Considering the role of the minimum viable population (MVP) and the existence of close substitutes in scope tests

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Abstract

Validation of contingent valuation (CV) exercises for environmental goods has traditionally been done with scope tests, although wild species valuations have been controversial and often did not pass such scope tests. The current study complements previous efforts made to explain scope test failures, by explicitly examining the role of the minimum viable population (MVP), and the uniqueness of the environmental good being valued. In this study we value a recovery program for the common murre in Northern Spain. It shows that when no information is provided about the existence of close substitutes of the species being valued, the WTP estimates are not sensitive to the size of the good being recovered. However, when information is provided about the existence of other close substitutes of the same species, the mean WTP value drops significantly for the program aiming to recover a larger amount of pairs. These results, showing a failure of the scope test, are discussed and contrasted with previous studies.

Keywords: contingent valuation, endangered species, MVP, scope test.

Introduction

Bioeconomic approaches have studied the economic benefit of a species depending on the stock size and considering the minimum viable population (MVP) (Kontoleon and Swanson, 2002; Bulte and van Kooten, 1999). Willingness to pay (WTP) estimates for an endangered species are expected to be affected by a broad range of characteristics, including the uniqueness of the species being valued and the danger of irreversible extinction. In this sense, contingent valuation (CV) studies usually consider both, the stock of the species and the recovery objectives, but less attention has been given to the uniqueness of the species being valued (to the existence of other potential substitutes) and the role of the MVP needed for the endangered species to survive.

In order to validate the results obtained via CV, the NOAA Panel (Arrow *et al.*, 1993) recommended that a CV study should pass a scope test, assuming a rational valuation behavior as in a real market. As in any other goods, WTP for endangered species is expected to increase with the quantity of the environmental good being protected. However, several studies dealing with the valuation of threatened species have failed the scope test, showing that smaller populations of the same species had more value than bigger ones (Desvousges *et al.*, 1993; Fredman, 1995; Heberlein *et al.*, 2005)**.** This result does not fit with the micro-economics principle of non satiation, or even the marginal decreasing utility theory, postulated by Rollins and Lyke (1998), as an attempt to explain previous scope test failures. Nevertheless, other wildlife studies have passed the scope test, concluding that the size of the good affects the WTP estimates (Giraud, Loomis and Johnson, 1999; Mullarkey and Bishop, 1999; Jakobsson and Dragun, 2001; Veinsten *et al.,* 2004). However, all these studies have measured the value of different

species, comparing a species being valued with all other endangered species or other environmental goods. Other positive results were also obtained by Loomis and White (1996) in a meta-analysis with 18 contingent valuation studies for endangered species in the U.S., concluding that the size of the population being recovered affects positively the WTP estimate. Smith and Osborne's (1996) in another meta-analysis on visibility improvements for Natural Parks in the U.S. also found a positive relationship between the WTP estimates and the percentage improvement in visible range.

As it is well-known, endangered species are complex environmental goods, containing ecological characteristics which affect the economic ones. We presume that when recovering the stock of a species which is under the MVP, WTP increases as the number of individuals in the stock reaches this MVP. Above this level, WTP for an increase on population may decrease, indicating a negative marginal WTP. Rollins and Lyke's (1998) study on natural parks in Canada finds a positive marginal decreasing utility in the number of additional parks being created, although their study only takes into account the minimum number of parks that would cover all Canadian ecosystems, and not any number above this minimum conservation standard.

Up to now, studies which found negative marginal utility have viewed it as an exceptional result or even a failure of the valuation method, and not many authors have attempted to explain the reasons for this negative marginal WTP result. Fredman (1995) in his study of the white-backed woodpecker found a negative marginal WTP as a function of the bird population density for those who stated existence values as the main motivation for paying for the recovery program. He explained this result by indicating that "people primary holding an existence value may be more inclined to distribute their

total WTP amount among additional species or public amenities, when the proposed population density is large and the species is not considered as threatened any longer" (Fredman, 1995). If the priority of the respondent is the use value, he affirmed, "then a positive marginal increasing WTP should result." This occurred in the case of a moose hunting study (Mattson, 1990). Mattson found that WTP for moose population increased with the stock, due to the use values attributes of the good. The results obtained by Heberlein *et al.* (2005) showed also scope test failure for a wolf recovery program (a species with high non-use value), where WTP to reach a population of 300 wolves was higher than WTP to recover 800 wolves. In this case, existence value is the main value of the good, although wolves are a species which often cause conflicts with the local population, and these may condition the final WTP. Desvousges *et al.* (1993) valued a program for avoiding the annual death of 2,000, 20,000 and 200,000 birds. This study also failed to pass the scope test, and the authors attributed this result to the embedding effect bias. However, this study has received several consistency criticisms (Diamond and Hausman, 1994), although the authors were not able to explain satisfactory the failure of this CV exercise, Boyle et al. (1994).

This present study contributes to this literature by looking at the effect of other substitutes of the good being valued as one potential explanation that may help us to understand some of the previous results. Smith and Osborne's (1996) suggested to look at the potential effect of the perceived substitutes for the resource being valued in the context of scope tests. As far as we know, no other known study followed this recommendation. We hypothesize that when endangered resources have close substitutes (that is, there is a similar species not threaded by extinction even if it is

located in other geographical area), individuals may not be willing to pay higher amounts for stocks of the good above the MVP.

In the present case study we deal with the common murre restoration program in Spain. This marine bird is endangered and well under its MVP, while its recovery does not create much of a conflict with other activities or species. In particular, in our valuation scenario, using a split-sample methodology, one half of the sample received information about a recovery program aiming to reach the MVP for the common murre in Galicia (set at 20 pairs), while the other half was presented with a recovery program for 60 pairs, remaining the MVP on 20 pairs. This second higher stock level was chosen to test for the scope effect, and it is nearly the population required to assure common murres in Galicia for a period of 50 years (Rodríguez and Furelos, 2004). Furthermore, we tested the sensitivity of these WTP estimates when in a second treatment individuals were informed about the existence of other colonies in Northern Europe which are not in danger of extinction. We found that when no information was provided about the existence of these substitute resources, WTP estimates were practically identical (about €16 per household) for the program recovering the common murre up to the MVP or 60 pairs. However, when this information was provided, the WTP estimate was reduced, passing from €17 per household for the program aiming to recover 20 pairs to €11 per household for the program recovering 60 pairs. In the following sections, we describe the sample, the questionnaire used, and the results in greater detail. The paper concludes with a discussion highlighting the main findings.

Study Design

Our study is centered on the common murre (*Uria aalge*) population in Galicia. This marine bird is currently under danger of extinction (Martí and Del Moral, 2003) with only from 3 to 5 pairs that rest in wild. This species has been decreasing in population from the last decades, because of habitat loss, scarce resources for its diet and intensive fishing activity (Rodriguez and Furelos, 2004). Breeding colonies have decreased in number from seven to only two small colonies in last 30 years (see picture 2). These local colonies in Galicia are unique in Spain and have been recently affected by the Prestige oil spill, in November 2002.

Common murre information

Respondents were given a short description of the species' status in Galicia: they were told about its distribution, its population regression and its endangered status. Graphic materials were used while surveying and included a common murre neutral picture and a map with past and current stock distributions in Galicia (see Picture 1 and Picture 2). This information was common to all questionnaires. In contrast to this very small local population, common murre colonies throughout Northern Europe are not threatened by extinction. Winter migrations bring these Northern European populations to Southern Europe, where they coexist with the local Spanish common murre.

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Valuation Scenario

The scenario described in the survey consisted in a recovery program for the considered species. The recovery program was designed following a proposal made by Rodriguez and Furelos (2004) for the common murre in Galicia and was completed with other information provided by similar restoration programs applied in California (U.S. Fish

and Wildlife Service, 1995). In this way, we aimed to create a very realistic recovery action. The survey indicated that the main goal of the recovery program was to increase the number of adult pairs of common murres living in Galicia from the current critical levels (3-5) to 20 and 60 pairs in a 10 year period, depending on the version. This recovery objective would be reached via four basic restoration actions: 1) creating protected areas, 2) restricting commercial fishing in the designated protected areas, 3) increasing the control over spills and pollution episodes, and 4) constant surveillance of the existing and new colonies (via cameras and radio telecommunications).

Current Galician population is now under the minimum viable population standard, so for its recovery we considered this MVP as the first goal to be achieved for any program with practical purposes. This MVP is 20 pairs (Rodriguez and Furelos, 2004). Those individuals who valued the 60 pair recovery program knew they were valuing an increase in population that was well above the MVP. Further, individuals who valued the 20 pair program were also aware that they were valuing an increase just to get to the MVP. This scope test differs from previous studies for endangered wildlife (Fredman, 1995; Heberlein et al., 2005), given that in our valuation respondents are informed about the MVP, and they value an increase in the stock to reach this minimum.

Survey versions

From the considerations presented above, we have developed 4 different survey versions. Questionnaires were identically administrated only differing in the scope of the program and the European population information. The four final versions are presented in Table 1. The first version contained information about the Galician common murre situation (picture 2 was showed), while the second survey version was

also informing also about the existence of European common murres and their migrations (picture 3 and picture 4 were shown). As we observed in the pre-test of the survey and later implementation, people were not aware of the existence of other common murre colonies in other areas until told. Furthermore, in order to test how WTP changed with respect to the stock level, we further split the sample into two more additional treatments based on the different stock levels that were recovered: as indicated earlier, the first program description was aiming at recovering only up to 20 pairs, while the second program was aiming to recover the stock up to 60 pairs.

All versions of the questionnaire were designed following the NOAA panel recommendations, as well as some common features of other previous surveys conducted by Giraud *et al*. (2002), and Kotchen and Reiling (2000). The common structure was conformed by specific sections. The initial section was comprised of basic questions about consumption habits and environmental behavior (recycling, water and energy use, etc), followed by the section containing information about species conservation and the status of the common murre in Galicia. This written information was complemented by graphics that detailed the current situation and location of the local colonies of common murre in Galicia (figures 1, 2, 3 and 4). In all survey versions individuals were reminded of the fact that a MVP of 20 pairs was necessary for the common murre to survive in Galicia. Following the common murre descriptive information section, the contingent valuation scenario was described to the respondents: version 1 and version 2 of the survey presented a 20 pair recovery program, and version 3 and version 4 were presenting the 60 pair program. Once the information about the program was provided and individuals were familiar with the environmental good at

hand, respondents were presented with the following valuation question, worded as follows:

Consider that the Galician Common Murre Restoration Program will be the only way to avoid common murre extinction, so that by the year 2015 the ***common murre population will be increased from 5 pairs (current level) up to 60/20 pairs****, while 20 pairs is the minimum viable level of population for the common murre to survive. The Galician Common Murre Restoration Program will be put in place only if a majority of households in Galicia supports it.*

As you know, in order to manage this restoration program economic resources are needed. This restoration program will be funded with a ***one time increase on income taxes* in the next income tax declaration*** *(only for adults over 18 years of age). All the money collected would be kept in a fund for the disposition of the program, which will be audited every two years.*

We want you to be aware that the money collected via this extra tax would only legally be used for this program. However, there are at least 13 other endangered species in Galicia, including birds, fish, reptiles, and mammals.

Also remember that the money you spend on this program will not be available for the purchase of other goods or for supporting recovery programs for other endangered species.

*Given your current income level, are you willing to pay **X €** in a one-time payment for the Galician Common Murre Restoration Program, so that the program will be implemented?*

□ YES □ NO

(*) Individuals who are not obligated to pay their income taxes will receive in the mail a special tax form requesting their contribution to this specific program.

This dichotomous choice valuation question with referendum format contained bids from 15 to 150€ that had been previously pre-tested. Reminders of alternative possible expenses and of the total endangered species in Galicia were included in all questionnaires before the WTP question, following NOAA Panel recommendations (Arrow et al., 1993).

Survey pre-test and implementation

Once the questionnaires were designed, the survey and visual aids were intensively pre-tested for comprehensiveness in several focus groups and in test surveys conducted in the city of Santiago de Compostela, during the months of April and May 2005. After this period the final survey was administered in 12 municipalities of Galicia, with an equal distribution of coastal and non-coastal communities. These municipalities also offered a representation of semi-rural, semi-urban, and urban areas. The main criteria followed to select these locations were related to their similarities with the current Galician Population Census (IGE, 2004).

The surveys were conducted in June and July 2005, and they were administered following a random route. Personal surveying was elected and surveys were conducted in private homes, or at the home entrance, and in town squares which denoted the beginning or the end of each random route. A total of 660 surveys were completed with the four versions of the questionnaire equally distributed in each municipality.

Results

A 65.48% response rate was obtained, which can be considered fairly high for surveys not employing any economic incentive for participants. A final sample of 598 usable questionnaires was employed in the statistical analysis, 313 for the 20 pair stock version and 285 for the 60 pair stock version. Table 2 summarizes the main socio-economic variables in our samples and compares them with the most recent Galician Population Census (IGE, 2004). In general terms, our samples, both of 20 and 60 pair program, match well with the Census profiles in respect to certain sample's socio-economic characteristics, such as age and gender.

Given our empirical objectives, we need to first assess whether there are differences in the socio-economic composition of both program versions. If differences are found, then these might justify a divergence in WTP estimates. However, according to the t-test results displayed in Table 3 and 4, there are no statistically significant differences between the socio-demographic compositions of both sub-samples with different pairs, at conventional critical levels, and there is only a significant difference between high income levels in the survey versions of the 20 pair program (versions 1 and 2).

Once we have checked for data comparability issues, a logit model was developed to analyze the responses to the WTP question framed above, where:

$$(1)\ \text{Prob}(WTP_i = 1) = \frac{e^{\beta' x_i}}{1 + e^{\beta' x_i}},$$

and

$$(2)\quad \beta' x_i = \beta_0 + \beta_1 \ln BID_i + \beta_2 COAST_i + \beta_3 NATURALIST_i + \beta_4 MIDINC_i + \beta_5 HIGHINC_i.$$

In this specification, the dependent variable WTP_i is the dichotomous variable representing the individual response to the WTP question. The explanatory variables include the BID amount (in its log form), and a series of indicator variables, representing respondent's socio-economic characteristics that are suspected to affect individual preferences for the conservation program. These socio-economic variables include the COAST variable, which denotes whether the individual lives by the coast; the variable NATURALIST, that indicates whether the individual frequently engages in open air activities or enjoys walks in nature; and MIDINC and HIGHINC are two indicator variables corresponding with the medium and higher income categories (versus the omitted LOWINC category). Summary statistics for each survey version and complete variable definition are presented in Tables 3 and 4.

In line with our study design, we modeled all 4 survey versions (Table 1) with the same logit specification, employing the same set of explanatory variables. We present next the scope test results, differentiating sub-samples regarding the information about the species in Northern Europe.

Scope test results with respect to MVP levels and uniqueness

Table 5 presents the results for the scope test when respondents are informed about other common murre colonies in Northern Europe, and their migration to Galicia. Overall, WTP estimates coming from individuals aware that the common murre also inhabits in the rest of Europe and is currently not endangered fail to pass the scope test. Mean WTP for a 20 pair recovery program is about 17.10€ per household, and this value decreases to 10.90€ when the population recovery objective is set to 60 pairs. This is an interesting result that makes us reflect upon the importance of the existence of other substitutes when conservation threshold levels pass the defined MVP.

Table 6 presents the results for the scope test between both sub-samples without this information about the substitute colonies in Northern Europe. In this case, respondents only knew that the common murre was in danger of extinction in Galicia and that the only pairs left were from 3 to 5. The results omitting information about other colonies lead to a different valuation, in which the scope test fails, although it does not appear a negative marginal WTP. WTP for the 20 pairs program is 16.92€ per household, while WTP for 60 pairs is almost the same, with 16.12€ per household for supporting the program. Thus, we emphasize the importance of the information related to uniqueness of the species when valuing and endangered species. Omitting a wider description of the species can lead to biased estimates, although the results may pass a scope test. In spite that this is a surprising result, it is not the first time that a negative marginal WTP value was found in CV studies. As we have seen, previous research has obtained a negative scope test and has been interpreted it as an exception (Fredman, 1995; Heberlein et al., 2005). These studies value the same good, giving at least two levels of population with a specific status. However, Heberlein *et al.* (2005), as well as Fredman (1995), did not

value a species that was under its MVP. Consequently, from these previous studies it remains unknown at what point on the demand curve for the stock density, participants start having a negative marginal WTP. For this common murre exercise, we believe that this negative tendency may start at the MVP level. We assume that under this minimum WTP may increase with each additional individual added, given that at least 20 pairs are needed for survival.

Summary of Scope test

Table 7 summarizes the obtained estimates for all four scenarios. An outstanding finding is the large effect on WTP values of the non-uniqueness of the good being valued. When individuals were aware of the existence of close substitutes, WTP values decreased significantly with respect to the scenario in which no information about substitutes was provided. When information about the existence of substitutes was not provided, WTP values for the program recovering 20 pairs (MVP level) and 60 pairs were practically identical. However, when information about the existence of other Northern European colonies not threatened by extinction was provided, WTP values for the recovery of 60 pairs dropped significantly with respect to the MVP level (set at 20 pairs). Overall, it is noticeable the scope test failure. In this sense, on average the WTP for a program that would recover common murre population from current 3-5 pair to a 20 pair stock (minimum viable population) was 16.77€ per household, while WTP for the program of a 60 pair recovery was only 13.55€ per household.

Thus, these findings seem to suggest that for the valuation of endangered species which are associated with a high passive value, conservation of a viable limit is preferable than conservation of a larger amount of stock. It may be the case that after the survival of the

species is guaranteed, individuals may prefer to protect other endangered species, instead of paying more to get a higher stock of a single one.

Overall, our results show that Galician society wants to save the species from extinction. However, when the population to be recovered is above the MVP, preferences change resulting in a lower mean WTP value. We believe that the fact of informing participants about the MVP level may help explaining these results, and also the nature of the good, which has a predominant existence value. Our scope test fails in the traditional economic sense, where marginal increasing values are expected for environmental goods at two levels of scope (Rollins and Lyke, 1998). Nevertheless, Rollins and Lyke (1998) reconcile previous scope test results with the theory of diminishing marginal values, where WTP for a higher amount of the good increases within a convex curve. The current results show that after the MVP is reached, the diminishing marginal WTP may even become negative.

Conclusions

In the present paper we have analyzed how WTP for an endangered species behaves with increases in population, from below the MVP to this minimum level, and then from the MVP to a higher level. We have also tested how the information regarding the uniqueness of the species being valued can affect the scope test results. We have obtained a marginal negative WTP when stock levels were above the MVP, in the scenario when information about the European colonies of the common murre was provided. Alternatively, when this information was not provided, WTP for the MVP was equal to the WTP for a population of 60 pairs. Furthermore, and as previous studies suggest, we acknowledge the importance of information provision. As Heberlein *et al.*

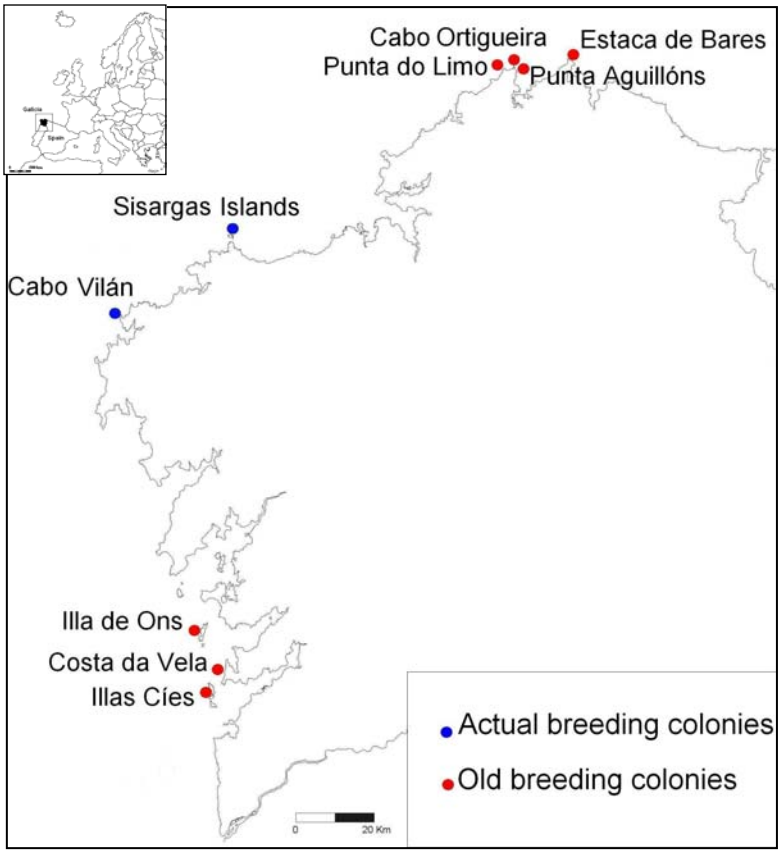
(2005) indicate, and on light of the present results, we recommend that a CV study for endangered species should include information like the species current population, its distribution, its minimum viable population, and the population needed to put the species out of the endangered status. Additionally, we also find an important effect associated with informing survey participants about the existence of the species in other geographical areas. With all this information people could better judge the desirable level of protection they wish for a given species. As a conclussion, we suggest that negative marginal WTP for a species with high existence value may reflect people's true preferences and thus, it may not denote failure of the validity of the CV results per se.

Our study has however some caveats. A limitation of the current study is that it only values two levels of stock (20 and 60 pairs) and it would be desirable to have a larger number of points to construct a complete demand curve for the stock. We suggest the need for further research valuing different levels of species recovery where it can be identified a minimum quantity that guarantees recovery. Unique species should be also considered to analyze if there appears the negative marginal WTP anomaly. This research will be helpful in understanding CV results for environmental goods with high existence value and for policy implementations related to wildlife recovery. Results as the ones here presented can be also introduced into the safe minimum standard approaches in order to include the preservation benefits of the species (Berrens *et al.*, 1999).

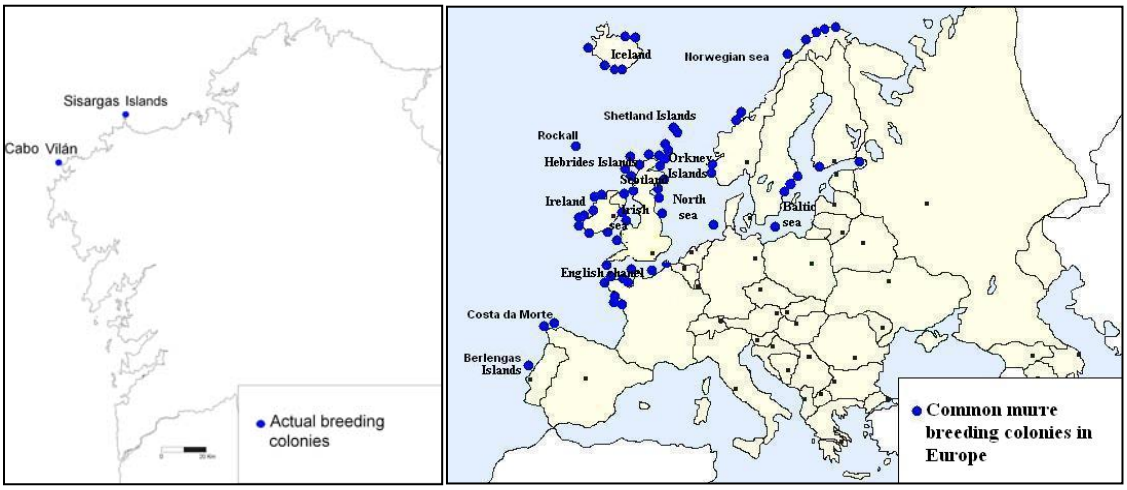
Figures and pictures

Picture 1 common murre neutral picture

Picture 2 common murre past and current distribution (breeding colonies) in Galicia (Spain)



Picture 3 common murre current situation and European colonies



Picture 4 common murre migration

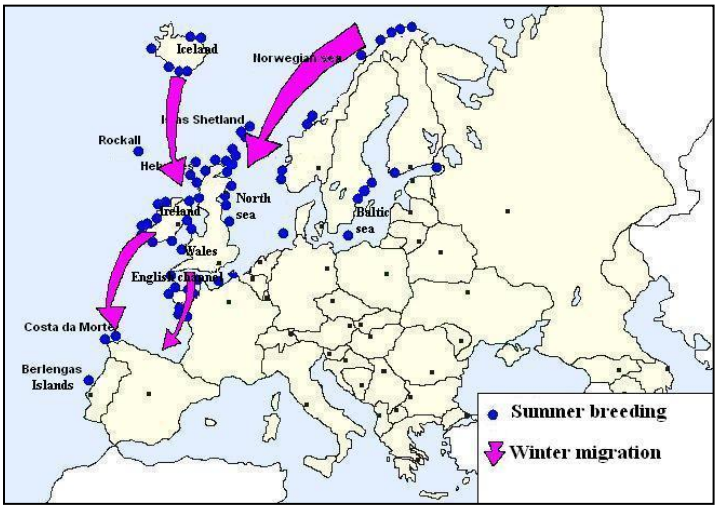


Table 1 Survey versions applied

	20 pairs	60 pairs	Galician Population	European Population
Version 1	X		X	
Version 2	X		X	X
Version 3		X	X	
Version 4		X	X	X

Table 2 Comparison between samples and census socio-demographics for the 20 and 60 pair programs (%)

	Galicia Census(*)	Sample 20 pairs (versions 1-2)	Sample 60 pairs (versions 3-4)
Woman (%)	51.86	51.32	54.72
Age less than 30 yea	24.26	25.51	27.89
Age between 30-64 y	51.79	53.96	53.60
Age > 65 years (%)	23.94	20.53	18.49
Basic Education (%)	45.10	32.00	30.85
High School Educati	44.30	42.00	41.26
University Degree (%	10.60	26.00	27.88

(*)Source: IGE-Galician Institute of Statistics, 2004.

Table 3 Summary statistics of variables for the 20 pair program (means)

Variable	Description	Galician population (version 1)	European population (version 2)	T-test
WOMAN	Gender: woman (1). Man (0)	0.51	0.52	-0.23
YOUNG	Age: less than 30 (1); rest (0)	0.24	0.26	-0.58
MIDAGE	Age: between 30-65 (1), rest (0)	0.53	0.55	-0.69
OLDERAGE	Age: mote than 65 (1), rest (0)	0.23	0.18	1.42
EDUCATION	Graduate education (1), not graduate (0)	0.70	0.67	0.77
LOWINCOME	Monthly gross income; less than 1000€ (1), rest (0)	0.24	0.25	0.00
MIDINCOME	Monthly gross income; between 1001-2000€ (1), rest (0)	0.70	0.67	0.94
HIGH_INCOME	Monthly gross income; more than 2001€ (1), rest (0)	0.05	0.07	-1.78
EMPLOYED	Employed (1), rest (0)	0.66	0.69	-1.06
RETIRED	Retired (1), rest (0)	0.14	0.10	1.33
STAYHOME	Stay at home (1), rest (0)	0.08	0.07	0.54
STUDENT	Student (1), rest (0)	0.11	0.10	-0.05
COAST	Coastal municipality (1), Inland municipality (0)	0.48	0.47	0.38

Table 4 Summary statistics of variables for the 60 pair program

Variable	Description	Galician population (version 3)	European population (version 4)	T-test
WOMAN	Gender: woman (1). Man (0)	0.55	0.54	0.20
YOUNG	Age: less than 30 (1); rest (0)	0.28	0.28	0.07
MIDAGE	Age: between 30-65 (1), rest (0)	0.51	0.56	-1.30
OLDERAGE	Age: mote than 65 (1), rest (0)	0.21	0.16	1.52
EDUCATION	Graduate education (1), not graduate (0)	0.35	0.41	-1.41
LOWINCOME	Monthly gross income; less than 1000€ (1), rest (0)	0.17	0.20	-0.89
MIDINCOME	Monthly gross income; between 1001-2000€ (1), rest (0)	0.78	0.73	1.50
HIGHINCOME	Monthly gross income; more than 2001€ (1), rest (0)	0.04	0.07	-1.38
EMPLOYED	Employed (1), rest (0)	0.62	0.65	-0.75
RETIRED	Retired (1), rest (0)	0.13	0.10	1.08
STAYHOME	Stay at home (1), rest (0)	0.10	0.08	0.90
STUDENT	Student (1), rest (0)	0.11	0.15	-1.43
COAST	Coastal municipality (1), Inland municipality (0)	0.45	0.46	-0.11

Table 5 Scope test for versions 2 and 4 with European colonies information

Variables	European common murre information			
	20 pair program		60 pair program	
LNBID	-1.3679 (-0.2964)	-4.62***	-0.972 (-0.3023)	-3.22***
COAST	0.0141 (-0.4415)	0.03	0.9733 (-0.4742)	2.05*
NATURALIST	0.6991 (-0.4618)	1.51	0.4317 (-0.5226)	0.83
MID INCOME	0.7264 (-0.5297)	1.37	0.486 (-0.6276)	0.77
HIGH INCOME	2.8891 (-0.9068)	3.19***	3.0931 (-0.9549)	3.24***
CONSTANT	2.9683 (-1.1109)	2.67**	1.2254 (-1.2267)	1.00
N	159		146	
WTP	**17.10**		**10.90**	

(***) it indicates statistical significance at α=0.001; (**) it indicates statistical significance at α=0.01; and (*) indicates that the variable is statistically significant at α=0.1

Table 6 Scope test for versions 1 and 3 only with Galician common murre information

Variables	Only Galician Common murre information			
	20 pair program		60 pair program	
LNBID	-1.1363	-3.72***	-1.0197	-3.42***
	(-0.3058)		(-0.2981)	
COAST	0.6623	1.5	0.8018	1.85*
	(-0.4426)		(-0.4328)	
NATURALIST	0.9078	1.97*	0.9591	2.14*
	(-0.4616)		(-0.4483)	
MID INCOME	0.4052	0.74	0.8641	1.38
	(-0.5499)		(-0.6255)	
HIGH INCOME	1.1064	1.11	2.1215	1.93*
	(-0.9945)		(-1.1010)	
CONSTANT	2.2774	1.71*	1.3977	1.18
	(-1.3353)		(-1.1829)	
N	154		139	
WTP	**16.92**		**16.12**	

(***) it indicates statistical significance at α=0.001; (**) it indicates statistical significance at α=0.01; and (*) indicates that the variable is statistically significant at α=0.1

Table 7: WTP estimates for different survey versions

	WTP (€/household) to get endangered species to MVP level (20 pairs)	WTP (€/household) to get endangered species above MVP (60 pairs)
Without information about substitutes	16.92 (n=154)	16.12 (n=139)
With information about the existence of substitutes	17.10 (n=159)	10.90 (n=146)
Total	16.77 (n=313)	13.55 (n=285)

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