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Estimating Distributional Effects of Environmental Policy in Swedish Coastal Environments – A Walk along different Socio-economic Dimensions

Cecilia Håkansson[1*], Katarina Östberg[2] and Göran Bostedt[2, 3]

[1*] Division for Environmental Strategies Research, KTH Royal Institute of Technology, Sweden. Corresponding author.
[2]CERE, Centre for Environmental and Resource Economics, and Dept. of Forest Economics, Swedish University of Agricultural Sciences, Sweden
[3]Dept. of Economics, University of Umeå, Sweden

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UMEÅ UNIVERSITET

Department of Economics, Umeå University, S-901 87, Umeå, Sweden

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[1*] Division for Environmental Strategies Research, KTH Royal Institute of Technology, Sweden. Corresponding author.

[2]CERE, Centre for Environmental and Resource Economics, and Dept. of Forest Economics, Swedish University of Agricultural Sciences, Sweden

[3]Dept. of Economics, University of Umeå, Sweden

ABSTRACT

This paper studies distributional effects of environmental policies in Swedish coastal environments, in monetary and environmental quality terms, for different socio-economic groups. The study area is widely used for different recreational activities and has a mix of different visitors. Data comes from a choice experiment study. Some results confirm limited existing knowledge from previous research, although the ethnical dimension to a certain extent contradicts conventional perceptions. Based on previous research from other countries, the hypothesis would be that native Swedes would benefit more from environmental improvements than respondents with a non-Swedish background. Interestingly results differ, depending on the environmental amenity. For example, respondents with a non-Swedish origin benefit more, both in monetary and environmental quality terms, from reduced noise and littering compared to respondents with a Swedish origin. Also, independent of ethnical background, people use the area in a similar manner.

Keywords distributional effects in monetary and environmental quality terms, non-market valuation, marine policy, ethnicity

JEL Classification Q51, Q52, Q53

1. Introduction

Distributional effects of environmental policies are relatively rarely analyzed in the economic literature (Serret and Johnstone 2006). However, there is an increasing demand from policy makers for distributional impacts of environmental policies to be investigated. For example, the EU Water Framework Directive (EC 2000) requires economic analyses of water use to be made for each river basin, where the analysis must include both efficiency and distributional aspects. Another example is the general recommendation to the Swedish EPA to complement economic analyses of environmental policy with an analysis of the distributional impacts (in accordance with SOU 2003:2, Distributional effects of environmental policy, page 19). Many recent research papers also recommend that economic analyses, such as cost-benefit analysis (CBA:s), of environmental projects should present and discuss distributional effects. (e.g. Vinning and Weimer 2010; Serret and Johnstone 2006; Loomis 2011; Kinnell et al. 2012).

There are several arguments for studying distributional effects of an environmental policy. First, efficiency and equity are not necessarily possible to separate and both aspects should therefore be highlighted (e.g. McGuire and Aaron. 1969; Klasen 2008; Serret and Johnstone 2006). Second, information on the distributional effects can be used as a basis for designing environmental policies that make undesirable distributional effects as small as possible. Furthermore, the decision basis becomes more transparent if it not only includes efficiency concerns, but also presents which groups in society who wins or loses from the project, which can promote a more constructive debate on environmental policy impacts.

Economic theory gives no clear answer to how the various costs and benefits of a project should be divided among different socio-economic groups such as different income groups, ethnic groups, generations, or geographically separated populations. Nor is it obvious what should be distributed. Several options are available, such as welfare, income and environmental quality (Kriström 2006). The implication of this is that even if the distributional effects are studied in an economic analysis, it is still up to policy makers to determine how the results should be used.

The most common way to present the distributional effects of an environmental policy is to present who wins and who loses from the project in monetary terms. By far, the distributional impact for different income groups is the most frequently studied dimension; and also encouraged by the decision-makers (Serret and Johnstone 2006). This since it is often considered in the public debate to be important to examine whether a measure mainly benefits high or low income groups. However, regardless of income, different socio-economic groups can have different preferences for an environmental good/service. For example, people that live in rural areas with a large density of large carnivores can have very different preferences for carnivore conservation than people who live in areas with few or no carnivores (e.g. Håkansson et al. 2011).

The analysis of distributional impacts of an environmental policy in monetary terms could be complemented by introducing distributional effects in terms of environmental quality, i.e. degree of access or exposure to a specific environmental amenity. When studying an environmental "good", such as improved water quality, this would mean analyzing access and when studying environmental "bads", such as low air quality, it would mean analyzing exposure. Serret and Johnstone (2006) recommend that both monetary and physical distributional effects should be analyzed. An argument for complementing the analysis of monetary distributional effects is that the preferences for environmental quality can vary across different socio-economic groups both in physical and in monetary terms. This means that an improvement of environmental quality which may appear to be most beneficial for one group in physical terms may be most beneficial for another group in monetary terms (and vise versa), cf. Serret and Johnstone (2006). Since it is not obvious what should be distributed it becomes even more important to highlight that different analyses can give different results in terms of which groups that are the biggest winners and which groups that are the biggest losers from implementing an environmental policy.

Most studies on the distributional effects in physical terms focus on differences between income groups. It should be noted that most of the work on the distributional effects of environmental quality is concerned with existing states of the environment, rater than changes in the state resulting from the introduction of an environmental policy. Furthermore, few studies have examined the physical evidence of exposure or availability of environmental quality in combination with differences in preferences between different socio-economic groups (Serret and Johnstone 2006).

The aim of this paper is to study distributional effects of environmental policies in Swedish coastal environments, in monetary terms and in terms of environmental quality, for different socio-economic groups.

The main focus will be on distributional effects in monetary terms. This study uses the choice experiment (CE) method to analyze the effects of three different environmental quality improvements on the Swedish east coast; *water quality*, *less algae blooms* and *less noise and littering*. These improvements will be an effect of an implementation of different environmental policies. The socio-economic dimensions in focus are income, gender, age, non-users vs. users, proximity, and ethnicity.

A special focus on ethnicity is warranted since Sweden, as many other European countries, has become increasingly ethnically and culturally diverse. Of Sweden's population of about 9.4 million around 1.7 million are classified as having a foreign background, which according to Statistics Sweden implies that the person is either foreign-born, or Swedish born with two foreign-born parents. In other words, nearly 20 percent of the Swedish population has a foreign background according to this definition. This raises the importance of conducting research on non-market valuation that makes it possible to study the ethnical dimension. Despite this the literature on distributional impacts of an environmental policy depending on ethnicity is scarce. In the non-market valuation literature there exists some earlier travel costs studies from the US that highlight the issue, but as concluded by Bowker and Leeworthy (1998), these studies look at recreation participation for different ethnical groups, but economic values based on ethnicity is not analyzed in this literature. Bowker and Leeworthy (1998) on the other hand explore price response in relation to recreation demand. Their study show significant differences in demand between different ethnical groups, with white Americans having the highest demand. To our knowledge no similar studies exist in Europe.

Even though literature on distributional effects in terms of environmental quality is limited in the economic literature, there is an extensive literature on leisure involvement and some of this literature is focusing on outdoor recreation participation. (Lee and Scott, 2002; Booth et al., 2010) When studying the distributional impacts in terms of environmental quality we will investigate differences in changes in participation between respondents that live close to the area and those who do not, i.e., the impact distance have on the level of use, as well as differences that can be linked to ethnicity. The majority of research dealing with the participation of ethnic groups in outdoor recreation has focused on African-Americans and Hispanics, often compared to white Americans, where white Americans are found to have a higher participation than the other groups (Thapa, Graefe, and Absher 2002) The European literature is scarce, but a recent study from the UK show that the minority groups were starkly underrepresented when it came to visiting protected areas (Booth et al., 2010). A study by Jay et al. (2010) report evidence of significant underrepresentation by ethnic minorities in nature recreation while a review article by Gentin (2011) emphasize the fact that recreational patterns follow from cultural backgrounds. Since a population often consists of different ethnicities with different cultural backgrounds and preferences, studying differences in preferences between these groups could be of policy interest (Moshtat, 2007).

The paper is organized as follows. In Section 2, we provide a background to the study and present the valuation scenarios. In Section 3, we present the survey and the WTP question. In Section 4, we discuss the results and draw conclusions.

2. Background and methods

2.1 The study area

The study area Himmerfjärden is situated close to Stockholm on the east coast (see Figure 1). The area is widely used for recreation, such as fishing, bathing, and boating, and has a mix of visitors – permanent residents, frequent visitors such as summer house owners, and less frequent visitors.

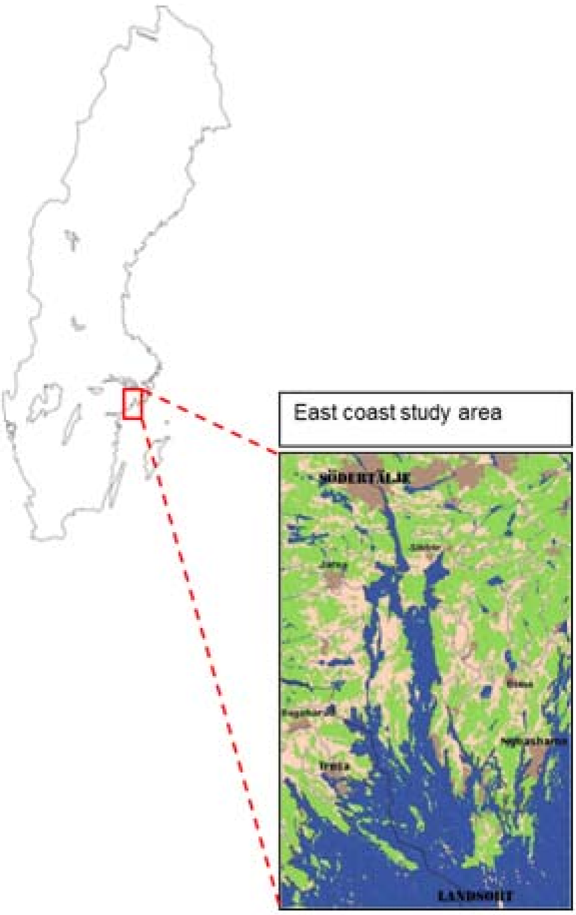

Figure 1. The location of the study area.

There are three main kinds of ecological problems in the area: eutrophication effects, littering and noise, and increasing occurrence of algae blooms. High concentrations of nutrients cause decreased water clarity, decrease of bladderwrack (*Fucus vesiculosus*) stands, and overgrowth with filamentous macroalgae. There is a well-known correlation between water clarity and bladderwrack presence, since it is dependent on light from the surface. A high nutrient concentration also leads to the growth of algae that compete with the bladderwrack. The presence of bladderwrack stands is thus an indicator of good water conditions with respect to eutrophication. The Himmerfjärden area also has problems with cyanobacterial blooms. These blooms are a natural phenomenon in the Baltic Sea, which Himmerfjärden is a part of, but the frequency and extent of occurrence increases with increasing concentrations of nutrients. The algae blooms are sometimes toxic and can be harmful to both humans and animals. These problems can restrict the opportunities for beach and water recreation in the study area.

The EU's Water Framework Directive (WFD) calls for coastal and inland water areas to be classified on a scale to describe the ecological status in terms of water quality. By 2015, the goal is that all these waters should reach "good ecological status" (European Parliament 2000). A formal requirement for good status is specified so as to allow *"only a slight departure from the biological community which would be expected in conditions of minimal anthropogenic impact"* (EC 2010). This means that the requirements for each status level may vary both between and within countries. The Swedish Environmental Protection Agency (Swedish EPA 2007) has developed norms for classifying the status based on different representative geographical areas, and we have used the indicators; water clarity, presence of bladderwrack and amount of overgrowth with filamentous algae in the description of the water quality scale provided to the survey respondents.. We also used photos representative of each water quality class (see Appendix I). Cyanobacterial blooms are not included in this status classification since they do not always co-vary with general eutrophication effects (Elmgren and Larsson 2001).

Potential actions for improvements regarding eutrophication and algae blooms are a reduction of nutrient effluents from for example sewage treatment plants around the area. Regarding noise and littering, county administrative boards in Sweden have responded by introducing Special Consideration Zones (SCZs), in which there are (not legally binding) restrictions regarding, e.g., littering, boat traffic and other sources of noise. In principle, the same types of restrictions apply in all SCZs, making this policy a "standard" one.

2.2 Scenarios

To describe the present status in different parts of the study area to the respondents in a detailed manner, we collaborated with senior ecologists who have local knowledge. We aimed for realism in terms of what could reasonably be achieved with policy as well as in determining status quo. For *water quality* status quo differs between *very low, low,* and *moderate* in different parts of the study area.[1] *Algae blooms* is treated as a separate attribute because it is not an indicator in the WFD status classification and there may be a need for different types of action to address these two issues. Discussions within focus groups also showed that respondents consider algae blooms and water quality as two separate attributes. Status quo for *algae blooms* was defined as *high risk for one large scale bloom in the study area every year*. For noise and littering, status quo was defined as *no specific policy action is taken against the problems.*

Aiming at decreasing eutrophication to improve water quality and lessen the occurrence of algae blooms, the proposed policy action was defined as improving the technology in municipal sewage treatment plants. For noise and littering, the policy action would be to introduce three SCZs in certain parts of the study area.

Implementing these policy actions should lead to changes in the attributes. For *water quality* and *algae blooms*, two potential levels of improvement were presented, and for *noise and littering*, there was only one potential level of improvement. The *water quality* scenarios were an improvement by one level (e.g. from *very low* to *low*) or by two levels (e.g. from *very low* to *moderate*), in each part of the study areas. For *algae blooms* the scenarios were a high risk of one large-scale bloom in the study area every third, or every tenth year. For *noise and littering,* the scenario was less noise and littering. The scenarios are summarized in Table 1, below.

Table 1. The valuation scenarios

	Water quality	*Algae blooms* (Himmerfjärden only)	*Noise and littering*
Status quo	Very low, low or moderate	High risk of one large-scale bloom every year	No specific actions are taken
When policy actions are taken	Improvement by one level or Improvement by two levels	High risk of one large-scale bloom every third year or High risk of one large-scale bloom every tenth year	Less noise and littering as a result of SCZ restrictions

The financing of the proposed policy actions was described as a monthly fee to be collected from the citizens of the municipalities surrounding the study area between the years 2010 to 2029. The fee would support a government fund for implementing the proposed plan of action.

2.3 Survey

A web-based panel survey was conducted during fall 2009. The questionnaire underwent extensive pre-testing, through focus groups and a pilot study. The panels, supplied by the survey company Norstat, consisted of randomly selected adults (18 years or older). The panelists agree to participate in the panel and regularly receive requests to participate in surveys on different topics.

In this paper, we present data from two sampling groups. The *Non-locals* are panelists who live in the southern parts of Stockholm County, but not close to the study area while the *Locals* are panelists who live close to the study area. The questionnaire (for a complete version see Östberg et al., 2010) consisted of five parts. The first part concerned familiarity with and usage of the area. The second part described the present status of the coastal environment and contained questions about the respondents' attitudes towards and familiarity with environmental problems in the coastal environment. In the third part we presented the scenarios**.** This was followed by the CE questions. The survey concluded with socioeconomic questions.

2.4 Method- Monetary valuation

In each choice set the respondents were asked to choose between three alternatives, where the first alternative was always the status quo, offering no environmental improvements and no extra costs. The other two alternatives offered various levels of improvements along with a cost to the household, with the amounts 0, 20, 100, 500, and 1000 SEK per month. An example of a choice set is provided in figure 1. When it comes to the design of the choice sets, the aim is to be able to estimate the different attributes and their levels independently of one another, and at the same time, to limit the number of choice sets presented to each respondent to reduce the number of choices they will have to make. To manage this we used a D-optimal procedure (OPTEX) in SAS to generate an orthogonal main effects design and a cyclical fold over; see Kuhfeld (2005). The choice sets were blocked into two groups of six sets each, meaning that each respondent were faced with six choice sets. A standard cheap talk-script was used, highlighting the importance of evaluating each choice set independent of the others, and asking the respondents to give their true preferences, despite the hypothetical situation (cf. Carlsson et al 2005; Cummings and Taylor 1999).

	Option A	*Option B*	*Option C*
Water quality	As today	As today	One class improvement
Algae blooms	As today	Every 10th summer	As today
Noise and littering	As today	As today	Less noise and littering
Cost to your household	0 SEK/month	20 SEK/month	100 SEK/month

☐ I would choose Option A

☐ I would choose Option B

☐ I would choose Option C

Figure 1. Example of a choice set

2.5 Econometric specification

A multinomial logit model (MNL) was used to estimate the respondents' WTP for different policy programs aimed at improving the coastal environment (henceforth "policy program"). The MNL model is based on a standard random utility framework in which utility is divided into observable and unobservable components (Hanemann 1984). Individual *i*'s utility from policy program *p* is defined as:

$$U_{ip}\,(X_p, D_i, Y_i - Cost_{ip}) = v_{ip}\,(X_p, D_i, Y_i - Cost_{ip}) + \varepsilon_{ip},$$

where X_p is a vector of attributes that describe policy program *p*, D_i is a vector of sociodemographic variables that are specific to individual *i*, Y is income and $Cost_{ip}$ is the cost to individual *i* of the policy program *p*. v_{ip} is the part of the utility function that is observable to the analyst but there are also unobservable influences of utility and to account for these ε_{ip} is modeled as a random term. Each individual is faced with three different policy programs, *p* = A, B, C, and can either choose one of the policy programs B or C, or the status quo option A. Individuals are assumed to make comparisons between the different alternatives and then choose the one that offers the greatest utility. Individual *i* will choose policy program B if

$$U_{iB}\,(X_B, D_i, Y_i - Cost_{iB}) \geq U_{iz}\,(X_z, D_i, Y_i - Cost_{iz}), \quad \text{for } z = A, C,$$

which is the same as:

v_{iB} (X_B, D_i, Y_i – $Cost_{iB}$) + $\varepsilon_{iB} \geq v_{iz}$ (X_z, D_i, Y_i – $Cost_{iz}$) + ε_{iz}.

If the ε_{ip} are assumed to be independently and identically drawn from an extreme value type 1 distribution, then the model can be estimated as a multinomial logit (MNL) (Hensher et al 2005).

3. Results

3.1 Descriptive statistics and distribution of environmental quality depending on distance

297 *Locals* and 506 *Non-locals* responded to the questionnaire. Summary statistics are given in Table 2 for general characteristics such as age, sex, education level, income and ethnic background. The variable ethnic is defined as that a respondent is foreign-born, and/or one or both parents are foreign-born.[2] Summary statistics for characteristics related to visiting the area are also presented in Table 2. For binary variables the number of observations is presented within parenthesis and for the other variables the confidence interval is presented within parenthesis.

The variable *visit* is the share of respondents that have visited the area during the last five years, and *visits per year* is the number of days per year, on average, a respondent stated that she/he visits the area. *Frequent visitor* is the share of respondents who visit the area more than 50 times per year while *visited young* is the share of respondents that has spent time in the area while growing up.

In order to analyze distributional effects, between those who live close to the area (*Locals*) and those who live further away (*Non-locals*), in terms of environmental quality due to different policy actions, Table 2 presents the share of respondents that have stated that they will increase their number of visits to the area if either the water quality level improves by two levels (visit when water quality improvement), the occurrence of algae blooms decrease from once every year to once every 10^{th} year (visit when less frequent algae blooms), or there will be less noise and littering (visit when less noise and littering)[3]. Table 2 also presents how many extra days per year, on average, that the respondents will visit the area if these improvements would be realized.

Table 2. Descriptive statistics

	Locals	Non-locals
Age***	48.06 (12.50)	41.15 (12.50)
Sex (female=1)**	0.57 (168)	0.67 (340)
Income (>40000 SEK)**	0.40 (117)	0.36 (183)
Ethnic**	0.15 (43)	0.35 (131)
Visit**	0.88 (260)	0.40 (200)
Visits per year***	111.97 (140.41)	10.32 (30.17)
Frequent visitor (yes/no)**	0.38 (114)	0.05 (27)
Visited young (yes/no)**	0.48 (142)	0.34 (172)
Visit when water quality improvement(yes)*,**	0.20 (58)	0.24 (122)
Extra visits when water quality improvement*,***	4.76 (13.28)	2.87 (8.98)
Visit when less frequent algae blooms (yes)*,**	0.15 (42)	0.11 (51)
Extra visits when less algae blooms*, ***	2.62 (8.63)	0.85 (3.55)
Visit when less noise and littering (yes) **,****	0.08 (23)	0.10 (48)
Extra visits when less noise and littering ***, ****	1.43 (8.47)	2.42 (9.99)

* Negative values are excluded, less than 1 percent.

** Number of observations within parenthesis

*** Confidence interval within parenthesis

**** Negative values are included, less than 2 percent.

The general statistics in Table 2 show that the mean age and the income are somewhat higher for *Locals* than for *Non-locals*. There is also a larger share of women, compared to men, in both groups. Notably, the share of respondents with a non-Swedish background is significantly higher (within a 95 percent confidence interval) for *Non-locals* (0.35) than for *Locals* (0.15). This indicates that background seems to matter when it comes to whether a respondent lives close to the area, that is the coast, or not. This result is found in other studies as well (e.g. Booth et al., 2010).

Concerning the characteristics related to visiting the area presented in Table 2, results show that there is a clear connection between distance, i.e. how far away from the area the respondents live, and how often they visit the area. *Locals* visit the area much more frequently compared to *Non-locals*. Further, the results in Table 2 show that *Locals* have a lower share (not significant) of respondents that state they will visit the area more frequently if the water quality improves with two levels, compared to *Non-locals*. The same result holds for if restrictions for less noise and littering will be implemented in the area, while the opposite holds if there will be less frequent algae blooms in the area.

Concerning the mean number of visits per year the respondents state they would visit the area if the water quality improves with two levels, *Non-locals* have a statistically significant lower number of days, within a 99 percent confidence interval, compared to *Locals*. For a hypothetical reduction in the frequency of algae blooms, *Non-locals* also reveal a significantly (within a 99 percent confidence interval) lower number of increased visits per year, compared to *Locals.* In the case of less noise and littering however, *Non-locals* present a higher number than *Locals*, although this number is not significant. It can be concluded that the results from all three policy actions do not indicate any connection between change in respondent visitation frequency, due to implementation of any of the policy actions, and geographical distance to the area. Concerning distributional impacts between Locals and Non-locals in terms of access to environmental quality the results can be summarized in one major finding:

Major finding 1

In terms of access to environmental quality, respondents that live closer to the area benefit more from all policy actions, compared to those who live further away.

This result is in line with previous studies (e.g. Huhtala and Pouta 2009; Booth et al., 2010).

3.2 Distribution of environmental quality depending on ethnic background

Table 3 presents distributional effects in terms of environmental quality between groups with different ethnic background, due to different policy actions. See Section 3.1 for definitions of the different variables. *Locals* and *Non-locals* are divided into two sub-samples; *non-Swedish background* and *Swedish background*. A respondent born outside Sweden, and/or with one or both parents born outside Sweden, is here defined as having a non-Swedish background. For binary variables the number of observations is presented within parenthesis and for the other variables the confidence interval is presented within parenthesis.

The results in Table 3 show that within both the *Locals* and *Non-locals* groups there are no significant differences (within a 90 percent confidence interval), neither in the share of respondents that have visited the area during the last five years, nor in the number of visits per year to the area, between *non- Swedish background* and *Swedish background*. We thus find no significant connection neither between the share of respondents that have visited the area during the last five years and ethnicity or between the frequency of visits to the area in general and ethnicity.

Further, the results in Table 3 show that there is no significant difference (within a 90 percent confidence interval) in the share of respondents that state that they will visit the area more frequently if the water quality improves with two levels between *non-Swedish background* and *Swedish background* within the two groups *Locals* and *Non-locals*. The same result holds for the other two policy implementations.

Concerning the number of extra visits per year to the area if the water quality is improved or if the frequency of algae blooms goes down, no significant differences between *non-Swedish background* and *Swedish background* within the two groups, *Locals* and *Non-locals,* can be found. However, in the case of less noise and littering and in the group *Non-locals*, respondents with *non-Swedish background* demonstrate a statistically significantly higher average increase in the number of visits to the area (within a 95 percent confidence interval), compared to respondents with *Swedish background*.

In general we find no evidence of a connection between changed visiting behavior and ethnicity. That is, there are no distributional impacts due to ethnic background. To a large extent this also seems to be the case when looking at the total change of visits due to the different policy actions, however, with less noise and littering being an exception.

Table 3. Distributional effects in terms of environmental quality depending on ethnic background

Group	Sub-groups	Visit (yes) **	Visits per year ***	Visit when water quality improv. (yes)*,**	Extra visits when water quality improv. *,***	Visit when less frequent algae blooms (yes)*,**	Extra visits when less algae blooms *, ***	Visit when less noise and littering (yes) **,****	Extra visits when less noise and littering ***, ****
Locals	Swedish background	0.88 (223)	113.88 (141.54)	0.21 (52)	4.65 (12.76)	0.16 (39)	2.81 (9.00)	0.08 (20)	1.37 (8.34)
Locals	Non-Swedish background	0.86 (37)	100.68 (134.54)	0.15 (6)	5.43 (16.25)	0.08 (3)	1.33 (5.62)	0.07 (3)	1.79 (9.25)
Non-locals	Swedish background	0.39 (146)	11.21 (32.57)	0.24 (91)	2.97 (9.66)	0.10 (38)	0.79 (3.06)	0.08 (30)	0.60 (5.81)
Non-locals	Non-Swedish background	0.42 (54)	7.75 (21.67)	0.31 (20)	2.57 (6.67)	0.10 (13)	1.05 (4.73)	0.14 (18)	1.83 (7.39)

* Negative values are excluded, less than 1 percent.
** Number of observations within parenthesis
*** Confidence interval within parenthesis
**** Negative values are included, less than 2 percent.

As mentioned in the introduction, the American and European literature that has analyzed the link between outdoor recreation and ethnicity shows that the minorities in the US and in the UK are less likely to participate in outdoor recreation than the white majority. This holds not only because many minority group members occupy a lower socio economic status, but also because of various cultural values (Lee and Scott 2001

For the group *Locals*, our result show that there are no differences between *Swedish background* and *Non-Swedish background* regarding participation in outdoor recreation. This does not necessarily contradict the finding in the literature that the white majority participate more in outdoor recreation compared to other minorities. In *Locals* a majority of the respondents that have been defined as having a non-Swedish background in our study, comes from northern Europe, in total 81 percent. That is, the majority of the respondents that belong to the group *Non-Swedish background* come from a similar cultural background as those who belong to the group *Swedish background* and hence can be expected to have similar cultural values.

On the other hand, for *Non-locals*, our result to some extent contradicts previous literature. It is in the group *Non-locals* where we find differences between the group *Non-Swedish background* and the group *Swedish background*, where the respondents in *Non-Swedish background* have a tendency to benefit more from *less noise and littering* compared to *Swedish background*. In *Non-locals* the share of respondents with a non-Swedish background who comes from northern Europe is much lower compared to *Locals*, 61 percent vs. 81 percent. Since the *Non-Swedish background* group is more heterogeneous, compared to *Locals*, more differences in outdoor participation between *Non-Swedish background* and *Swedish background* would be expected based on previous literature.

When analyzing the income dimension the respondents were divided into two income groups which contain, respectively, respondents who live in a household with a monthly income up to 40 000 SEK after tax, and respondents who live in a household with a monthly income greater than 40 000 SEK after tax. Within each group, *Non-Swedish background* has a somewhat lower share of respondents that are defined as high income persons compared to *Swedish background*. For *Non-Swedish background* the share is 0.37 for *Locals* and 0.32 for *Non-locals*. For *Swedish background* the share is 0.40 for *Locals* and 0.38 for *Non-locals*. Outdoor recreation literature indicates that low income respondents are less likely to participate in outdoor recreation activities than high income respondents and income is by far the most powerful explanatory socio-economic variable (Scott and Munsom 1994; Huhtala and Pouta 2009). Since the income distribution is similar in the *Swedish background* and *Non-Swedish background* groups, it could be expected that those with a non-Swedish origin as a group should benefit about the same from the improvements, in terms of access to environmental quality, compared to *Swedish background*. Based on Table 3, this seems to be the case in our study, with *noise and littering* as an exception. Based on the two income groups, it was formally tested with a simple t-test if these findings are due to differences in preferences or differences in income. The results show that our findings remain even if income is considered. The findings can be summarized as:

Major finding 2

Independent of income, respondents with a non-Swedish origin and respondents with a Swedish origin, benefit about the same from improvements in water quality and less frequent algae blooms.

Major finding 3

Independent of income, respondents with a non-Swedish origin benefit more from less noise and littering, compared to respondents with a Swedish origin.

Table 4 presents how the area is used by the subgroups *Swedish background* and *non-Swedish background* within the two groups *Locals* and *Non-locals*. The descriptive statistics in Table 4 are very similar for *Swedish background* and *non-Swedish background* within the groups. However, independent of ethnic background *Locals* use the area to a larger extent than *Non-locals*. Hence, in contradiction to previous literature (e.g. Lee et al. 2002**;** Virden and Walker 1999; Ho et al. 2005), the results indicate that ethnical background does not influence how the area is used.

Major finding 4

Independent of ethnical background, respondents use the area in a similar manner.

Table 4. Descriptive statistics for activities undertaken by the respondent when visiting the area, presented in share of respondents (number of observations within parenthesis)

	Group			
	Locals		Non-locals	
Activity	Swedish background	Non-Swedish background	Swedish background	Non-Swedish background
Sailing	12 (32)	9 (4)	6 (22)	7 (9)
Boat less than 10 hp	13 (33)	14 (6)	6 (21)	3 (4)
Boat more than 10 hp	31 (79)	30 (13)	8 (31)	6 (5)
Water mobile	0 (1)	0 (0)	1 (3)	0 (0)
Water skiing	3 (7)	0 (0)	1 (3)	1 (1)
Kayaking or rowing	16 (40)	16 (7)	5 (18)	8 (10)
Surfing	1 (3)	0 (0)	1 (3)	0 (0)
Swimming	74 (186)	67 (29)	27 (101)	28 (37)
Sun bathing	63 (158)	56 (24)	23 (87)	24 (31)
Walking	61 (154)	56 (24)	22 (81)	21 (28)
Bird watching	10 (25)	9 (4)	3 (12)	2 (3)
Diving	2 (6)	5 (2)	2 (7)	1 (1)
Barbecuing	35 (88)	26 (11)	11 (39)	14 (18)
Ice skating or skiing	84 (211)	89 (38)	2 (9)	2 (2)
Fishing	32 (81)	28 (12)	11 (41)	11 (14)
Other	14 (30)	19 (7)	12 (17)	2 (1)
Work	7 (18)	5 (2)	2 (6)	1 (1)
Visit relatives	12 (30)	14 (6)	12 (43)	8 (11)
Camping	6 (16)	7 (3)	4 (13)	4 (5)
Rent a cabin	1 (2)	0 (0)	2 (6)	4 (5)
Summer house	3 (5)	2 (1)	5 (17)	4 (5)
Residence	36 (91)	30 (12)	1 (2)	2 (3)

i The table includes all observations, i.e., both respondents that have visited the area and respondents that have not visited the area

3.3 Monetary distribution- Modeling results

We used the Nlogit statistical software to analyze the MNL models. Definitions of the variables used in the models are given in Table 5. Since the model is generic, meaning that the alternatives are unlabeled, a common alternative-specific constant (ASC) was included for the two alternatives that imply changes in the coastal environment, specified as one for the policy programs and zero for the status quo option. The ASC captures variations in preferences that are not explained by the other variables in the model. Socio-demographic variables were interacted with the alternative-specific constant to account for some of the heterogeneity present among respondents. In this way we can uncover the effects these variables might have on respondents' choice of a policy program instead of the status quo. The modeling results are presented in Table 6.

Table 5. Definition of model variables

Variable	Definition
Attributes	
Quality 1	One level of improvement in the water quality
Quality 2	Two levels of improvement in the water quality
Algae 3	Risk of a large-scale algae bloom every third summer
Algae 10	Risk of a large-scale algae bloom every tenth summer
Noise & littering	Less noise and littering
Cost	The cost of an alternative
Characteristics	
Byear	The year the respondent was born
Female	Dummy indicating if the respondent is female
Income	Respondent's household income
Ethnic	Dummy indicating if any of the respondent's parents were born abroad or the respondent was born abroad
Visited young	Dummy variable indicating if the respondent spent time in the area when he/she was growing up
Frequent visitor	Dummy indicating if the respondent visits the area more than 50 times per year
Change	Continuous variable indicating how the respondent would change his or her visits to the area measured in number of days due to less noise and littering, large algae blooms would occur every 10^{th} year, and the water quality would improve with 2 levels

Table 6. Multinomial logit estimations

Variable	Locals	Non-locals
Quality 1	1.129***	0.841***
	(0.103)	(0.075)
Quality 2	1.431***	1.167***
	(0.100)	(0.073)
Algae 3	0.907***	0.786***
	(0.099)	(0.073)
Algae 10	0.911***	0.682***
	(0.097)	(0.072)
Noise and littering	0.110	0.109**
	(0.067)	(0.050)
Cost	-0.003***	-0.003***
	(0.000)	(0.000)
ASC	1.022	24.357***
	(10.456)	(7.497)
Ethnic	-0.568***	-0.125
	(0.168)	(0.105)
Female	-0.049	0.532***
	(0.132)	(0.097)
Income	-0.008	0.065***
	(0.033)	(0.024)
Byear	-0.001	-0.013***
	(0.005)	(0.004)
Frequent visitor	0.243*	-0.610**
	(0.132)	(0.211)
Visited young	-0.492***	0.381***
	(0.133)	(0.106)
Change	0.005***	0.025***
	(0.002)	(0.005)
Log-likelihood	-1422.007	-2544.657
Pseudo-R^2	0.23315	0.21439
Number of observations	1782	3036
	(36 skipped)	(12 skipped)

Note: ***significant at 1%, **significant at 5%, * significant at 10%. Standard errors are given in parenthesis.

In the models, the coefficients for the attributes are all significant, except for *noise and littering* in the *Locals* group, and they all have the expected signs. Positive signs indicate that the respondents have positive preferences for these attributes. The highly significant cost coefficients have negative signs in all groups, showing that the higher the cost associated with a policy program, the less likely it is that a respondent will choose that option. Overall, the models are highly significant and show a good fit[4]. There is no straightforward way of interpreting the values of the coefficients except for the sign and significance. All of the included socio-demographic variables except *ethnic* are significant in the model for *Non-locals*. Women and respondents with a higher income are more likely to choose one of the policy programs and the probability also increases with age. The variable *ethnic* is significant in the model for group 1 and its negative sign indicates that respondents with a non-Swedish background are less likely to choose a policy program. It is notable that the signs for the variable *visited young* are different in the two models. Respondents from group 3 who spent time in the area when they were growing up are more likely to choose a policy program, while those from group 1 prefer the status quo situation. The same opposing results can be seen for the variable *frequent visitor* which is positive for group 1 but negative for group 3. The variable *change* is significant and positive for both groups indicating that respondents who would spend more days in the area if the environmental improvements would be implemented are also more likely to choose a policy program.

Marginal WTP estimates provide information about respondents' preferences for a marginal change in a specific attribute such as an improvement in water quality by one level. These are obtained by calculating the marginal rates of substitution between the attributes and cost; this is simply the ratio of the coefficients:

marginal WTP = $-\beta_{attribute} / \beta_{cost}$

Since the models are estimated using maximum likelihood there is uncertainty from the randomness of parameters. To provide estimates of the precision of marginal WTP measures we obtained confidence intervals using the Krinsky and Robb method with 1000 replications (Krinsky and Robb, 1986). Since the aim is to compare estimates of welfare measures among different socio-demographic groups, mean marginal WTP values were obtained by dividing the groups into smaller sub-groups for which the econometric model was re-estimated. All attributes except *noise and littering* were significant at the 1% level in all models. It is noted in the tables to follow in which of the sub-groups *noise and littering* was significant. The division into smaller groups was based on the socio-demographic variables used in the CE models except for the variable *change*. Regarding income, two sub-groups was formed; a low-income (<40 000 SEK/month/household) and a high-income group (>40 000 SEK/month/household. Age was divided into three sub-groups; 35 years old and younger, 36-60 years old and 61 and older. These choices were made to avoid getting to few observations in any one group while still maintaining a meaningful division. Mean marginal WTP values for each attribute in each group and sub-group are found in Table 7 and 8 together with a 95 % confidence interval.

Table 7. Marginal WTP for group 1 in SEK

	Whole sample (297)	Men (129)	Women (168)	Ethnic (43)	Non-ethnic (254)
Quality 1	389.01 (325.03;453.18)	429.71 (322.45;540.35)	354.17 (273.24;435.76)	592.61 (351.35;871.71)	368.03 (302.57;437.78)
Quality 2	491.23 (427.69;561.36)	550.25 (434.47;654.38)	466.98 (384.32;548.60)	737.20 (482.74;1048.96)	471.36 (400.61;538.25)
Algae 3	311.97 (250.84;379.22)	239.22 (127.41;355.98)	361.83 (274.18;457.93)	334.13 (92.50;602.82)	303.71 (234.54;373.34)
Algae 10	313.93 (253.05;378.64)	340.65 (238.15;447.18)	288.41 (210.45;367.97)	277.31 (50.86;515.49)	314.74 (252.94;379.45)
Noise and litter	38.20 (-7.54;82.69)	53.53 (-28.51;132.34)	34.76 (-20.34;89.91)	102.18 (-68.65;298.94)	30.75 (-15.07;76.82)
	Income ≥ 40000 (117)	**Income < 40000 (174) (Noise sig.)**	**Frequent visitor (114) (Noise sig.)**	**Infrequent visitor (183)**	**Visited young (142)**
Quality 1	486.63 (382.81;604.16)	326.31 (248.80;415.52)	468.48 (330.67;606.69)	349.09 (276.04;421.54)	403.30 (304.06;507.22)
Quality 2	597.74 (493.86;716.32)	426.42 (341.63;512.09)	651.13 (508.46;816.38)	421.86 (350.60;497.89)	513.73 (412.87;623.59)
Algae 3	323.50 (219.02;430.31)	307.29 (222.97;398.43)	464.95 (327.67;619.61)	231.36 (156.32;305.21)	341.49 (240.49;440.59)
Algae 10	331.41 (236.75;431.85)	304.74 (227.01;383.57)	421.29 (297.68;561.84)	259.72 (186.11;328.11)	311.92 (217.35;411.76)
Noise and litter	0.96 (-70.61;74.69)	62.37 (1.93;119.34)	119.79 (23.87;211.92)	3.97 (-49.66;54.80)	-1.94 (-70.12;62.72)
	Did not visit young (155) (Noise sig.)	**Age ≤ 35 (43)**	**Age 36-60 (199)**	**Age > 60 (55)**	
Quality 1	380.62 (290.83;473.54)	267.14 (93.97;457.25)	448.06 (360.49;537.07)	326.90 (192.81;454.65)	
Quality 2	481.80 (391.53;574.66)	515.28 (352.46;700.52)	540.19 (455.14;632.91)	382.29 (255.55;516.90)	
Algae 3	295.82 (194.30;395.95)	399.54 (215.29;593.71)	329.86 (242.45;422.34)	190.88 (52.32;331.90)	
Algae 10	318.61 (233.65;400.26)	341.36 (185.96;507.82)	333.90 (257.27;416.00)	236.82 (98.74;369.16)	
Noise and litter	70.51 (10.03;134.82)	50.13 (-72.18;173.21)	26.53 (-32.35;86.96)	52.36 (-35.99;140.87)	

Numbers of observations are noted within parenthesis. Note: 95% confidence intervals obtained by Krinsky and Robb simulations with 1000 replications are given in parenthesis beneath the mean values

Table 8. Marginal WTP for group 3 in SEK

	Whole sample (506) (Noise sig.)	**Men (166)**	**Women (340) (Noise sig.)**	**Ethnic (130)**	**Non-ethnic (376) (Noise sig.)**
Quality 1	308.33 (256.32;359.23)	308.16 (207.31;410.21)	310.71 (248.16;375.47)	325.82 (224.67;442.44)	304.13 (245.96;365.12)
Quality 2	427.61 (374.68;480.77)	430.20 (329.68;542.57)	427.03 (367.92;492.17)	447.35 (336.99;568.02)	425.14 (364.79;485.22)
Algae 3	289.48 (236.93;341.27)	206.21 (113.71;292.79)	327.96 (266.25;391.34)	329.31 (218.23;451.05)	273.96 (209.49;336.33)
Algae 10	249.64 (194.97;301.12)	187.63 (101.06;274.45)	278.63 (221.53;341.09)	270.05 (165.03;386.53)	243.68 (185.11;301.09)
Noise and litter	40.27 (2.56;76.19)	-10.46 (-80.53;56.88)	59.87 (18.23;103.10)	24.89 (-54.90;102.83)	43.93 (5.15;84.43)
	Income ≥ 40000 (183)	**Income < 40000 (321) (Noise sig.)**	**Frequent visitor (27)**	**Infrequent visitor (479) (Noise sig.)**	**Visited young (172)**
Quality 1	277.33 (189.66;360.35)	328.24 (261.46;395.10)	366.10 (-40.05;845.44)	303.70 (250.00;356.71)	329.70 (234.91;422.83)
Quality 2	383.28 (298.05;474.11)	451.85 (382.10;522.21)	624.37 (253.62;1125.71)	418.00 (366.19;472.43)	478.81 (382.92;574.68)
Algae 3	290.91 (209.15;375.12)	290.32 (223.24;356.98)	567.03 (165.71;1131.50)	281.32 (231.83;338.36)	355.55 (251.39;460.07)
Algae 10	236.71 (148.29;317.32)	260.50 (201.39;327.73)	633.25 (258.02;1148.59)	237.99 (190.79;289.44)	341.19 (251.66;430.98)
Noise and litter	-3.84 (-61.31;56.70)	65.13 (21.45;113.34)	36.75 (-238.93;329.70)	39.55 (6.51;74.64)	43.66 (-17.81;109.19)
	Did not visit young (334) (Noise sig. 10%)	**Age ≤ 35 (160) (Noise sig. 10%)**	**Age 36-60 (299) (Noise sig. 10%)**	**Age > 60 (47)**	
Quality 1	298.60 (235.95;364.19)	246.37 (151.63;343.74)	312.59 (245.04;384.13)	489.96 (297.43;690.94)	
Quality 2	400.61 (334.40;468.38)	336.50 (247.14;433.51)	449.88 (376.49;520.95)	594.77 (408.48;828.55)	
Algae 3	256.03 (191.16;324.68)	302.49 (206.53;394.19)	282.95 (213.78;355.21)	256.05 (70.35;452.41)	
Algae 10	204.69 (145.00;265.27)	237.62 (144.78;326.84)	251.22 (185.78;315.27)	259.63 (90.99;443.37)	
Noise and litter	37.04 (-2.69;80.15)	55.14 (-10.38;120.28)	43.83 (-3.98;88.46)	-33.00 (-159.40;95.26)	

Numbers of observations are noted within parenthesis. Note: 95% confidence intervals obtained by Krinsky and Robb simulations with 1000 replications are given in parenthesis beneath the mean values

The results in Tables 7 and 8 show that there are differences in estimated marginal WTP both between the attributes and between the sub-groups. Even though the confidence intervals for the estimated values overlap to some extent, it is of interest to formally test the hypothesis that the population means are equal between the sub-groups. Welch's *t* test (Welch 1947), accounting for possibly unequal variances, rejects the null hypothesis of equality in means for all sub-groups except for two cases in *Locals*. Namely, respondents who spent time in the area when they were growing up as well as respondents who did not, express similar WTP for reducing the risk of a large-scale algae bloom to every tenth summer. Regarding *noise and littering,* respondents belonging to the age groups 'up to 35 years old' and 'more than 60 years old' have the same mean marginal WTP. In *Non-locals* there are four tests that do not reject the null hypothesis of equal means; men and women for the attribute *improved water quality* by one and two classes, high and low income groups for reducing the risk of an algae bloom to every third summer, and frequent visitor and infrequent visitors for *less noise and littering*. These results suggest that there are significant differences in mean marginal WTP estimates between the groups.

Looking at the whole samples for the two groups, the marginal WTP values are a little bit higher in *Locals* for all attributes, besides *noise and littering.* The respondents seem more willing to contribute to improvements in water quality followed by reducing the risk for a large scale algae bloom while less noise and littering seem to be of less relative importance.

For *improved water quality*, marginal WTP is higher for two levels of improvement then for one level, while it seems that for *algae blooms* the respondents are somewhat indifferent between the levels of improvement and sometimes even prefer the lower level of improvement. Comparing the mean estimates for *less noise and littering*, we see a lot of variation and the confidence intervals show that there may even be negative values for this attribute. An explanation might be that some respondents feel that they have something to lose if an SCZ were to be introduced. For example, even though they may be in favor of less noise, they may dislike speed restrictions for their own motor boats. But these values must be interpreted cautiously since the attribute was not significant in the models for *Locals* and in some of the models for the sub-groups.

Major finding 5

Respondents who live closer to the area benefit more from improved water quality and less frequent algae blooms, compared to those who live further away.

This finding is in line with previous results in the valuation literature that studies people who live close to an area contra those who does not live close to an area, which shows that the former group in many cases reveal a higher WTP than the later group. (e.g. Huhtala and Pouta 2009)

A closer look at the mean marginal WTP values show that *men* in the *Locals* group have higher mean values than *women* for *improved water quality* while in the *Non-locals* group they are almost the same. *Women* in both groups have higher mean WTP for reducing the risk of algae blooms to every third summer than they have for reducing it to every tenth summer, a contradictive result that is also found for *men* in the *Non-locals* group.

Major finding 6

No general conclusion can be drawn regarding distributional impacts between men and women of improving the water quality and less frequent algae blooms.

This result is also in line with previous results in the valuation literature. Valuation studies examining gender differences with respect to preferences for environmental goods present varying results. Some studies have found that women express a higher mean WTP than men while other studies have found the reverse and yet others present mean WTP values that are not significantly different between women and men (see Farreras *et al*. 2005, for a literature review). A general pattern of gender differences in WTP for an environmental project is impossible to determine either for a specific natural resource or for natural resources as a whole.

It is interesting to note that *ethnic* express much higher marginal WTP than *non-ethnic* for *improved water quality* and *less noise and littering* in the *Locals* group. The difference is considerably smaller in the *Non-locals* group; however a Welch's *t* test confirms that the differences are significant in both cases. No specific patterns can be found for the algae attribute. The same result is found when income is controlled for by dividing the groups into high and low income and then running the model again to estimate WTP for *ethnic* and *non-ethnic*.

Major finding 7

Independent of income, respondents with a non-Swedish origin benefit more from improved water quality and less noise and littering, compared to respondents with a Swedish origin. No specific patterns can be found for less frequent algae blooms.

It is hard to compare this result with previous literature. As mentioned in the introduction, the literature on distributional impacts of an environmental policy between ethnical groups is limited and is mainly focusing on environmental bads. (Serret and Johnstone 2006) The literature on differences in WTP between different ethnical groups for an environmental quality improvement is as far as we know more or less non-existent, especially in Europe. Still, based on conducted travel costs studies in the US and on the recreation literature in general; it could be argued that we should have expected a higher WTP for the group *Swedish background* than for *Non-Swedish background*.

Regardless of group, income does not seem to matter for WTP regarding less *algae blooms*. However, respondents with high income express larger mean WTP for *improved water quality* in *Locals* while the opposite is true for *Non-locals*.

Major finding 8

The distributional effects due to differences in income vary depending on the environmental improvements.

This finding is in line with previous studies. The existing valuation literature shows that environmental policy revenues, in terms of increased monetary wealth as a result of improved environmental quality, can favor both high and low income earners (Kriström 2006). In our case, there are large variations; in some cases environmental improvements seem to primarily benefit high-income earners, in other cases low-income earners.

Further, independent of group, respondents who visit the area more than 50 times per year, have higher mean WTP values for *improved water quality* and less *algae blooms*, compared to those who visit the area more seldom. Even more, the mean values for *visited young* are slightly higher for almost all attributes than those for *did not visit young* in both groups.

Major finding 9

Respondents that visit the area more frequently, compared to those who do not, benefit more from the environmental improvements.

Major finding 10

Respondents that are familiar with the area since childhood have a higher WTP than those who are not.

That more frequent users/respondents that are familiar with the area since childhood, have a higher WTP than less frequent users/those that did not visit the area in childhood is not an unexpected result. The valuation literature that studies users contra non-users of environmental quality shows that users in many cases show a higher WTP than non-users, however, in many cases no differences can be found. The valuation literature shows that familiarity often influences the WTP positively (e.g. Hasselström and Håkansson 2012).

Finally, there is no distinctive pattern that can distinguish the preferences between the three different age groups. This result is in line with previous studies; some studies show that age matters, others that it does not (e.g. Booth et al., 2010; Håkansson et al. 2011).

Major finding 11

Age does not influence WTP.

Discussion and Conclusions

Despite the attention distributional aspects is given in practical decision-making in the environmental arena, distributional effects remains an area which is given limited attention in the nonmarket valuation literature. This paper studies distributional effects of environmental policies in Swedish coastal environments, in monetary terms and in terms of environmental quality, for different socio-economic groups. The socio-economic dimensions in focus are income, gender, age, non-users vs. users, proximity, and ethnicity. The study area is

Himmerfjärden; a wide coastal inlet situated close to Stockholm on the east coast of Sweden, an area which is widely used for different recreational activities and which has a mix of visitors – from permanent residents, and summer house owners to day-trippers.

The data comes from a choice experiment study in the form of a web-based panel survey. Results are in many ways similar to the limited existing knowledge from previous research. First, in terms of proximity and access to environmental quality, respondents that live closer to the area benefit more from all policy actions, compared to those who live further away. Also, respondents who live closer to the area and/or are familiar with the area since childhood benefit more from improved water quality and less frequent algae blooms, compared to those who live further away. Somewhat more interesting results can be found along the ethnical dimension. Here a possible hypothesis, based on the limited research made in other countries, would be that native Swedes would benefit more from environmental improvements than respondents with a non-Swedish background. Interestingly the results differ, depending on the environmental amenity studied. When controlling for income, both respondents with a non-Swedish and with a Swedish origin benefit about the same from improvements in water quality and less frequent algae blooms. However, respondents with a non-Swedish origin benefit more from less noise and littering compared to respondents with a Swedish origin. Also, it is interesting to note that independent of ethnical background, people use the area in a similar manner. On the other hand one can argue that a large share of the respondents with non-Swedish background have a Finnish background, i.e. come from a country very similar to Sweden, but a closer inspection shows that the Finns only accounts for a large share of non-Swedish background in the *Locals* group. An explanation to the lack of differences between Swedes and non-Swedes in use and valuation can be found in the type of nature environment in focus here. There simply seems to be some truth in the saying that everyone loves the sea. To go bathing, fishing or just relax by the sea is a simple pleasure that respondents with a non-Swedish background seem to enjoy as much as Swedes. Results would most likely have been different if the nature environment under study had been the Swedish mountains, situated far from Sweden's larger urban centers, or the forest, where traditional "Swedish" activities such as berry-picking or hunting play an important role. In general, different ethnic groups have very different preferences in terms of outdoor recreation, where ethnic minorities tend to prefer more developed recreation areas, while recreationists with a Nordic background often prefer wilder areas.

Along the income dimension the distributional effects vary depending on environmental improvements. For the amenity less algae blooms, income does not seem to matter for WTP. However, local respondents with high income express larger mean WTP for the amenities improved water quality, while the opposite is true for the Non-locals group. This finding is in line with previous studies, at least in the sense that previous research has shown that some environmental amenities primarily benefit high income earners while others benefit low income earners.

Overall, these results are important for policy formulation. The Swedish parliament has adopted 16 environmental objectives as overarching goals for Sweden's environmental policy. One of these goals is called "A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos", and improved water quality and low levels of noise is among the included specific sub-goals. If coastal environments are especially important for Swedes with a non-Swedish ethnical background, with associated positive health effects for these groups, the importance of this environmental objective increases. Policies within natural resource agencies often favor those groups who already are users of outdoor recreation. Unless natural resource managers change how to do ”business as usual", the needs of multiple disadvantaged groups continue to be marginalized in favor of those already in power.

Finally, it should be emphasized that more research in non-market valuation with focus on distributional dimensions needs to be conducted. Especially, it would be interesting to see more research on the ethnical dimension, both to inform policy-makers, but also to improve benefits transfer. European countries are becoming increasingly multi-cultural and non-market valuation studies need to take this into account. Overall, it is often argued that benefit transfer should not be conducted between countries that can be expected to have big cultural differences, since this can cause big differences in WTP. To a certain extent this can also be said for transfer between different ethnical groups within a country. (Morrison et al. 2006)

Footnotes

1. We used “very low”, “low”, “moderate”, “good”, and “very good” as descriptors of the water quality levels to the respondents. This corresponds to “bad”, “poor”, “moderate”, “good”, and “high”, as used in WFD policy documents.

2. This definition is somewhat broader than the definition used by Statistics Sweden (cf. introduction).

3. Some respondents might visit the area less often due to for example that they want to use a boat that will cause a lot of noise in the area.

4. According to Domencich and McFadden (1975), values of pseudo-R^2 between 0.2 and 0.4 are comparable to R^2 values of between 0.6 and 0.8 for the linear regression model.

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Appendix I

[This Appendix gives a brief overview of the scenarios in the questionnaire.]

Scenario 1: Improved water quality

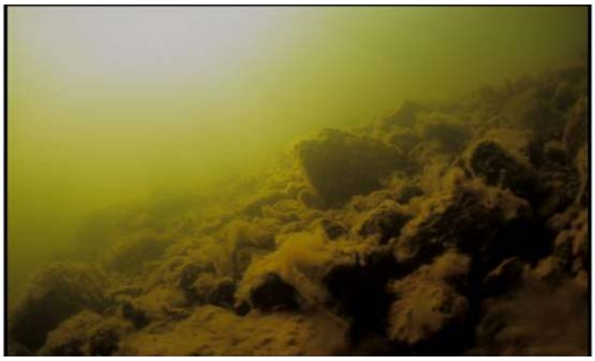
[Information to respondents]

Turbid water implies that the water clarity ("Secchi depth") is low. In turbid water, the living conditions for bladderwrack deteriorate. Large stands of bladderwrack are thus a sign of good water quality. Turbid water is caused by large effluents of the nutrients nitrogen and phosphorus.

> FACTS ABOUT SECCHI DEPTH
> The Secchi depth is measured during the summer. A white disc is lowered into the water, and the depth at which it is no longer visible is registered. The perceived Secchi depth when bathing etc. can though differ from this result.

The water quality can be divided into five levels, depending on, among other things, the Secchi depth and the amount of bladderwrack.

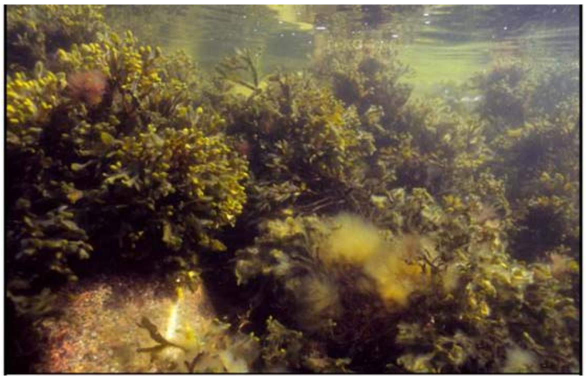
Below, you see examples of what the water looks like at different quality levels. (Figure I) In the boxes below each picture, the levels are described more thoroughly. You will need this info later on in order to proceed with the survey. The water quality levels are called *very low, low, moderate, good,* and *very good* [in Swedish - *mycket låg, låg, måttlig, god,* and *mycket god*].



1.VERY LOW
Sight depth maximum 2,5 meters. Bladder wrack does not exist at all, or to a very limited extent. The environment is very poor in species. Drifting algae mats are common.
Photo: Jerker Lokrantz

2.LOW
Sight depth 2,5 – 3,5 meters. Bladder wrack might exist on very shallow water, very sparsely, or not at all. Drifting algae mats can be common.
Photo: Anders Wallin

3.MODERATE
Sight depth 3,5-5 meters. Sparse bladder wrack stands from a depth of 0,5 to 2-3 meters. Different fine-threaded algae grow on the bladder wrack. Drifting algae mats are common.
Photo: Robert Kautsky



4.GOOD
Sight depth 5-6,5 meters. Bladder wrack forms dense populations. Some brown algae might grow on the bladder wrack. There are no algae mats.
Photo: Jerker Lokrantz

5.VERY GOOD
Sight depth more than 6,5 meters. Bladder wrack forms dense populations. No growth of fine-threaded algae on the bladder wrack. There are no drifting algae mats.
Photo: Forststyrelsen, 2005

Figure I. Different quality levels

The present water quality between Södertälje and Landsort (east coast study area). (Figure II)

On the map, the present water quality is shown in different parts of the area. “Mycket låg vattenkvalitet” = “very low water quality” (red), “Låg vattenkvalitet” = “low water quality” (orange) and “Måttlig vattenkvalitet” = “moderate water quality” (yellow).

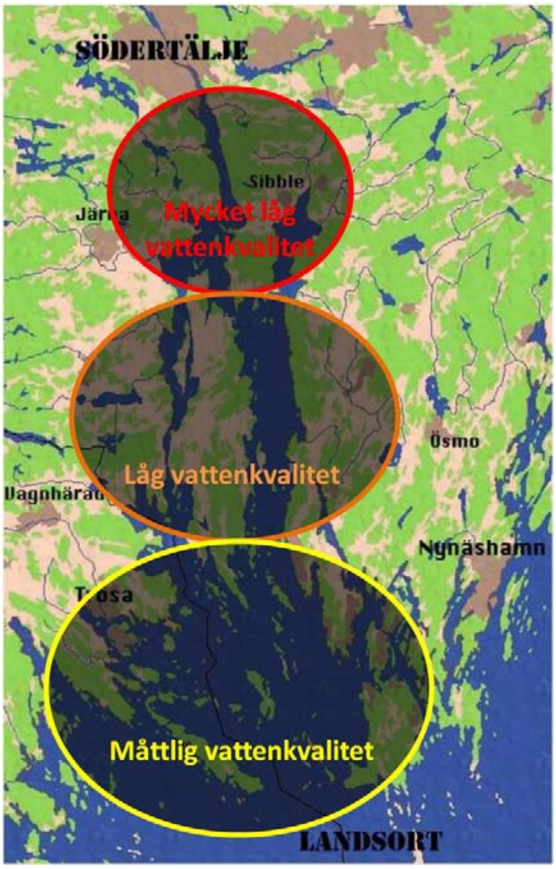


Figure II. Present water quality levels

The problems with low water clarity can decrease if emissions of nutrients decrease. The waters between Södertälje and Landsort are affected by emissions from, for example, the sewage treatment plant in Himmerfjärden, a big sewage treatment plant that takes care of sewage from approximately 250 000 people.

[Action scenario]

Assume that in 2010, with the help of, for example, new technology, it will be possible to decrease the emissions of nutrients from the sewage treatment plant in Himmerfjärden as well as from other municipal sewage treatment plants that affect the waters between Södertälje and Landsort.

Below, we present the current water quality in different parts of the area and what will happen if the actions to improve the water quality by one or two levels are undertaken. [The first column shows present water quality in different areas, being very low, low, or moderate. The second and third columns show the water quality in each respective area in a scenario where policy action improves the water quality by one (second column) or two (third column) levels.] (Figure III)

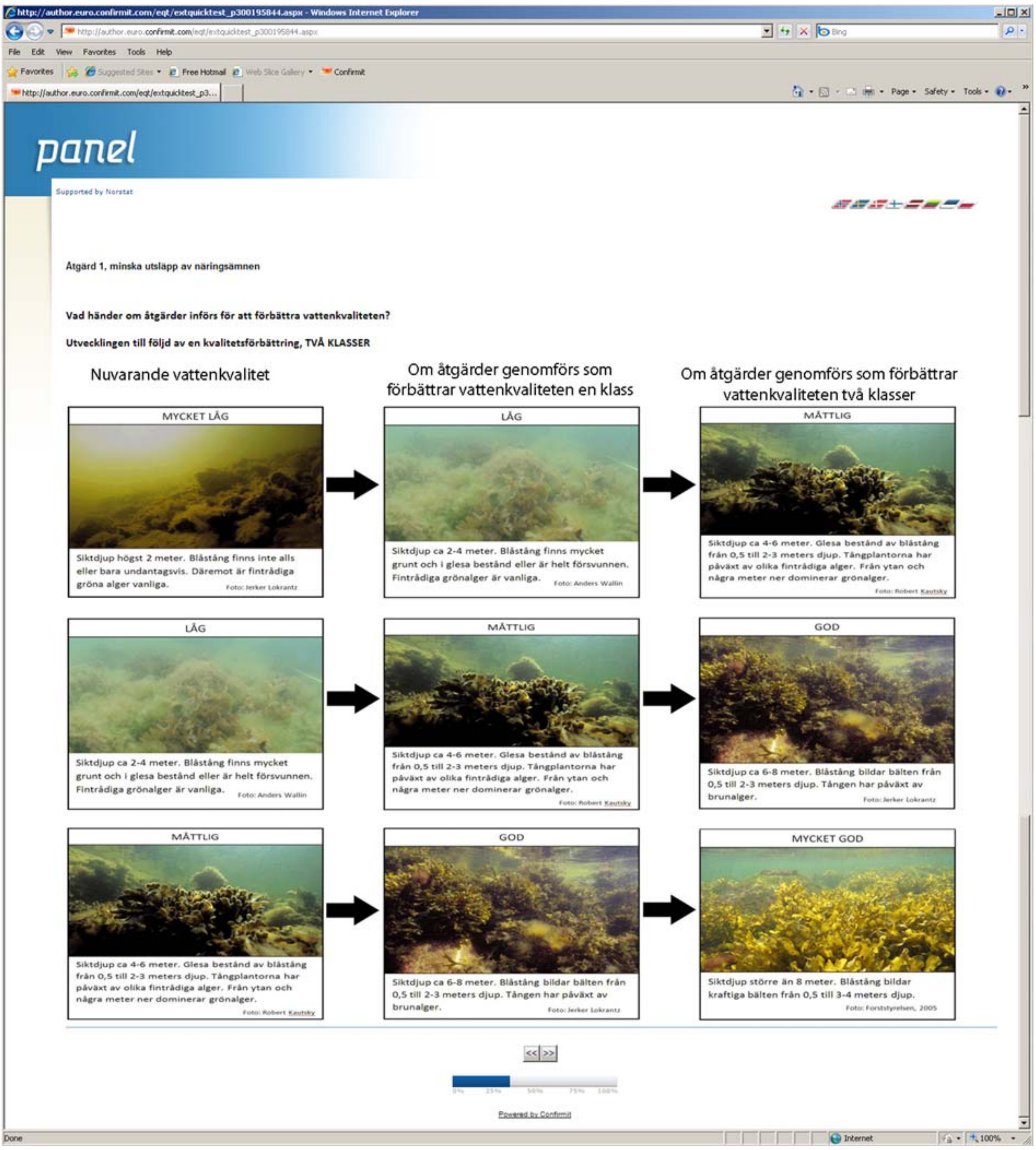


Figure III. Current water quality and after actions to improve the water quality by one and two levels

Scenario 2. Less noise and littering

[Information to respondents]

Some people experience that, for example, motor boats cause a lot of noise in the coastal environment and that people litter too much in the water and on the beaches.

The present situation between Södertälje and Landsort: The authorities have not taken any specific actions to reduce noise and littering in these water areas.

[Action scenario] Introduction of restricted areas

In a restricted area the visitors are encouraged to:

a. Keep to a low speed, maximum 5 knots.
b. Use the engine as little as possible and avoid leaving the engine running.
c. Not drive jolly boats or rubber boats with an outboard engine (if not necessary).
d. Avoid jet-skiing or and other noisy water activities.
e. Not play loud music.
f. Not cause swells for anchored boats or for people that are swimming.
g. Not litter.
h. Not discharge sewage into the water.

In connection with the restricted areas being established, collection points for recycling will be set out. Also, arrangements to take care of sewage will be made.

Assume that in 2010 it is possible to introduce three restricted areas in the waters between Södertälje and Landsort at the locations marked on the map. (Figure IV)

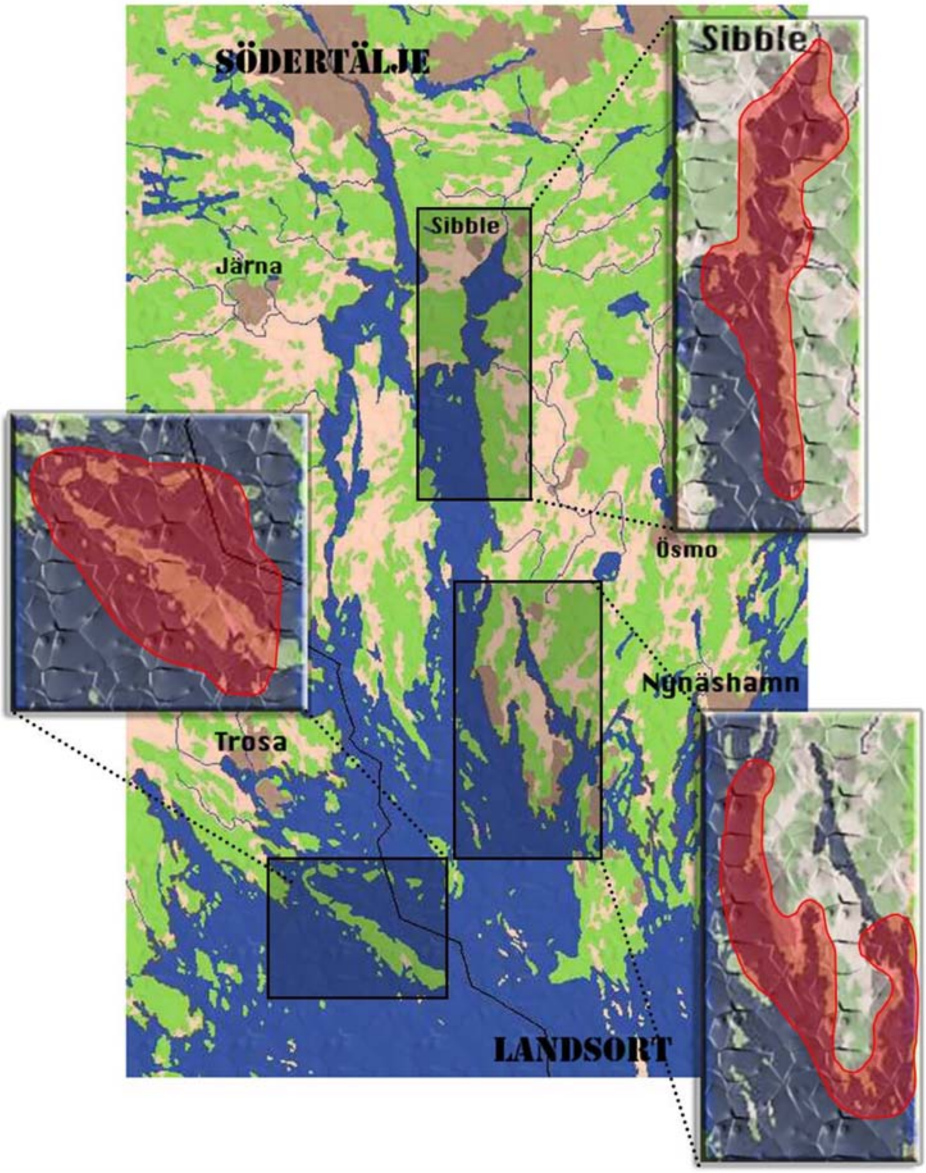


Figure IV. Restricted areas in the waters between Södertälje and Landsort

Regarding noise and littering one of the following situations can come about:

- <u>Like today:</u> The restricted areas will *not* be introduced and there will therefore *not* be less noise and littering in the area. The situation will basically be the same as today.
- <u>Less noise and littering:</u> The restricted areas will be introduced and hence there will be less noise and littering in the area. The restricted areas will be working according to plan after 1-3 years.