

This article was downloaded by: [Copenhagen University Library]

On: 10 April 2014, At: 01:43

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## International Journal of Cultural Policy

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/gcul20>

### Exploring preferences and non-use values for hidden archaeological artefacts: a case from Denmark

Thomas Lundhede <sup>a</sup>, Trine Bille <sup>b c</sup> & Berit Hasler <sup>d</sup>

<sup>a</sup> Forest & Landscape, University of Copenhagen, Rolighedvej 23, DK-1958, Frederiksberg, Denmark

<sup>b</sup> Department of Innovation and Organizational, EconomicsCopenhagen Business School, Kilevej 14A, 3rd floor, DK-2000, Frederiksberg, Denmark

<sup>c</sup> Telemarksforskning, Norway

<sup>d</sup> Department of Environmental Science, Department of Policy Analysis, Aarhus University, Frederiksborgvej 399, DK-4000, Roskilde, Denmark

Published online: 23 Jan 2012.

To cite this article: Thomas Lundhede, Trine Bille & Berit Hasler (2013) Exploring preferences and non-use values for hidden archaeological artefacts: a case from Denmark, International Journal of Cultural Policy, 19:4, 501-530, DOI: [10.1080/10286632.2011.652624](https://doi.org/10.1080/10286632.2011.652624)

To link to this article: <http://dx.doi.org/10.1080/10286632.2011.652624>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing,

systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

## Exploring preferences and non-use values for hidden archaeological artefacts: a case from Denmark

Thomas Lundhede<sup>a</sup>, Trine Bille<sup>b,c\*</sup> and Berit Hasler<sup>d</sup>

<sup>a</sup>*Forest & Landscape, University of Copenhagen, Rolighedvej 23, DK-1958, Frederiksberg, Denmark;* <sup>b</sup>*Department of Innovation and Organizational, Economics Copenhagen Business School, Kilevej 14A, 3rd floor; DK-2000, Frederiksberg, Denmark;* <sup>c</sup>*Telemarksforskning, Norway;* <sup>d</sup>*Department of Environmental Science, Department of Policy Analysis, Aarhus University, Frederiksborgvej 399, DK-4000, Roskilde, Denmark*

This paper presents a choice experiment study of a proposed wetland restoration project which aims to preserve archaeological artefacts from Stone Age villages which are presently buried within the topsoil. Wetland restoration can avoid destruction of the artefacts due to agricultural cultivation and drainage, and in addition improve biological diversity and recreational opportunities. The results indicate that even though the artefacts are not visible or usable for the population of today, but may contain information and potential value for future generations, the strongest preferences displayed is for ensuring permanent protection of archaeological artefacts, rather than biological diversity and recreational opportunities. The results are discussed in relation to the Prospect Theory: people value a loss of cultural heritage higher than a gain of new cultural goods or services. This insight is of general interest to cultural economics and cultural policy, especially with respect to heritage protection.

**Keywords:** heritage protection; archaeological artefacts; Prospect Theory; economic valuation; cultural policy; choice experiment

### 1. Introduction

Objectives in relation to restoring areas of nature are often many sided, as are the benefits. In this study, we present a valuation of a proposed nature and wetland restoration project in a river basin area, Store Aamose, situated within an open landscape in Western Zealand in Denmark. The aim of the restoration project is the preservation of cultural heritage and archaeological artefacts from Stone Age villages and sacrificial sites that are presently buried within the top soil. The artefacts are threatened by agricultural cultivation and drainage but can be preserved by wetland restoration. A wetland restoration project would also enhance biological diversity in the area, with a positive impact mainly on conditions for waterfowls, and would also improve landscape features and recreational interests.

This paper estimates the Danish population's preferences and willingness to pay (WTP) for the restoration of Store Aamose by valuing each of the above-mentioned potential benefits. All the benefits are non-marketed and thus do not have a price, why the improvements to Store Aamose have been valued by use of the valuation

---

\*Corresponding author. Email: [tb.ino@cbs.dk](mailto:tb.ino@cbs.dk)

method choice experiment (CE). The CE methodology is very well suited to explore the important issue of trade-offs between the different attributes and values of the landscape in question.

Valuing cultural heritage as well as environmental attributes within the same study makes it possible to compare and rank the preferences for these attributes. The study examines a context that has multiple dimensions (private and public, local and global, use and option value, cultural and environmental) and aims to separate out the cultural (archaeological) dimension of the valuation.

The novelty of this work lies mainly in the application of stated preference techniques to the valuation of buried archaeological goods, i.e. investigating preferences for goods that cannot be seen. As such these values are exclusively related to non-use values; for example, the value of preserving potentially important information for future generations.

The results therefore will be of high importance to cultural policy-makers in situations where they may have to decide upon the benefits of heritage protection of goods that have no use for the population of today (such as the buried archaeological artefacts in the study area), but that may contain information and value that are of potential interest for future generations.

The article is organised with a literature review in Section 2 where after we present the case study, the Store Aamose area in Denmark, in Section 3. Section 4 presents the methodology used, namely the choice modelling approach and Section 5 presents the survey design and implementation. Section 6 presents the results, and Section 7 concludes the paper.

## 2. Literature review

Stated preference valuation studies of non-marketed good have increased in scale and scope over the last 20 years. One of the pioneering studies in cultural economics was a study by Throsby and Withers (1986) valuing the populations WTP for arts and culture as a public good in Sydney, Australia. The greatest number of studies has been conducted within environmental economics, where a vast number of studies have been carried out (see, e.g. Carson 2007). Far fewer studies have been undertaken within cultural economics, and fewer still to value cultural heritage and archaeological sites. Noonan (2003) has made a meta-analytic review of contingent valuation (CV) studies performed within cultural economics. This meta-analysis contains data from 72 studies; a total of three studies deal with archaeological sites, 26 with historical sites and seven with heritage. Moreover, 10 studies value museums (e.g. Santagata and Signorello 2000) and three value theatres (e.g. Bille Hansen 1997). The remaining studies deal with valuations involving the arts, media broadcasts, libraries and sport. The majority of studies within this field, however, deal with preservation of historical buildings and monuments (such as Stonehenge, see Maddison and Mourato 2001). An edited book by Navrud and Ready (2002) contains a collection of valuation studies dealing with historical buildings, monuments and artefacts. Most of these studies show substantial use values as well as non-use values attributed to cultural assets. Values for users (visitors or residents) are invariably higher than for non-users, but a general finding is that non-visitor benefits are positive as well (Navrud and Ready 2002).

Very few studies deal with hidden archaeological artefacts as is the case in this study. One of them is the study by Whitehead and Finney (2003), which looks into

the WTP for submerged historic shipwreck. Using the CV method in relation to households in eastern North Carolina, they ask the population how much they are willing to pay to maintain shipwrecks in their pristine state. The purpose of the study is to determine whether there are potentially significant non-market values for managing historic shipwrecks as submerged maritime cultural resources rather than as salvageable market commodities. The empirical results indicate that respondents are willing to pay for protection of shipwrecks from treasure hunters and preserving the public good aspects of these cultural resources.

Similarly, there are only few other studies tackling both cultural (heritage) and natural values associated with landscapes and other resources. Lockwood *et al.* (1996) have analysed the conflict between cultural heritage and nature conservation in the Australian Alps using CV. The case study concerns cattle grazing on the Bogong High Plains in the Australian Alps, where the long-standing practice of grazing cattle, which is considered by some people to have considerable cultural value, is having an adverse effect on the native alpine and sub-alpine vegetation. Nature conservation and heritage values were measured separately using two independent surveys, and the CV-study found values for conservation of heritage that were greater than those for the competing values associated with preserving the natural environment.

Boxall *et al.* (2003) have examined the important challenge facing managers of public lands in the area of tension between use, overuse and risk of damage to the site attribute. They estimated the value of unique aboriginal cultural resources using joint revealed-stated preference methods. The empirical application involves the discovery of aboriginal rock paintings along wilderness canoe routes in eastern Manitoba, Canada. In the study, the authors exploit revealed preference information about actual trips to existing recreation sites and stated preference information about undiscovered pictographs. In the latter exercise, canoeists were asked if they would change their site choice in response to the presence of two types of rock painting: a 'pristine' painting and another spoiled by vandals. Not surprisingly, the results show that vandalised pictographs are worth considerably less.

In another study (Rolfe and Windle 2003), the protection of aboriginal cultural heritage sites in central Queensland has been valued. Choice modelling was used to estimate non-use values for protecting cultural heritage sites in the context of water resource allocation and irrigation development. The scenarios were described in terms of three environmental attributes and one cultural heritage attribute, making the respondents directly aware of the variety of trade-offs. Three population groups were sampled: an indigenous population, the general community in Rockhampton and the general community in Brisbane. Results show that there are significant differences in values between indigenous and general population groups. The general population groups had negative values for high levels of cultural heritage site protection, but did have positive values for small increases in protection above current levels. This does not mean that Aboriginal cultural heritage is not valued by the general community, but in terms of the trade-off with economic development, the general community appeared more concerned about environmental issues. However, as Rolfe and Windle (2003) remark, the subject needs further investigation, especially with regard to how values change when more information is provided about the types of amenities that might be protected, as the results do not indicate how values will change with the quality of the items being protected.

The study by Rolfe and Windle (2003) is the one that most closely resembles the present study on Store Aamose, in which CE is applied with scenarios that include trade-offs between cultural heritage and environmental attributes.

### 3. Case study: the Store Aamose area in Denmark

The Store Aamose area was originally one of the largest wet moorland areas in the eastern part of Denmark. However, the moor and marsh area has been cultivated over the past 250 years, and during the 1950s and 1960s the Aamose stream was channellised and the area heavily drained. The area is now partly protected, but the main part of the area is under agricultural production.

During the hunting and agrarian Stone Age period, the Store Aamose area was an attractive place to live, and from a cultural historic point of view the area has a certain, unique status. The area is internationally well known for its well-preserved Stone Age artefacts, buried in the top soil profile and deeper layers of the soil. The artefacts comprise the remains of villages; skeletons from humans, domestic and wild animals; fishing and hunting tools; sacrificial objects and places; as well as ornaments, and the artefacts are preserved by the soil and the groundwater, which has been at a constant, high level in the area. A large number of different artefacts have already been recovered from the area and exhibited in museums. The main body of the archaeology, however, still remains in the soil and cultivation and drainage in the area threaten its persistence. In some parts of the area, settlements of international interest have been identified very close to the cultivated layer of the soil. Artefacts are also in evidence in the deeper layers of the soil profile, however. It is assumed that if the artefacts are preserved *in situ*, there will be future possibilities for extraction and preservation of the artefacts *ex situ* in museums. Preservation can be achieved by dismantling the drainage systems, thereby raising the water level, as the decay rate of the artefacts is inversely related to soil moisture. Without *in situ* restoration, the artefacts will be damaged within a few years and the option and bequest values will be lost.

Conservation of the artefacts could be viewed as a non-renewable stock associated with some extraction cost, an opportunity cost for storage or preservation and some value to respondents. To unearth all the archaeological artefacts within the next few years is, however, not regarded as an economic feasible alternative. Furthermore, it is likely that new generations of archaeologists will have better knowledge and access to research techniques other than those at our disposal today which will result in better excavated artefacts.

The politically relevant restoration possibilities of the area include three scenarios (Danish Forest and Nature Agency 2001) which differ with regard to the degree of preservation of artefacts. Furthermore also the size of area restored, the extent of the improvement in conditions for biodiversity and the extent of public access in the area are affected. These scenarios describe the outcome of the restoration of Store Aamose and *ex-situ* protection of artefacts was not considered feasible. As a consequence, *ex-situ* protection was not included in the CE conducted.

### 4. Methodology

This paper uses a choice modelling approach to value the attributes in the utility function. The CE method was originally developed for market analysis (Louviere

*et al.* 2000) and relies on Lancaster's (1966) consumer theory and McFadden's (1974) random utility model. Individuals choose among complex goods by evaluating their attributes, and the indirect utility the individuals derive can be described as a function of these attributes.

In a CE study of environmental goods, respondents are often asked to choose between a status quo situation and sets of pre-defined alternatives comprising management options, which are normally each, associated with different implementation costs in the form of prices. This should resemble the market situation that respondents are used to in everyday life. Respondents are requested to select their preferred alternative, and under the assumption that the individuals make choices to maximise their utility, subject to resource constraints. This provides an explicit basis for assessing the price in relation to effects and, therefore, the method is excellent for valuing compounded environmental goods which contain a number of attributes eligible for valuation. In contrast to the CV method, the term 'indirect method' is used, as consumer preferences are estimated on the basis of preferred situations and not on the basis of actual expressed WTP.

Using the random utility model as the basis for analysing respondents' choices, the estimation of utility can be formally described as:

$$U_{ij} = V_{ij}(x_j, z_i) + \varepsilon_{ij}. \quad (1)$$

The term  $U_{ij}$  is the  $i$ th individual's utility of the good described by alternative  $j$ .  $V_{ij}$  is a deterministic term depending on the alternatives' attributes  $x_j$ , and the individual's characteristics,  $z_i$ . The term  $\varepsilon_{ij}$  is stochastic in the sense that its variation cannot be observed by the analyst. Neglecting  $z_i$ , the utility for a respondent facing a choice between the status quo and two management alternatives can be described as follows:

$$U_{ijk} = \begin{cases} II V(ASC, x_{ijk}, \tilde{\beta}_i) + \varepsilon_{ijk} & \text{if } k = 1 \text{ (status quo),} \\ V(x_{ijk}, \tilde{\beta}_i, \beta, \sigma_i) + \varepsilon_{ijk} & \text{if } k = 2, \\ V(x_{ijk}, \tilde{\beta}_i, \beta, \sigma_i) + \varepsilon_{ijk} & \text{if } k = 3, \end{cases} \quad (2)$$

where  $k$  denotes the choice occasion. The function  $V_{ijk}$  is indirect utility, which consists of a vector of variables that explains the individual's choice ( $x_{ijk}$ ) and vectors of individual-specific betas ( $\tilde{\beta}_i$ ), all to be estimated, and a fixed parameter ( $\beta$ ). The term  $\sigma_i$  is an additional error component (Train 2003) which is meant to capture additional variance associated with the cognitive effort of evaluating two 'hypothetical' management scenarios as suggested by Ferrini and Scarpa (2007).

Assuming that  $\varepsilon_{ijk}$  is IDD (independent and identically distributed) extreme value distributed, the probability of individual  $i$  choosing alternative  $k$  out of  $J$  alternatives can be defined by the conditional logit model:

$$\Pr(ijk) = \frac{\exp^{\tilde{\beta}x_{ijk} + \sigma_i}}{\sum_j \exp^{\tilde{\beta}x_{ijk} + \sigma_i}}. \quad (3)$$

Initial analysis showed violation of the restrictive assumption of independence of irrelevant alternatives (see Hausmann and McFadden 1984) and thus a random

parameter logit, following Train (2003), was used in order to take respondent heterogeneity into account. The probabilities can then be described as integrals of the standard conditional logit function evaluated at different  $\beta$ 's with a density function as the mixing distribution. If the density, as in this paper, is specified to be normal, the probability of the model becomes:

$$\Pr(ki) = \int \left( \frac{\exp^{\tilde{\beta}x_{ijk} + \sigma_i}}{\sum_j \exp^{\tilde{\beta}x_{ijk} + \sigma_i}} \right) \phi(\beta|b, W) d\beta, \quad (4)$$

where  $\phi(\beta|b, W)$  is the distribution function for  $\beta$ , with mean  $b$  and covariance  $W$ . The analyst chooses the appropriate distribution for each parameter in  $\beta$ . In our specification, we have a panel structure to allow for repeated choices by the same respondent. Equation (4) does not have a closed form, so the equation is simulated by averaging the probabilities computed by 500 ha draws.

WTP for the non-monetary attributes is estimated as the marginal rate of substitution between each of the attributes and the monetary attribute:

$$WTP = -\beta_a / \beta_p, \quad (5)$$

where  $\beta_a$  is the estimated parameter of attribute  $a$ , and  $\beta_p$  is the price parameter.

## 5. Survey design and implementation

### 5.1. Utility of Store Aamose

In order to measure preferences we need to define the elements of an individual's utility function. Since the restoration project has several dimensions, the individual consumer can obtain utility from the different aspects of the restoration project. The project includes several attributes which can represent different kinds of value for the individual respondents. The attributes are shown in Table 1.

First and foremost, the restoration project will secure the archaeological artefacts located in the area for the future. If nothing is done, these will be destroyed, as mentioned in Section 3. The kinds of value that individuals place on the archaeological artefacts can therefore be defined as pure existence value, bequest value and option value (cf. Garrod and Willis 1999). Existence value comprises the value of storing the artefacts in the earth, even if they are never used. Bequest value comprises the value of storing the artefacts for future generations, retaining the possibility for future extraction and research. There is no present use value associated with the archaeological artefacts connected to the restoration project, since the artefacts are buried in the soil and cannot be seen. There can be option values, however, as there may be use values associated with seeing and experiencing the artefacts related to future excavation.

The restoration will also result in improved conditions for animal and plant life in the area and improved conditions for several endangered species. Individuals can ascribe different kinds of values to the concept of biodiversity: (a) existence value, where the value relates to protecting rare species and a large number of different animals and plants being protected in the area; (b) bequest value, where protection secures biodiversity for future generations; (c) use value, where the value consists



Table 1. The attributes used in the CE. Description as given to the respondents.

Attribute	Levels
The acreage of the protected area in hectare	Six levels between 230 and 1750 ha
Biodiversity	<p><i>Low diversity:</i> A large number of animals, but distributed among a smaller number of ordinary species. Vulnerable and rare species are threatened by distinction because of dry conditions and cultivation</p> <p><i>Some diversity:</i> Many animals distributed among a larger number of ordinary species, including small birds. Vulnerable and rare plants are only threatened by distinction few places</p> <p><i>High diversity:</i> Many ordinary and rare animal species, especially bird species. Rare species are protected against dry conditions and cultivation</p>
Protection of the ancient artefacts	<p><i>Continued destruction:</i> Important artefacts, including internationally unique sacrificial and places of residence will be demolished within in a number of years</p> <p><i>Reduced destruction:</i> The speed of destruction is reduced significantly for some of the most important artefacts, but the destruction is not brought to an end</p> <p><i>Protection now and in the future:</i> The artefacts will be protected within the soil now and in the future so that they can be removed from the soil and presented in the future</p>
Public access	<p><i>Restricted access</i> by a few tracks and paths</p> <p><i>Extended access</i> to a larger part of the area by a larger system of paths and tracks</p>
Extra payment in annual tax (household level)	Six levels of 0, 10, 30, 60, 113 and 200 EUR <sup>a</sup>

<sup>a</sup>Using 1 EUR  $\approx$  7.5 DKK.

of being able to see more animals and plants while visiting the area; and (d) option value, i.e. the value associated with the possibility of seeing more animals and plants in the area, even if this option is not used at the current time.

The area of Store Aamose currently under protection is 230 ha, and the scenarios for further designation and restoration include areas in the range of approximately 600–1500 ha. The value of an extra hectare of restoration area can be ascribed to both use and non-use values, but we anticipate that the value of an extra hectare is linked to the other attributes in the sense that an extra hectare is not found valuable if none of the other attributes, such as biodiversity, artefacts or access are improved. But of course, a landscape dimension is inherent in this attribute as well, and as such there can be existence, bequest, option and present use values connected to an increase in the area protected.

Finally, restoration may also result in better recreational opportunities in the area, partly by providing the area with a higher experience value when nature and ancient artefacts are protected, but also by extending the current path and road system in the area. The value that individuals can place on increased access to the area is either use value or option value. Use value is connected to visiting the area and enjoying the recreation opportunities.

The above, however, represent values in a deterministic world. The real world is full of uncertainties and, for instance, the precise rate at which the artefacts decay

is not known or stated in the survey. Uncertainty about the decay rate might be important, especially if the perceived decay rate varies across respondents in ways that correlate with other important variables. Similarly, uncertainty about the quality or quantity of the (hidden) artefacts seems important. If the perception of (hidden) quality varies among respondents, and preservation values are positively correlated with quality, the question is if the valuation exercise is estimating a value of preserving the existing (hidden) quality or instead valuing the expected quality. To enlighten these questions, special attention was given to the focus groups' tests of the questionnaire (cf. Section 5.4) The uncertainties have to some degree been eliminated by the inclusion of alternatives where full protection of the artefacts is promised, now and in the future.

## 5.2. Choice of attributes

As mentioned above, size of area restored, extent of improvement in biodiversity, level of protection of the unique archaeological artefacts in the wet soil and degree of public access and recreational possibilities are all used as attributes in the valuation.

Quantitative attribute levels have some obvious advantages as they can be connected to dose–response functions associated with the effects of the wetland restoration and other management options in the area. Such dose–response functions could, for instance, be used to estimate, e.g. the number or the share of artefacts or waterfowl protected per hectare of wetland restored. However, it has not been possible to obtain such dose–response functions from the available data on the effects. Qualitative formulations have therefore been used. The qualitative approach has been used in many earlier studies (cf. Bergstrom and Dorfman 1994, Stenger and Willinger 1998, Boiesen *et al.* 2005, Hanley and Wright 2005, Hasler *et al.* 2005).

The wording used in the description of the status quo for biodiversity and artefacts, as well as that of the alternatives states, is taken from the actual area description made by Danish Forest and Nature Agency. Respondents' perception and understanding of the description have been tested in the focus groups (cf. Section 5.4).

The respondents were presented with the following information:

Store Aamose is well known internationally for its numerous and well-preserved artefacts from the Stone Age, including both the hunter–gatherer and the agrarian periods. The artefacts comprise settlement remains, angling tools, other tools, skeletons from humans and animals, sacrificial sites and ornaments. Some of the artefacts have already been excavated and exhibited in museums, but the largest part is still buried in the soil profiles. A considerable portion of these hidden artefacts is now close to destruction due to drainage activities as part of agricultural production. If the artefacts are to be protected for the future, the water-table has to be raised.

With regard to the biodiversity attribute, the respondents were further informed that:

Animal life in Store Aamose mostly comprises common species such as deer, pheasant, hare and wading birds as well as duck species. In parts of Store Aamose there are plants which are rare on Zealand, for example heather plants. The rare plant species are threatened by conditions which are too dry.

Even though the concept of 'biodiversity' can be hard for laypeople to relate to, it have the benefit that it does not describe only one species or a number of selected

species but describes nature quality in more general terms. Some earlier studies indicate that the WTP for one single species is much larger than that for nature quality in general (cf. Boiesen *et al.* 2005), but results from other studies are more mixed in this regard (cf. Veisten *et al.* 2004). Photographs of the typical flora and fauna in the area were shown as illustrations, but we did not name the birds, animals and flowers shown as we expected that this would induce the respondents to focus on these species and not on the biodiversity attribute and the other attributes as such.

The respondents were informed that the public today has limited access to the area by foot or bicycle using a narrow track into the area. A total of 2 km of pathways exists in the part of the area that is currently under nature protection.

As can be seen from Table 1, the extent of the area restored can increase incrementally through six levels, from 230 to 1750 ha. The respondents were informed that:

The extent of the present area under nature protection is 230 hectares. One hectare is  $100 \times 100$  metres, i.e. the approximate size of a football ground. The total area under nature protection could extend to up to 1750 hectares. For comparison, the Skjern River Basin in the western part of Denmark is about 2200 hectares.

The Skjern River Basin is mentioned as this area is regarded well known to all respondents.

Choice of payment vehicle forms a substantive part of the survey design and should have a plausible connection with the good it is being used to value (Garrod and Willis 1999). To ensure that the selected payment vehicle is perceived as realistic, fair and equitable for all respondents, we have chosen an annual income tax increase as the payment vehicle. Another option was to use an entrance fee. This, however, would have excluded the present focus on both use and non-use values and would have narrowed our analysis to use values only. According to the results of our focus group tests, an increase in annual income tax level was found to be reliable and equitable. In this connection, it should be noted that annual payments have been chosen as opposed to a one-off payment both because this confirms the assumption of a tax which is annual, and because compensation of the costs of the protection can be interpreted as annual costs for the farmers that are prevented from cultivating the soil. The obtained benefits from the nature restoration also reflect an annual, long-term benefit compared to a one-off benefit. In terms of the levels of the cost attribute, six levels were applied, ranging from 0 to 1500 DKK, corresponding to 0–200 EUR. The respondents were informed that the costs of implementing the policy alternatives are assumed to be covered by the Danish taxpayers and that all taxpayers would contribute equally to the implementation of the alternatives. Moreover, it is emphasised that the stated amount (WTP) represents a sum over and above their present income tax payment.

A so-called ‘cheap talk’ section was included as an attempt to eliminate hypothetical bias by including an explicit discussion of the problem of budgetary constraints and of the risk of overemphasising the WTP (Cummings and Taylor 1999, List 2001, Aadland and Caplan 2006).

### 5.3. *The choice sets*

Consulting the literature it is often recommended, sometimes even required, that a status quo alternative, or an ‘opt-out’ option, is included in the design, as failure to

do so may imply that respondents are forced to choose alternatives which they do not desire (cf. Bateman *et al.* 2002). A status quo alternative, describing the baseline situation that will prevail if current initiatives are maintained and if no further action is taken, is therefore included in the present study. This alternative is characterised by 'continued destruction', 'low diversity' and 'restricted access' to the 230 ha area.

It should be noted that the status quo alternative is subject to an asymmetry between the construction of the heritage and the biodiversity attributes. The heritage attribute is not a current level of quality or quantity of artefacts, but it is actually a trend and implies a change in the quality of the attribute. The other two attributes appear to be described as levels or constant qualities. This asymmetry could pose a problem in conceiving of this as the status quo, as it not only invokes the respondents' unobserved impressions of the current quality of the hidden heritage resources but also their unobserved impressions of the decay rate. This question has been discussed in the focus groups (cf. Section 5.4).

Besides, the description of the biodiversity and heritages attributes is asymmetric or non-neutral in the sense that the heritage resource's status quo is 'continued destruction' implying actual loss and eventual disappearance, yet the biodiversity resource's status quo is merely a continued level thereby implying no commensurate 'threat' as indicated in scenario wording. This asymmetry can be related to the Prospect Theory by Kahneman and Tversky (1979) and the 'endowment effect'. According to Prospect Theory, a loss of a good already in the possession of the respondent may be valued higher than an equal gain in the good, if the good is not yet in the possession of the respondent. Value is assigned to gains and losses rather than to final assets, and probabilities are replaced by decision weights. This theory has among other things been used to explain the disparity between WTP and WTA (willingness-to-accept) in many studies (see, e.g. Knetch and Sinden 1984, 1987, Hanemann 1991). In this study, the artefact attribute involves 'prevention of a loss' relative to the status quo, where respondents sacrifice other goods to prevent destruction of important artefacts. The biodiversity attribute, on the other hand, involves obtaining a gain in biodiversity over the status quo, where the status quo is represented by 'low biodiversity', and 'some diversity' or 'high diversity' can be obtained. Therefore, on the basis of Prospect Theory, it can be expected that the respondents have higher WTP for the artefacts compared to the biodiversity.

Apart from the status quo alternative, which features in all choice sets, each choice set contains two alternatives. According to Bateman *et al.* (2002), it is important to ensure that respondents are not asked to perform too complex tasks, as this may induce respondents to provide unreliable answers or resort to using simplifying decision strategies instead of the compensatory decision strategies which are assumed in CE. In the present context, it is considered appropriate to operate with a choice set size of three alternatives per set, consisting of one alternative describing the status quo and two 'hypothetical' management alternatives. The combination of the alternatives into choice sets is performed using a fractional factorial design, which comprises a part of the potential choice sets. The design is orthogonal, which means that the attribute levels vary independently and without correlation between the levels and the attributes. The design is also balanced, i.e. each attribute level and combinations of these are represented with the same frequency. The fractional factorial design contains 18 choice sets, divided into three blocks, which means that each respondent was presented with six choice sets. An example of a choice set is shown in Figure 1.

Please choose one of the following three options:

	Present situation	Alternative 1	Alternative 2
The area of the protected area in hectares	230	230	1,250
Biodiversity	Low	Low	Some
Protection of the ancient artefacts	Continued destruction	Reduced destruction	Protection now and in the future
Public access	Restricted	Extended	Restricted
Extra payment in annual tax	0 DKK	225 DKK (30 EUR)	850 DKK (113 EUR)

I prefer

(please only tick one of the boxes)

Figure 1. An example of a choice set.

#### 5.4. Data collection and tests

The final questionnaire both contained the choice questions and questions about the attitudes and habits of the respondents. The questionnaire is attached in the appendix.

Three focus groups were used to test the questionnaire before submission, especially the choice options, the wording of the questions and the background information; and these tests provided valuable information on the understanding of the attributes, the choices and the information presented. Several questions were discussed and tested in the focus groups. Firstly, the scenarios for preservation of the artefacts were discussed, and the respondents had no difficulties in understanding the trade-off between costs and restoration, and the respondents understood the arguments in the questionnaire for not having immediate extraction and exhibition in museums as an option. Secondly, the uncertainties related to the decay rate of the artefacts as well as the uncertainty about the quality and quantity of the hidden artefacts was discussed. The respondents seemed to have no problems understanding that the artefacts are close to destruction within in the next few years, if nothing is done and that the artefacts are numerous and of international interest which should be interpreted as of high quality. Therefore, the uncertainties related to the decay rate as well as the quality and quantities of the artefacts are not expected to flaw the results. Thirdly, the asymmetry between the artefacts and the biodiversity due to the question of gains vs. losses (the Prospect Theory) was discussed. This asymmetry was acknowledged by the respondents who were aware of the loss of unique archaeological artefacts (see Section 6.1). However, one of the main experiences gained was that cognitive understanding of biodiversity and nature quality is much more difficult than understanding artefacts and their preservation, even though these artefacts are hidden and most likely will never be seen by the respondents.

The survey was distributed during the period 26 May to 3 June 2005. The professional survey institute GALLUP was used, including GALLUP's Internet panel, which contains approx. 35,000 individuals. Overall, the survey was distributed to 3200 individuals, and 1636 respondents had replied after one week, the cut-off

imposed for response to the survey. This resulted in a response rate of around 51%. It is arguably a different experience to answer WTP questions through an Internet-based survey compared to a paper-based questionnaire or face-to-face interviews. However, other studies, (e.g. Olsen 2009, Lindhjem and Navrud 2011) have shown that the choice of survey mode has no significantly impact on either data quality of welfare estimates.

The sample was compared to the population of Denmark with regard to gender, age and income, and was found to be reasonably representative for the population. The survey mode also turned out to be as representative as other survey modes – elderly people, over 70, are not represented in the sample, but experience reveals that this age group is also highly underrepresented in postal surveys (Hasler *et al.* 2005). As often is the case with surveys, we also see in this study a small overrepresentation of people in the 31–45 age range and of respondents with high incomes.

## 6. Results

In this section, we present the results of the study and discuss them.

As mentioned, the price attribute ranged from no tax increase (0 EUR) to an increase of 200 EUR per year per individual. Paying for such goods out of general income taxation could create some difficulties, as the marginal amount involved seems small in relation to the total tax bill for each individual. Figure 2 shows the number of times a bid was accepted by respondents depict a declining acceptance from 0 EUR to the highest bid of 200 EUR. This indicates that the respondents react to the price in the way we would expect, and therefore there seems to be no problems with the small amounts involved in the valuation. The highest bid was accepted in 7.6% of the choice sets and thus did not completely succeed in choking the demand. On the other hand, major problems with ‘fat tails’ in the distribution of WTP are not indicated.

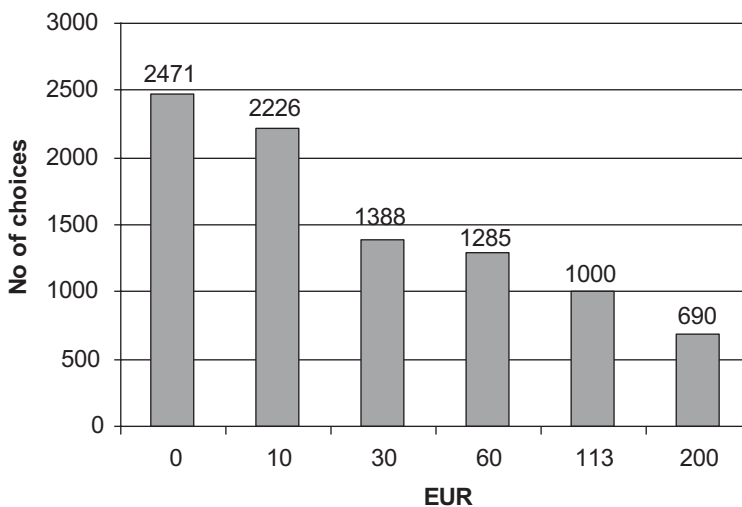


Figure 2. Number of ‘bids’ or choices of alternatives at different price levels, all other attributes held equal.

The sample is reduced by a total of 126 respondents who were regarded as serial non-respondents (von Haefen *et al.* 2005) – respondents who chose the status quo alternative in all six choice sets, and motivated this with a statement which was considered as being a protest. Another 174 respondents chose the cheapest alternative in each choice set and 1035 never chose the present situation. Both these groups are retained in the sample. The data analysed thereby consist of responses from 1510 respondents.

The WTP for protection of the artefacts, access and nature restoration is analysed using a mixed logit model, cf. Section 4. The attributes (AREA), access (ACCESS) and price (TAX) are quantitative variables, while the qualitative attributes biodiversity (BIO\_H and BIO\_M) and protection of artefacts (PRES and RED) are dummy variables. The parameters for these variables should be interpreted as the utility of the change from the present situation (described by the status quo alternative) to the protection level presented. Following recommendations from e.g. Bennet and Adamowicz (2001) we also have included an alternative specific constant (ASC), which is a dummy variable describing preferences for the status quo situation which are not described by the attributes selected in the present study. The tax parameter is kept non-random (see, e.g. Scarpa *et al.* 2008), and so is the alternative specific constant. All other variables are assumed to be normally distributed. The estimated parameters in the main effect model are apparent from Table 2.

All mean variables are estimated to be significantly different from zero, except BIO\_M. WTP estimates for significant variables are calculated using a DKK-EUR exchange rate of 7.50. The results show that the population has a significantly positive WTP when it comes to reducing the destruction of ancient artefacts

Table 2. Parameter estimates of mixed logit with error component and WTP in EUR.

Parameter	Estimate	Std. error	P-value	WTP (95% confidence interval)
TAX	-0.109	0.003	0.000	
ASC	-2.257	0.166	0.000	-275 (-315 to -234)
BIO_M	0.082	0.045	0.069	10 (-1 to 21)
BIO_H	0.572	0.045	0.000	70 (58 to 81)
ACCESS	-0.155	0.030	0.000	-19 (-26 to -12)
PRES	1.277	0.053	0.000	156 (144 to 167)
RED	0.868	0.047	0.000	106 (95 to 117)
AREA	0.015	0.004	0.000	2 (1 to 3)
SD_BIO_M	0.006	1.269	0.996	
SD_BIO_H	0.020	1.047	0.985	
SD_ACCESS	0.191	0.121	0.115	
SD_PRES	0.887	0.067	0.000	
SD_RED	0.525	0.087	0.000	
SD_AREA	0.007	0.037	0.847	
$\sigma$	2.446	0.149	0.000	
Observed choices	9060			
Respondents	1510			
Log Likelihood (LL)	-7024.120			
$\chi^2$	5858.602			
Pseudo $R^2$	0.294			

which at the moment lie in the soil profile of Store Aamose and are threatened by current use of the wet moorland. The WTP for reducing destruction is estimated at approximately 106 EUR per person in additional annual income tax, whereas the WTP for ensuring permanent protection of such ancient artefacts is estimated at approximately 156 EUR per person per year.

Furthermore, the results show that the population has a significantly positive WTP for enhancing the biodiversity level to high in Store Aamose, amounting to approximately 70 EUR per year in additional income tax per person. This WTP covers changing the current level of low biodiversity in Store Aamose.

The analysis also indicates a positive WTP for additional amounts of restored area. The WTP for extension of the area restored is estimated at approximately 2 EUR per additional 100 ha. The WTP is, also in this case, calculated as an annual WTP, per person. The result indicates that WTP increases with the size of area restored.

The estimate of the WTP for access to Store Aamose via an extended path and road system in the area is, however, significantly negative. This means that, on average, the respondents experience a non-benefit (e.g. a negative benefit) by establishing further access to the area over and above the existing path and road system. This negative benefit may stem from the fact that the respondents find that new paths and roads in the area correlate negatively with the conditions for plant and animal life as well as the protection of ancient artefacts. Besides, it may be explained by the fact that the majority of the respondents did not have any prior knowledge of Store Aamose and did not intend to visit Store Aamose in the future, even if the area was restored.

Looking at the variables with the prefix *SD\_*, indicating the derived standard deviations for the mean parameters, it can be seen that we found heterogeneity only in the case of the parameters related to preserving the artefacts. This does, however, not imply that preference heterogeneity around the mean does not exist for other parameters, only that we have not succeeded in revealing the heterogeneity (Hensher and Greene 2003). Also note that the estimated  $\sigma$  cannot refute the presence of an extra variance associated with the two management alternatives in each choice set.

Looking at the derived standard deviation for *ACCESS*, we see that it is almost significant at the 10% level. Therefore, we explore heterogeneity in *ACCESS* and in other variables using the respondent's postcode as an indicator for how close they lived to Store Aamose.

Figure 3 shows how the zones in which respondents lived are positioned around the area. Zone 1, which borders the Store Aamose area, includes 4.1% of the respondents, Zone 2 approximately 13% and Zone 3 approximately 18%. Note that the zones are not perfectly shaped rings around the area due to the use of postcodes rather than a measure of distance. Nevertheless, an idea of heterogeneity due to the respondents' address is provided. In the estimations, these zones were coded as dummy variables and interacted with different attributes. The result of this estimation can be seen in Table 3.

As anticipated, the picture is quite different when looking at the section of the population that lives close to Store Aamose. Respondents close to Store Aamose have a positive total WTP for increased access to Store Aamose of approximately 37 EUR per year per person, whereas no significant effect can be estimated in the next zone.

The interaction of zones and the attribute for cultural heritage also shows an interesting picture. For the level 'Preservation of artefacts', the first two zones have



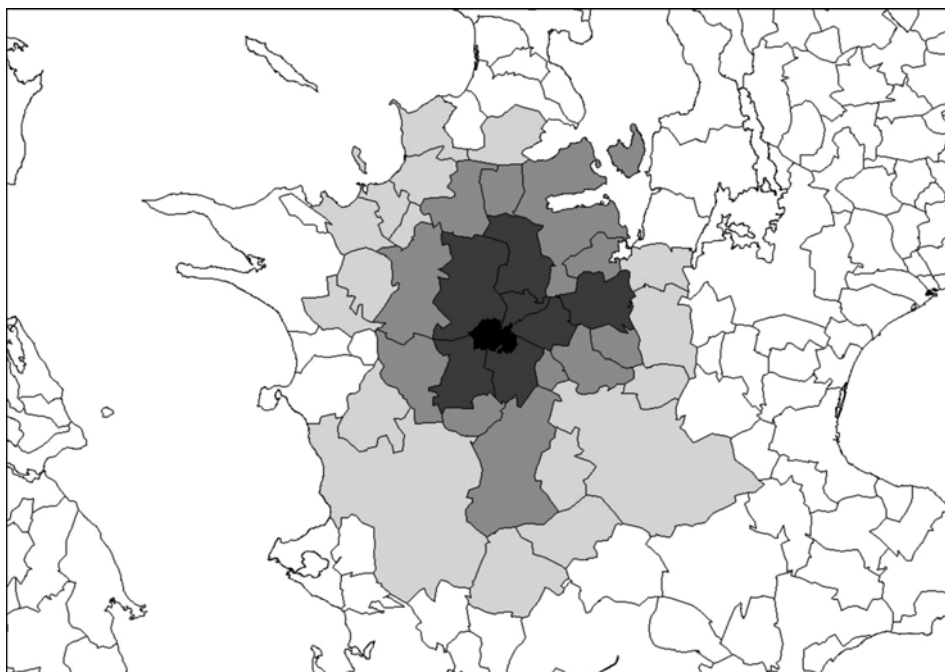


Figure 3. Map showing the area Store Aamose (black) and zones based on respondents' postcodes. The dark grey indicates Zone 1 and the lighter grey indicates Zones 2 and 3.

no significant effect, whereas Zone 3 shows a significant positive WTP for preservation. Interpretation of this finding is not straightforward, and attempts to do so will mainly be guessing. An explanation could be that respondents believe that artefacts occasionally can be found incidental by visitors and gathered for private collections (which actually happens). Respondents living far away from the area may therefore have extra interest in protection of the artefacts from such behaviour.

Besides the actual valuation task, the survey also included questions to reveal respondents' knowledge and use of Store Aamose, and perceptions and attitudes towards biodiversity and cultural heritage. Around 64% of the sample were not familiar with the special character of the area and more than 81% were neither familiar with nor had they visited the area. Respondents were asked to state the importance of cultural heritage and biodiversity in different ways, in order to reveal the significance of use value vs. existence value. The results can be seen in Figure 4 and imply that, in broad terms, the use value of biodiversity is deemed less important compared with the existence value of biodiversity as well as the use and existence values of cultural heritage in general. This is in accordance with the estimated results of the mixed logit model, presented above.

### 6.1. Discussion

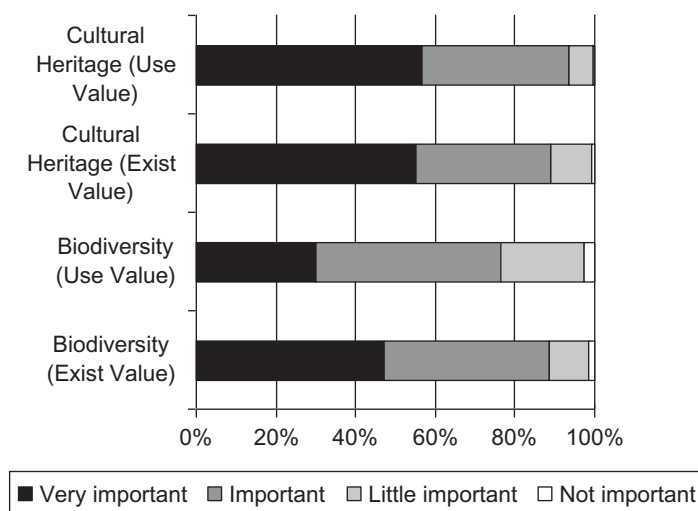
The relative priorities revealed in the estimated WTP for ancient artefacts, larger area, protection of biological diversity and access all seem plausible. The average WTP is

Table 3. Parameter estimates of mixed logit with error component including interactions with geographical zones and WTP in EUR.

Parameter	Estimate	Std. error	P-value	WTP (95% confidence interval)
TAX	-0.110	0.003	0.000	
ASC	-2.259	0.166	0.000	-275 (-315 to -234)
BIO_M	0.080	0.045	0.075	10 (-1 to 20)
BIO_H	0.570	0.045	0.000	69 (58 to 81)
ACCESS	-0.165	0.033	0.000	-20 (-28 to -12)
Z1_ACC	0.473	0.143	0.001	57 (23 to 92)
Z2_ACC	-0.074	0.087	0.393	-9 (-30 to 12)
PRES	1.219	0.061	0.000	148 (135 to 162)
Z1_PRES	-0.216	0.197	0.275	-26 (-73 to 21)
Z2_PRES	0.151	0.132	0.252	18 (-13 to 50)
Z3_PRES	0.302	0.111	0.006	37 (10 to 63)
RED	0.892	0.056	0.000	108 (96 to 121)
Z1_RED	-0.320	0.182	0.078	-39 (-82 to 4)
Z2_RED	-0.104	0.109	0.339	-13 (-39 to 13)
Z3_RED	0.009	0.102	0.932	1 (-23 to 25)
AREA	0.015	0.004	0.000	2 (1 to 3)
SD_BIO_M	0.004	0.132	0.997	
SD_BIO_H	0.023	0.081	0.983	
SD_ACCESS	0.180	0.128	0.162	
SD_PRES	0.874	0.068	0.000	
SD_RED	0.521	0.087	0.000	
SD_AREA	0.008	0.036	0.813	
$\sigma$	2.444	0.147	0.000	
Observed choices	9060			
Respondents	1510			
LL	-7015.812			
$\chi^2$	5875.271			
Pseudo $R^2$	0.295			

the largest when it comes to preserving the nationally and internationally unique, ancient artefacts in Store Aamose, whereas the estimated WTP for increased biodiversity in the area is approximately half this level. This comparatively smaller WTP seems plausible as the focus is not the protection or creation of a unique biodiversity or the maintenance of species which are not found elsewhere, but only improvement in the biodiversity in the specific local area in question. In other words, biodiversity may be seen as easier to substitute than the artefacts. Furthermore, the potential loss of artefacts represents a real lost opportunity, a loss which if realised would be impossible to restore. This might have caused a kind of reluctance to 'trade' with the attribute of artefacts which may have come through in the estimates of WTP.

This result can be related to Throsby's (2001) framework of sustainability applied to cultural capital, and particularly the inclusion of longer term decision time-frames in light of inter-generational equity concerns and the precautionary principle. Throsby (2001) has identified six principles, dimensions or criteria which define sustainability in its application to cultural capital: material and non-material well-being, inter-generational equity and dynamic efficiency, intra-generational equity, maintenance of diversity, precautionary principle and finally maintenance of cultural systems



How important is it that...

...existing material at museums is kept for future generations? *Cultural Heritage (bequest value)*

...cultural heritage in the soil is secured for future generations, and excavation is possible in the future? *Cultural Heritage (pure existence value)*

you see a varied animal and plant life? *Biodiversity (use value)*

you know there exists a varied animal and plant life - you do not necessarily need to see them? *Biodiversity (existence value)*

Figure 4. Value importance related to cultural heritage and biodiversity.

and recognition of interdependence. *The term inter-generational equity* refers to fairness in distribution of welfare, utility or resources between generations. In cultural terms, this means ensuring that future generations are not denied access to cultural resources and are not deprived of the cultural underpinnings of their economics, social and cultural life, as a result of the short-sighted or selfish actions of those alive today. Similarly, *the precautionary principle* states that decision which may lead to irreversible change should be approached with extreme caution and from a strongly risk-averse position. The destruction of an item of cultural capital, like the unique artefacts, is a case of irreversible loss if the item is unique and irreplaceable, and in such a case, the precautionary principle should be applied if the item is considered of sufficient value to warrant it. According to Throsby, neglect of cultural capital by allowing heritage to deteriorate, by failing to sustain the cultural values that provide people with a sense of identity and by not undertaking the investment needed to maintain and increase the stock of both tangible cultural and intangible cultural capital, will lead to loss of welfare. The economic valuation done in this study seems actually to confirm that the respondents are taking both the inter-generational equity criteria and the precautionary principle into account in their valuation.

The high WTP for ancient artefacts compared to biodiversity improvement may also be related to the Prospect Theory by Kahneman and Tversky (1979) and the 'endowment effect'. We cannot reject that the estimated preferences for artefacts are affected by Prospect Theory or by the fact that it was not possible to precisely describe the artefacts in terms of quantity and quality. Although the uncertainties surrounding the artefacts that potentially are hidden in the topsoil of Store Aamose it is interesting, and not without importance, to observe respondent's preferences for this cultural heritage. The conclusions drawn from these findings will, despite the uncertainties, be of high value for policy-makers, archaeologists and the like.

As far as ancient artefacts and biodiversity are concerned, it is largely existence value and bequest value which prevail, i.e. benefits to society in general and not only to the users of the area. Therefore, it makes sense that the average WTP for ancient artefacts and biodiversity are, by and large, similar in the population as a whole to those of people living in the area local to Store Aamose.

Access to the area is a different matter. Here, it is use value which is important, and more so for the population living near Store Aamose. Therefore, it makes sense that this section of the population has a positive WTP for increased access to the area, whereas the population in the rest of the county has a lower WTP, and perhaps even a negative WTP. If the extension of paths were indifferent or lacked use value, then WTP would be expected to be zero for path extensions rather than negative. However, the negative estimates may be due to the negative correlation between pathways and biodiversity/artefacts, in other words that respondents think that extensions of path can have a negative impact on existence and bequest value of the artefacts and the biodiversity.

Although the relative priorities revealed in the WTP for each of the attributes seems plausible, the general level of WTP can be considered as being rather high due to the fact that the restoration project is only one out of many. Other types of stated preference analyses have previously indicated moral satisfaction and so-called 'warm glow' (see, e.g. Kahneman and Knetsch 1992). This implies that the respondents would like to pay for achieving the good feeling of doing something worthwhile for the environment or cultural heritage. The WTP displayed is, therefore, not so much linked to the actual project/change, but is rather a positive expression of the respondents' attitudes towards more general problems. It is possible to imagine that, to a certain degree, this could be the case in this analysis. The respondents are willing to pay for preservation of ancient artefacts and for increased biodiversity. Via the questionnaire, they are presented with the opportunity of expressing their WTP for these effects in the Store Aamose project. However, at the same time they may have 'emptied their accounts', assigning all their WTP to improvements in biodiversity and preservation of ancient artefacts in general.

Another explanation for overestimating WTP is a potential lack of understanding of the scope of the project. The questionnaire only covers the population's WTP for restoration of Store Aamose and the respondents were not asked whether they would give the same amount per restoration project if there were 10 different restoration projects (e.g. the current Danish national park projects) in various places of the country. This type of bias, called embedding, has also been the subject of discussion in the literature. In any case, WTP is presumed to decline for each new restoration project that is introduced.

Various sources of response bias are always present and must be taken into consideration. In this case, we obtained answers from just over half the invited respon-

dents which leaves us uninformed about the preferences of the approximate remaining half. One could argue that respondents willing to offer time in answering a questionnaire may be interested in the subject which may suggest higher preferences for the good being valued (self-selection bias). Other sources may be respondents who are reluctant to state their true preferences and instead practise some kind of strategic behaviour. These types of biases can occur due to both the decision to purchase the good (the choice between the status quo and the alternatives), and in the trade-offs between alternatives and attributes, i.e. the marginal value vector might be biased upwards.

Moral satisfaction, self-selection bias and other forms of difference between responses to real and hypothetical valuation questions are often referred to as hypothetical bias (Murphy *et al.* 2005). There are still few published studies that test for hypothetical bias in CE, and certainly there is a need for studies to test the CE method along the lines of the testing already carried out in CV studies. We have not tested hypothetical bias in this study, but recognise that such bias can explain the relatively high level of WTP for the attribute levels here – even though former studies indicate that hypothetical bias is reduced when applying CE as compared to CV. One method to test hypothetical bias is to test real and hypothetical market behaviour within the same studies; but this test of course requires that the good in question is marketed or that an experimental market can be established. Carlsson and Martinsson (2001) as well as Cameron *et al.* (2002) have performed such experiments, and both studies fail to reject a hypothesis of equal marginal WTP in a real and a hypothetical setting using CEs.

On the other hand, Johansson-Stenman and Svedsäter (2003) reject the quality of marginal WTPs in their tests, and Lusk and Schroeder (2004) find that hypothetical total WTP for the good exceeds real WTP. Carlsson *et al.* (2005) conclude in a test of the application of cheap talk that CE may also suffer from hypothetical bias just as CV surveys do – and that a natural follow-up question for us as researchers is the true level of WTP, requiring further research on this topic. To make the context as realistic as possible, and to ensure equity, we use increases in the income tax bill as payment vehicle – and in focus group testing, we found that this instrument was reliable. Furthermore, we used a cheap talk reminder to reduce hypothetical bias, building on experience from previous research – i.e. the overall impression is that most authors find that the cheap talk script is effective. We have not tested whether this is the case, and as evidence on the cheap talk effect is not unequivocal, various applications of this tool certainly desire more research and testing. However, this type of testing has been outside the scope of the resources of this study.

The problems mentioned here are the general caveats in most valuation studies and can in general be taken care of by careful survey design and testing. In this study, we have addressed them as far as possible and tried to minimise the problems in the survey design, as explained above. However, some of the problems need more extensive qualitative testing than has been possible within this study.

A common approach to test the validity of the results is to test whether the survey responses conform to our expectations from economic (or other) theory. It is often tested whether results are sensitive to income. We estimated the interaction between price and respondent income but found no significant effect. One reason for this might be that respondent income only was measured in classes. Not being able to find significant effect of income is, however, not uncommon. In a meta-analysis Schlöpfer (2006) find that only 63% of the studies, which report income

effects, found positive effects. In another meta-analysis, Jacobsen and Hanley (2009) find that 56 of 145 data points reported internal significance of income as an explanatory factor for WTP, whilst 39 reported insignificant effects.

## 7. Conclusion

The conclusion arrived at in the present study is that the population is willing to pay a considerable amount for restoration of an area such as Store Aamose. Because of the complex nature of this project and the high presence of existence values, one can expect some hypothetical bias.

A distinct attribute of the restoration project was reduced rate of destruction or even the preservation of ancient artefacts buried in the top soil of Store Aamose. We found positive preferences and WTP for enhancing biodiversity to a high level and for expanding the area. We found even higher preferences for the reduced destruction and preservation of ancient artefacts resulting in high WTP. One reason for the higher WTP displayed for artefacts than for the other attributes can be that respondents are not able to substitute artefacts as easily as, for example, biodiversity – loss of artefacts can be more likely to be considered an irreversible loss (Throsby 2001).

The higher WTP for the artefacts compared to increased biodiversity may, however, be partly explained by the Prospect Theory (Kahneman and Tversky 1979) where a loss is estimated higher than an equal gain. This insight is of general interest to cultural economics and cultural policy since the large part of cultural policy concerning heritage protection may be affected by the Prospect Theory: people value a loss of cultural heritage higher than a gain of new cultural goods or services. This issue has not been discussed in cultural economics, and further research is needed in this area.

## References

- Aadland, D. and Caplan, A.J., 2006. Cheap talk reconsidered: new evidence from CVM. *Journal of economic behavior & organization*, 60 (4), 562–578.
- Bateman, I.J., et al., 2002. *Economic valuation with stated preference techniques. A manual*. Cheltenham: Edward Elgar.
- Bennet, J. and Adamowicz, V., 2001. Some fundamentals of environmental choice modelling. In: J. Bennet and R.K. Blamey, eds. *The choice modelling approach to environmental valuation*. Cheltenham: Edward Elgar, 37–69.
- Bergstrom, J.C. and Dorfman, J.F., 1994. Commodity information and willingness-to-pay for groundwater quality protection. *Review of agricultural economics*, 16 (3), 413–425.
- Bille Hansen, Trine, 1997. The willingness-to-pay for the royal theatre in Copenhagen as a public good. *Journal of cultural economics*, 21 (1), 1–28.
- Boiesen, J., et al. (2005). *Værdisætning af de danske lyngheder*. Working Paper. KVL, Frederiksberg.
- Boxall, P.C., Englin, J., and Adamowicz, W.L., 2003. Valuing aboriginal artefacts: a combined revealed-stated preference approach. *Journal of environmental economics and management*, 45, 213–230.
- Cameron, T., et al., 2002. Alternative nonmarket value-elicitation methods: are revealed and stated preferences the same? *Journal of environmental economics and management*, 44 (2002), 391–421.
- Carlsson, F., Frykblom, P., and Lagerkvist, C.J., 2005. Using cheap talk as attest for validity in choice experiments. *Economic letter*, 89, 147–152.

- Carlsson, F. and Martinsson, P., 2001. Do hypothetical and actual marginal willingness to pay differ in choice experiments? *Journal of environmental economics and management*, 27, 179–192.
- Carson, R.T., 2007. *The stated preference approach to environmental valuation, volume II: conceptual and empirical issues*. Aldershot: Ashgate.
- Cummings, R.G. and Taylor, L.O., 1999. Unbiased value estimates for environmental goods: a cheap talk design for the contingent valuation method. *American economic review*, 89 (3), 649–665.
- Danish Forest and Nature Agency, 2001. *Aamose – The green heart of West Sealand. Action plan for nature development and protection of cultural heritage in the eastern part of Store Aamose*. Copenhagen: Ministry of Environment, The National Forest and Nature Agency.
- Ferrini, S. and Scarpa, R., 2007. Designs with a-priori information for nonmarket valuation with choice-experiments: a Monte Carlo study. *Journal of environmental economics and management*, 53 (3), 342–363.
- Garrod, G. and Willis, K.G., 1999. *Economic valuation of the environment. Methods and case studies*. Cheltenham: Edward Elgar.
- Hanemann, W.M., 1991. WTP and willingness to accept: how much can they differ? *The American economic review*, 81 (3), 635–647.
- Hanley, N. and Wright, R.E., 2005. Estimating the economic value of improvements in river ecology using choice experiments. Paper presented at the 14th annual meeting of European Environmental Economists, Bremen.
- Hasler, B., et al. 2005. *Valuation of protection and purification of groundwater by choice experiments and contingent valuation methods*. Technical Report from NERI nr. 543.
- Hausmann, J. and McFadden, D., 1984. Specification test for the multinomial logit model. *Econometrica*, 52, 1219–1240.
- Hensher, D.A. and Greene, W.H., 2003. The mixed logit model: the state of practice. *Transportation*, 30, 133–176.
- Jacobsen, J.B. and Hanley, N., 2009. Are there income effects on global willingness to pay for biodiversity conservation? *Environmental and resource economics*, 43, 137–160.
- Johansson-Stenman, O. and Svedsäter, H., 2003. Self image and choice experiments: hypothetical and actual willingness to pay. Working Papers in Economics No. 94. Department of Economics, Gothenburg University.
- Kahneman, D. and Knetsch, J.L., 1992. Valuing public goods: the purchase of moral satisfaction. *Journal of environmental economics and management*, 22 (1), 57–70.
- Kahneman, D. and Tversky, A., 1979. Prospect theory: an analysis of decision under risk. *Econometrica*, 47 (2), 263–292.
- Knetsch, J.L. and Sinden, J.A., 1984. WTP and compensations demanded: experimental evidence of an unexpected disparity in measures of value. *The quarterly journal of economics*, 99, 507–521.
- Knetsch, J.L. and Sinden, J.A., 1987. The persistence of evaluation disparities. *The quarterly journal of economics*, 102, 691–695.
- Lancaster, K.J., 1966. A new approach to consumer theory. *The journal of political economy*, 74 (2), 132–157.
- Lindhjem, H. and Navrud, S., 2011. Are Internet surveys an alternative to face-to-face interviews in contingent valuation? *Ecological economics*, 70 (9), 1628–1637.
- List, J.A., 2001. Do explicit warnings eliminate the hypothetical bias in elicitation procedures? Evidence from field auctions for sports cards. *American economic review*, 91, 1498–1507.
- Lockwood, M, Tracey, P., and Klomp, N., 1996. Analysing conflict between cultural heritage and nature conservation in the Australian Alps: a CVM approach. *Journal of environmental planning and management*, 39 (3), 357–370.
- Louviere, J.J., Hensher, D.A., and Swait, J.D., 2000. *Stated choice methods. Analysis and application*. 1st ed. Cambridge: Cambridge University Press.
- Lusk, J.L. and Schroeder, T.C., 2004. Are choice experiments incentive compatible? A test with quality differentiated beefsteaks. *American journal of agricultural economics*, 86, 467–482.

- Maddison, D. and Mourato, S., 2001. Valuing different road options for Stonehenge. *Conservation and management of archaeological sites*, 4 (4), 203–212.
- McFadden, D., 1974. Conditional logit analysis of qualitative choice behavior. In: P. Zarembka, ed. *Frontiers in econometrics*. New York, NY: Academic Press, 105–142.
- Murphy, J.J., Stevens, T., and Weatherhead, D.A., 2005. Is cheap talk effective at eliminating hypothetical bias in a provision point mechanism? *Environmental and resource economics*, 30 (3), 327–343.
- Navrud, S. and Ready, R.C., eds., 2002. *Valuing cultural heritage. Applying environmental valuation techniques to historic buildings, monuments and artefacts*. Northampton, MA: Edward Elgar.
- Noonan, D.S., 2003. Contingent valuation and cultural resources: a meta-analytic review of the literature. *Journal of cultural economics*, 27 (3–4), 159–176.
- Olsen, S.B., 2009. Choosing between internet and mail survey modes for choice experiment surveys considering non-market goods. *Environmental and resource economics*, 44 (4), 591–610.
- Rolfe, J. and Windle, J., 2003. Valuing the protection of aboriginal cultural heritage sites. *The economic record*, 79, 85–95.
- Santagata, W. and Signorello, G., 2000. Contingent valuation of a cultural public good and policy design: the case of ‘Napoli Musei Apert’. *Journal of cultural economics*, 24 (3), 181–203.
- Scarpa, R., Thiene, M., and Marangon, F., 2008. Using flexible taste distributions to value collective reputation for environmentally friendly production methods. *Canadian journal of agricultural economics*, 56 (2), 145–162.
- Schläpfer, F., 2006. Survey protocol and income effects in the contingent valuation of public goods: a meta-analysis. *Ecological economics*, 57, 415–429.
- Stenger, A. and Willinger, M., 1998. Preservation value for groundwater quality in a large aquifer: a contingent valuation study of the Alsatian aquifer. *Journal of environmental management*, 33 (3), 177–193.
- Throsby, D., 2001. *Economics and culture*. Cambridge: Cambridge University Press.
- Throsby, D. and Withers, G.A., 1986. Strategic bias and demand for public goods: theory and an application to the arts. *Journal of public economic*, 31, 307–327.
- Train, K.E., 2003. *Discrete choice methods with simulation*. Cambridge: Cambridge University Press, 334 pp.
- Veisten, K., et al., 2004. Scope insensitivity in contingent valuation of complex environmental amenities. *Journal of environmental management*, 73, 317–331.
- Von Haefen, R.H., Massey, D.M., and Adamowicz, W.I., 2005. Serial nonparticipation in repeated discrete choice models. *American journal of agricultural economics*, 87 (4), 1061–1076.
- Whitehead, J.C. and Finney, S.S., 2003. WTP for submerged maritime cultural resources. *Journal of cultural economics*, 27 (3–4), 231–240.

**Appendix. This questionnaire is an English translation of the Danish questions used in the original Internet survey**

**Questionnaire: Attitudes to protection of nature and cultural heritage in Store Aamose**

### Instructions to complete the questionnaire

This questionnaire is about protections of nature, cultural heritage and people’s WTP for realisation of nature restoration projects.

The first part of the questionnaire is about your use of nature in your spare time. Furthermore, you will be asked about your attitude towards protection of nature and cultural heritage in general.

The second part focuses on protection of nature in an area in the county of Western Zealand which is named Store Aamose. In this part of the questionnaire, we will ask you about your attitudes towards recreational possibilities, access to the area and the protection of nature and cultural heritage in Store Aamose.



At relevant places in the questionnaire, you will be given detailed information about the present state of nature, cultural heritage and access to Store Aamosø. The questionnaire is sent to randomly chosen persons all over Denmark. It is important for the results to answer as many questions as possible and return the questionnaire.

We will ask you to answer the questionnaire personally and not let other members of your household do the answering. We are interested in your personal view. All answers are equally good no matter how much knowledge you might have about the subjects beforehand.

**Your experience of Nature**

**1. Do you ever visit a nature area in your spare time? (not urban parks and playgrounds)**

(Tick one)

Yes   
No

[Q2–5 only if answer to Q1 is Yes]

**2. When was your last visit to a nature area?**

(Tick one)

Less than a week ago   
1 to 2 weeks ago   
3 to 4 weeks ago   
1 to 2 months ago   
3 to 4 months ago   
5 to 12 months ago   
More than a year ago

**3. How important is the following types of nature for your recreational experience in the Danish nature?**

(Tick one in each line)

	<i>Very important</i>	<i>Important</i>	<i>Less important</i>	<i>Not important</i>
Forest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meadow, moor, streams, lakes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heath	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Varying nature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**4. How often do you read the information about nature and history which is often available in folders and information posts around moors, forests and other nature areas?**

(Please tick one)

Never   
Sometimes   
Often   
Always

**5. How much does the following type of information interest you?**

(Please tick one in every line)

<i>Information about:</i>	<i>Very much</i>	<i>Some</i>	<i>Little</i>	<i>Not at all</i>
Birdlife in the area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wildlife in the area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plants in the area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ancient monuments in the area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rules for using the area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A map over the area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The areas' history in general	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 6. What is important to you in animal and plant life in the Danish nature?

	(Tick one in each line)			
	<i>Very important</i>	<i>Important</i>	<i>Less important</i>	<i>Not important</i>
That I <i>know</i> there exists a varied animal and plant life – I do not necessarily need to see it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
That I have the possibility of seeing animals and plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Your experience of cultural heritage

## 7. How many times have you visited ancient monuments the following places?

	<i>Never</i>	<i>Less than once</i>	<i>1–2 times</i>	<i>3–5 times</i>	<i>More than 5 times</i>	<i>Don't know</i>
Culture-historical museum (e.g. the National Museum [Nationalmuseet] or a local museum)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Natural History museum (e.g. Zoological Museum)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Historical buildings (e.g. castles, manors, churches, water mills)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grave mounds, ruins, cromlechs, defence systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 8. How important do you think it is to preserve the following types of cultural heritage?

	(Tick one in each line)			
	<i>Very important</i>	<i>Important</i>	<i>Less important</i>	<i>Not important</i>
Cultural heritage hidden in the earth which can be excavated in the future (e.g. Stone Age village, tools, wrecks, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Existing cultural heritage at museums	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Historical buildings (e.g. castles, manor houses churches, water mills)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grave mounds, ruins, cromlechs, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Questions about protections of nature and cultural heritage

The following questions are about Store Aamose in Western Zealand. Before you answer these questions, you are invited to read the following page with information about nature, cultural heritage and recreational opportunities in Store Aamose.

*Reference to information sheet*

Store Aamose is situated as seen from the map below:



**9. Did you know about Store Aamosø prior to this questionnaire?**

- Yes
- No

(if Q9 is yes)

**10. How often do you visit Store Aamosø?**

(*Sæt ét kryds*)

- Never
- Less than once a year
- Once a year
- More times a year

**11. How important do you find that the following facilities for the public are or will be established in Store Aamosø?**

	<i>Very important</i>	<i>Important</i>	<i>Less important</i>	<i>Not important</i>
Tracks and paths all over the area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tracks and paths, but only so much that There is no disturbance of animal and plants.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parking (max. 1 km away)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bird towers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information post	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Camping possibilities (spaces for tents, bivouacking)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Choice between future plans for Store Aamosø**

The following questions regard Store Aamosø in Western Zealand. The questions are made as choices between future possible plans for Store Aamosø. Before you have to choose between the plans, we will describe how they differ in terms of area size, biological diversity, preservation of cultural heritage, access to the area and price.

### Size of area

The present protected nature area in Store Aamose is 230 hectares. One hectare equals  $100 \times 100$  metre, which is approximately the size of a football field. The total size of protected area in Store Aamose can be up to 1,750 hectares in total. For comparison, the Skjern River valley is 2,200 hectares.

### The biological diversity

Biological diversity describes the conditions and the interaction between animal and plants. The plans can vary in three ways:

- *Small diversity*: A large number of animals, but distributed among a smaller number of ordinary species. Vulnerable and rare species are threatened by distinction because of dry conditions and cultivation.



- *Some diversity*: Many animals distributed among a larger number of ordinary species, including small birds. Vulnerable and rare plants are only threatened by distinction in a few places.



- *Large diversity*: Many ordinary and rare animal species, especially bird species. Rare species are protected against dry conditions and cultivation.



### Protection of the ancient artefacts

The protection of ancient artefacts can vary in three ways:

- *Continued destruction*: Important artefacts, including internationally unique sacrificial and places of residence will be destroyed within in a number of years.
- *Reduced destruction*: The speed of devastation is significantly reduced for some of the most important artefacts, but devastation is not brought to an end.
- *Protection now and in the future*: The artefacts will be protected in the soil now and in the future so that they can be removed from the soil and presented in the future.



### Public access

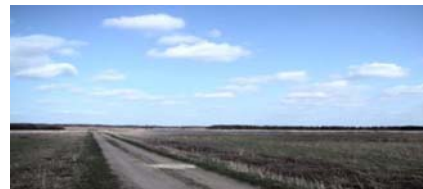
Public access can either be:

- *Restricted access* on a few tracks and paths.



or

- *Extended access* to a larger part of the area by a larger system of paths and tracks



### Price

The cost of the re-establishment will be paid by Danish citizens. Imagine that everybody on equal terms will contribute to the realisation of the proposed plan and that the annual payments are collected as an increase in the personal income tax. Furthermore, imagine that the collected amount will be ear marked to the proposed plan.

*You can choose between different alternatives with different prices.*

*Results from similar studies have shown that people have a tendency to over-estimate how much they are actually willing to pay for implementation of the various policy measures. Before you mark your selection, therefore, we kindly ask you to be totally sure that you are willing and able to pay the stated sum associated with an alternative.*

For each of the following 9 choice sets, we kindly ask you to mark your preferred proposed plan for Store Aamosé.

**Please choose 1 of the 3 alternatives.**

	Present situation	Alternative 1	Alternative 2
Size of nature area in hectares	230	1.500	1.250
Biological diversity	Small	Small	Large
Preservation of ancient artefacts	Continued	Reduced	Protection now and in the future
Public access	demolishment	demolishment	Extended
Additional <i>annual</i> income tax	Restricted	Restricted	225 DKK
	0 DKK	75 DKK	

**12. I prefer**

(Choose only one of the alternatives)

[5 more choice sets]

Follow up on choices

**18. Was it difficult to make your choices in the 6 choice sets?**

(Tick one)

Yes

No

[If Q18 is yes]

**19. Why was it difficult? Mention the most important and second most important reason.**

*Most important*  
(Tick one)

*Second most-important*  
(Tick one)

I could not relate to the information

I think there was too much information

I did not understand the questions

I think the alternatives were too pricy

It was difficult to choose because more attributes were important

Principally I do not think that citizens must pay for nature restoration

**20. How certain are you on the 9 choices you just made?**

(Tick one)

1

2

3

4

5

←—————→  
Very certain      Certain      In doubt      Uncertain      Very uncertain

**21. To which degree did the below-mentioned attributes affect your choices?**

*To a high degree*

*To some degree*

*Little*

*Not at all*

Size of area

Biological diversity

Preservation of ancient artefacts

Public access

Additional annual tax payment

[If all sq in Q12–17]

**22. What was the primary cause to choosing ‘the present situation’ in each of the previous choice questions (questions 12–17)?**

	<i>Most important (Tick one)</i>	<i>Second most important (Tick one)</i>
The alternatives were too pricy compared to what I got	<input type="checkbox"/>	<input type="checkbox"/>
I cannot afford to pay more tax	<input type="checkbox"/>	<input type="checkbox"/>
Store Aamose is too far away	<input type="checkbox"/>	<input type="checkbox"/>
I think it is important to keep the area as it is today	<input type="checkbox"/>	<input type="checkbox"/>
I will not pay more tax – I pay enough already	<input type="checkbox"/>	<input type="checkbox"/>
The questions were too difficult to answer	<input type="checkbox"/>	<input type="checkbox"/>

**23. If Store Aamose was established as you prefer, how many times would you visit the area?**

*(Please tick only one)*

Several times a year	<input type="checkbox"/>
Once a year	<input type="checkbox"/>
Once every second year	<input type="checkbox"/>
Once every fifth year	<input type="checkbox"/>
I would never visit the area	<input type="checkbox"/>

**Attitudes to nature and ancient artefacts**

**24. How would you describe your interest in nature and environmental matters?**

*(Please tick only one)*

Small	<input type="checkbox"/>
Medium	<input type="checkbox"/>
Large	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

**25. How would you describe your interest in ancient artefacts?**

*(Please tick only one)*

Small	<input type="checkbox"/>
Medium	<input type="checkbox"/>
Large	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

**26. Do you agree or disagree in the following statements?**

	<i>Agree</i>	<i>Somewhat agree</i>	<i>Neither/ nor</i>	<i>Somewhat disagree</i>	<i>Disagree</i>
Animal and plant life in the Danish nature must be numerous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There must be good possibilities for recreational life in the nature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Danish nature is threatened by human activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The authorities should invest more money in nature re-establishment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ancient artefacts should be secured for future generations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The authorities should invest more money in preserving essential artefacts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Background questions

**27. In which kind of area do you live at present and lived when you grew up?**

	<i>Present (tick one)</i>	<i>Childhood (tick one)</i>
The capital area	<input type="checkbox"/>	<input type="checkbox"/>
Large city (more than 100,000 citizens)	<input type="checkbox"/>	<input type="checkbox"/>
Medium city (10.000–99.999 citizens)	<input type="checkbox"/>	<input type="checkbox"/>
Small city (1.000–9.999 citizens)	<input type="checkbox"/>	<input type="checkbox"/>
Small town (500–999 citizens)	<input type="checkbox"/>	<input type="checkbox"/>
Village (200–499 citizens)	<input type="checkbox"/>	<input type="checkbox"/>
Rural area	<input type="checkbox"/>	<input type="checkbox"/>

**28. Are you a member of any of the following organisations? (Please tick as many as appropriate)**

An organisation that protects environment?	<input type="checkbox"/>
Local historical organisation?	<input type="checkbox"/>
Museal organisation	<input type="checkbox"/>
Natural historical organisation (zoology, botany or geology)?	<input type="checkbox"/>
Preservation organisation?	<input type="checkbox"/>
None of the above	<input type="checkbox"/>