.001***	<0.001***	<0.001***
	mean WTP for large damage	1,244 (1,936)	1,670 (2,518)	1,179 (1,906)	1,772 (2,628)	1,469 (2,142)	2,090 (3,088)	<0.001***	<0.001***	0.0015***
	mean WTP for extra large damage	1,662 (2,507)	1,905 (2,739)	1,574 (2,406)	2,073 (2971)	1,956 (2,708)	2,136 (3,034)	0.0111***	<0.001***	0,4396
Age (-) Min:18, Max:99	Mean age of survey participant	50.46 (16.81)	53.82 (17.35)	50.96 (17.12)	51.91 (18.46)	50.86 (13.95)	57.8 (15.89)	<0.001***	0.3077	<0.001***
Male (+)	Male participants in %	51	54	48	49	50	60	0.061*	0.8646	0.0099***
Hhincome (+)	Household income in NOK/year, midpoint values	746,693 (307,734)	736,437 (358,935)	725,959 (313,630)	730,480 (377,203)	744,502 (296,326)	772,599 (319,028)	0,3428	0,7964	0,2204
	excluded protesters and <2%	763,195 (303,162)	754,577 (356,067)	740,639 (307,966)	748,484 (372,435)	763,684 (288,838)	777,633 (313,099)	0,4436	0,665	0,5551
University education	participants with university education in %	36	60	38	61	38	65	<0.001***	<0.001***	<0.001***
Use	have used the area in the last 12 months to a certain extent in %	28	3	32	<0.5	21	10	<0.001***	<0.001***	<0.001***
Member_environment	are member of an environmental organization in %	5	7	6	7	5	6	0.005***	0.3433	0.6012
no corona_samewtp	2020 only: participants that would state approximately the same wtp if there would have been no pandemic in %		92		92		93			
expecthighertaxes	2020 only: participants that expect a substantial rise in taxes in the next 10 years in %		51		52		50			

The sample size was 5,575 for the 2015 study and 1,010 for the 2020 study. The percentage of complete answers was 47% for 2015 and 46% for 2020, which is sufficient for the use of results. When asked for their WTP for 2015 and 2020, 7% and 14% of participants, respectively, replied with "don't know". These were coded as "missing values." Further, many participants stated a monetary value of "zero" for their WTP. These were filtered out at a later stage if they were not classified as "true zeros" as determined by the reasons stated in the follow-up questions in the questionnaire.

The study calculated the WTP for the net results of participants, keeping the real zeros and protesters and excluding those who had a WTP above 2%. Mean WTP is a result of the midpoints created earlier from the values that respondents chose on the payment card. Mean WTP for 2015 is NOK 1,102 while mean WTP for 2020 is NOK 1,504.

The t-tests show that all differences between 2015 and 2020 for small, medium, and large damage scenarios are statistically significant for both the 5% and 1% levels. This is different for the extra-large damage scenario, where $p = .7979$. Thus, the results of the extra-large damage are not statistically significant.

A two-sample t-test with equal variances was used as a scope test to find out whether the mean WTP for 2015 was different from the mean WTP for 2020. Appendix 5.1. provides an overview of the t-test results.

$$diff = mean\,(2015) - mean\,(2020)\,, H_{0=}0 \qquad (5.1)$$

The study rejects the null hypothesis for all cases except the extra-large scenario for northern Norway. When the null hypothesis is rejected, there is a statistically significant difference.

5.3 Mean Willingness To Pay

The mean WTP for each of the four damage scenarios is listed in Table 8 below:

Table 8

Mean WTP

Variable description	**Sample**[17]					
	Full15 n=5,575	Full20 n=1,010	East15 n=1,707	East20 n=350	North15 n=808	North20 n=220

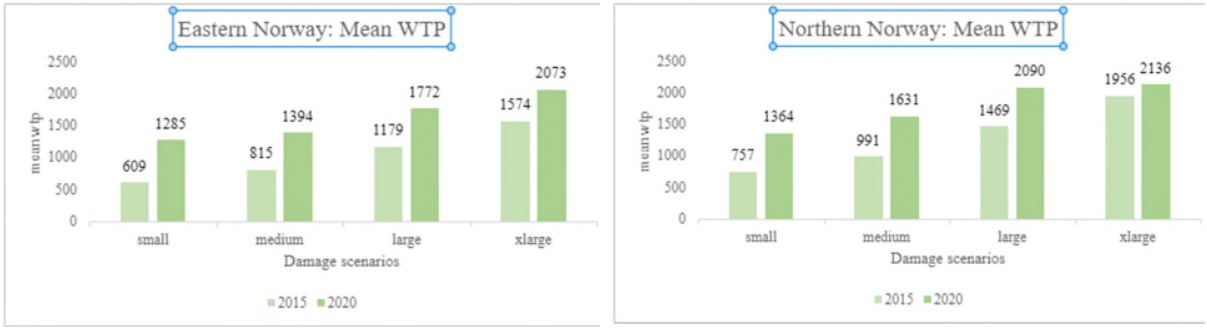
[17] Mean (standard deviation)

WTP[18] mean wtp for all four damage levels in NOK.	1,270 (3,807)	1,643 (2,748)	1,212 (1,806)	1,806 (3,109)	1,517 (4,018)	1,949 (3,001)
mean WTP for small damage	645 (1,219)	1,173 (1,987)	609 (1,182)	1,285 (2,238)	757 (1,439)	1,364 (2,152)
mean WTP for medium damage	859 (1,431)	1,309 (2,025)	815 (1,390)	1,394 (2,181)	991 (1,552)	1,631 (2,390)
mean WTP for large damage	1,244 (1,936)	1,670 (2,518)	1,179 (1,906)	1,772 (2,628)	1,469 (2,142)	2,090 (3,088)
mean WTP for extra large damage	1,662 (2,507)	1,905 (2,739)	1,574 (2,406)	2,073 (2971)	1,956 (2,708)	2,136 (3,034)

As expected, mean WTP rises along with the damage scenarios. This can be seen in Figure 5.1 and Figure 5.2 below:

Figure 5.1

Mean WTP for Eastern Norway and Northern Norway



[18] WTP is calculated as midpoint from payment card

Figure 5.2

WTP per Household per Year

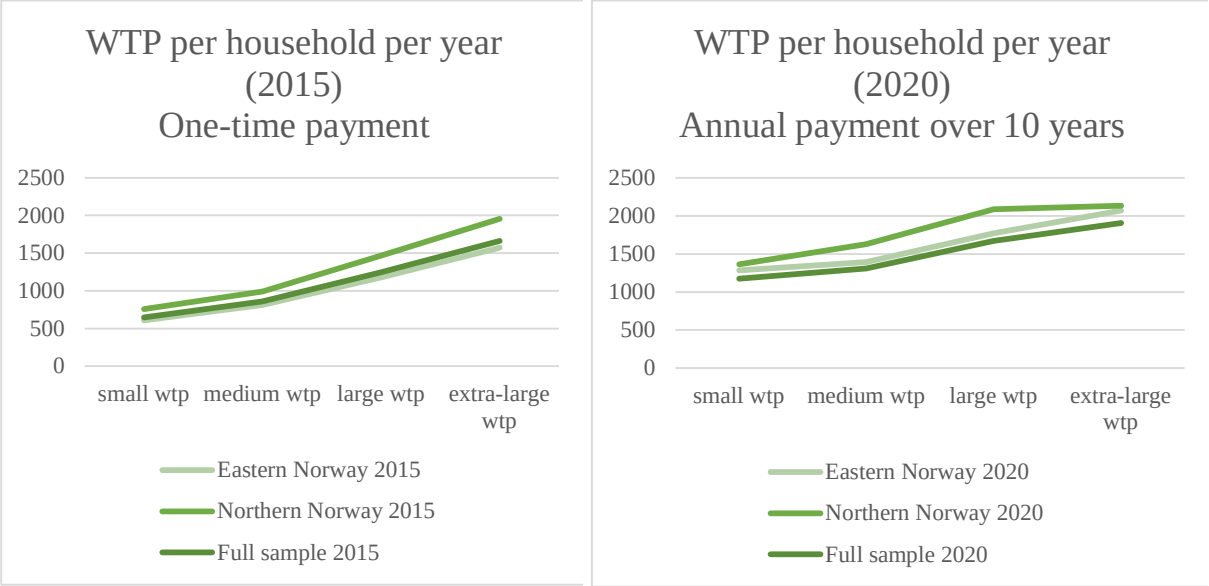


Figure 5.2 shows that the mean WTP for 2015 increases according to the level of environmental damage, from about 500-700 to about 1,400-2,000. Further, it shows that the mean WTP for 2020 also increases according to the level of environmental damage, from about 1100 up to about 1900-2100. This conforms to expectations of a higher WTP as the environmental damage scenario increases. In addition, the figure shows that the slope of the curve is less steep than expected for the extra-large scenarios, especially for northern Norway and the full sample. This supports the hypothesis that the WTPis affected by budget constraints. Since the 2020 dataset asked for a one-time payment, it is possible that participants would want to pay a higher amount but that they restrain.

5.4 Don’t knows and protesters

Survey participants may choose zero as an answer for their WTP for several reasons. This answer does not necessarily reflect their true WTP but could be a reflection of political resistance, missing trust in the power of authorities, environmental reasons, or other reasons. Therefore, it is common practice in CV studies to

distinguish between "real zeros" and "protesters."[19]. In practice, this means that participants receive a follow-up question in which they provide their reasons for stating zero or don't know for the WTP value. If the reason implies that they cannot afford to prioritize the change or it simply would not increase their utility, then they are classified as "real zeros," and their WTP values are kept within the calculation base for WTP. The question arises how to treat "don't know" replies and zero replies from the survey. If they are included in the calculation of WTP, they will probably lead to a lower estimate of WTP. Therefore, the researcher decided to exclude both "don't know" and "false zeros" and kept only the "true zeros," as suggested in Lindhjem et al (2014, p. 33).

Table 9 provides an overview of the most important reasons for stating zero WTP or "don't know." Note that the 2015 survey asked one follow-up question, whereas the 2020 survey provided four follow-up questions, each for one scenario. The study took the average of the four replies from 2020 to make the numbers comparable. The possible reply options were comparable, and only the order of questions was different. There was one additional question regarding a one-time tax payment for the 2020 survey, which has been accounted for in the percentage calculations in Table 9

Table 9

Don't Knows and Zero WTP Replies Summary

Categories from survey	**Classifi-cation**	**2015 Frequency**	**2020 %[20]**	**2020 % Frequency**	**2020 %**
My household cannot afford to pay	True zero	122	2,19	15	1,49
It is the shipping companies and the shipping industry that should pay	False zero	249	**4,47**	36	**3,51**
The tax level is already high enough	False zero	346	**6,21**	35	**3,49**
Whatever I say, policy measures will not be affected anyway	False zero	15	0,27	4	0,35
I would pay for measures in other coastal areas	True zero	3	0,05	1	0,12
It does not feel right to weigh the environment in money	False zero	14	0,25	3	0,30
I believe other tasks in society should be prioritized	True zero	34	0,61	8	0,77
I would not pay until I know what it costs	False zero	19	0,34	4	0,40

[19] See Lindhjem et al (2014), p. 33.
[20] Frequency > 3% written in bold.

Today's preparedness is already high enough	True zero	22	0,39	10	0,94
It was too difficult to choose an amount	False zero	104	1,87	37	**3,69**
I do not think there will be oil spills in this coastal area	False zero	4	0,07	2	0,20
I do not trust that the money will go to the right purpose	False zero	55	0,09	11	1,04
Other reasons, please specify	False zero	148	2,65	9	0,92
I believe that the money can be redistributed or used more efficiently	False zero	50	0,9	13	1,26
Not sure / Do not know	False zero	121	2,17	39	**3,89**
Sum		1405	25,20	228	22,52

As Table 9 shows, the 2015 survey has a slightly higher number of respondents with a a zero WTP or who did not know how much they would pay. 25% of respondents fell into this category, whereas 22% of respondents did in 2020. The top reasons for stating zero WTP for both years were that the tax level is already too high (6.21% for 2015 and 3.49% for 2020) and that the shipping companies and the shipping industry should pay (4.47% and 3.51%). Both reasons are classified as *false zeros*, also called *protest answers* or *protesters*. The top "true zero" reason is "My household cannot afford to pay", with 2.9% for 2015 and 1.49% for 2020. The reasons excluded from this analysis are those classified as "false zeros," including the ones that state "Not sure/ Do not know." In total, 1,125 replies were excluded from the 2015 data, and 122 replies were excluded from the 2020 data. This represents 81.99 % of answers for 2015 and 53.51% for 2020.

5.5 Sensitivity Analysis

Cost-benefit analysis often occur in the consideration phase, ex-ante, or in the early stages of a project (Boardman et al., 2018, p.3). As economic valuation often faces uncertainty with regards to expected values, future use, and other parameters, it is reasonable to conduct a sensitivity analysis. This analysis acknowledges there is uncertainty in the valuation of important parameters, and it should be a part of the majority of cost-benefit analyses (Boardman et al, 2018, p. 167). This study tested the robustness of the results from RQ 1 and RQ 2 and examined the different treatments of zero bidders and false zeros. The *base case* for the sensitivity analysis removed protesters and those who had a WTP higher than 2% of their annual income. Further, it coded "don't know" values as missing one.

This study carried out a sensitivity analysis for the region of eastern Norway since *n* is larger than for northern Norway. The baseline situation removed, both protesters and households that had a WTP above

2% of their annual household income (outliers*)* were removed. The analysis coded "don't know" values as missing ones. Case number 1 describes a scenario where protesters and outliers were removed but "don't know" values were included in the calculations using zero as opposed to missing values. The researcher performed a single t-test where the null hypothesis is that the population is equal to the corresponding result from the base scenario. The value which is tested against the mean is based on the value which has been calculated for the base scenario. Normal distribution is assumed. WTP in Case 1 is expected to be lower than in the base scenario. The difference is thus the treatment of" don't know" values, all other factors being equal. Case number 2 describes a situation where "don't know" values were coded as missing ones, but protesters were removed. Outliers were kept. This case shows that protesters will reduce the WTP amount, but outliers will increase it. Since the number of protesters is larger than the number of outliers, one could expect the WTP to be less than the base scenario. However, this is dependent on the WTP amount of the outliers. Figure 4.5 shows the results in a line chart.

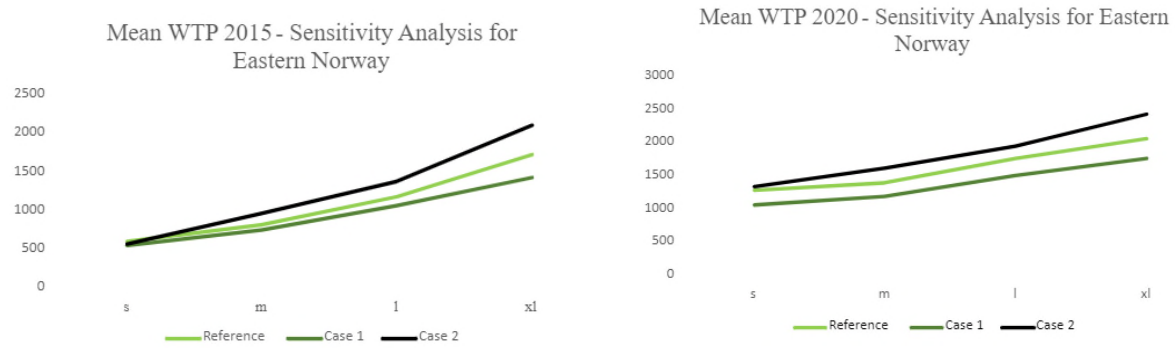
Table 10

Sensitivity Analysis for Eastern Norway

	2015			2020		
	Reference	Case 1	Case 2	Reference	Case 1	Case 2
Small damage						
Mean WTP	609	551	567	1284	1,073	1337
Standard deviation	1,182	1,137	3112	2,238	2,100	2306
P-value	<0.001***	0.026**	<0.001***	<0.001***	0.0404**	<0.001***
95% interval	553 - 665	499-602	612-906	1049 - 1520	871-1274	1096-1578
Total amount of respondents	1,707	1,888	1723	350	419	354
WTP Change in %		-9.52	-6.90		-16.43	4.13
Medium damage						
Mean WTP	815	749	975	1394	1,196	1628
Standard deviation	1,390	1,363	3195	2181	2,077	3487
P-value	<0.001***	0.0381**	<0.001***	<0.001***	0.0517	<0.001***
95% interval	749 - 881	688-811	825-1126	1166 - 1623	996-1395	1266-1990
Total amount of respondents	1,708	1,892	1728	353	419	359
WTP Change in %		-8.10	19.63		-14.20	16.79
Large damage						
Mean WTP	1,179	1,074	1387	1771	1,519	1952
Standard deviation	1,906	1,846	2806	2627	2,510	2915
P-value	<0.001***	0.0139**	<0.001***	<0.001***	0.005*	<0.001***
95% interval	1,088 - 1,270	990-1-157	1255-1520	1497 - 2045	1276-1,76	1652-2252
Total amount of respondents	1,696	1,870	1730	355	414	364
WTP Change in %		-8.91	17.64		-14.23	10.22
Extra-large damage						
Mean WTP	1,730	1,428	2120	2073	1,769	2438
Standard deviation	2,354	2,334	5894	2971	2,841	3608
P-value	<0.001***	<0.001***	0.3223	<0.001***	0.0311**	0.3223
95% interval	1,354-1,572	1,321-1,53·	1841-2398	1761 - 2385	1,493-2,04	2066-2810
Total amount of respondents	1,793	1,851	1721	350	410	363
WTP Change in %		-17.46	22.54		-14.66	17.61

Significance levels *10%, **5%, ***1%

Figure 5.3.

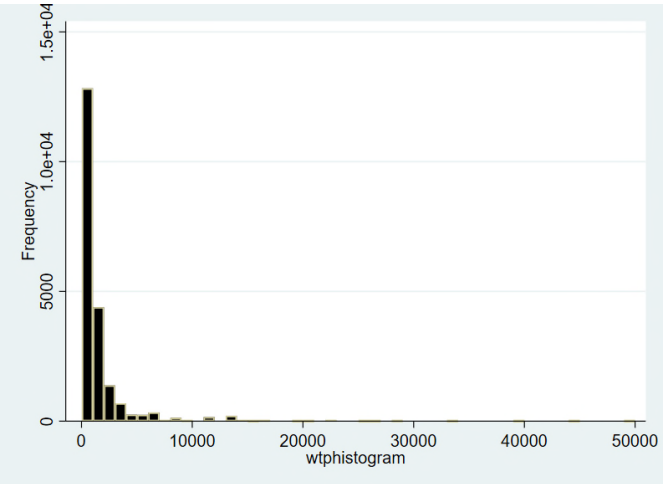


5.6. WTP Estimates for Panel Data

This study uses the OLS regression models for the regression to test the defined hypothesis. It also transferred the data format from wide to long and then to panel data. There are more than 26,000 observations for the WTP results for both years. This figure is so high because the results are pooled, and each survey participant answered questions for each of the four scenarios.

Figure 5.4

WTP Estimates for Panel Data – All Pooled

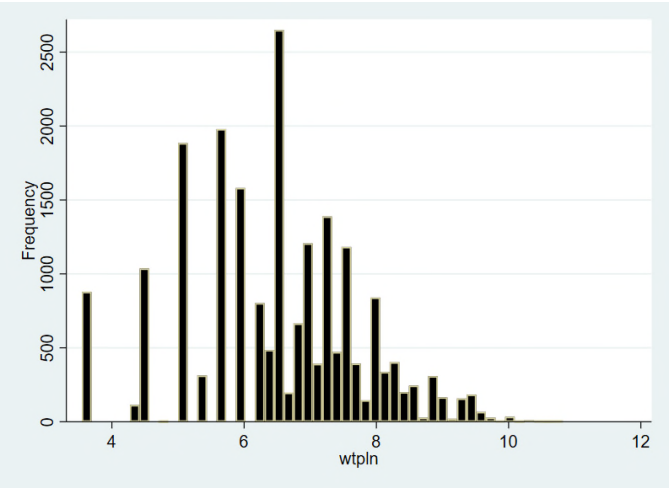


Due to the large number of observations, the researcher limited the values on the x-axis to NOK 50,000 to improve visibility. It is clearly visible that the results are right-skewed. This raises the concern of linearity,

and therefore the WTP variable was transformed with a log function. Figure 5.5 shows the histogram after the transformation.

Figure 5.5

WTP Estimates for Panel Data with Log-Transformation



The transformation was done by generating *wtpln = ln (1+wtp).* The researcher also transformed the variable for the household to a log-variable by defining *hhincomeln= ln (1+hhincome).*

5.7 Panel Data Regression

After merging the data from the two years and carrying out descriptive statistics, the next step was the panel data regression.

In the model, WTP is the dependent variable, which controls for the different scenarios and other control variables. The reference scenario is the one with the small damages, s. The form if the model is defined as follows:

$WTP\_ij = a + bx\_ij$ (5.2)

Where i = respondent and j= scenario.

The panel data has cross-sectional and time-series variations. The common effect at a particular time for all households needs to be controlled for, this is called *time fixed effects.* Further, the calculations also need to control for the individual household effect. A panel regression model is usually defined as

$$y_{it} = b_0 + b_1 x_{it} + b_2 D_i + b_3 D_{t+} e_{it} \quad (5.3)$$

Where b_2 is the fixed effects of the individual and b_3 is the time-fixed effects of the individual. The explanatory variable x_{it} is the possibility of correlation with the individual effects D_i – either using the FE model or the RE model.

When transferring the merged data set into panel data, the researcher received information that the panel variable was balanced. This implies that the variable, in this case *ID*, is available for most of the observations; otherwise, it would be unbalanced.

The next step was to transform the variable for household income into a log variable. The variable is in an interval form with as many as 39 different observations. Th researcher could thus treat the variable *hhincome* as linear since it has so many categories. Then, the midpoint is the value for each category.

The Stata result displays summary statistics as well as estimates of regression coefficients. The ANOVA table includes information about the sum of squares (SS), degrees of freedom (df) and the mean sum of squares (MS). The total sum of squares is 159,311.008. The model can be explained by 7,449.540, and 151,861.468 is the residual. The total degrees of freedom are 24,198, the model accounts for 7 of these and the residual for 24,198. When calculating the mean sum of squares, one takes the sum of squares and divides them by the degrees of freedom. The result of the F-statistic is 148.33 This is derived by taking the ratio from the model to the residual by defining F as in the equation below:

$$F = \frac{Model\ SS\ /df\ Model}{Residual\ SS/df\ Residual} \tag{5.4}$$

For this regression, F is calculated as

$$F = \frac{931.192}{6.277} = 1648.08 \tag{5.5}$$

This result of the F-statistic allows the researcher to test if the coefficients presented in this model are zero. This would be the null hypothesis. Further, the researcher examined the p-value, which shows the relation to the F-statistic, and find that it is zero. Thus, the study rejects the null hypothesis and concludes that the model is significant.

Further, the researcher examined the table of the estimated coefficients where the marginal effects of the variables are shown. The t-value for the coefficient for 2020 is 15.64, which is the coefficient ratio to the standard error. It is calculated by dividing the coefficient by the standard error (Vijayamohanan, 2016, p.17). Further, the corresponding p-value is zero. Therefore, the variable is significant. The other variables tested are age, male, use, and income. All of them are statistically significant, except for age. Therefore, age was transformed with a quadradic variable. This accounts for a non-variable effect of age.

Next, a Ramsey RESET test was carried out, which gives results on the fitted values of the transformed WTP variable, testing if the model is linear. The null hypothesis is that the model has no omitted values. The received F value is 0.16. See Appendix 5.2 for detailed test results. The results of the Breusch-pagan test show that the test for heteroscedasticity failed. Therefore, the standard errors of the parameter estimates needed to be adjusted to correct for heteroscedasticity. The results of panel regression analysis help to answer the remaining research questions.

The study estimated the effects of WTP for Eastern Norway with a linear regression for three cases: Model 1 was for the full sample, which includes all regions of Norway, Model 2 for eastern Norway and Model 3 for northern Norway. Table 11 gives an overview over dummy variables.

Table 11 Dummy Variables

Dummy variables	
male	1= male, 0 = otherwise
NORSTAT2020	1 = the study has been conducted in 2020, 0 = the study has been conducted in 2015
member_environment	1 = member of an environmental organization, 0 = otherwise
uni_education	1 = at least three years of university education, 0 = otherwise
use	1 = active use within the last 12 months, 0 = otherwise

Table 12

Panel Regression Results

	Full sample	**Eastern Norway**	**Northern Norway**
age_quad (=age)	>0.00 (9.24e)*	>0.00(0.00)***	>0.00(0.00)***
Male	-.525 (.0325)***	-.616 (0.51)***	-.593 (.090)***
NORSTAT2020 (=2020 survey)	.599 (.455)***	.893 (.065)***	.454 (.106)***
member_environment	.968 (.054)***	.919 (0.77)***	1.417 (.126)***
uni_education	.300 (.0333)***	.310 (.053)***	.436 (.0890)***
use	.304 (.038)	.413 (.059)***	-.145 (.115)
Scenario_number			

2 (=m)	.386 (.045)***	.405 (.071)***	0.310 (.116)**
3 (=l)	.777 (.045)***	.820 (.071)***	.659 (118)***
4 (=xl)	1.059 (0.459)***	1.11 (.073)***	.958 (.120)**
hhincome_ln	.0522 (.028)**	-0.001 (.0454)	.170 (.086)
Eastern_Norway	.0338 (.0329)		
_cons	4.216 (.378)***	4.81 (.595)***	2.642 (1.146)**
R^2	0.058	0.082	0.064
Number of obs	24,199	8,519	3,805

Significance levels. *10%, **5%, ***1%,

The researcher found that age has a negative effect on the full sample with a significance of 5% and a positive effect for eastern Norway, both being significant at a 5% level. The result for age for Northern Norway is not significant.

Men affect WTP negatively. This outcome was as expected. A decrease in WTP is found for all three models with a significance level of 1%.

Further, the researcher finds that WTP rises when the respondent was part of the 2020 survey. This is the case for all the three models with a 1% significance level.

Being a member of an environmental party does increase WTP as expected, with positive coefficients of .968 for the full sample, .969 for Eastern Norway and 1.417 for Northern Norway. A note is however on the sample size of these respondents, which is rather small, especially for Northern Norway, The sample size might be too small to lead to statistical decision.

Survey participants with a university education behave as expected with regards to their stated WTP amount: For all three scenarios the coefficients behave positive. In the calculations, having a university education leads to an increase in WTP between 28 and 41 percent. The coefficient is highest in Northern Norway.

The coefficient of the variable *use* is positive for the full sample and for Eastern Norway, and negative for Northern Norway. There is, however, only significance in one of the models. It is therefore not given that a relationship between the variable and WTP exists. The variable use is defined as *"use of the area to a certain extent"* within the last 12 months. For 2020 this indicated *3 or more trips to the area within the last 12 months.* For 2015 this indicated *used several times* and *used often.*

A very interesting observation can be made for the results of the scenario coefficients. It is expected that WTP rises along with the scenario size. Example wise are the effects for seals up to 1,000 deaths and making them in danger of extinction throughout Norway in the extra-large scenario for Northern Norway in 2015 vs. 30 deaths and no change in livestock status. For all three samples this trend can be proven to be true, with significance levels at 1% for the full sample and Eastern Norway and 5 % for Northern Norway. As the model controls for WTP with the small scenario as reference, it can be said that WTP is expected to rise between 31 and 40% for the medium damage scenario and between 66 and 82% for the large damage scenario. The numbers for the extra-large scenario are even higher: They increase between 95% and 111% compared to the reference scenario. The coefficient for Eastern Norway is increasing more than the coefficient for Northern Norway.

A regression that controls for when the survey has been conducted shows that the coefficient for the 2020 study is .742, which implies a positive correlation between the variables. This result is the difference of mean WTP for 2015 and 2020 and will thus answer RQ4.

6 Discussion

6.1. Research Questions and Hypothesis

The first two research questions are related to finding Norwegian households' mean WTP. The surveys present four scenarios, and the respondents are grouped locally. Further, the difference in years makes it necessary to separate the research questions into two.

1 What is Norwegian households' mean WTP to avoid environmental damage from ships' oil spill in 2015?

The mean WTP per household for all four damage levels is NOK 1,102 for the full sample, NOK 1,044 for eastern Norway and NOK 1,293 for northern Norway.

2 What is Norwegian households' mean willingness to pay to avoid environmental damage from ships in 2020?

The mean WTP per household for all four damage levels is NOK 1,514 for the full sample, NOK 1,6,31 for eastern Norway and NOK 1,790 for northern Norway.

3 How does the different payment vehicle influence the outcome from 1) and 2)?

The survey from 2015 asked participants to state their WTP in the form of a lump - sum payment. Instead, the 2020 survey chose the payment vehicle of an annual amount over 10 years. The study thus expected that the WPT for the one-time payment would be is higher than the amount for annual payment. However, this was not the case.

The study's hypothesis is that the WTP for the extra-large scenario in 2015 does not have the same proportional increase as for the other scenarios. This hypothesis shows to be true, possibly due to a budget constraint. This is due to a possible budget constraint. As Figure 5.2 shows, WTP for the full sample and for northern Norway sample flattens out.

4 What is the difference in mean WTP per hh/year year of avoiding an environmental damage from oil spills from 2015 to 2020?

A positive correlation implies that the WTP per year is 75% more on average if the study is conducted in 2020, compared to 2015.

5 How do socioeconomic factors explain WTP for avoiding environmental damage from oil spills for Norwegian households?

As Table 13 shows, the socioeconomic factors have the expected effect. The effect of age on the WTP was not clear since age is connected to two factors that have opposing effects. The study found that the actual sign effect is negative. It was not clear which outcome age would have on the statistics as there were two factors that were expected to go to opposite directions. The actual sign is thus negative.

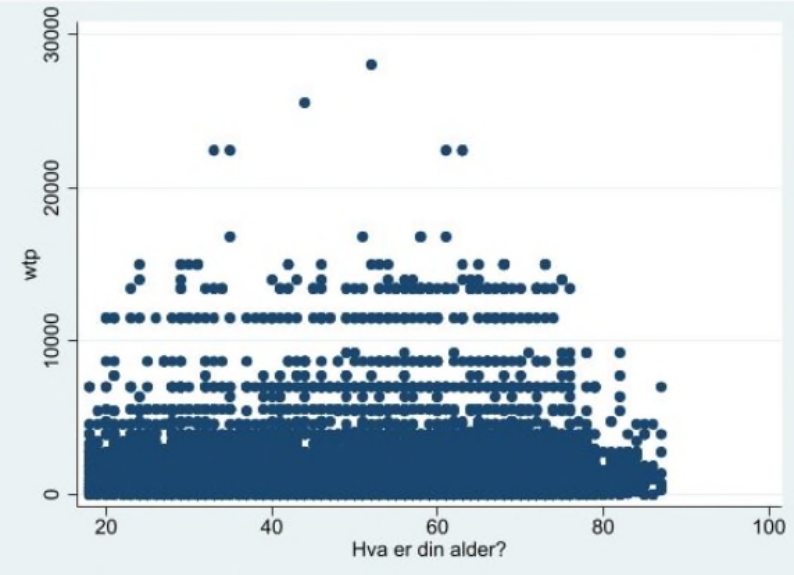
Table 13

Socioeconomic factors results

	Expected sign	**Actual sign**
A younger age (18 - 44) affects WTP negatively/positively	-/+	-
Male gender affects WTP negatively	-	-
University education affects WTP positively	0	+
Being a member of an environmental organization does affect WTP positively	+	+
Active use of the area affects WTP positively	+	+

Figure 6.1. shows the distribution of age. WTP increases along with age up to a peak between 40 and 60 and then decreases again.

Figure 6.1. Age distribution



6 How do the differences in survey participants affect the different outcomes from 4)?

The studies were conducted by different institutes. This study finds it interesting to see if their compositions of randomly selected survey participants in each study differs from each other and the Norwegian population, and if this influences on the results.

The percentage of men for 2020 was higher than for 2015. As a male gender affects WTP negatively, it is expected to reduce WTP values. As men are overrepresented in both CV studies, WTP can be expected to increase if the sample's genders were representative of Norwegian society. Further, the percentage of respondents with a university education is much higher in the 2020 sample. This might have influenced WTP positively compared to 2015. Further differences between the samples that might have influenced WTP positively are the age group of 60+, which was 62% in 2020 compared to 35% in 2015, and the percentage of respondents from northern Norway. Borh samples overrepresented the number of respondents from northern Norway with 14.9% in 2015 versus 9.4% of the entire population and 21.78% in 2020 versus 9.16% of the entire population. As studies have shown that respondents from northern Norway have a slightly higher WTP than those in other regions, a higher share of these respondents in 2020 can influence the total WTP accordingly.

7 What is the coronavirus pandemic effect after correction?

The 2020 questionnaire included questions regarding the Covid-19 pandemic. The study analysed the question of whether participants would have stated the same amount of WTP in a normal situation, that is, without the Covid-19 pandemic. The results show that 92.39 % of respondents were not affected by the pandemic, whereas 7.62% would have altered their WTP without Covid-19. This is much lower than expected, as the pandemic affected the whole population and there were many uncertainties regarding health services and restrictions. One reason could be that real income has increased, which could affect WTP. If net income increases, WTP is expected to increase as well.

Table 14

WTP affected by covid-19

	Frequency	Percent	Cumulated
WTP affected	77	7.62	7.62
WTP not affected	933	92.38	100
Total	1,010	100	

6 Conclusions and recommendations

This thesis has analyzed the survey result from two CV studies and found that some results were as expected while others were not. More than 6,000 individuals were asked to state their WTP for four different damage scenarios to prevent from oil spills from ship. Results indicate that Norwegians' WTP increases as the damage scenario increases. Since the variations and uncertainties are high, it is interesting to see the results of the comparison of the two CV studies. There might be reasons why WTP for the one-time payment is lower than expected. For example, it is known that oil spills can happen every year, so respondents might consider paying over 10 years a more realistic payment method. In contract, one-time payment in the form of a tax, is not as natural for many people, so there is a possibility that they are especially negative towards such payment. A conclusion is that tax authorities can consider this when designing tax schemes, noting that a payment method with lower annual rates over several years might be a better option as it is seen as a more realistic and trustworthy method. Further, there are more possibilities for economic freeriding. The study finds that protest zeros account for 81.99 % of responses for 2015 and 53.51 % for 2020. This can be an indicator that a tax scheme over several years is preferable to a one-time payment.

It will be interesting to see the results of the ongoing follow-up CV study to understand the coronavirus-effect. The study will be finished after summer 2022. Major changes in society from 2020 to 2022 include the end of the Covid-19, increased energy-and transport costs, and increased inflation.

Bibliography

Benoit, K. (2011*): Linear Regression Models with Logarithmic Transformations.* Methodology Institute, London School of Economics.

Boardman, A., Greenberg, D.H., Vining, D.H., Weimer, D.L. (2017): *Cost-Benefit Analysis. Concepts and Practice.* (4th ed.). Cambridge University press.

Hansen, T. & Tjernshaugen, A. (2021): Kommunereformen. In *Store norske leksikon*. Retrieved from https://snl.no/kommunereformen

Haukås, K.(2020). *Transportytelsesstatistikken (2010-2018): Transportytelser for godsskip*

Transportsytelsesstatistikken . Retrieved from https://www.toi.no/getfile.php?mmfileid=51191

Helbæk, M. (2017): *Statistikk - Kort og godt.* (3rd ed.). Universitetsforlaget

Johnston, R.J., Boyle, K. J., Adamovicz, W., Bennett, J., Brouwer, R., Trudy, A.C., Hanemann, M., Hanley, N., Ryan, M., Scarpa, R., Tourangeau, R., Vossler, C.A. (2017). Contemporary Guidance for Stated Preference Studies. *Journal of the Association of Environmental and Resource Economists,* (4(2), 319-405). https://dx.doi.org/10.1086/691697

Johnston, R.J., Boyle, K. J., Loureino, M. L., Navrud, S., Rolfe, J. (2021). Guidance to Enhance the Validity and Credibility of Environmental Benefit Transfers. *Journal of the Association of Environmental and Resource Economists,* (79, 575-624). https://doi.org/10.1007/s10640-021-00574-w

Lindhjem, H., Magnussen, K., Navrud, S., Skjeflo, S., & Brude, O. (2016). *Verdsetting av miljørelatert velferdstap ved oljeutslipp fra skip*.Vista Analyse.

Lindhjem, H., Voll Dombu, S., Laugesen, J., Magnussen, K., Møskeland, T., Navrud, S. (2020) *Verdsetting av miljørelatert nytte ved håndtering av forurensede sedimenter. Kalkulasjonspriser for samfunnsanalytiske analyser. (*Menon Economics, DNV GL: Menon-publikasjon nr.24/2020). https://www.menon.no/wp-content/uploads/2020-24-Verdsetting-av-nytten-av-sedimenth%C3%A5ndtering.pdf

McLeod, S. A. (2019, May 20). *What a p-value tells you about statistical significance*. Simply Psychology. www.simplypsychology.org/p-value.html

Millennium Ecosystem Assessment (2005). Ecosystems and Human Well-Being: Synthesis. Island Press, Washington. https://www.millenniumassessment.org/en/Reports.html

Navrud, S. (2016): Miljøverdsetting – verdsettingsmetoder og verdioverføring. Kapittel 1 i Hagen, K.P & G.H.Volden (red.) 2016: *Miljøkonsekvenser av store investeringstiltak.* (NMBU Trondheim: Concept-publication 48/2016, p.26-54*)* https://www.ntnu.no/documents/1261860271/1262010703/Concept_nr48_no.pdf/66cfa9b6-fc50-41c3-b18f-0f1aff5a7668?version=1.0

Navrud, S., Lindhjem, H. & Magnussen, K. (2016). Valuing Marine Ecosystem Services Loss from Oil Spills for Use in Cost-Benefit Analysis of Preventive Measures. Forthcoming in *Paulo A.L.D. Nunes, Pushpam Kumar, Lisa Emelia Svensson, Anil Markandya (eds.) 2016: Handbook on the Economics and Management for Sustainable Oceans.* Edward Elgar Publishing, Cheltenham.

Navrud, S., Lindhjem, H. & Magnussen, K. (2014). Verdsetting av velferdstap ved oljeutslipp fra skip - Fra storm til smulere farvann? *Samfunnsøkonomen, 2014*(6), 25 - 36

Navrud,S. (2020, March 12). *How to Value Ecosystem Service Damages for Policy Use.* [Conference presentation]. Norwegian University of Science and Technology, Trondheim.

Norwegian Coastal Administration (2021). *Veileder i samfunnsøkonomisk analyse.* https://www.kystverket.no/sjovegen/tiltak-i-farvannet/veileder-samfunnsokonomisk-analyse/

Norwegian Public Health Institute (2022, April 29). *Statistics about coronavirus and COVID19.* https://www.fhi.no/en/id/infectious-diseases/coronavirus/daily-reports/daily-reports-COVID19/

NOU 2012:16 (2012): Cost-Benefit Analysis. Ministry of Finance. https://www.regjeringen.no/contentassets/5fce956d51364811b8547eebdbcde52c/en-gb/pdfs/nou201220120016000en_pdfs.pdf

NOU 2013:10 (2013). Natural benefits – on the values of ecosystem services. Ministry of Climate and Environment. https://www.regjeringen.no/en/dokumenter/nou-2013-10/id734440/

Olerud,K., Smith-Solbakken, M.(2021): Exxon-Valdez ulykken. *Store norske leksikon* . Retrieved from https://snl.no/Exxon_Valdez-ulykken

Oishimaya, S.N. (2020). Countries with the most coast line . In *World Atlas*, https://www.worldatlas.com/articles/countries-with-the-most-coastline.html

Research Council of Norway (2021). *COAST-BENEFIT: Ecosystem Service Valuation For Coastal Zone Management: From Promise to Practice.* Project Bank. Retrieved from COAST-BENEFIT: Ecosystem Service Valuation For Coastal Zone Management: From Promise to Practice - Prosjektbanken (forskningsradet.no)

Stata Corporation. (2021). *Stata base reference manual*. College Station, TX: Stata Corp. Retrieved from https://www.stata.com/bookstore/base-reference-manual/#contents

Statistics Norway (2022b). Alders- og kjønnsfordeling i kommuner, fylker og hele landets befokning (K) 1986-2022. *Statistikkbanken.* Retrieved from https://www.ssb.no/statbank/table/07459/tableViewLayout1/

Statistics Norway (2022a). Befokningens utdanningsnivå. *Statistikkbanken.* Retrieved from https://www.ssb.no/utdanning/utdanningsniva/statistikk/befolkningens-utdanningsniva

Statistics Norway (2022c).Inntekts- og formuestatistikk for husholdninger. *Statistikkbanken.* Retrieved from https://www.ssb.no/statbank/table/09903/

Statistics Norway (2021). *Consumer Price Index*. Retrieved from https://www.ssb.no/en/priser-og-prisindekser/konsumpriser/statistikk/konsumprisindeksen

The Norwegian Agency for Public and Financial Management (2018). *Veileder i samfunnsøkonomiske analyser*. Retrieved from https://dfo.no/filer/Fagomr%C3%A5der/Utredninger/Veileder-i-samfunnsokonomiske-analyser.pdf

Thorsnæs, G. (2021). Troms – tidligere fylke. In *Store norske Leksikon* (4th ed.), https://snl.no/Troms_-_tidligere_fylke

United Nations (2015). *Goal 12. Ensure sustainble consumption and production patterns.* The UN Sustainable Development Goals. United Nations. Department of Economic and Social affairs. https://sdgs.un.org/goals/goal12

United Nations (2015). *Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development.* The UN Sustainable Development Goals. United Nations. Department of Economic and Social affairs. https://sdgs.un.org/goals/goal14

University of British Columbia (2022): DATA with STATA. Data Analysis and Statistics with STATA – UBC. Retrieved from https://blogs.ubc.ca/datawithstata/

Vijayamohanan, P.N. (2016). *Panel Data Analysis with Stata part 1 - Fixed Effects and Random Effects Models.* Center for Development Studies, Kerala, India. Retrieved from: https://mpra.ub.uni-muenchen.de/76869/1/MPRA_paper_76869.pdf

Woolridge, J. (2016). *Introductory Econometrics: A Modern Approach.* (2nd.ed.). Cengage.

Appendices

Appendix 1 The survey 2015

Test - v3

Du er nå kommet til undersøkelsens viktigste del.

Det er ingen riktige eller gale svar her. Det er din ærlige mening vi er ute etter, og alle synspunkter og svar er like riktige.

NORSK GALLUP

Test - v3

Kystverket vurderer nye tiltak for å forhindre miljøskader fra oljeutslipp

Skipsfarten i Oslofjordområdet ventes å øke. Kystverket vurderer derfor nye tiltak for å forhindre miljøskader fra oljeutslipp. Det trengs en innsats nå, og denne vil bestå av både:

- **Forebyggende tiltak for å forhindre oljeutslipp - bl.a. bedre merking og overvåking av skipsledene, fjerning av grunner og skjær.**
- **Tiltak som forhindrer at oljen sprer seg hvis utslipp likevel skulle skje - bl.a. nye og bedre lenser for å samle opp oljen.**

Hvor godt eller dårlig kjenner du til Kystverkets ulike tiltak for å unngå miljøskader fra oljeutslipp fra skipsfart?

- Ikke i det hele tatt
- Lite
- Middels
- Ganske godt
- Meget godt

NORSK GALLUP

Test - v3

Uten nye tiltak vil det skje miljøskader fra oljeutslipp

Uten de nye tiltakene mener eksperter at det vil skje et skipsuhell i Oslofjordområdet de nærmeste årene. Oljeutslippet kan forårsake enten en liten, middels, stor eller svært stor miljøskade. Med de nye tiltakene kan vi unngå miljøskadene.

Næringslivet, skipsfarten, staten og folk flest har alle nytte av skipstrafikken, og alle parter må derfor betale for de nye tiltakene. Alle husstander må dekke sin del av kostnadene gjennom en øremerket engangsskatt som går kun til Kystverkets nye tiltak innenfor regionen du bor i.

Vi ber deg nå tenke igjennom hva det er verdt for deg, og husstanden din, å unngå hver av de fire miljøskadestørrelsene.
Din mening er viktig for Kystverkets valg av omfang av tiltak, og dermed for kostnadene for din husstand.

NORSK GALLUP

Test - v3

Liten miljøskade

Du vil nå bli spurt om de fire skadestørrelsene etter tur. Vi starter med «liten miljøskade».
Uten nye tiltak, kan det i løpet av de nærmeste årene skje et skipsuhell med oljeutslipp som forårsaker én liten miljøskade i Oslofjordområdet.

Dersom de nye tiltakene gjennomføres, vil vi unngå denne "lille" miljøskaden. I tabellen og kartet vil vi nå at du skal se spesielt på den lille miljøskaden.

	MED NYE TILTAK	UTEN NYE TILTAK			
	Uten miljøskade	**Liten miljøskade** Tilsvarer utslipp av 20 tonn diesel	**Middels miljøskade** Tilsvarer utslipp av 200 tonn bunkersolje	**Stor miljøskade** Tilsvarer utslipp av 2000 tonn bunkersolje	**Svært stor miljøskade** Tilsvarer utslipp av 20 000 tonn råolje
Skade på sjøfugl 	Området er viktig for sjøfugl som ærfugl, skarv, laksand, grågås, svaner, og sårbare sjøfugl som sjøorre, teist og fiskemåke	**200** døde sjøfugl **Ubetydelig** påvirkning på sjøfuglbestandene	3000 døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter **1 år**	7000 døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter **2 år**	15 000 døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter **3 år**
Skade på sel 	Viktig yngleområde for sel Selbestanden er i god forfatning	**20** døde sel **Ubetydelig** påvirkning på selbestanden	40 døde sel Selbestanden vil ta seg opp igjen etter **1 år**	80 døde sel Selbestanden vil ta seg opp igjen etter **2 år**	120 døde sel Selbestanden vil ta seg opp igjen etter **5 år**
Skade på liv i sjøen 	Området er viktig gyte- og oppvekstområde for fisk og annet liv i havet Beiteområde for flere bestander	**Ubetydelige** skader på livet i sjøen	Liten skade på livet i sjøen Trygt å spise fisk og skaldyr etter **1 år**	Noe skade på livet i sjøen, spesielt lokale bestander Trygt å spise fisk og skaldyr etter **1-2 år**	Større skade på livet i sjøen, spesielt lokale bestander Trygt å spise fisk og skaldyr etter **1-2 år**
Skade på kystsone 	Svært viktig friluftsområde	**20 km** kystlinje forurenset Området kan brukes som normalt etter mindre enn **1 år**	30 km kystlinje forurenset Området kan brukes som normalt etter **2 år**	120 km kystlinje forurenset Området kan brukes som normalt etter **3 år**	190 km kystlinje forurenset Området kan brukes som normalt etter **5 år**

● Utslippspunkt ● Liten skade

Test - v3

Hva er det verdt for deg og husstanden din å unngå én liten miljøskade i Oslofjordområdet?

Vis i figuren nedenfor det meste, om noe, husstanden din helt sikkert er villig til å betale i en øremerket engangsskatt for nye tiltak for å unngå én liten miljøskade i Oslofjordområdet.

Husk at dersom husstanden din betaler for dette, har dere mindre penger igjen til å bruke på andre ting.
Flytt markøren til ønsket beløp.
Engangsbeløp i kroner:

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0 10 50 100 200 300 400 500 700 900 1100 1300 1500 1800 2200 2700 3200 3800 4400 5500 7000 8500 12000 Mer enn 12000 Vet ikke

NORSK GALLUP

Test - v3

Middels miljøskade

Vi vet ikke sikkert størrelsen på oljeutslippet og miljøskaden som kan skje i området. Uten de nye tiltakene kan det i stedet for ett utslipp med liten miljøskade, forekomme ett skipsuhell med oljeutslipp som gir middels miljøskade.

Dersom de nye tiltakene gjennomføres, vil man unngå denne ene miljøskaden. I tabellen og kartet vil vi nå at du skal se spesielt på den middels store miljøskaden.

	MED NYE TILTAK	UTEN NYE TILTAK			
	Uten miljøskade	Liten miljøskade Tilsvarer utslipp av 20 tonn diesel	Middels miljøskade Tilsvarer utslipp av 200 tonn bunkersolje	Stor miljøskade Tilsvarer utslipp av 2000 tonn bunkersolje	Svært stor miljøskade Tilsvarer utslipp av 20 000 tonn råolje
Skade på sjøfugl	Området er viktig for sjøfugl som ærfugl, skarv, laksand, gråmåke, svaner, og sårbare sjøfugl som sjøorre, teist og fiskemåke	200 døde sjøfugl Ubetydelig påvirkning på sjøfuglbestandene	3000 døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter 1 år	7000 døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter 2 år	15 000 døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter 3 år
Skade på sel	Viktig yngleområde for sel Selbestanden er i god forfatning	20 døde sel Ubetydelig påvirkning på selbestanden	40 døde sel Selbestanden vil ta seg opp igjen etter 1 år	80 døde sel Selbestanden vil ta seg opp igjen etter 2 år	120 døde sel Selbestanden vil ta seg opp igjen etter 5 år
Skade på liv i sjøen	Området er viktig gyte- og oppvekstområde for fisk og annet liv i havet Beiteområde for flere bestander	Ubetydelige skader på livet i sjøen	Liten skade på livet i sjøen Trygt å spise fisk og skalldyr etter 1 år	Noe skade på livet i sjøen, spesielt lokale bestander Trygt å spise fisk og skalldyr etter 1-2 år	Større skade på livet i sjøen, spesielt lokale bestander Trygt å spise fisk og skalldyr etter 1-2 år
Skade på kystsone	Svært viktig friluftsområde	20 km kystlinje forurenset Området kan brukes som normalt etter mindre enn 1 år	30 km kystlinje forurenset Området kan brukes som normalt etter 2 år	120 km kystlinje forurenset Området kan brukes som normalt etter 3 år	190 km kystlinje forurenset Området kan brukes som normalt etter 5 år

● Utslippspunkt ● Middels skade

Test - v3

Hva er det verdt for deg og din husstand å unngå én middels miljøskade i Oslofjordområdet?

Hva er det meste, om noe, din husstand helt sikkert vil betale i øremerket engangsskatt, for å gjennomføre nye tiltak slik at man unngår én middels miljøskade?

Husk at dette beløpet kommer istedenfor, ikke i tillegg til, beløpet du oppga for å unngå én liten miljøskade.
Flytt markøren til ønsket beløp.
Engangsbeløp i kroner:

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NORSK GALLUP

Test - v3

Stor miljøskade

Som nevnt tidligere, vet vi ikke sikkert størrelsen på utslipp og miljøskade som kan skje i området. Uten de nye tiltakene kan det istedenfor et utslipp med liten eller middels stor miljøskade, skje et skipsuhell med oljeutslipp som gir stor miljøskade.

Dersom de nye tiltakene gjennomføres, vil man unngå denne ene store miljøskaden. I tabellen og kartet vil vi nå at du skal se spesielt på den store miljøskaden.

	MED NYE TILTAK	UTEN NYE TILTAK			
	Uten miljøskade	Liten miljøskade Tilsvarer utslipp av 20 tonn diesel	Middels miljøskade Tilsvarer utslipp av 200 tonn bunkersolje	Stor miljøskade Tilsvarer utslipp av 2000 tonn bunkersolje	Svært stor miljøskade Tilsvarer utslipp av 20 000 tonn råolje
Skade på sjøfugl	Området er viktig for sjøfugl som ærfugl, skarv, laksand, gråmåke, svaner, og sårbare sjøfugl som sjøorre, teist og fiskemåke	200 døde sjøfugl Ubetydelig påvirkning på sjøfuglbestandene	3000 døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter 1 år	7000 døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter 2 år	15 000 døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter 3 år
Skade på sel	Viktig yngleområde for sel Selbestanden er i god forfatning	20 døde sel Ubetydelig påvirkning på selbestanden	40 døde sel Selbestanden vil ta seg opp igjen etter 1 år	80 døde sel Selbestanden vil ta seg opp igjen etter 2 år	120 døde sel Selbestanden vil ta seg opp igjen etter 5 år
Skade på liv i sjøen	Området er viktig gyte- og oppvekstområde for fisk og annet liv i havet Beiteområde for flere bestander	Ubetydelige skader på livet i sjøen	Liten skade på livet i sjøen Trygt å spise fisk og skalldyr etter 1 år	Noe skade på livet i sjøen, spesielt lokale bestander Trygt å spise fisk og skalldyr etter 1-2 år	Større skade på livet i sjøen, spesielt lokale bestander Trygt å spise fisk og skalldyr etter 1-2 år
Skade på kystsone	Svært viktig friluftsområde	20 km kystlinje forurenset Området kan brukes som normalt etter mindre enn 1 år	30 km kystlinje forurenset Området kan brukes som normalt etter 2 år	120 km kystlinje forurenset Området kan brukes som normalt etter 3 år	190 km kystlinje forurenset Området kan brukes som normalt etter 5 år

● Utslippspunkt ● Stor skade

Test - v3

Hva er det verdt for deg, og husstanden din, å unngå én stor miljøskade i Oslofjordområdet?

Hva er det meste, om noe, din husstand helt sikkert vil betale i en øremerket engangsskatt, for å gjennomføre nye tiltak slik at man unngår én stor miljøskade?

Husk at dette beløpet kommer istedenfor de beløpene du oppga for liten og middels skade.
Flytt markøren til ønsket beløp.
Engangsbeløp i kroner:

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0 10 50 100 200 300 400 500 700 900 1100 1300 1500 1800 2200 2700 3200 3800 4400 5500 7000 8500 12000 Mer enn 12000 Vet ikke

NØRSK GALLUP

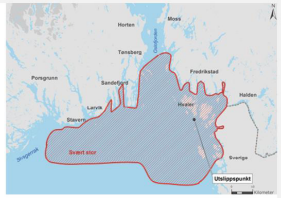
Test - v3

Svært stor miljøskade

Tenk deg nå istedenfor at dersom det ikke gjennomføres tiltak skjer det et skipsuhell med oljeutslipp som gir svært stor miljøskade.

Dersom det gjennomføres tiltak, vil man unngå denne ene miljøskaden. I tabellen og kartet vil vi nå at du skal se spesielt på den svært store miljøskaden.

	MED NYE TILTAK	UTEN NYE TILTAK			
	Uten miljøskade	Liten miljøskade Tilsvarer utslipp av 20 tonn diesel	Middels miljøskade Tilsvarer utslipp av 200 tonn bunkersolje	Stor miljøskade Tilsvarer utslipp av 2000 tonn bunkersolje	Svært stor miljøskade Tilsvarer utslipp av 20 000 tonn råolje
Skade på sjøfugl 	Området er viktig for sjøfugl som ærfugl, skarv, laksand, gråmåke, svaner, og sårbare sjøfugl som sjøorre, teist og fiskemåke	200 døde sjøfugl Ubetydelig påvirkning på sjøfuglbestandene	3000 døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter 1 år	7000 døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter 2 år	**15 000** døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter **3 år**
Skade på sel 	Viktig yngleområde for sel Selbestanden er i god forfatning	20 døde sel Ubetydelig påvirkning på selbestanden	40 døde sel Selbestanden vil ta seg opp igjen etter 1 år	80 døde sel Selbestanden vil ta seg opp igjen etter 2 år	**120** døde sel Selbestanden vil ta seg opp igjen etter **5 år**
Skade på liv i sjøen 	Området er viktig gyte- og oppvekstområde for fisk og annet liv i havet Beiteområde for flere bestander	Ubetydelige skader på livet i sjøen	Liten skade på livet i sjøen Trygt å spise fisk og skaldyr etter 1 år	Noe skade på livet i sjøen, spesielt lokale bestander Trygt å spise fisk og skaldyr etter 1-2 år	**Større** skade på livet i sjøen, spesielt lokale bestander Trygt å spise fisk og skaldyr etter **1-2 år**
Skade på kystsone 	Svært viktig friluftsområde	20 km kystlinje forurenset Området kan brukes som normalt etter mindre enn 1 år	30 km kystlinje forurenset Området kan brukes som normalt etter 2 år	120 km kystlinje forurenset Området kan brukes som normalt etter 3 år	**190 km** kystlinje forurenset Området kan brukes som normalt etter **5 år**



● Utslippspunkt ● Svært stor skade

Test - v3

Hva er det verdt for deg og din husstand å unngå én svært stor miljøskade i Oslofjordområdet?

Hva er det meste, om noe, din husstand helt sikkert vil betale i en øremerket engangsskatt, for å gjennomføre nye tiltak slik at man unngår én svært stor miljøskade?

Husk at dette beløpet kommer istedenfor de beløpene du oppga for liten, middels og stor skade.
Flytt markøren til ønsket beløp.
Engangsbeløp i kroner:

1/1

0

0 10 50 100 200 300 400 500 700 900 1100 1300 1500 1800 2200 2700 3200 3800 4400 5500 7000 8500 12000 Mer enn 12000 Vet ikke

NØRSK GALLUP

Test - v3

Er du helt sikker på beløpene du har valgt?

Her ser du miljøskadetabellen igjen, nå med engangsbeløpene du oppga for å unngå hver av skadestørrelsene (se under tabellen).

Noen oppgir høyere beløp i undersøkelser, enn det de faktisk vil betale. Det kan også være vanskelig å vurdere hva det er verdt å unngå den lille skaden i forhold til å unngå de større skadene.
Vi ber deg derfor vurdere alle beløpene en gang til, slik at du er sikker på beløpene du har valgt. Det er ikke noe riktig eller galt svar her.

Om du vil endre, gjør du det ved å trykke på pilene under tabellen. Om du ikke vil endre, går du bare videre.

Test - v3

Om du vil endre, gjør du det ved å trykke på pilene under tabellen. Om du ikke vil endre, går du bare videre.

	MED NYE TILTAK	UTEN NYE TILTAK			
	Uten miljøskade	**Liten miljøskade** Tilsvarer utslipp av 20 tonn diesel	**Middels miljøskade** Tilsvarer utslipp av 200 tonn bunkersolje	**Stor miljøskade** Tilsvarer utslipp av 2000 tonn bunkersolje	**Svært stor miljøskade** Tilsvarer utslipp av 20 000 tonn råolje
Skade på sjøfugl 	Området er viktig for sjøfugl som ærfugl, skarv, laksand, gråmåke, svaner, og sårbare sjøfugl som sjøorre, teist og fiskemåke	**200** døde sjøfugl **Ubetydelig** påvirkning på sjøfuglbestandene	**3000** døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter **1 år**	**7000** døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter **2 år**	**15 000** døde sjøfugl Bestander av vanlige og sårbare sjøfugl vil ta seg opp igjen etter **3 år**
Skade på sel 	Viktig yngleområde for sel Selbestanden er i god forfatning	**20** døde sel **Ubetydelig** påvirkning på selbestanden	**40** døde sel Selbestanden vil ta seg opp igjen etter **1 år**	**80** døde sel Selbestanden vil ta seg opp igjen etter **2 år**	**120** døde sel Selbestanden vil ta seg opp igjen etter **5 år**
Skade på liv i sjøen 	Området er viktig gyte- og oppvekstområde for fisk og annet liv i havet Beiteområde for flere bestander	**Ubetydelige** skader på livet i sjøen	**Liten** skade på livet i sjøen Trygt å spise fisk og skalldyr etter **1 år**	**Noe** skade på livet i sjøen, spesielt lokale bestander Trygt å spise fisk og skalldyr etter **1-2 år**	**Større** skade på livet i sjøen, spesielt lokale bestander Trygt å spise fisk og skalldyr etter **1-2 år**
Skade på kystsone 	Svært viktig friluftsområde	**20 km** kystlinje forurenset Området kan brukes som normalt etter mindre enn **1 år**	**30 km** kystlinje forurenset Området kan brukes som normalt etter **2 år**	**120 km** kystlinje forurenset Området kan brukes som normalt etter **3 år**	**190 km** kystlinje forurenset Området kan brukes som normalt etter **5 år**

Du svarte tidligere 0kr på liten miljøskade. Vil du endre til nytt beløp:

0

Du svarte tidligere 0kr på medium miljøskade. Vil du endre til nytt beløp:

0

Du svarte tidligere 0kr på stor miljøskade. Vil du endre til nytt beløp:

0

Du svarte tidligere 0kr på svært stor miljøskade. Vil du endre til nytt beløp:

0

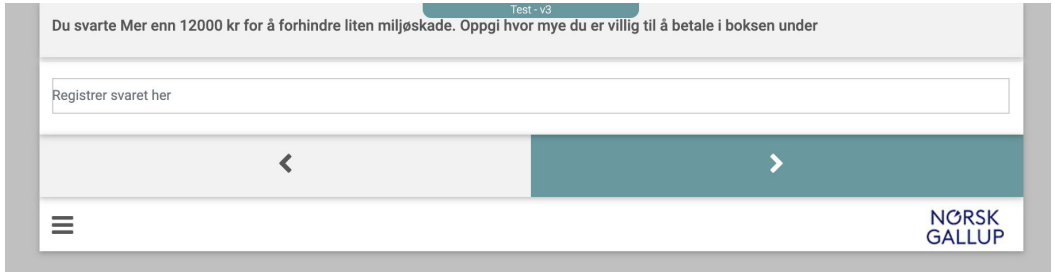
NORSK GALLUP

Test - v3

Du har ovenfor sagt at du, eller husstanden din, ikke er villig til å betale noe for å unngå en eller flere av miljøskadene fra oljeutslipp, eller du har svart 'Vet ikke'.

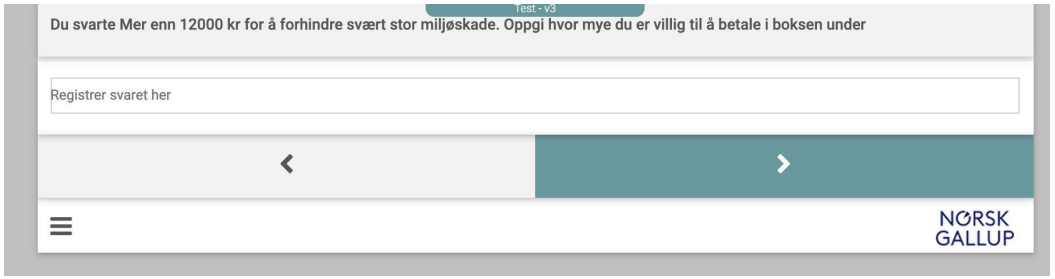
Hva er den viktigste grunnen til at du/dere ikke vil betale?
Kryss av for den ene grunnen som var aller viktigst for deg.

- Husstanden min har ikke råd til å betale for dette
- Det er rederiene og skipsnæringen som bør betale
- Skattenivået er allerede høyt nok
- Hva jeg sier vil ikke påvirke om tiltakene gjennomføres eller ikke
- Jeg ville betalt for tiltak i andre kystområder
- Jeg føler det ikke er riktig å veie miljøet i penger
- Jeg mener andre samfunnsoppgaver bør prioriteres først
- Jeg vil ikke betale før jeg vet hva det koster
- Dagens beredskap er bra nok
- Det var for vanskelig å komme fram til et beløp
- Jeg tror ikke det vil skje oljeutslipp i dette kystområdet
- Jeg stoler ikke på at pengene vil gå til det riktige formålet
- Jeg mener at penger kan omfordeles eller brukes mer effektivt
- En engangsskatt er urealistisk og/eller ikke tilstrekkelig
- Andre grunner, spesifiser...
- Usikker/Vet ikke


Test - v3
Du svarte Mer enn 12000 kr for å forhindre liten miljøskade. Oppgi hvor mye du er villig til å betale i boksen under
Registrer svaret her
NØRSK GALLUP


Test - v3
Du svarte Mer enn 12000 kr for å forhindre middels miljøskade. Oppgi hvor mye du er villig til å betale i boksen under
Registrer svaret her
NØRSK GALLUP


Test - v3
Du svarte Mer enn 12000 kr for å forhindre stor miljøskade. Oppgi hvor mye du er villig til å betale i boksen under
Registrer svaret her
NØRSK GALLUP


Test - v3
Du svarte Mer enn 12000 kr for å forhindre svært stor miljøskade. Oppgi hvor mye du er villig til å betale i boksen under
Registrer svaret her
NØRSK GALLUP

Test - v3

Du har ovenfor sagt at du, eller husstanden din, er villig til å betale for å unngå en eller flere av miljøskadene fra oljeutslipp.
Hvilket av disse utsagnene synes du best beskriver hvorfor du er villig til å betale for å unngå miljøskader av oljesøl?

- Jeg er opptatt av å bevare en ren kyst slik at jeg og min husstand kan se og bruke kysten
- Jeg er opptatt av å bevare en ren kyst selv om jeg og min husstand ikke bruker kysten
- Jeg pleier å gi noe til slike gode formål
- Jeg oppga et beløp fordi jeg ville vise at det er viktig å bevare en ren kyst, men det er ikke sikkert jeg betaler beløpet
- Jeg følte en forpliktelse til å betale fordi alle andre husstander også blir spurt om å betale
- Jeg er opptatt av å bevare en ren kyst for dem som bor der
- Ingen av utsagnene overfor passer helt eller delvis. Skriv den viktigste grunnen til at du vil betale: _____
- Usikker/Vet ikke

NORSK GALLUP

Test - v3

Nå forsetter vi med neste del av undersøkelsen

Hvor sikkert eller usikkert tror du det er at Kystverkets tiltak kan forebygge miljøskadene vi har beskrevet i Oslofjordområdet?

- Helt sikkert
- Ganske sikkert
- Ganske sikkert ikke
- Helt sikkert ikke
- Vet ikke

NORSK GALLUP

Test - v3

Hvor ofte de siste 12 månedene har du foretatt de følgende fritidsaktivitetene i Oslofjordområdet?

1/10

Gåtur eller jogging langs stranden

Ikke i det hele tatt	Én gang	2-12 ganger	13-24 ganger	25 ganger eller mer	Usikker/Vet ikke

NORSK GALLUP

Test - v3

Hvor ofte de siste 12 månedene har du foretatt de følgende fritidsaktivitetene i Oslofjordområdet?

2/10

Fritidsfiske

Ikke i det hele tatt	Én gang	2-12 ganger	13-24 ganger	25 ganger eller mer	Usikker/Vet ikke

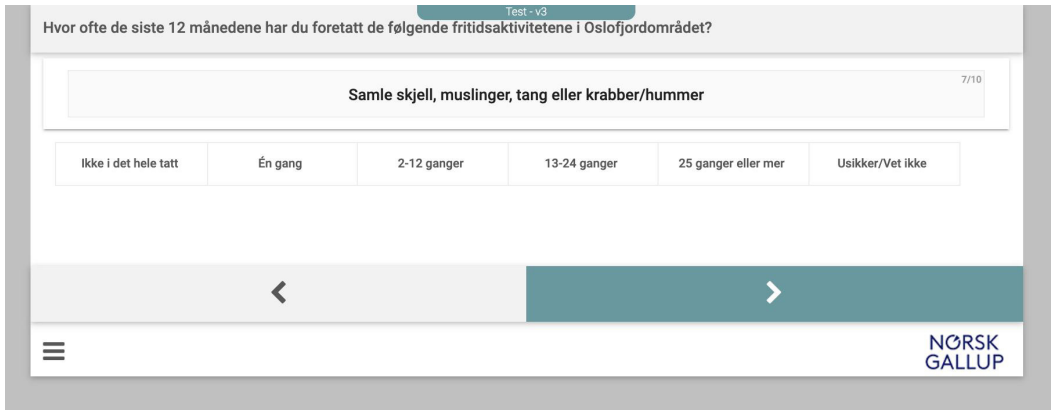
NORSK GALLUP

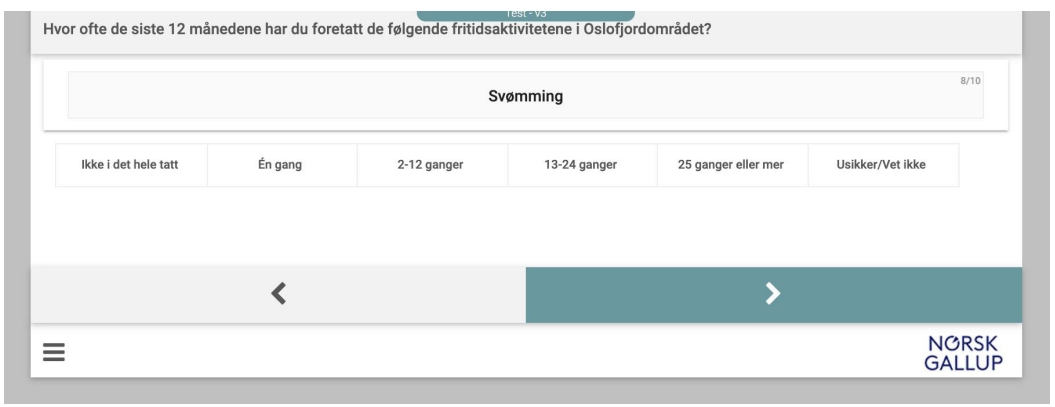

Test - V3
Hvor ofte de siste 12 månedene har du foretatt de følgende fritidsaktivitetene i Oslofjordområdet?
3/10
Båttur (uten fiske)
Ikke i det hele tatt
Én gang
2-12 ganger
13-24 ganger
25 ganger eller mer
Usikker/Vet ikke
NORSK GALLUP


Test - V3
Hvor ofte de siste 12 månedene har du foretatt de følgende fritidsaktivitetene i Oslofjordområdet?
4/10
Kanotur, vindsurfing eller dykking
Ikke i det hele tatt
Én gang
2-12 ganger
13-24 ganger
25 ganger eller mer
Usikker/Vet ikke
NORSK GALLUP

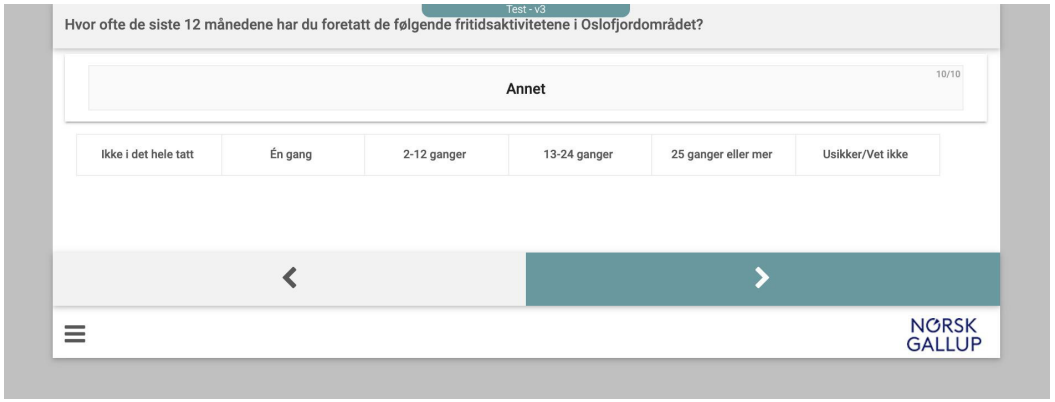

Test - V3
Hvor ofte de siste 12 månedene har du foretatt de følgende fritidsaktivitetene i Oslofjordområdet?
5/10
Jakt på sjøfugl eller sel
Ikke i det hele tatt
Én gang
2-12 ganger
13-24 ganger
25 ganger eller mer
Usikker/Vet ikke
NORSK GALLUP


Test - V3
Hvor ofte de siste 12 månedene har du foretatt de følgende fritidsaktivitetene i Oslofjordområdet?
6/10
Fotografering eller tegning
Ikke i det hele tatt
Én gang
2-12 ganger
13-24 ganger
25 ganger eller mer
Usikker/Vet ikke
NORSK GALLUP


Test - v3
Hvor ofte de siste 12 månedene har du foretatt de følgende fritidsaktivitetene i Oslofjordområdet?
7/10
Samle skjell, muslinger, tang eller krabber/hummer
Ikke i det hele tatt
Én gang
2-12 ganger
13-24 ganger
25 ganger eller mer
Usikker/Vet ikke
NORSK GALLUP


Hvor ofte de siste 12 månedene har du foretatt de følgende fritidsaktivitetene i Oslofjordområdet?
8/10
Svømming
Ikke i det hele tatt
Én gang
2-12 ganger
13-24 ganger
25 ganger eller mer
Usikker/Vet ikke
NORSK GALLUP


Hvor ofte de siste 12 månedene har du foretatt de følgende fritidsaktivitetene i Oslofjordområdet?
9/10
Fugletitting eller dyreobservasjon
Ikke i det hele tatt
Én gang
2-12 ganger
13-24 ganger
25 ganger eller mer
Usikker/Vet ikke
NORSK GALLUP


Test - v3
Hvor ofte de siste 12 månedene har du foretatt de følgende fritidsaktivitetene i Oslofjordområdet?
10/10
Annet
Ikke i det hele tatt
Én gang
2-12 ganger
13-24 ganger
25 ganger eller mer
Usikker/Vet ikke
NORSK GALLUP

Test - v3

Tenk deg at det skjer et oljeutslipp som gir **stor** miljøskade i den delen av Oslofjordområdet du bruker mest. Hva vil du da gjøre?

- Jeg bruker ingen deler av Oslofjordområdet
- Jeg vil fortsette å bruke kystområdet, selv om det er forurenset
- Jeg vil dra til et annet kystområde mens området er forurenset
- Jeg vil ikke dra til et annet kystområde, men vente til området igjen blir rent
- Jeg vil dra til en elv eller innsjø, mens området er forurenset
- Jeg vil aldri bruke dette kystområdet igjen, selv om oljesølet blir ryddet
- Vet ikke

NØRSK GALLUP

Test - v3

Hvilken del av kysten, om noen, **har du brukt til fritidsaktiviteter** de siste 5 årene?
Flere svar mulig

- Oslo
- Rogaland
- Møre og Romsdal
- Nordland
- Viken
- Innlandet
- Vestfold og Telemark
- Agder
- Vestland
- Trøndelag
- Troms og Finnmark
- Har ikke brukt noen del av kysten siste 5 år
- Vet ikke

NØRSK GALLUP

Test - v3

For hvilken del av norskekysten, om noen, **vil det være av størst betydning** for deg og din husstands livskvalitet å unngå miljøskader fra oljeutslipp?
Flere svar mulig

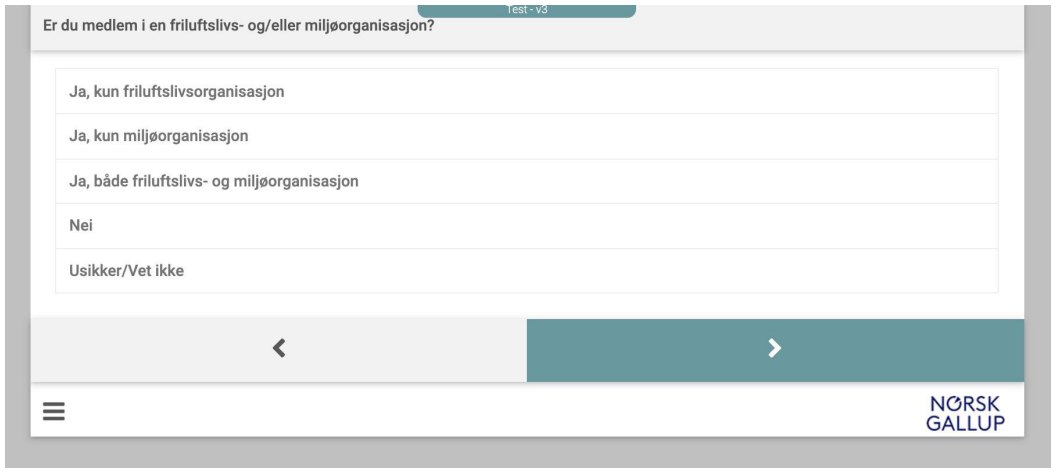
- Oslo
- Rogaland
- Møre og Romsdal
- Nordland
- Viken
- Innlandet
- Vestfold og Telemark
- Agder
- Vestland
- Trøndelag
- Troms og Finnmark
- Ingen del av kysten
- Vet ikke

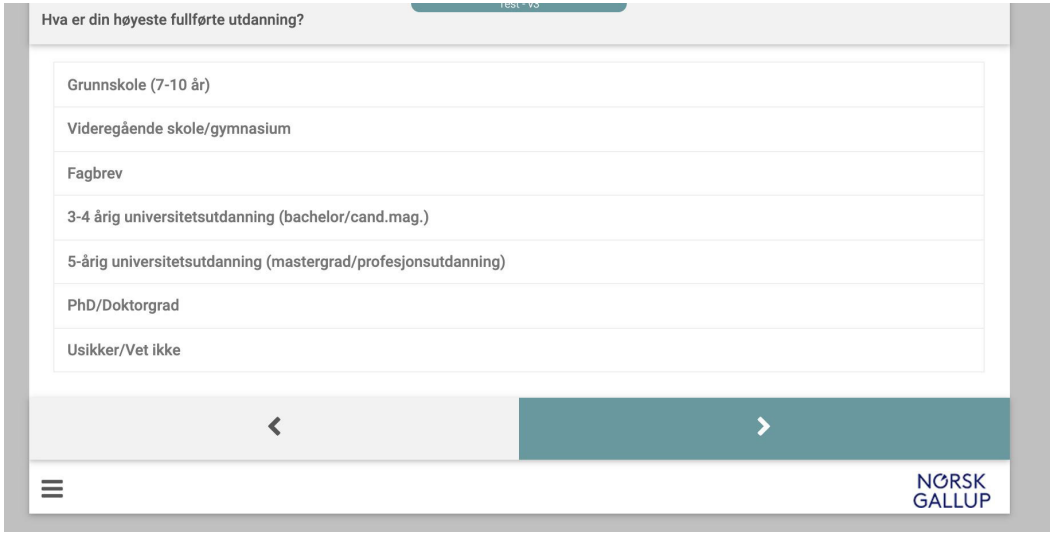
NØRSK

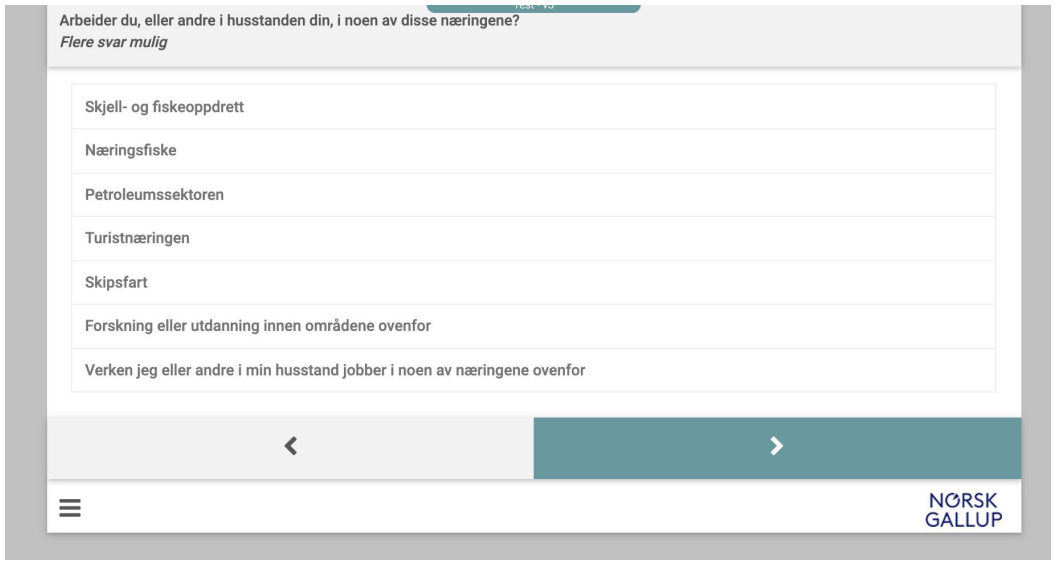
Test - v3

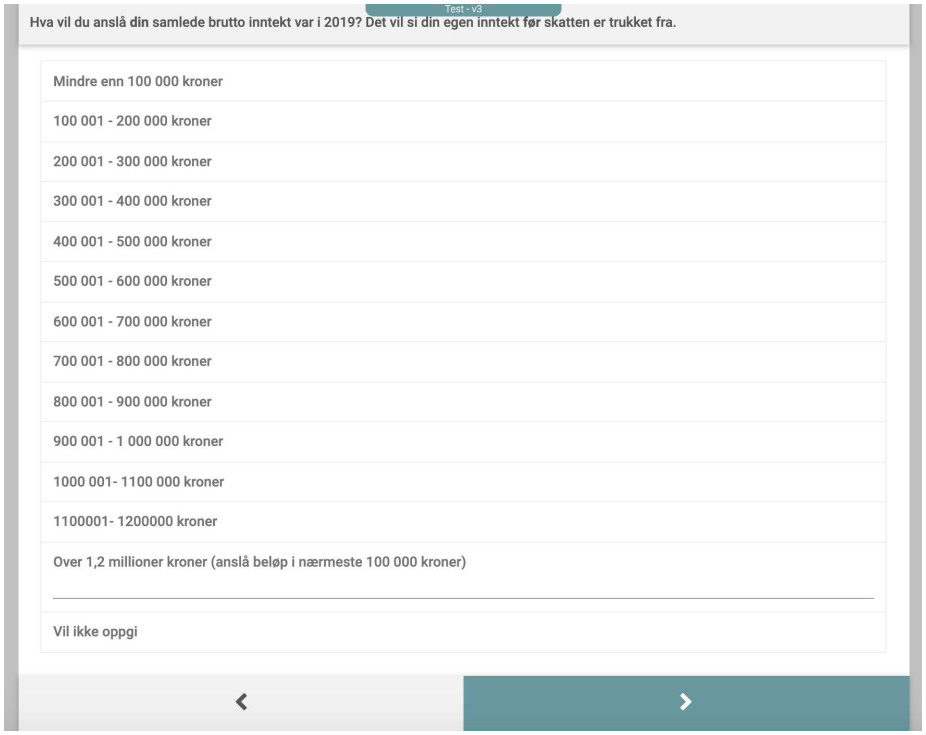
Helt til slutt ber vi deg om å oppgi noe bakgrunnsinformasjon om deg selv og husstanden din.

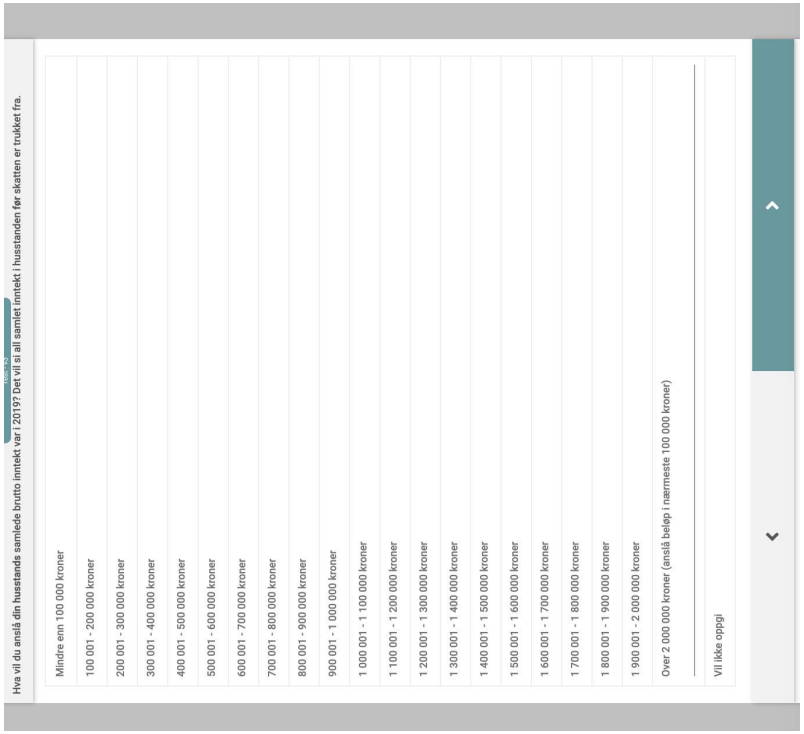
NØRSK GALLUP


Test - v3
Er du medlem i en friluftslivs- og/eller miljøorganisasjon?
Ja, kun friluftslivsorganisasjon
Ja, kun miljøorganisasjon
Ja, både friluftslivs- og miljøorganisasjon
Nei
Usikker/Vet ikke
NORSK GALLUP


Test - v3
Hva er din høyeste fullførte utdanning?
Grunnskole (7-10 år)
Videregående skole/gymnasium
Fagbrev
3-4 årig universitetsutdanning (bachelor/cand.mag.)
5-årig universitetsutdanning (mastergrad/profesjonsutdanning)
PhD/Doktorgrad
Usikker/Vet ikke
NORSK GALLUP


Test - v3
Arbeider du, eller andre i husstanden din, i noen av disse næringene?
Flere svar mulig
Skjell- og fiskeoppdrett
Næringsfiske
Petroleumssektoren
Turistnæringen
Skipsfart
Forskning eller utdanning innen områdene ovenfor
Verken jeg eller andre i min husstand jobber i noen av næringene ovenfor
NORSK GALLUP


Test - v3
Hva vil du anslå din samlede brutto inntekt var i 2019? Det vil si din egen inntekt før skatten er trukket fra.
Mindre enn 100 000 kroner
100 001 - 200 000 kroner
200 001 - 300 000 kroner
300 001 - 400 000 kroner
400 001 - 500 000 kroner
500 001 - 600 000 kroner
600 001 - 700 000 kroner
700 001 - 800 000 kroner
800 001 - 900 000 kroner
900 001 - 1 000 000 kroner
1000 001- 1100 000 kroner
1100001- 1200000 kroner
Over 1,2 millioner kroner (anslå beløp i nærmeste 100 000 kroner)
Vil ikke oppgi



Test - v3

Dersom det var stortingsvalg i dag, ville du da stemme - og i så fall på hvilket parti?

- Det norske Arbeiderparti
- Fremskrittspartiet
- Høyre
- Kristelig Folkeparti
- Kystpartiet
- Miljøpartiet De Grønne
- Pensjonistpartiet
- Rødt
- Senterpartiet
- Sosialistisk Venstreparti
- Venstre
- Annet parti / liste
- Ønsker ikke å oppgi parti
- Usikker / Vet ikke
- Vil ikke stemme
- Har ikke stemmerett

Test - v3

Stemte du ved Kommunevalget 2015, og hvilket parti eller liste stemte du i så fall på?

- Det norske Arbeiderparti
- Fremskrittspartiet
- Høyre
- Kristelig Folkeparti
- Kystpartiet
- Miljøpartiet De Grønne
- Pensjonistpartiet
- Rødt
- Senterpartiet
- Sosialistisk Venstreparti
- Vesntre
- Annet parti / liste
- Ønsker ikke å oppgi parti
- Husker ikke / Vet ikke
- Stemte ikke
- Hadde ikke stemmerett

Test - v3

Tenk tilbake til situasjonen rett før utbruddet av Corona-viruset i Norge da samfunnet var i en normal situasjon. Alt i alt, hvor fornøyd var du med livet på den tiden?

Flytt markøren for å svare

1/1

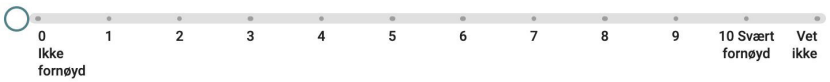
0 Ikke fornøyd | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 Svært fornøyd | Vet ikke

NORSK GALLUP

Test - v3

Tenk nå på hva Corona-viruset eventuelt betyr for livet ditt nå. Alt i alt, hvor fornøyd er du med livet for tiden?
Flytt markøren for å svare

1/1



NØRSK GALLUP

Test - v3

Hvordan tror du **husholdningsinntekten** din vil bli i 2020, som følge av Corona-viruset, sammenliknet med en normalsituasjon?

- Mye lavere
- Litt lavere
- Omtrent den samme
- Litt høyere
- Mye høyere
- Vet ikke

NØRSK GALLUP

Test - v3

Tenk tilbake på spørsmålene i denne undersøkelsen, om betalingsvillighet for å unngå miljøskader fra oljeutslipp.
Ville du oppgitt de samme beløpene i en normalsituasjon uten utbrudd av Corona-virus?

- Ja, ville oppgitt samme beløp
- Nei, ville oppgitt høyere beløp
- Nei, ville oppgitt lavere beløp
- Vet ikke

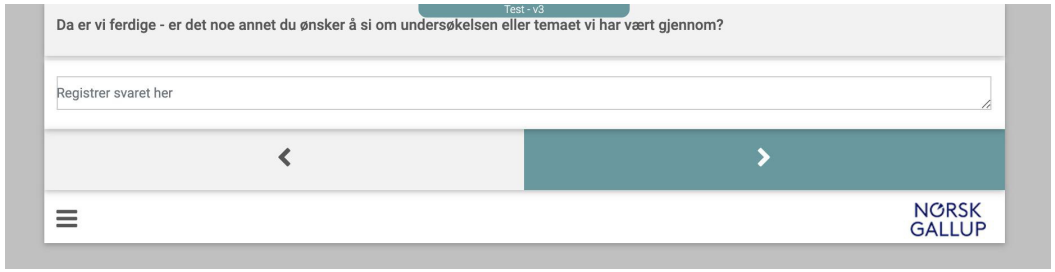
NØRSK GALLUP

Test - v3

Du har tidligere deltatt i tilsvarende kartlegging, og forskerne bak dette prosjektet ønsker å se svarene i sammenheng.
Aksepterer du at svarene sammenlignes med tidligere?
Din anonymitet er uansett ivaretatt.

- Ja
- Nei

NØRSK GALLUP


Test - v3
Da er vi ferdige - er det noe annet du ønsker å si om undersøkelsen eller temaet vi har vært gjennom?
Registrer svaret her
NØRSK
GALLUP

Appendix 2 The survey 2020

i11a

Du er nå kommet til den viktigste delen av undersøkelsen. Vi vil gjerne at du er litt ekstra grundig når du svarer på denne delen.

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i11

Kystverket vurderer nå flere tiltak for å styrke oljevernberedskapen. Det er både tiltak som forebygger skipsulykker som gir oljeutslipp og tiltak som forhindrer spredning av olje hvis utslipp likevel skulle skje.

Tenk deg nå at uten nye tiltak vil det skje en utslippshendelse i Vestfjorden de nærmeste årene som kan forårsake enten liten, middels, stor eller svært stor miljøskade. Tiltakene vil kunne unngå disse miljøskadene.

Vi ønsker at du tenker igjennom hva det er verdt for deg og din husstand å unngå hvert enkelt av de fire skadenivåene. Du vil nå bli spurt om de fire skadenivåene etter tur. Vi starter med den lille miljøskaden

Din mening er viktig for Kystverkets vurdering av hvor stor tiltakspakke som skal velges.

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i12x

Liten miljøskade

Tenk deg først at uten nye tiltak, vil det i løpet av de nærmeste årene skje ett skipsuhell med oljeutslipp som forårsaker liten miljøskade i Vestfjorden-området.
Dersom det gjennomføres tiltak, vil man unngå denne miljøskaden som vist i tabellen og kartet nedenfor.

	Med tiltak	Uten tiltak			
	Dagens tilstand	Liten miljøskade	Middels miljøskade	Stor miljøskade	Svært stor miljøskade
Skade på fugl	Området er viktig hekke-, trekk- og overvintringsområde for sjøfugl. Har vært nedgang i sjøfugl siste år, men bestander i hovedsak i god forfatning	Fuglebestandene i hovedsak i god forfatning. I alt 1500 døde fugl	Lomvi lokalt utrydningstruet. Øvrige bestander tilbake til normalt etter 1 år. I alt 15 000 døde fugl	Bestanden av krykkje og lomvi lokalt utrydningstruet. Øvrige bestander tilbake til normalt etter 2 år. I alt 50 000 døde fugl	Bestanden av krykkje og lomvi utrydningstruet i Norge. Øvrige bestander tilbake til normalt etter 4 år. I alt 120 000 døde fugl
Skade på sel	Området er viktig for sel. Selbestandene i god forfatning	Selbestandene i god forfatning. I alt 30 døde sel	Selbestandene i god forfatning. I alt 100 døde sel	Bestanden av selarten steinkobbe lokalt utrydningstruet. I alt 500 døde sel	Bestanden av selarten steinkobbe utrydningstruet i Norge. Øvrige arter tilbake til normalt etter 4 år. I alt 1000 døde sel
Skade på kystsone	Rikt ravinelandskap og dypvanns koraller. Området er viktig for rekreasjon og friluftsliv for fastboende og tilreisende	5 km kystsone bestående av *svaberg og strender* tilsølt med olje. Påvirker landbasert og vannbasert friluftsliv. Berørte områder kan brukes som normalt etter 6 måneder	30 km kystsone bestående av *svaberg og strender* tilsølt med olje. Påvirker landbasert og vannbasert friluftsliv. Berørte områder kan brukes som normalt etter 1 år	150 km kystsone bestående av *svaberg og strender* tilsølt med olje. Påvirker landbasert og vannbasert friluftsliv. Berørte områder kan brukes som normalt etter 3 år	400 km kystsone bestående av *svaberg og strender og fiskevær* tilsølt med olje. Påvirker landbasert og vannbasert friluftsliv. Berørte områder kan brukes som normalt etter 5 år
Skade på annet liv i sjøen	Området er viktig gyte- og internasjonalt viktig oppvekst- og beiteområde for flere fiskeslag.	Kan høstes som før. Trygt å spise sjømat. Gyte- og oppvekstområder for fisk ikke påvirket	Kan høstes som før. Trygt å spise sjømat. Gyte- og oppvekstområder for fisk tilbake til normalt etter 1 år	Fisk, skalldyr, skjell og tang bør ikke spises før 3 år etter utslippet. Gyte- og oppvekstområder for fisk tilbake til normalt etter 3 år	Fisk, skalldyr, skjell og tang bør ikke spises før 5 år etter utslippet. Gyte- og oppvekstområder for fisk tilbake til normalt etter 5 år

Spredning av olje som gir liten miljøskade

Naturvernområder
Viktige friluftsområder

<< >>

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q12

Hva er det verdt for deg og din husstand å unngå én liten miljøskade i Vestfjorden?

Næringslivet, skipsfarten, staten og husstandene drar alle nytte av skipstrafikken, og alle parter må derfor betale for tiltakene som gjør at man unngår miljøskader fra oljeutslipp. Alle husstander i landet må dekke sin del av kostnadene gjennom økt inntektsskatt som går uavkortet til Kystverket for å bedre oljevernberedskapen.

Hva er det meste, om noe, din husstand helt sikkert vil betale i økt skatt per år de neste 10 årene, for å gjennomføre tiltak slik at man unngår en liten miljøskade i Vestfjorden? Husk at dersom husstanden din betaler for dette, blir det mindre penger igjen å bruke på andre ting.

Tenk på hva det er verdt for deg og din husstand å unngå én liten miljøskade i Vestfjorden-området.

I glideskalaen nedenfor, velg det høyeste beløpet, om noe, din husstand helt sikkert er villig til å betale per år i 10 år.

Kroner per år for hvert år i en 10-års periode:

0 25 50 100 300 500 700 900 1100 1400 1800 2200 2700 3200 3800 4400 5100 5800 7000 8500 10000 13000 15000 Mer enn 15000 Vet ikke

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q12

Hva er det verdt for deg og din husstand å unngå én liten miljøskade i Vestfjorden?

Næringslivet, skipsfarten, staten og husstandene drar alle nytte av skipstrafikken, og alle parter må derfor betale for tiltakene som gjør at man unngår miljøskader fra oljeutslipp. Alle husstander i landet må dekke sin del av kostnadene gjennom økt inntektsskatt som går uavkortet til Kystverket for å bedre oljevernberedskapen.

Hva er det meste, om noe, din husstand helt sikkert vil betale i økt skatt per år de neste 10 årene, for å gjennomføre tiltak slik at man unngår en liten miljøskade i Vestfjorden? Husk at dersom husstanden din betaler for dette, blir det mindre penger igjen å bruke på andre ting.

Tenk på hva det er verdt for deg og din husstand å unngå én liten miljøskade i Vestfjorden-området.

I glideskalaen nedenfor, velg det høyeste beløpet, om noe, din husstand helt sikkert er villig til å betale per år i 10 år.

Kroner per år for hvert år i en 10-års periode:

0 25 50 100 300 500 700 900 1100 1400 1800 2200 2700 3200 3800 4400 5100 5800 7000 8500 10000 13000 15000 Mer enn 15000 Vet ikke

i12

Tilsvarer totalt i 10 år:

250 kroner

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q12

Hva er det verdt for deg og din husstand å unngå én liten miljøskade i Vestfjorden?

Næringslivet, skipsfarten, staten og husstandene drar alle nytte av skipstrafikken, og alle parter må derfor betale for tiltakene som gjør at man unngår miljøskader fra oljeutslipp. Alle husstander i landet må dekke sin del av kostnadene gjennom økt inntektsskatt som går uavkortet til Kystverket for å bedre oljevernberedskapen.

Hva er det meste, om noe, din husstand helt sikkert vil betale i økt skatt per år de neste 10 årene, for å gjennomføre tiltak slik at man unngår en liten miljøskade i Vestfjorden? Husk at dersom husstanden din betaler for dette, blir det mindre penger igjen å bruke på andre ting.

Tenk på hva det er verdt for deg og din husstand å unngå én liten miljøskade i Vestfjorden-området.

I glideskalaen nedenfor, velg det høyeste beløpet, om noe, din husstand helt sikkert er villig til å betale per år i 10 år.

Kroner per år for hvert år i en 10-års periode:

0 25 50 100 300 500 700 900 1100 1400 1800 2200 2700 3200 3800 4400 5100 5800 7000 8500 10000 13000 15000 Mer enn 15000 Vet ikke

i12

Tilsvarer totalt i 10 år:

Tallet må være høyere enn 15000 kroner

q12num

Vennligst angi beløp over 15000:

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q12B

Hva er den viktigste grunnen til at du oppga at din husstand ikke er villig til å betale noe for å unngå miljøskader fra oljeutslipp eller ikke vet hvilket beløp du skal oppgi?

Kryss av for den grunnen som var viktigst for deg.

- Dagens beredskap er bra nok
- Det var for vanskelig å komme fram til et beløp
- Skattenivået er allerede høyt nok
- Min husstand har ikke råd til å betale for dette
- Jeg ville betalt for tiltak i andre kystområder
- Jeg føler det ikke er riktig å veie miljøet i penger
- Hva jeg sier vil ikke påvirke om tiltakene gjennomføres eller ikke
- Det er rederiene og skipsnæringen som bør betale
- Jeg mener andre samfunnsoppgaver bør prioriteres først
- Jeg stoler ikke på at pengene vil gå til det riktige formålet
- Jeg tror ikke det vil skje oljeutslipp i dette kystområdet
- Jeg mener at penger kan omfordeles eller brukes mer effektivt
- Jeg vil ikke betale før jeg vet hva det koster
- Andre grunner, spesifiser:
- Usikker/ vet ikke

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I13a

Middels miljøskade

Tenk deg nå istedenfor at uten tiltak vil det skje ett skipsuhell med oljeutslipp som gir middels miljøskade i Vestfjorden-området, som vist i tabellen og kartet nedenfor.

	Med tiltak		Uten tiltak		
	Dagens tilstand	Liten miljøskade	Middels miljøskade	Stor miljøskade	Svært stor miljøskade
Skade på fugl 	Området er viktig hekke-, trekk- og overvintringsområde for sjøfugl. Har vært nedgang i sjøfugl siste år, men bestander i hovedsak i god forfatning	Fuglebestandene i hovedsak i god forfatning I alt 1500 døde fugl	Lomvi lokalt utrydningstruet Øvrige bestander tilbake til normalt etter 1 år I alt 15 000 døde fugl	Bestanden av krykkje og lomvi lokalt utrydningstruet Øvrige bestander tilbake til normalt etter 2 år I alt 50 000 døde fugl	Bestanden av krykkje og lomvi utrydningstruet i Norge Øvrige bestander tilbake til normalt etter 4 år I alt 120 000 døde fugl
Skade på sel 	Området er viktig for sel. Selbestandene i god forfatning	Selbestandene i god forfatning I alt 30 døde sel	Selbestandene i god forfatning I alt 100 døde sel	Bestanden av selarten steinkobbe lokalt utrydningstruet I alt 500 døde sel	Bestanden av selarten steinkobbe utrydningstruet i Norge Øvrige arter tilbake til normalt etter 4 år I alt 1000 døde sel
Skade på kystsone 	Rikt ravinelandskap og dypvanns koraller Området er viktig for rekreasjon og friluftsliv for fastboende og tilreisende	5 km kystsone bestående av svaberg og strender tilsølt med olje Påvirker landbasert og vannbasert friluftsliv Berørte områder kan brukes som normalt etter 6 måneder	30 km kystsone bestående av svaberg og strender tilsølt med olje Påvirker landbasert og vannbasert friluftsliv Berørte områder kan brukes som normalt etter 1 år	150 km kystsone bestående av svaberg og strender tilsølt med olje Påvirker landbasert og vannbasert friluftsliv Berørte områder kan brukes som normalt etter 3 år	400 km kystsone bestående av svaberg og strender og fiskevær tilsølt med olje Påvirker landbasert og vannbasert friluftsliv Berørte områder kan brukes som normalt etter 5 år
Skade på annet liv i sjøen 	Området er viktig gyte- og internasjonalt viktig oppvekst- og beiteområde for flere fiskeslag.	Kan høstes som før Trygt å spise sjømat Gyte- og oppvekstområder for fisk ikke påvirket	Kan høstes som før Trygt å spise sjømat Gyte- og oppvekstområder for fisk tilbake til normalt etter 1 år	Fisk, skalldyr, skjell og tang bør ikke spises før 3 år etter utslippet Gyte- og oppvekstområder for fisk tilbake til normalt etter 3 år	Fisk, skalldyr, skjell og tang bør ikke spises før 5 år etter utslippet Gyte- og oppvekstområder for fisk tilbake til normalt etter 5 år

Spredning av olje som gir middels stor miljøskade

Naturvernområder
Viktige friluftsområder

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q13

Hva er det verdt for deg og din husstand å unngå én middels miljøskade i Vestfjorden?

Hva er det meste, om noe, din husstand helt sikkert vil betale i økt skatt per år de neste 10 årene, for at Kystverket skal gjennomføre tiltak slik at man unngår én middels miljøskade i Vestfjorden?

Husk at dette beløpet kommer istedenfor; ikke i tillegg til, beløpet du oppga tidligere for å unngå liten miljøskade.

Kroner per år for hvert år i en 10-års periode:

0 25 50 100 300 500 700 900 1100 1400 1800 2200 2700 3200 3800 4400 5100 5800 7000 8500 10000 13000 15000 Mer enn 15000 Vet ikke

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q13

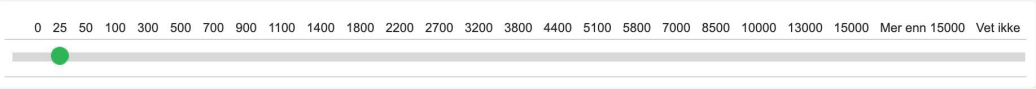
Hva er det verdt for deg og din husstand å unngå én middels miljøskade i Vestfjorden?

Hva er det meste, om noe, din husstand helt sikkert vil betale i økt skatt per år de neste 10 årene, for at Kystverket skal gjennomføre tiltak slik at man unngår én middels miljøskade i Vestfjorden?

Husk at dette beløpet kommer istedenfor; ikke i tillegg til, beløpet du oppga tidligere for å unngå liten miljøskade.

Kroner per år for hvert år i en 10-års periode:

0 25 50 100 300 500 700 900 1100 1400 1800 2200 2700 3200 3800 4400 5100 5800 7000 8500 10000 13000 15000 Mer enn 15000 Vet ikke



i13

Tilsvarer totalt i 10 år:

250 kroner

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Powered by Confirmit

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q13

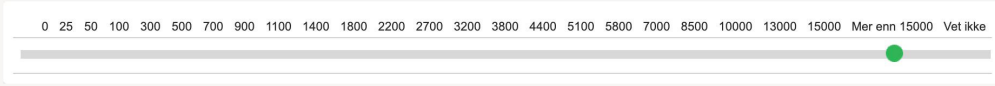
Hva er det verdt for deg og din husstand å unngå én middels miljøskade i Vestfjorden?

Hva er det meste, om noe, din husstand helt sikkert vil betale i økt skatt per år de neste 10 årene, for at Kystverket skal gjennomføre tiltak slik at man unngår én middels miljøskade i Vestfjorden?

Husk at dette beløpet kommer istedenfor; ikke i tillegg til, beløpet du oppga tidligere for å unngå liten miljøskade.

Kroner per år for hvert år i en 10-års periode:

0 25 50 100 300 500 700 900 1100 1400 1800 2200 2700 3200 3800 4400 5100 5800 7000 8500 10000 13000 15000 Mer enn 15000 Vet ikke



i13

Tilsvarer totalt i 10 år:

Tallet må være høyere enn 15000 kroner

q13num

Vennligst angi beløp over 15000:

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q13b

Hva er den viktigste grunnen til at du oppga at din husstand ikke er villig til å betale noe for å unngå miljøskader fra oljeutslipp eller ikke vet hvilket beløp du skal oppgi?

Kryss av for den grunnen som var viktigst for deg.

- ○ Dagens beredskap er bra nok
- ○ Det var for vanskelig å komme fram til et beløp
- ○ Skattenivået er allerede høyt nok
- ○ Min husstand har ikke råd til å betale for dette
- ○ Jeg ville betalt for tiltak i andre kystområder
- ○ Jeg føler det ikke er riktig å veie miljøet i penger
- ○ Hva jeg sier vil ikke påvirke om tiltakene gjennomføres eller ikke
- ○ Det er rederiene og skipsnæringen som bør betale
- ○ Jeg mener andre samfunnsoppgaver bør prioriteres først
- ○ Jeg stoler ikke på at pengene vil gå til det riktige formålet
- ○ Jeg tror ikke det vil skje oljeutslipp i dette kystområdet
- ○ Jeg mener at penger kan omfordeles eller brukes mer effektivt
- ○ Jeg vil ikke betale før jeg vet hva det koster
- ○ Andre grunner, spesifiser:
- ○ Usikker/ vet ikke

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i14x

Stor miljøskade

Tenk deg nå at dersom det ikke gjennomføres tiltak skjer det istedenfor et skipsuhell med oljeutslipp som gir stor miljøskade i Vestfjorden.

Dersom det gjennomføres tiltak, vil man unngå denne miljøskaden, som vist i tabellen og kartet nedenfor.

	Med tiltak			Uten tiltak	
	Dagens tilstand	Liten miljøskade	Middels miljøskade	Stor miljøskade	Svært stor miljøskade
Skade på fugl					
	Området er viktig hekke-, trekk- og overvintringsområde for sjøfugl. Har vært nedgang i sjøfugl siste år, men bestander i hovedsak i god forfatning	Fuglebestandene i hovedsak i god forfatning. I alt 1500 døde fugl	Lomvi lokalt utrydningstruet. Øvrige bestander tilbake til normalt etter 1 år. I alt 15 000 døde fugl	Bestanden av krykkje og lomvi lokalt utrydningstruet. Øvrige bestander tilbake til normalt etter 2 år. I alt 50 000 døde fugl	Bestanden av krykkje og lomvi utrydningstruet i Norge. Øvrige bestander tilbake til normalt etter 4 år. I alt 120 000 døde fugl
Skade på sel					
	Området er viktig for sel. Selbestandene i god forfatning	Selbestandene i god forfatning. I alt 30 døde sel	Selbestandene i god forfatning. I alt 100 døde sel	Bestanden av selarten steinkobbe lokalt utrydningstruet. I alt 500 døde sel	Bestanden av selarten steinkobbe utrydningstruet i Norge. Øvrige arter tilbake til normalt etter 4 år. I alt 1000 døde sel
Skade på kystsone					
	Rikt ravinelandskap og dypvanns koraller. Området er viktig for rekreasjon og friluftsliv for fastboende og tilreisende	5 km kystsone bestående av svaberg og strender tilsølt med olje. Påvirker landbasert og vannbasert friluftsliv. Berørte områder kan brukes som normalt etter 6 måneder	30 km kystsone bestående av svaberg og strender tilsølt med olje. Påvirker landbasert og vannbasert friluftsliv. Berørte områder kan brukes som normalt etter 1 år	150 km kystsone bestående av svaberg og strender tilsølt med olje. Påvirker landbasert og vannbasert friluftsliv. Berørte områder kan brukes som normalt etter 3 år	400 km kystsone bestående av svaberg og strender og fiskevær tilsølt med olje. Påvirker landbasert og vannbasert friluftsliv. Berørte områder kan brukes som normalt etter 5 år
Skade på annet liv i sjøen					
	Området er viktig gyte- og internasjonalt viktig oppvekst- og beiteområde for flere fiskeslag.	Kan høstes som før. Trygt å spise sjømat. Gyte- og oppvekstområder for fisk ikke påvirket	Kan høstes som før. Trygt å spise sjømat. Gyte- og oppvekstområder for fisk tilbake til normalt etter 1 år	Fisk, skalldyr, skjell og tang bør ikke spises før 3 år etter utslippet. Gyte- og oppvekstområder for fisk tilbake til normalt etter 3 år	Fisk, skalldyr, skjell og tang bør ikke spises for 5 år etter utslippet. Gyte- og oppvekstområder for fisk tilbake til normalt etter 5 år

Spredning av olje som gir stor miljøskade

Naturvernområder
Viktige friluftsområder

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Powered by Confirmit

q14

Hva er det verdt for deg og din husstand å unngå én stor miljøskade i Vestfjorden?

Hva er det meste, om noe, din husstand helt sikkert vil betale i økt skatt per år de neste 10 årene, for at Kystverket skal gjennomføre tiltak slik at man unngår én stor miljøskade i Vestfjorden?

Husk at dette beløpet kommer istedenfor de beløpene du oppga tidligere.

Kroner per år for hvert år i en 10-års periode:

0 25 50 100 300 500 700 900 1100 1400 1800 2200 2700 3200 3800 4400 5100 5800 7000 8500 10000 13000 15000 Mer enn 15000 Vet ikke

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q14

Hva er det verdt for deg og din husstand å unngå én stor miljøskade i Vestfjorden?

Hva er det meste, om noe, din husstand helt sikkert vil betale i økt skatt per år de neste 10 årene, for at Kystverket skal gjennomføre tiltak slik at man unngår én stor miljøskade i Vestfjorden?

Husk at dette beløpet kommer istedenfor de beløpene du oppga tidligere.

Kroner per år for hvert år i en 10-års periode:

0 25 50 100 300 500 700 900 1100 1400 1800 2200 2700 3200 3800 4400 5100 5800 7000 8500 10000 13000 15000 Mer enn 15000 Vet ikke

i14

Tilsvarer totalt i 10 år:

250 kroner

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Powered by Confirmit

q14

Hva er det verdt for deg og din husstand å unngå én stor miljøskade i Vestfjorden?

Hva er det meste, om noe, din husstand helt sikkert vil betale i økt skatt per år de neste 10 årene, for at Kystverket skal gjennomføre tiltak slik at man unngår én stor miljøskade i Vestfjorden?

Husk at dette beløpet kommer istedenfor de beløpene du oppga tidligere.

Kroner per år for hvert år i en 10-års periode:

0 25 50 100 300 500 700 900 1100 1400 1800 2200 2700 3200 3800 4400 5100 5800 7000 8500 10000 13000 15000 Mer enn 15000 Vet ikke

i14

Tilsvarer totalt i 10 år:

Tallet må være høyere enn 15000 kroner

q14num

Vennligst angi beløp over 15000:

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q149

Hva er den viktigste grunnen til at du oppga at din husstand ikke er villig til å betale noe for å unngå miljøskader fra oljeutslipp eller ikke vet hvilket beløp du skal oppgi?

Kryss av for den grunnen som var viktigst for deg.

- ○ Dagens beredskap er bra nok
- ○ Det var for vanskelig å komme fram til et beløp
- ○ Skattenivået er allerede høyt nok
- ○ Min husstand har ikke råd til å betale for dette
- ○ Jeg ville betalt for tiltak i andre kystområder
- ○ Jeg føler det ikke er riktig å veie miljøet i penger
- ○ Hva jeg sier vil ikke påvirke om tiltakene gjennomføres eller ikke
- ○ Det er rederiene og skipsnæringen som bør betale
- ○ Jeg mener andre samfunnsoppgaver bør prioriteres først
- ○ Jeg stoler ikke på at pengene vil gå til det riktige formålet
- ○ Jeg tror ikke det vil skje oljeutslipp i dette kystområdet
- ○ Jeg mener at penger kan omfordeles eller brukes mer effektivt
- ○ Jeg vil ikke betale før jeg vet hva det koster
- ○ Andre grunner, spesifiser: _____
- ○ Usikker/ vet ikke

<< >>

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iNews

Svært stor miljøskade

Tenk deg nå istedenfor at dersom det ikke gjennomføres tiltak skjer det ett skipsuhell med oljeutslipp som gir svært stor miljøskade i Vestfjorden.

Dersom det gjennomføres tiltak, vil man unngå denne ene miljøskaden, som vist i tabellen og kartet nedenfor.

	Med tiltak				Uten tiltak
	Dagens tilstand	Liten miljøskade	Middels miljøskade	Stor miljøskade	Svært stor miljøskade
Skade på fugl					
Skade på sel					
Skade på kystsone					
Skade på annet liv i sjøen					

<< >>

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qNew

Hva er det verdt for deg og din husstand å unngå én svært stor miljøskade i Vestfjorden?

Hva er det meste, om noe, din husstand helt sikkert vil betale i økt skatt per år de neste 10 årene, for at Kystverket skal gjennomføre tiltak slik at man unngår én svært stor miljøskade i Vestfjorden?

Husk at dette beløpet kommer istedenfor de beløpene du oppga tidligere.

Kroner per år for hvert år i en 10-års periode:

0 25 50 100 300 500 700 900 1100 1400 1800 2200 2700 3200 3800 4400 5100 5800 7000 8500 10000 13000 15000 Mer enn 15000 Vet ikke

<< >>

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qNew

Hva er det verdt for deg og din husstand å unngå én svært stor miljøskade i Vestfjorden?

Hva er det meste, om noe, din husstand helt sikkert vil betale i økt skatt per år de neste 10 årene, for at Kystverket skal gjennomføre tiltak slik at man unngår én svært stor miljøskade i Vestfjorden?

Husk at dette beløpet kommer istedenfor de beløpene du oppga tidligere.

Kroner per år for hvert år i en 10-års periode:

0 25 50 100 300 500 700 900 1100 1400 1800 2200 2700 3200 3800 4400 5100 5800 7000 8500 10000 13000 15000 Mer enn 15000 Vet ikke

iNew

Tilsvarer totalt i 10 år:

250 kroner

<< >>

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qNew

Hva er det verdt for deg og din husstand å unngå én svært stor miljøskade i Vestfjorden?

Hva er det meste, om noe, din husstand helt sikkert vil betale i økt skatt per år de neste 10 årene, for at Kystverket skal gjennomføre tiltak slik at man unngår én svært stor miljøskade i Vestfjorden?

Husk at dette beløpet kommer istedenfor de beløpene du oppga tidligere.

Kroner per år for hvert år i en 10-års periode:

0 25 50 100 300 500 700 900 1100 1400 1800 2200 2700 3200 3800 4400 5100 5800 7000 8500 10000 13000 15000 Mer enn 15000 Vet ikke

lNew

Tilsvarer totalt i 10 år:

Tallet må være høyere enn 15000 kroner

qNewnum

Vennligst angi beløp over 15000:

<< >>

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qNew8

Hva er den viktigste grunnen til at du oppga at din husstand ikke er villig til å betale noe for å unngå miljøskader fra oljeutslipp eller ikke vet hvilket beløp du skal oppgi?

Kryss av for den grunnen som var viktigst for deg.

- Dagens beredskap er bra nok
- Det var for vanskelig å komme fram til et beløp
- Skattenivået er allerede høyt nok
- Min husstand har ikke råd til å betale for dette
- Jeg ville betalt for tiltak i andre kystområder
- Jeg føler det ikke er riktig å veie miljøet i penger
- Hva jeg sier vil ikke påvirke om tiltakene gjennomføres eller ikke
- Det er rederiene og skipsnæringen som bør betale
- Jeg mener andre samfunnsoppgaver bør prioriteres først
- Jeg stoler ikke på at pengene vil gå til det riktige formålet
- Jeg tror ikke det vil skje oljeutslipp i dette kystområdet
- Jeg mener at penger kan omfordeles eller brukes mer effektivt
- Jeg vil ikke betale før jeg vet hva det koster
- Andre grunner, spesifiser:
- Usikker/ vet ikke

<< >>

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q18

Hvor viktig var de ulike delene av miljøskaden for deg da du oppga din betalingsvillighet for de fire skadestørrelsene?

	Svært viktig	Ganske viktig	Verken viktig eller uviktig	Ganske Uviktig	Ikke viktig i det hele tatt	Usikker/ vet ikke
Døde fugler	○	○	○	○	○	○
Hvordan oljen påvirker friluftslivet	○	○	○	○	○	○
Om sel og fugl ble lokalt utrydningstruet	○	○	○	○	○	○
Døde sel	○	○	○	○	○	○
Sårbarheten til økosystemet	○	○	○	○	○	○
Hvor lang tid det tar før området kan brukes som før	○	○	○	○	○	○
Hvor lang tid det tar før det er trygt å spise sjømat	○	○	○	○	○	○
Antall km kystlinje som synlig påvirkes av oljen	○	○	○	○	○	○
Skader på livet i havet generelt	○	○	○	○	○	○

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q19

I hvilken grad tror du at Kystverket vil bruke resultatene fra denne undersøkelsen når de bestemmer hvor omfattende tiltak de skal sette i verk mot oljeutslipp langs kysten av Nord-Norge?

- I svært stor grad
- I stor grad
- Verken i stor eller liten grad
- I liten grad
- I svært liten grad
- Vet ikke

<< >>

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q20

Hvor sikkert tror du det er at din husstand må betale økt skatt de neste 10 årene dersom det blir gjennomført nye tiltak mot oljeutslipp langs kysten av Nord-Norge?

- ○ Helt sikkert
- ○ Ganske sikkert
- ○ Ganske sikkert ikke
- ○ Helt sikkert ikke
- ○ Vet ikke

<< >>

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q21

Hvor sikkert tror du det er at Kystverkets tiltak kan unngå miljøskadene vi har beskrevet?

- ○ Helt sikkert
- ○ Ganske sikkert
- ○ Ganske sikkert ikke
- ○ Helt sikkert ikke
- ○ Vet ikke

<< >>

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q7

Er det noen områder langs norskekysten der du mener det er spesielt viktig å unngå skader på naturmiljøet fra oljeutslipp?

- ☐ Oppgi navn og type område
- ○ Mener ingen områder er spesielt viktige
- ○ Mener alle områder er like viktige
- ○ Usikker/ vet ikke

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q24

Du svarte tidligere at du/din husholdning hadde tatt 3 turer til Lofoten-området de siste 12 månedene.
På en typisk (gjennomsnittlig) tur til Lofoten i løpet av de siste 12 månedene, hvor mange dager tilbrakte du/din husholdning der? Vennligst oppgi ditt beste anslag.

Velg det alternativet som best dekker det du ville gjøre.

- ○ Mindre enn 1 dag
- ○ 1 dag
- ○ 3 dager
- ○ 4 dager
- ○ 5 dager
- ○ 6 dager
- ○ 7 dager
- ○ 8 dager
- ○ 9 dager
- ○ 10 dager
- ○ Flere enn 10 dager
- ○ Angi ditt beste anslag:

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Q24X2

På en typisk tur til Lofoten i løpet av de siste 12 månedene, omtrent hvor mye penger brukte du/din husholdning, inkludert reiseutgifter og merkostnader forbundet med opphold (overnatting, mast, underholdning, o.l.)?

Reiseutgifter	Kr
Merkostnader forbundet med oppholdet	Kr
Total pengebruk på typisk tur til Lofoten	Kr 0

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Q24x3

På en typisk tur til Lofoten i løpet av de siste 12 månedene, hvilket hoved-transportmiddel blir benyttet?

- ○ Jeg er fastboende i dette området
- ○ Egen bil
- ○ Leiebil
- ○ Buss
- ○ Tog
- ○ Fly
- ○ Sykkel
- ○ Motorsykkel
- ○ Hurtigruten
- ○ Annen sjøgående transport (ikke bilferge)
- ○ Annet transportmiddel (spesifiser):
- ○ Vet ikke/husker ikke

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Q24X4

Hvor sannsynlig er det at du/din husholdning kommer til å reise til Nord-Norge (Nordland, Troms og/eller Finnmark) i løpet av de neste 12-24 månedene?

- ○ Veldig usannsynlig
- ○ Ganske usannsynlig
- ○ Nøytral/vet ikke
- ○ Ganske sannsynlig
- ○ Veldig Sannsynlig

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Q24X5

Hvor sannsynlig er det at du/din husholdning kommer til å reise til Lofoten i løpet av de neste 12-24 månedene?

- ○ Veldig usannsynlig
- ○ Ganske usannsynlig
- ○ Nøytral/vet ikke
- ○ Ganske sannsynlig
- ○ Veldig Sannsynlig

<< >>

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Q24X6

Dersom du/din husholdning IKKE skulle reise til Lofoten, hvor ville du/dere da reist til?
Vennligst oppgi de mest sannsynlige alternative reisemålene i Norge eller utenfor Norge.

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q24x

Hvor enig eller uenig er du i at det bør åpnes for oljeboring utenfor Lofoten?

1									
Svært uenig	2	3	4	5	6	7	8	9	10 Svært enig

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INFO_bakgrunn

Helt til slutt ber vi deg om å oppgi noe bakgrunnsinformasjon om deg og din husstand.

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tlx1

Dersom det var stortingsvalg i dag, ville du da stemme - og i så fall på hvilket parti?

- Det norske Arbeiderparti
- Fremskrittspartiet
- Høyre
- Kristelig Folkeparti
- Kystpartiet
- Miljøpartiet De Grønne
- Pensjonistpartiet
- Rødt
- Senterpartiet
- Sosialistisk Venstreparti
- Venstre
- Annet parti / liste
- Ønsker ikke å oppgi parti
- Usikker / Vet ikke
- Vil ikke stemme
- Har ikke stemmerett

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Bx2

Stemte du ved stortingsvalget i 2013, og hvilket parti stemte du i så fall på?

- ○ Det norske Arbeiderparti
- ○ Fremskrittspartiet
- ○ Høyre
- ○ Kristelig Folkeparti
- ○ Kystpartiet
- ○ Miljøpartiet De Grønne
- ○ Pensjonistpartiet
- ○ Rødt
- ○ Senterpartiet
- ○ Sosialistisk Venstreparti
- ○ Venstre
- ○ Annet parti / liste
- ○ Ønsker ikke å oppgi parti
- ○ Husker ikke / Vet ikke
- ○ Stemte ikke
- ○ Hadde ikke stemmerett

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Bx3

Tenk tilbake til situasjonen rett før utbruddet av Corona-viruset i Norge da samfunnet var i en normal situasjon. Alt i alt, hvor fornøyd var du med livet på den tiden?

Ikke fornøyd i det hele tatt — Svært fornøyd

0 1 2 3 4 5 6 7 8 9 10 Vet ikke

<< >>

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Bx4

Tenk på hva Corona-viruset eventuelt betyr for livet ditt nå. Alt i alt, hvor fornøyd er du med livet for tiden?

Ikke fornøyd i det hele tatt — Svært fornøyd

0 1 2 3 4 5 6 7 8 9 10 Vet ikke

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q25

Er du medlem i en miljøorganisasjon?

- ○ Ja
- ○ Nei
- ○ Usikker/ vet ikke

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q26

Hva er ditt høyest fullførte utdanningsnivå?

- ○ Grunnskole
- ○ Ungdomsskole
- ○ Videregående skole/gymnasium
- ○ 3-4 årig universitetsutdannelse (bachelor/cand.mag.)
- ○ 5-årig universitetsutdannelse (mastergrad e.l.)
- ○ PhD/Doktorgrad
- ○ Usikker/ vet ikke

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q27

Arbeider du eller andre i din husstand i noen av de følgende næringene?

Kryss av for de alternativer som passer.

- ☐ Skjell- og fiskeoppdrett
- ☐ Næringsfiske
- ☐ Petroleumssektoren
- ☐ Turistnæringen
- ☐ Skipsfart
- ○ Ingen i min husstand jobber i noen av næringene ovenfor

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q28

Hva vil du anslå var din samlede brutto disponible inntekt i 2019? Det vil si din egen inntekt før skatten er trukket fra.

Velg et alternativ

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q28

Hva vil du anslå var din samlede brutto disponible inntekt i 2019? Det vil si din egen inntekt før skatten er trukket fra.

- ✓ Velg et alternativ
- Mindre enn 100 000 kroner
- 100 001 - 200 000 kroner
- 200 001 - 300 000 kroner
- 300 001 - 400 000 kroner
- 400 001 - 500 000 kroner
- 500 001 - 600 000 kroner
- 600 001 - 700 000 kroner
- 700 001 - 800 000 kroner
- 800 001 - 900 000 kroner
- 900 001 - 1 000 000 kroner
- 1000 001- 1100 000 kroner
- 1100001- 1200000 kroner
- Mer enn 1,2 millioner kroner
- Vil ikke oppgi

<< >>

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q29

Hva vil du anslå var din husholdnings samlede brutto disponible inntekt i 2019? Det vil si din husholdnings inntekt før skatten er trukket fra.

Velg et alternativ

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q29

Hva vil du anslå var din husholdnings samlede brutto disponible inntekt i 2019? Det vil si din husholdnings inntekt før skatten er trukket fra.

- ✓ Velg et alternativ
- Mindre enn 100 000 kroner
- 100 001 - 200 000 kroner
- 200 001 - 300 000 kroner
- 300 001 - 400 000 kroner
- 400 001 - 500 000 kroner
- 500 001 - 600 000 kroner
- 600 001 - 700 000 kroner
- 700 001 - 800 000 kroner
- 800 001 - 900 000 kroner
- 900 001 - 1 000 000 kroner
- 1 000 001 - 1 100 000 kroner
- 1 100 001 - 1 200 000 kroner
- 1 200 001 - 1 300 000 kroner
- 1 300 001 - 1 400 000 kroner
- 1 400 001 - 1 500 000 kroner
- 1 500 001 - 1 600 000 kroner
- 1 600 001 - 1 700 000 kroner
- 1 700 001 - 1 800 000 kroner
- 1 800 001 - 1 900 000 kroner
- 1 900 001 - 2 000 000 kroner
- Mer enn 2 000 000 kroner
- Vil ikke oppgi

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Bx5

Hvordan tror du husholdningsinntekten din vil bli i 2020, som følge av Corona-viruset, sammenliknet med en normalsituasjon?

- ○ Mye lavere
- ○ Litt lavere
- ○ Omtrent samme
- ○ Litt høyere
- ○ Mye høyere
- ○ Vet ikke

<< >>

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Bx6

Tenk tilbake på spørsmålene om betalingsvillighet for å unngå miljøskader fra oljeutslipp.
Ville du svart det samme i en normalsituasjon uten utbrudd av Corona-virus?

- ○ Ja, ville oppgitt samme beløp
- ○ Nei, ville oppgitt høyere beløp
- ○ Nei, ville oppgitt lavere beløp
- ○ Vet ikke

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qEnd

Da er vi ferdige - er det noe annet du ønsker å si om undersøkelsen eller temaet vi har vært gjennom?

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satisfaction

Hvor fornøyd eller misfornøyd er du med å besvare denne undersøkelsen?

Generell tilfredshet

Emne

Lengde

Design

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Appendix 3 Unit Transfer

I adjusted for price changes from 2015 to 2020 values with the help of the Consumer Price Index calculator provided by Statistics Norway.[21] The values from the 2015 – survey needed to be adjusted to 2020 levels to compare the two data sets. The calculator allows researchers to calculate what NOK 100 from 1930 would be worth today. It is based itself on the monthly consumer price indexes published by Statistics Norway.

When using "average 2015" to "average 2020," the calculator stated an increase in the price of 12.2%. Using this information, the researcher created new variables for all WTP amounts for 2015.

This had to be done for all the four scenarios for each interval:

*Small_wtp15_KPI = Small_wtp15*1.1222*

*Medium_wtp15_KPI = Medium_wtp15*1.1222*

*Large_wtp15_KPI = Large_wtp15*1.1222*

*Xlarge_wtp15_KPI = Xlmall_wtp15*1.1222*

[21] The tool is provided on Statistic Norway's website: https://www.ssb.no/priser-og-prisindekser/konsumpriser/statistikk/konsumprisindeksen

Appendix 4 Data

Appendix 4.1. Summarizing of regions for TNS Kantar data with regards to municipal reform of 2017

	if NorDemo_fylke == 1	**Østfold**		**172**
	if NorDemo_fylke == 2	Akershus		479
	if NorDemo_fylke == 3	Oslo		700
	if NorDemo_fylke == 4	Hedmark		76
	if NorDemo_fylke == 5	Oppland		89
	if NorDemo_fylke == 6	Buskerud		84
	if NorDemo_fylke == 7	Vestfold		92
	if NorDemo_fylke == 8	Telemark		213
	if NorDemo_fylke == 9	Aust-Agder		128
	if NorDemo_fylke == 10	Vest-Agder		202
	if NorDemo_fylke == 11	Rogaland		760
	if NorDemo_fylke == 12	Hordaland		682
	if NorDemo_fylke == 13	Sogn og Fjordane		70
	if NorDemo_fylke == 14	Møre og Romsdal		355
	if NorDemo_fylke == 15	Sør -Trøndelag		494
	if NorDemo_fylke == 16	Nord-Trøndelag		171
	if NorDemo_fylke == 17	Nordland		431
	if NorDemo_fylke == 18	Troms		297
	if NorDemo_fylke == 19	Finnmark		80
	if NorDemo_fylke == 20	Utlandet*/		0
	Total			**5575**
Østlandet = Østfold + Akershus + Oslo + Hedmark + Oppland + Buskerud+ Vestfold + Telemark			Sum 1-8	1905
Vestlandet = Møre og Romsdal + Hordaland + Sogn og Fjordane + Rogaland			Sum 11-14	1867
Sør-Norge = Aust-Agder+ Vest - Agder			Sum 9-10	330
Midt-Norge=Sør-Trøndelag og Nord-Trøndelag			Sum 15-16	665
Nord-Norge= Troms + Finnmark + Nordland			Sum 17-19	808
total				**5575**

Appendix 4.2. Percentage of members of an environmental organization for both years, sorted by gender:

```
. tab member_environment if NORSTAT2020==0 & male==1
```

member_environment	Freq.	Percent	Cum.
0	2,705	95.96	95.96
1	114	4.04	100.00
Total	2,819	100.00	

```
. tab member_environment if NORSTAT2020==0 & male==0
```

member_environment	Freq.	Percent	Cum.
0	2,584	93.76	93.76
1	172	6.24	100.00
Total	2,756	100.00	

2015

```
. tab member_environment if NORSTAT2020==1 & male==1
```

member_environment	Freq.	Percent	Cum.
0	507	93.37	93.37
1	36	6.63	100.00
Total	543	100.00	

```
. tab member_environment if NORSTAT2020==1 & male==0
```

member_environment	Freq.	Percent	Cum.
0	429	91.86	91.86
1	38	8.14	100.00
Total	467	100.00	

2020

Appendix 5 Tests

Appendix 5.1 T-test results

Scenario	df	Sign level	Critical t-value	Pooled St.Dev.	Difference	|t-value|	Reject H_0
Eastern Norway							
s	909	0.05	1.645	1440	-675	8.12	yes
m	2059	0.05	1.645	1569	-579	6.37	yes
l	2049	0.05	1.645	2060	-592	4.95	yes
xl	2015	0.05	1.645	2520	-499	3.37	yes
Northern Norway							
s	909	0.05	1.645	1728	-607	4.59	yes
m	905	0.05	1.645	1772	-640	4.42	yes
l	902	0.05	1.645	2379	-621	3.19	yes
xl	879	0.05	1.645	2777	-179	0.77	no
Full sample							
s	5842	0.05	1.645	1367	-528	10.4	yes
m	5844	0.05	1.645	1538	-450	7.88	yes
l	5811	0.05	1.645	2036	-425	5.61	yes

xl	5707	0.05	1.645	2543	-243	2.54	yes

Appendix 5.2 Ramsey and Breusch-Pagan test

```
. estat ovtest

Ramsey RESET test using powers of the fitted values of wtpln
       Ho:  model has no omitted variables
                F(3, 25475) =      0.16
                   Prob > F =      0.9256

. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of wtpln

         chi2(1)      =   427.70
         Prob > chi2  =   0.0000
```

Appendix 6 Analyses

Appendix 6.1 Regression WTPln

```
. reg wtpln ageln male NORSTAT2020 use i.scenario_number hhincomeln
```

Source	SS	df	MS		
				Number of obs	= 24,199
				F(8, 24190)	= 148.33
Model	7449.54014	8	931.192517	Prob > F	= 0.0000
Residual	151861.468	24,190	6.27786142	R-squared	= 0.0468
				Adj R-squared	= 0.0464
Total	159311.008	24,198	6.5836436	Root MSE	= 2.5056

wtpln	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ageln	-.1517326	.044732	-3.39	0.001	-.23941	-.0640551
male	-.5361243	.0328831	-16.30	0.000	-.6005772	-.4716713
NORSTAT2020	.7369195	.0471366	15.63	0.000	.6445288	.8293103
use	.3373004	.0381614	8.84	0.000	.2625017	.4120991
scenario_number						
2	.3855038	.0455653	8.46	0.000	.296193	.4748145
3	.7764241	.0455616	17.04	0.000	.6871206	.8657276
4	1.059407	.045588	23.24	0.000	.9700521	1.148763
hhincomeln	.0869544	.0304274	2.86	0.004	.0273147	.146594
_cons	4.553875	.41676	10.93	0.000	3.737	5.370751

Appendix 6.2 Panel regression data

6.2.1 Panel regression data of the full sample

```
. reg wtpln ageln male NORSTAT2020 member_environment uni_education use i.scenario_number hhincomeln Eastern_Norway, r

Linear regression                               Number of obs     =     24,199
                                                F(11, 24187)      =     150.87
                                                Prob > F          =     0.0000
                                                R-squared         =     0.0578
                                                Root MSE          =     2.4912
```

wtpln	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
ageln	-.0807989	.0408817	-1.98	0.048	-.1609295	-.0006683
male	-.5092307	.0324994	-15.67	0.000	-.5729316	-.4455299
NORSTAT2020	.6153709	.0455859	13.50	0.000	.5260197	.7047221
member_environment	.9616744	.054774	17.56	0.000	.854314	1.069035
uni_education	.2855559	.0333983	8.55	0.000	.2200933	.3510185
use	.2993487	.0385077	7.77	0.000	.2238712	.3748262
scenario_number						
2	.3855277	.0447723	8.61	0.000	.2977712	.4732843
3	.7765126	.0451314	17.21	0.000	.6880522	.8649731
4	1.059626	.0458935	23.09	0.000	.9696714	1.14958
hhincomeln	.0653846	.0287346	2.28	0.023	.009063	.1217062
Eastern_Norway	.0355456	.0329562	1.08	0.281	-.0290505	.1001418
_cons	4.397891	.377946	11.64	0.000	3.657094	5.138689

6.2.2. Panel regression data of Eastern Norway

```
. reg wtpln ageln male NORSTAT2020 member_environment uni_education use i.scenario_number hhincomeln if Eastern_Norway==1, r

Linear regression                               Number of obs     =      8,519
                                                F(10, 8508)       =      85.82
                                                Prob > F          =     0.0000
                                                R-squared         =     0.0821
                                                Root MSE          =      2.345
```

wtpln	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
ageln	.1271304	.0631118	2.01	0.044	.003416	.2508447
male	-.611742	.051607	-11.85	0.000	-.7129041	-.5105798
NORSTAT2020	.8999394	.0654919	13.74	0.000	.7715594	1.028319
member_environment	.9145967	.0774989	11.80	0.000	.76268	1.066513
uni_education	.3020499	.0529929	5.70	0.000	.198171	.4059288
use	.4088451	.0598637	6.83	0.000	.2914977	.5261926
scenario_number						
2	.4051801	.0717636	5.65	0.000	.2645061	.5458541
3	.820819	.0718363	11.43	0.000	.6800024	.9616356
4	1.112187	.0730348	15.23	0.000	.9690207	1.255353
hhincomeln	-.0035114	.0454329	-0.08	0.938	-.092571	.0855482
_cons	4.48649	.5946193	7.55	0.000	3.320892	5.652088

6.3.3. Panel regression data of Northern Norway

```
. reg wtpln ageln male NORSTAT2020 member_environment uni_education use i.scenario_number hhincomeln if Northern_Norway==1, r

Linear regression                               Number of obs     =      3,805
                                                F(10, 3794)       =      35.76
                                                Prob > F          =     0.0000
                                                R-squared         =     0.0617
                                                Root MSE          =     2.6049
```

wtpln	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
ageln	.1065405	.124714	0.85	0.393	-.1379726	.3510535
male	-.5268891	.0900591	-5.85	0.000	-.7034579	-.3503203
NORSTAT2020	.5071285	.1056269	4.80	0.000	.3000376	.7142195
member_environment	1.435282	.1263799	11.36	0.000	1.187503	1.683061
uni_education	.4128557	.0890489	4.64	0.000	.2382674	.587444
use	-.1654112	.1147209	-1.44	0.149	-.3903318	.0595094
scenario_number						
2	.3099156	.1160461	2.67	0.008	.0823969	.5374343
3	.6589496	.1182118	5.57	0.000	.4271847	.8907144
4	.9584473	.1201076	7.98	0.000	.7229656	1.193929
hhincomeln	.1708032	.0862548	1.98	0.048	.0016929	.3399135
_cons	2.449056	1.145816	2.14	0.033	.2025813	4.695532

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