

WILLINGNESS TO PAY FOR THE CONSERVATION OF ENDANGERED SPECIES IN FOUR ASIAN COUNTRIES



Economy and Environment Program for Southeast Asia

Willingness to Pay for the Conservation of Endangered Species In Four Asian Countries

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EEPSEA was established in May 1993 to support training and research in environmental and resource economics. Its goal is to strengthen local capacity for the economic analysis of environmental problems so that researchers can provide sound advice to policymakers. The program uses a networking approach to provide financial support but also meetings, resource persons, access to literature, publication outlets, and opportunities for comparative research across its member countries. These are Thailand, Malaysia, Indonesia, the Philippines, Vietnam, Cambodia, Lao PDR, China and Papua New Guinea. EEPSEA is a corporate project administered by the Singapore office of the International Development Research Centre (IDRC) on behalf of the Sponsors Group. The latter include IDRC, the Canadian International Development Agency (CIDA) and the Swedish International Development Cooperation Agency (Sida).

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Foreword

This book presents the results of a co-ordinated multi-country study aimed at assessing the potential for Asian countries to finance programs to conserve protected species. The research was done by a team of university-based researchers from Thailand, Vietnam, China and the Philippines. The project was organized and financed by the Economy and Environment Program for Southeast Asia (EEPSEA).

The idea for the project arose during a five-day course on stated preference methods for environmental valuation conducted under EEPSEA's auspices by Dale Whittington of the University of North Carolina at Chapel Hill and Vic Adamowicz of the University of Alberta, in May 2004. As the course unfolded, a group of participants became excited by the possibilities of applying these methods to an urgent policy problem; of exploring some "twists" in stated preference research design in developing countries; and in doing so through a closely coordinated project that would apply variations of the same research instrument across countries. A series of planning meetings with Dale, Vic and the participants ensued and continued over the life of the two-year project. This culminated in a series of international conference presentations, most notably at the World Congress of Environmental and Resource Economists in Kyoto, Japan, in June 2006.

This is the first time that EEPSEA has implemented such a large and tightly integrated project. As can be imagined, the amount of planning and coordination required was formidable. The authors had to share ideas and data, to compromise on innumerable methodological choices and to collectively produce questionnaires, data sets and working papers. They did so in a spirit of cooperation and fun and we all became great friends in the process. The results have been more than worth the effort: a study that surveyed more than 6,000 households in four countries to come up with novel and policy-relevant findings.

Asia is home to some of the planet's most charismatic and most threatened species. I hope this book provides useful insights into the attitudes of Asians toward endangered species and the steps that might be taken to generate revenue for their conservation.

Herminia Francisco
Director, EEPSEA

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INTRODUCTION

David Glover

The world is rapidly losing its biodiversity as species become extinct at an unprecedented rate. Much of this loss is occurring in the developing world, where the expansion of agriculture into frontier areas, poaching and weak enforcement of protective measures are endemic. As incomes grow in many developing countries, it is natural to wonder to what extent these countries will be able to finance measures to pay for endangered species protection. How do citizens of developing countries feel about conservation? Are they willing to make personal contributions towards it? If so, what mechanisms might be put in place to mobilise such contributions? How effective would the revenue collected be in meeting conservation needs?

These are the questions that motivate this book. They were first raised by a group of Asian researchers in 2004 and explored over the next three years in a comparative cross-country research project carried out in China, Thailand, the Philippines and Vietnam. Using a common survey instrument, these researchers applied the contingent valuation method (CVM) to assess the willingness of local populations to pay for the conservation of several endangered species. The team estimated local willingness to pay (WTP) and explored how a variety of payment vehicles affected people's decisions to support national and regional conservation plans. The survey instrument included an extensive set of attitudinal questions that allowed them to assess the relationship between respondents' attitudes, socioeconomic characteristics, and willingness to pay.

The surveys were administered by dropping off questionnaires at people's residences, using similar procedures and protocols in each study country. Altogether over 6,000 respondents participated in the survey; these were randomly selected in Beijing, Ho Chi Minh City, Hanoi, Bangkok and Davao City. The most populous of these cities is Beijing with over 15 million people; the smallest is Davao City in the Philippines, with about one million. Average annual per capita income ranges from 540 USD for Ho Chi Minh City/Hanoi to 2,490 USD for Bangkok. There are also variations in culture and familiarity with the species in question.

This was an ambitious undertaking. It was designed as a comparative research project because it was believed that this would provide insights into several issues important to policy formulation and the improvement of research methodology.

In terms of policy, we were interested in seeing if there were significant differences in willingness to pay across countries. If so, do they reflect cultural differences or simply differences in income? To what extent are people aware of the plight of endangered species and would education or awareness campaigns be likely to increase willingness to pay (WTP)?

We were also aware that many Asian governments are perceived to be lacking in transparency. People everywhere are reluctant to pay additional taxes to support environmental protection; this is particularly so in Asia where people are suspicious of their governments' motives and trustworthiness. Furthermore, Asian governments have difficulty collecting income tax; high rates of tax evasion further undermine the acceptability of taxes as a way of raising money for conservation. In such circumstances, what are the prospects for alternative payment vehicles to raise revenues? Focus group discussions identified utility bills, with the revenue protected from a trust fund, as the most promising candidate.

In terms of research methodology, we were aware of a number of issues that have played out in the literature on stated preference methods (i.e. methods by which researchers induce respondents to state their preferences for specified goods in a hypothetical situation, rather than observing actual payment behavior in real markets). Some of these issues have not been explored extensively in developing country circumstances. We were particularly interested in exploring scope effects (how responsive an individual's willingness to pay is to the size of the good offered); possible differences between willingness to pay in hypothetical and real situations; and the effects of visual materials, specifically colored photographs, on willingness to pay.

We believed it would be possible to explore all of these issues through a single research instrument: a contingent valuation survey. By including questions about knowledge and the socio-economic status of households, we would be able to assess not only willingness to pay but also its possible correlates.

We adopted what is by now a standard technique in CVM - the dichotomous

choice format, in which each respondent is offered a single option at a single price and given an accept-or-reject choice. Assessing the reactions of respondents to a variety of options and prices is accomplished by providing different combinations of goods and prices to different groups of respondents. These are referred to as split samples. Our survey had an elaborate structure of split samples designed to capture the influence of the many possible explanatory variables in which we were interested. The samples were split in order to capture the following factors:

- a) Five price or “bid” levels were used.
- b) Two payment vehicles were used: a surcharge added to the household’s water bill and a surcharge added to its electricity bill.
- c) The payment vehicle was then subdivided to provide two degrees of choice. In one scenario, respondents were told that if the majority of the population voted in favor of the payment, it would be made mandatory i.e. applied to every household’s utility bill. Respondents exposed to the second scenario were told that the contribution would be made on a voluntary basis through a check-off. We hoped that this would provide insight into the effects of fear of free riding through voluntary contributions on WTP.
- d) Countries were varied (four in all). These were partly correlated with income levels.
- e) Colored or black & white photographs were shown in the questionnaire.
- f) The scenarios described either a conservation program carried out by a single country or one in which that country participated in a region-wide (and therefore probably more effective) effort.
- g) One pair of scenarios described a program affecting the entire country or only part of the country, as a scope test.

The study was carried out in Thailand, Vietnam, the Philippines and China (Beijing and Macao). In most cases, each team did a survey of WTP for a species of particular importance (though not necessarily unique) to that country, plus a species of regional importance – the marine turtle. The “single country” species were the black-faced Spoonbill in Macao, China, whale shark in the Philippines, rhinoceros in Vietnam and the Philippine eagle.

Each group of respondents was exposed to a scenario that varied with respect to at least one of the variables above. Over 150 unique scenarios were employed. Given this, the structure of the overall study is difficult to capture in a single diagram. A table in the Philippine eagle chapter provides a good breakdown of one country study.

In addition, we provide estimates of the cost of conserving the species in question. We also projected the mean willingness to pay estimates from our CV survey onto the relevant populations to provide estimates of the aggregate willingness to pay, or the total amount of revenue that could potentially be raised for conservation. This allows us to compare the costs and benefits of conservation programs and to assess the financial feasibility of these programs, were they to rely solely on local sources of revenue.

The book thus provides a rich exploration of the variations inherent both in Asia and in the contingent valuation methodology. In the ensuing chapters we attempt to explore the implications of these variations for the financing of programs to conserve endangered species in the region.

LITERATURE REVIEW AND METHODOLOGY

Anabeth Indab, Dieldre Harder, Jin Jianjun

The cost of a conservation program includes both the direct cost of implementing the component activities and the indirect costs or foregone income that resources devoted to conservation program could have generated. In forest ecosystems that are traditionally used by communities within and/or in villages surrounding the forests, the foregone 'income' would normally include the value of forest products collected from the forest and/or the income from use of the land for agricultural and tree-farming activities. A conservation program would normally limit or cease some of these economic but extractive activities in the areas covered by the program. The same situation is faced by many private landowners in developed countries, whose lands have been identified as hosts to endangered species. Under the US Endangered Species Act of 1973, for instance, private landowners are not allowed to carry out development activities on their own land if such activities would disturb the endangered species. Thus, conservation programs impose a cost not only to de facto owners of State-managed natural resources in many developing countries but also to private landowners in developed countries.

Matthews et al. (2000) noted that in 1990, the United States would have to spend USD 770 million to be able to recover 70 percent of its endangered species to a self-sustaining level. At that time, its funding level was only USD 50 million a year (cited from Barker 1993). The estimate for Canada is similarly high. In 1998, the estimated cost of recovering 61 endangered species was placed at USD 165 million, while funding in 1998 totaled USD 5 million only. These figures show that the costs of conservation are quite high and that even developed countries are unable to meet all the cost requirements. The situation is expected to be more difficult in developing countries where resources are low and many programs compete for them.

The cost is particularly high for endangered species conservation since habitat conservation occupies an important part of any species conservation program. Damania and Bulte (2001) presented some cost estimates of protecting animals from poaching. In Africa, the cost ranges from USD200 to USD 500 per hectare (cited from Parker and Graham 1989; Simmons and Kreuter 1989; Burton 1999). These values are said to be much lower than the

actual expenditures on enforcement, thus, accounting for the difficulty of fighting poaching threats to wildlife.

Total Economic Value of Endangered Species Conservation

An endangered species conservation program can generate a wide variety of use and non-use values. The total economic values of the conservation can be grouped into several categories (Loomis and White, 1996): (a) use value such as sightseeings of the species; (b) option value to maintain genetic information provided by populations of the endangered species that may be useful for medicinal and genetic engineering applications in the future (Loomis, 1995); (c) existence value derived from the satisfaction of knowing that a particular species has a sustainable population in its native habitat (Freeman, 2003); (d) bequest value, which the current generation receives from knowing that preservation today would make this species available to the future generations. Collectively these benefits are referred to as the Total Economic Value (Randall and Stoll, 1983).

Non-market Valuation Techniques

This study aims to estimate the total benefits of endangered species conservation. However, estimating the non-market benefits from endangered species conservation is not easy, given the market failure associated with the public good. Consequently, economists have been addressing the questions concerning the economic value of non-market goods or services using different approaches. These may be divided into revealed and stated preference methods.

Revealed preference methods, also known as indirect methods, infer the value of associated non-market goods and services by studying actual (revealed) behaviors on an actually observed market. Typical examples of revealed preference methods are travel cost method (TCM) and hedonic price method (HPM) (Braden et al., 1991). Since the revealed preference methods require observable market data to make inferences about non-market values, it is hard to apply them to measure adequately the non-use or intangible values of endangered species conservation (Cooper, 1994; Stevens et al., 2000; Bateman, et al., 2002).

Stated preference methods, also known as direct methods, assess the value of non-market goods and services by using individuals' stated behaviors in a

hypothetical setting. The most widely used stated preference methods is the contingent valuation method (CVM). This study is interested in assessing the value of endangered species conservation to the public, measured in terms of whether people would be willing to pay for the endangered species conservation. CVM was used to quantify public preferences and WTP for endangered species conservation. The summary and meta-analysis of CVM studies of Loomis and White (1996) suggest that CVM can provide meaningful estimates of the benefits of preserving endangered species, which can be used in policy planning.

Contingent Valuation Method

The contingent valuation method (CVM) (Mitchell and Carson, 1989) is a survey approach that involves developing a hypothetical market or referendum, which an individual uses to reveal or state his or her WTP for the protection of a specific species in a particular location (Loomis and White, 1996). It was originally proposed by Ciriacy-Wantrup in 1947; however, Davis (1963) was the first to use the CVM empirically when he estimated the benefits of goose hunting through a survey among goose hunters. This method gained popularity because it is the only approach that estimates the total economic benefits of environment amenity for both the users and nonusers (Amirnejad et al., 2005). Over the past two decades, the use of CVM for measuring WTP for social projects has been well accepted and widely used in many different circumstances in developing countries (Tapvong and Kruavan, 1999).

The dichotomous choice method, which seeks simple ‘yes’ or ‘no’ answers to an offered bid, is generally preferred to other methods (e.g., open-ended method) because it most closely approximates the “take it or leave” nature of most market transactions.

Effects of Payment Vehicles on Willingness to Pay (WTP)

A number of studies in developed countries found evidence that the payment vehicle influences WTP for public goods (Rowe et al. 1980, Brookshire et al. 1983). However, there have been mixed findings on which payment vehicle, voluntary or mandatory, is best suited in CV applications. Some studies have shown that mandatory tax is more incentive compatible than voluntary contributions or donations. The latter, though widely used and may be the only way to generate financing for some type of goods (Berrens et al. 2002, Champ et al. 1997), is considered prone to strategic overbidding as a result of warm

glow and free riding. However, Ledyard (1995), in his review of this issue, concluded that although voluntary contribution mechanism is not incentive compatible, empirical evidence has consistently shown that pure free-riding occurs far less frequently than what expected utility theory predicts.

Methods have also been devised to correct for the hypothetical bias inherent in voluntary mechanisms. In an experimental context, Murphy et al. (2005) used the voluntary contribution scheme with an added feature that included a provision point mechanism (PPM) with a money-back guarantee (MBG). His results show that PPM with MBG can reduce hypothetical bias.

In some cases, respondents may resist the idea of being compelled to make the payments while others may not wish to impose a cost on those who would not otherwise contribute voluntarily (Champ et al. 1997). It is also worthy to note that the researcher has no taxing authority and this could make compulsory payments (taxes, utility bills) problematic or highly unrealistic to the respondents. Bateman et al. (1995) and Jacobsson and Dragun (2001) found that income tax in support for environmental protection had larger WTP values than donations or trust fund contributions. The landscape amenity study of Kato and Hidano (2002) also yielded significantly lower WTP values for the voluntary mechanism, which was perceived to be inequitable especially if even those who will not benefit from the resource will be made to pay.

Vehicle neutrality, on the other hand, is suggested by the results of Hackl and Pruckner (2003) when valuing health related Red Cross services. They found that WTP estimates are insensitive to payment vehicle for both spike and double-bounded models.

However, the sensitivity of WTP to payment mechanisms has not yet been tested in developing countries where income constraints could pose a significant factor on households' decision-making. One of the purposes of this study was to carry out such a test by assessing respondents' reactions to a variety of payment vehicles.

Scope Sensitivity

The scope sensitivity issue in CV studies remains controversial. Insensitivity to scope conflicts with the rational choice behavior assumed for agents in the neo-classical economic model. Based on the assumption of non-satiation of wants, WTP is expected to increase with increasing numbers of the (normal)

commodity; it is expected also to be higher for a comprehensive good than for a subset of that good.

Critics of CV claim that stated WTP for preserving endangered species does not relate to economic choice behavior but reflects more the good cause dump or the purchase of moral satisfaction (Kahneman and Knetsch 1992). The scope or size of the project therefore would not matter.

Harrison (2002), commenting on the NOAA blue ribbon panel conclusion, says insensitivity to scope (perfect embedding) is “perhaps the most important internal argument against the reliability of the CV approach.” Citing a study that shows the lack of significant differences in the WTP values to protect 2,000 migratory birds vs. 20,000 birds vs. 200,000 birds, he contends that the real problem lies with the way information is provided to the respondents. In the particular study he cited, respondents were given the approximate percentage of the total bird population to be protected, wherein the smallest and largest amounts were respectively listed as “much less than 1%” and “about 2%.” It is therefore quite possible that the respondents considered the share of population as essentially the same. This observation is consistent with the point made by Carson and Mitchell (1993) that apparent scope insensitivity is primarily due to flaws in survey design.

Veisten et al. (2004) performed a scope test (internal and external) for preserving endangered species in Norwegian forests using four sub-samples of respondents and two elicitation formats (open-ended with payment card versus open-ended without payment card). Unlike most CV studies on endangered species that involved charismatic or known species, this study focused on «low-profile» species, i.e., insects and cryptogams, together with flowers and birds — this being more representative of what the authors considered a ‘complex environmental amenity’ with predominant passive-use values. The results show that while indeed some respondents are insensitive to scope, this is a minority group; hence, they do not significantly affect the final outcomes. Interestingly, the study found that elicitation format had a more decisive effect in that the open-ended elicitation format without any payment card resulted in more respondents not answering the WTP question or stating a possibly untrue zero WTP. Thus, it concluded that the observed insensitivity to scope is due to flaws in survey design and amenity misspecification and is thus not an inherent weakness of CVM.

Others find nothing wrong with the insensitivity to scope behavior.

Rollins and Lyke (1998), for instance, argue that the observed insensitivity to scope could result from diminishing marginal values. Hence, with successive quantities of the public good (e.g., protected areas), each additional unit put under protection would receive a positive but lower value. Income effects could be another explanation. With limited budget, optimization of spending on private and public goods is constrained (Randall and Hoehn 1996). Thus, even if the valuation is hypothetical, respondents are expected to limit their stated total WTP according to their ability to pay.

The chapter on the Philippine eagle reports the results of such a scope test: it presented different groups of respondents with conservation programs of different sizes to see if this affected willingness to pay.

Extent of the Market

Aggregation of benefits for pure public good is simply summing the WTP of all agents of the relevant population, since enjoyment of the good by one agent does not necessarily preclude others from enjoying the same good (Just et al. 1982). Thus, the aggregation of individual benefits is linked to the question on which relevant population these benefits accrue. Whether benefits are confined to a certain locality, region, country, or even the world has implication on financing and provision. While relatively few studies deal with the aggregation issues, authors argue that this could be more relevant than simply refining the per-unit estimates (Smith 1993; Loomis 2000; Bateman et al. 2005).

For example, choosing a geographic area that includes beneficiaries only while ignoring the benefits that might accrue to non-beneficiaries could undervalue WTP estimates. On the other hand, assuming similar per unit benefit to the population when this is not the case would lead to overvaluation.

While there are studies in developed countries devoted to examining the extent of the market (Loomis 2000; Pate and Loomis 1997; Bateman et al. 2005), the application of CV in developing countries on the issue of spatial range of environmental goods is scant. Refining CV studies in order to adapt to the context of developing countries and to come up with reliable and credible results is evident in several studies (Whittington et al. 1992; Hadker et al. 1997; Lauria et al. 1999; Choe et al. 1996; Shultz et al. 1998; Barton 1998; Alam 2005).

In this book we attempt to use the mean WTP values derived from our surveys to assess the total revenue that might be mobilized from a relevant population within each county to support endangered species conservation.

Effect of Colored Pictures on WTP

Most CV studies focused on the level of information as a significant factor affecting respondents' valuation of the commodity (Samples et al. 1986; Bergstrom et al. 1990; Ajzen et al. 1996). Less attention has been given to the effect of visual presentation (i.e., use of colored photographs in survey questionnaires) despite its wide recognition as a significant perception factor in other fields. Le Grange (2000) says that “...*photographs hold the promise of engaging those who may be less educated or who do not speak the language of researchers...*”

Some CV researchers carefully test their survey materials. For instance, undesirable reactions to the use of photographs led Shyamsundar and Kramer (1996) to drop visual aids from their survey instrument. In addition, the observation that respondents were indicating WTP out of a sense of coercion led the researchers to rephrase the valuation question in favor of eliciting willingness to accept (WTA) to forgo access to forest areas.

The use of visual aids and communication devices has been applied on mortality-risk reduction studies. For instance, Loomis and duVair (1993) evaluated the effect of alternative risk communication devices on WTP, using two versions of the CV questionnaire, which differed in the device used to communicate risks from hazardous waste. Both risk communication devices provide WTP functions, which vary statistically with absolute risk reduction. Similarly, the study of Corso et al. (2000) shows that visual aids are value enhancing; they found significant differences in the effect of alternative visual aids on sensitivity of estimated WTP values to magnitude of mortality-risk reduction.

While the use of large and impressive photographs may be an effective means of conveying information and holding the interest in the CV interview, Arrow et al. (1993) express concern on the use of misleading photographs and suggest that all such visual information should be subjected to particular scrutiny and pilot testing.

Later in this book we report the results of an experiment in the Philippines that assessed the effect of coloured vs. black & white photos on WTP.

Hypothetical vs. Real WTP

There are some debates about whether or not CVM can measure accurately the respondents' maximum WTP (Diamond and Hausman, 1994; Portney, 1994). The nucleus of the controversy is the extent to which hypothetical choices in CVM correspond to real economic choices (Carlsson and Martinsson, 2001) i.e. the amount people are actually willing to pay in a real situation with their own money may differ from the amount they say they would pay in a hypothetical survey situation. Reasons for such discrepancies could include efforts to please the interviewer or the ease of offering large payments when no real money is involved.

A later chapter reports the results of an experiment we carried out in Macao to see if WTP in a hypothetical market differed from that in a real market.

SURVEY METHODOLOGY

Our contingent valuation survey presented a hypothetical scenario about a proposed conservation program in each country. The components of the program, including the institutions involved, who would pay and how, were presented in the contingent or hypothetical scenario. On the basis of this scenario, the respondents were asked whether they would vote for or against a public program at a particular price provision. A great deal of time was spent crafting this hypothetical scenario and generating the appropriate survey instrument that could best assess and capture the value of endangered species conservation.

Questionnaire Design

The key element in a CVM study is a properly designed questionnaire. A questionnaire is a data-collection instrument that sets out, in a formal way, the questions designed to elicit the desired information (Bateman et al, 2002)

Much importance was given to ensuring that the respondents understood and accepted the hypothetical scenario. The project's initial activities focused on gathering scientific information and proper conservation measures for the species, which were then presented as the conservation program. The program was framed based on consultations with local experts and scientific literature.

Qualitative and quantitative information was obtained from three main

sources: personal interviews and focus group discussions, pilot surveys of households, and the main survey of households.

Personal Interviews and Focus Group Discussions (FGDs)

The personal interviews gathered the respondents' insights on what institutions will be involved, payment vehicle, timing of payment, technical and political feasibility of the program, and other information. Then in the course of the series of FGDs held, all the information was presented, refined, revised, and finalized in preparation for the survey pre-test. Several FGDs were conducted for young professionals, government bureaucrats, and middle-income and low-income household heads.

Pre-tests

Pre-testing refers to testing out the questionnaire on a small sample of respondents to identify and correct potential problems (Bateman et al. 2002). The survey pre-test also provided the indicators that were used to plan the required overall sample size. Based on the pre-test results, the questionnaire was revised and, where needed, back-translated by language experts to ensure that the researcher was able to communicate the questions based on the desired information that the research meant to convey. (Back translation means that the questionnaire was translated from the original English version to the local dialect of the target respondents and then translated back to English by a second party or language expert.)

Both the personal interview and self-administered survey format were pre-tested. Based on observations during the pre-test and the results of the pre-test itself, we decided to use a drop-off or self-administered survey in order to avoid various biases. Enumerators would approach the randomly selected household and ask whether they would agree to participate in the survey. If they agree, the enumerator would leave the questionnaire and explain that only the household head could be the respondent. The household head was identified as the person in charge of the daily expenditures and other (younger) family members. After one to three days, depending on the commitment made by the respondent, the enumerator would come back and collect the questionnaire. Before leaving the house, the enumerator would assess and make sure that the questionnaire had been completely filled out. If necessary, he or she may conduct a follow-up personal interview.

Questionnaire Structure

The questionnaire described the commodity to be valued, the mechanism by which the good will be provided, and the method of payment. To determine if the scenario had been communicated successfully, each respondent was debriefed at the end of the questionnaire. (A sample questionnaire, for one species and payment vehicle can be seen in the Appendix.)

Some questions served to assess whether or not a respondent who says he/she will pay nothing for whale shark conservation is stating his/her true valuation or just stating a protest bid.

Part 1	To get people to start thinking about social or public priorities. This section includes questions on what public issues they think are currently being prioritized and what are being neglected.
Part 2	To establish attitudinal behavior about species conservation and to assess the respondent's familiarity with the existence, condition, threats, and importance that they place on the presence of whale sharks.
Part 3	To describe the conservation plan to protect the existence of whale sharks. This section contains the referendum or WTP question.
Part 4	Debriefing questions, including those designed to bring out the problems in the choice of payment vehicle, are included in the questionnaire.
Part 5	To determine the socioeconomic characteristics of the respondent.

Elicitation Method

We adopted the referendum method recommended by the NOAA panel because of its incentive properties. The single-bounded dichotomous choice with an open-ended follow-up question was used in the survey. Each respondent was asked whether he/she would vote (or pay), or be willing to donate, in favor of the proposition that, if approved by the majority, would provide for conservation of the species in question. The elicitation question was presented in a take-it-or-leave-it format that imitates the choice facing an individual in a real market.

The study used two payment vehicles with a split sample design. One is a voluntary surcharge on a household's water bill every month for the next five years. The other is a mandatory surcharge on a household's water bill every month for the next five years. Some arguments can be found in the literature

on whether the voluntary contribution mechanism or mandatory payment vehicle should be used in developing countries. A number of recent CVM studies, for example, Champ et al (1997) and Chilton and Hutchinson (1999), have used the voluntary contribution mechanism to motivate respondents to tell the truth. However, Berrens et al. (2002) argues that the application of voluntary contribution mechanisms in the absence of a coercive provision rule could create both free-riding and warm-glow giving situations. Recognizing that such an approach fails the test of incentive compatibility, more recent CV research uses mandatory payment vehicles. Though it solves the problem of free-riding, however, it has several disadvantages. For example, some respondents may resist the idea of being forced to pay while others may not want to impose cost on those who would not have contributed voluntarily (Champ et al., 1997). However, empirical work that explores the differences between voluntary and mandatory WTP is still limited (Ryan, 2007). This current study addresses this issue by using a dichotomous choice elicitation and split sample design in the field to evaluate the possible effects of different payment vehicles (voluntary or mandatory payments, made though additions to the household's water or electricity bill) on respondents' preferences for endangered species conservation. The range of payment vehicles explored in our studies is as follows:

Payment Vehicles			
Vietnam	electricity bill	mandatory	one-time payment
Philippines	electricity bill	mandatory	monthly payment over 5 years
Whaleshark	electricity bill	voluntary	monthly payment over 5 years
Macao	water bill	voluntary	monthly payment over 5 years
Spoonbill	water bill	mandatory	monthly payment over 5 years
Philippines Eagle	Permutations of voluntary/mandatory, water/electricity, using coloured/B&W photos (see chapter for details)		
Four Countries Marine Turtle	Permutations of voluntary/mandatory, via monthly electricity bills for 5 years, for a region-wide or single country programs		

To make clean comparisons across CV scenarios, identical formats and questions were used, varying only in payment vehicle. In each case, the

respondents were told that the amount was fixed and would not change with the volume of water or electricity used. The hypothetical payment was limited to five years to make the payment more tangible than would a longer or indefinite payment duration. (The one exception was Vietnam, where the scenario used a one-time payment.)

Based on the results of the focus groups and pre-test surveys, five different bids were established. These varied by country and species, as shown below. Within each of the two independent samples, each respondent was presented with a single randomly assigned dollar amount of these five payment levels and asked to respond with a simple ‘yes’ or ‘no’ to paying for the program.

		Bid Levels				
Philippines	PHP	5	10	30	50	100/150
Eagle	USD	0.02	0.01	0.2	1	2/3
Macao	MOP	1	5	10	20	40
Spoonbill	USD	0.125	0.625	1.25	2.5	5
Philippines	PHP	1	5	10	50	100
Whaleshark	USD	0.02	0.01	0.2	1	2
Vietnam	VND,000's	1	10	25	50	300
Rhino	USD	0.0625	0.625	1.5	3	18.75
4 Countries	USD	0.02			various	7.5
Turtle						

If the answer to the WTP question was “yes”, the respondent was asked to give reasons for their choice. A follow-up question asked the respondents how certain they were about really contributing that amount if given an actual situation to do so, using a 5-point Likert’s scale (1 = very uncertain, 5 = very certain). Blumenschein et al. (2001) argue that the follow-up certain question could reduce the hypothetical bias of dichotomous choice contingent valuation method. Respondents who said they were not willing to pay the specified premium were asked on their reasons. This question can be used to identify the protest and valid zero answers. These respondents were further asked if they would be willing to pay any amount even though they were unwilling to pay the specified amount. This indicates whether or not they hold any economic value for the conservation program.

Prior to the WTP questions, a cheap talk script was included to reduce

hypothetical bias. People were reminded of their limited budget and that any payment to support this program would necessarily mean that they had less money available to contribute to other issues or to buy things. The WTP questions were followed by some ‘debriefing questions’ which included their opinions on the choice of the payment vehicle.

The final section of the questionnaire contained background questions on the respondent’s gender, age, education, income, occupation and household size.

Valuation Question

The wording of the WTP question varied slightly among our country studies, depending on the payment vehicle, geographical area and so on, but it generally conformed to the following format:

“Would you vote in favor of this conservation program? If so, this would mean that you and the other households in this area would pay a fixed monthly surcharge of \$ __ through your electricity bill. Remember that the surcharge of \$___ will be collected every month for 5 (or 10) years. All the money that will be raised will go to the conservation program described above.”

Yes (Go to Number 15)	No (Go to Number 12)
-----------------------	----------------------

Sampling procedure

The household survey was administered to household heads, i.e. the husband, wife, or adult child who is already earning income. The household head is defined as an adult member of the family who can decide on financial matters for the family. A multi-stage stratified sampling was conducted to obtain a representative sample.

The total sample size was a function of the number of respondents needed to provide a reliable sample for each bid level, times the number of bid levels, times the number of payment vehicles. We also assumed that not all households would agree to participate or would complete their questionnaires. The initial sample was about 30% larger than the number needed to produce reliable results, to allow for attrition. The table below illustrates this procedure for one of our case studies:

Number of Samples for the Whale Shark Survey, Philippines

Split Sample	Mandatory Payment	Voluntary Contribution
No. of actual samples	60 samples/bid	60 samples/bid
No. of bid prices	5	5
Total	300	300
Target (Usable Questionnaires)	200	200
Pilot Testing	40 samples/bid x 3 bids = 120	

The total final sample size for the other case studies was as follows: rhino, Vietnam: 690; spoonbill, Macao: 400; eagle, Philippines: 1,200; marine turtle, four countries: 3,680.

Adjustments for Certainty

Respondents were asked how certain they were of making the payment if the proposed conservation program would be implemented. The choices given were: completely sure, sort of sure, not so sure, and not sure at all. Those who answered 'yes' to WTP question but are either 'not so sure' or 'not sure at all' were re-classified as 'no' respondents. This approach is similar to the method used by Champ et al. (1997 where 'yes' respondents who expressed degrees of uncertainty to the dichotomous choice WTP question were reclassified as 'no' respondents.

Dealing with Protest Responses

Various possible reasons (based on a series of FGDs) why respondents would not be willing to pay were included in the questionnaire as a debriefing question. Table 1 classifies the possible reasons as a valid 'No' or as a protest response. Two of the reasons -- "Majority of the poor will be affected" and "Only those from higher income groups should pay for this" -- can be either a valid 'No' or a protest response. They were classified under the latter category if the respondent was considered as poor according to his/her asset list reported in the survey. Respondents were allowed to choose a maximum of three reasons why they answered 'No' to the referendum question. If the sample chose at least one of the 'protest No' reasons, he/she is considered as a scenario rejecter under the condition that he/she also answered 'No' to the follow-up WTP open-ended question. Otherwise, if he/she indicated willingness to pay an amount other than the bid given in the follow-up WTP

question, his/her response is considered as a valid ‘No.’

Reasons for Unwillingness to Pay
Reason
Valid ‘No’ Response
I do not think conservation of whale sharks is worth doing
I cannot afford to pay for the program
I think that other species are more important than this one
I prefer giving money to humanitarian cause instead
Only people who will directly benefit from conservation should pay for this
Only those from higher income groups should pay for this*
Majority of the poor will be affected*
Protest Response (Scenario Rejecters)
I do not believe that the money I will pay will actually be used for conservation
I do not like adding the amount to my electricity bill. Find other alternative means except electricity charge
Only those from higher income groups should pay for this*
Majority of the poor will be affected*

Note: *Protest bid or valid “no” if respondent is actually poor.

Scope Test

In the Philippine eagle study, respondents were shown one of two conservation scenarios.

Scenario I: Comprehensive Mindanao Philippine Eagle Conservation Program

The current conservation program would be expanded to cover the whole Mindanao region. This means that the current area of 300,000 hectares will be increased to about 4.3 million hectares, representing almost 80 percent of Mindanao’s estimated forest areas. The conservation activities will include habitat/forest protection, in-situ breeding activities, conservation education program, and community-based (with a livelihood component) protection initiatives. These activities are expected to increase the survival rate of the Philippine Eagle from “fair” to “good”.

Scenario II: National Comprehensive Eagle Conservation Program

The current Conservation Program will be expanded to cover the four regions of the country known to be habitats of the Philippine Eagle. The area to be placed under protection is close to 8 million hectares. The conservation activities will include habitat/forest protection, in-situ breeding activities, conservation education program, and community-based (with a livelihood component) protection initiatives. These activities are expected to increase the Philippine Eagle's survival rate from “fair” to “excellent”.

The purpose of this was to see if respondents were “scope sensitive” – i.e. willing to pay more for a larger program. The results are discussed in the Philippine eagle chapter.

Model Estimation Procedure: Parametric

Mean and median WTPs with the dichotomous choice format are traditionally calculated from the coefficients relating the WTP responses against a constant and the bid (BID). An additional vector of socioeconomic variables (X) can also be factored into the model. The coefficients are typically estimated based on a logistic function:

$$P_i(\text{yes}) = F_i(\Delta V) = \frac{1}{1 + \exp(-\Delta V)} = \frac{1}{1 + \exp[-(\alpha + \beta_1 \text{BID} + X' \beta_2)]}$$

where α and β are coefficients to be estimated and *BID* is the amount the respondent was asked to pay.

The logit model above is then estimated using the maximum likelihood estimation method, which is the most common technique for estimating the logit model (Lee 1997). The log-likelihood function is

$$2) \quad \log L = \sum_{k=1}^N I_k \ln F_{\epsilon}(\Delta V_k) + (1 - I_k) \ln(1 - F_{\epsilon}(\Delta V_k))$$

where I_k is an indicator variable for observation k . If the answer is *yes*, $I_k = 1$; otherwise, $I_k = 0$.

Finally, the mean WTP can be determined using the formula:

$$\text{Mean WTP} = -\frac{\alpha}{\beta}$$

where α is the covariate parameters and β is the parameter of BID. In this case, median WTP will be equal to mean WTP.

Model Estimation Procedure: Non-parametric

Given the single-bounded, dichotomous choice question with a series of positive price bids, denoted as B_j , $j = 1, 2, \dots, j$, respondents were presented with one of these bid prices and they indicated whether or not they were willing to pay such amount. It is assumed that there exists a bid level at a value of zero wherein, if presented to a sample, all of the respondents would be willing to pay this amount.

Point estimates of the survivor function can only be calculated at each of the J bid levels. The following notations are used for estimating the point estimates:

- If the number of households in the sample is denoted as N , then the sub-sample facing bid level B_j can be denoted N_j .
- The households replying 'Yes' WTP are those respondents that have a higher WTP than the B_j amount. This amount is denoted as n_j .

And considering the assumption that everyone is willing to pay a non-negative amount for the non-market environmental good, it can therefore be set to $\hat{S}(B_0) = 1$.

From the equation, a point estimate of the survivor function at each bid level can be generated by dividing the number of respondents who answered 'Yes' to that bid level by the number of respondents in that sub-sample.

$$\hat{S}(B_j) = \frac{n_j}{N_j} \quad j = 0 \text{ to } J$$

In cases wherein the survivor function is not a non-increasing function, it will not generate a valid survivor function. To correct such problem, a technique known as the pooled adjacent violators algorithm can be employed. The technique includes pooling data for two adjacent bid levels if the estimate of the survivor function for the higher bid level is greater than that for the lower bid.

$$\hat{S}(B_j) = \hat{S}(B_{j+1}) = \frac{n_j + n_{j+1}}{N_j + N_{j+1}}$$

Mean WTP is then calculated using:

$$MeanWTP = \sum_{j=1}^J \hat{S}(B_j) [B_j - B_{j-1}]$$

**APPENDIX: SAMPLE QUESTIONNAIRE
CONSERVATION VALUE OF WHALE SHARKS:
SURVEY OF SORSOGON RESIDENTS**

(Mandatory payment vehicle, English version)

Introduction:

Good day! This is a survey sponsored by the Economy Environment Program for Southeast Asia (EEPSEA). The purpose of this survey is to find out how people in SORSOGON think about a conservation program to protect whale sharks in Donsol, Sorsogon. A similar survey is being done in three other countries: Thailand, Vietnam and China, but each of this country looks into a different endangered species. Here in the Philippines, we are focusing our study on whale sharks in Sorsogon.

Your household was randomly chosen to be part of the study. It will probably take you about 30 minutes to complete the questionnaire. I would like to assure you that whatever information you will reveal in the survey form will only be used for this research. Please take note that the information presented in the questionnaire below regarding the Conservation Program for whale shark is not yet in existence. The Program is presented, for the purpose of this survey, so that we can get your opinion on this matter.

If anything is unclear, please make note of any questions you might have. We will try to answer your questions when we come back to pick up the questionnaire.

There is no right or wrong answer to the questions. We only want to find out your honest opinion. We would like to request that only the <male/female> (*to be identified by the enumerator*)_household head (husband/wife/ employed sons or daughters) should answer this questionnaire. However, you may consult with other members of your household when answering the questionnaire if you wish. We also request that you NOT discuss the questions with your neighbors or other people outside your immediate household before you provide your answers.

If this questionnaire is fully accomplished, you will qualify for a raffle, which will give you a chance to win any **ONE** of the following prizes: (Please check the prize of your choice – check only ONE)

- ___ Grocery coupon worth ₱ 10,000
- ___ two-year subscription of National Geographic magazine
- ___ All expenses paid tour for Donsol whale shark watching for two (2)

This raffle will be drawn on December 15 at Sorsogon Provincial Capitol. We will call you in case you will win.

Name of the respondent (optional)	
Complete Address	
Phone Number	
Date form was left	
Date form was picked up	
Interviewer/Facilitator	

SECTION 1: Problems Facing the Country

1. In your opinion what are the ***THREE BIGGEST PROBLEMS*** facing our country today? On the right column, place 1 if you think it is the biggest problem, 2 if it is the second biggest, 3 if it is the third biggest problem.

Problem	Rank (Choose which is 1, 2 & 3)
a. Economic Problems (e.g., inflation)	
b. Poverty	
c. Education	
d. Health	
e. Crime, violence, inequality	
f. Government and Governance	
g. Infrastructure (e.g. roads, water)	
h. Environment	
i. Terrorism	
j. Relations with other countries	
k. Others:	

2. Do you think our environment and natural resources are properly taken care of? Please tick your choice.

☐

Yes

☐

No

3. What do you think are the ***THREE (3) MOST*** important issues related to nature and human impact on the natural environment? On the right column, place 1 if you think it is the most important problem, 2 if it is the second important, 3 for the third most important. (Choose only 3)

Natural Resource & Environmental Problem	Rank (Choose which is 1, 2 & 3)
Air pollution	
Water pollution	
Solid waste	
Increasing number of endangered species	
Deforestation	
Traffic problems	
Flooding due to soil erosion	
Enhanced greenhouse effect (reason why heat cannot exit earth)	
Destruction of coral reefs (this is the spawning and feeding area for fish)	
Others, pls. specify	

SECTION 2: Attitude Toward Conservation & Knowledge Of Whale Sharks

4. In terms of endangered species protection, which species do you believe is more deserving of protection? On the right column, place 1 if you think it is the **most important species**, 2 if it is the second important, 3 for the third most important species.

Species		Rank	Species		Rank
A		_____	D		_____
	Dugong			Whale Shark	
B		_____	E		_____
	Rhino			Spoonbill	
C		_____	F		_____
	Marine Turtle			Eagle	

5. Please read the following statements and tell us your opinion by choosing a grade between Strongly agree/Agree/ Indifferent/Disagree and Strongly disagree for all the issues enumerated below. Please remember that there is no right or wrong answer to these questions. Please check (✓) the column to enter your answer.

Note: Endangered species are plants and animals considered to be facing a high risk of extinction.

Statement To Agree/Disagree On...	Strongly Agree	Agree	Indifferent/ Neutral	Disagree	Strongly Disagree
The government should raise more funds to deal with environmental programs in this country.					
There are more important environmental concerns than endangered species conservation.					
Poaching of wildlife species should be punishable by law.					
It is everyone’s duty to ensure that plants and animals as we know them today will exist for mankind in the future.					
Citizens should contribute to endangered species conservation by making cash donations to this cause.					
Endangered species are important even if I don’t get to see them.					
The government should raise taxes to pay for more endangered species protection					
The government should first invest in helping people before it spends money on endangered species protection.					
Households who earn more income should pay higher taxes in order to pay for endangered species conservation.					
Endangered species conservation should not be a high priority concern of the government.					

6. The following questions are about whale sharks.

Yes	
No	

Please tell me whether the following statements are “True” or “False” – or just indicate "Don't Know" if you are unsure of the answer.

7. The whale shark is the largest fish in the world.	True	
	False	
	Don't Know	
8. Whale sharks do not stay in one place. They migrate to different parts of the ocean.	True	
	False	
	Don't Know	
9. The congregation of whale shark in Donsol is claimed to be the largest in the world.	True	
	False	
	Don't Know	
10. The whale sharks have slow reproductive rates and the continuing presence of one or a combination of these threats could easily wipe out the entire population	True	
	False	
	Don't Know	

Important: Please read the brochure attached to this survey form where you can find the details about the Whale Shark Conservation Program before you proceed with this survey. The succeeding part of the survey would not make sense to you and it would be very difficult to answer the following survey questions without reading the brochure first.

You can tear off the brochure from this survey form and keep it for your own use after you've read it thoroughly.

SECTION 3: A Conservation Plan for the Protection of Whale Shark

Implementing the many good ideas in the Conservation Program would require a lot of money. So far, there is no clear agenda where to get funds to carry out the activities in the Conservation Program.

The local government of Donsol regularly earmarks a portion of its budget for whale shark protection. However, this is not enough to cover the expenses for the implementation of the Conservation Program. One possible source of fund is to set up a **Whale Shark Trust Fund** wherein residents of Sorsogon will give an amount to the Fund by way of the **Whale Shark Conservation Fee**. However, setting up a Whale Shark Conservation Fund is not easy. It takes considerable effort.

We are undertaking this survey to find out if enough people from Sorsogon would be willing to pay a share to the fund to make it worthwhile. One proposal for fund collection is that people would give to the Trust Fund by paying a ***surcharge to their SORECO electricity bill which would serve as their part for setting up Whale Shark Trust Fund.*** The amount of the surcharge would be fixed for all households (meaning it would not vary by the level of household's electricity consumption and it would not vary in time). We know that there is not such a close connection between whale sharks and electricity bill. But after a series of consultations, we found out that it is only by this way would it be possible to collect payments from almost all households so that the responsibility for protecting whale sharks in Donsol will not just fall on select people or sectors. Given this situation, we are assuming that SORECO would be willing to collect the surcharge and ***ALL*** the money would be transferred to the Trust Fund and will only be used for Butanding Conservation Program. Naturally, the very poor households in our society who do not have electricity connection will not be required to pay anything for the conservation.

Let us suppose that there would first be *voting*. The purpose of this referendum would be to see how many people in Sorsogon would be willing to support a plan *to impose a monthly fixed surcharge on everyone's electricity bill.* Suppose that the SORECO bill surcharge would be adopted to support the *Whale Shark Conservation Program* only if greater than 50% of the people would vote positively to this plan.

Assume that this fixed surcharge would be added to your SORECO ***bill every month for the next five (5) years. All funds*** raised through the SORECO surcharge ***would go to the Whale Shark Trust Fund*** that will be ***managed and administered*** by the ***Whale Shark Conservation Management Board***, a multi-sectoral entity. In other words, SORECO will not have any role in managing the funds, it will only collect and will automatically transmit the money to the Trust Fund every month.

The reason that the surcharge would end after five (5) years is that it is expected that this would raise enough money to establish a trust fund. The income from this trust fund could be used by the *Whale Shark Conservation Program* far into the future.

PLEASE REMEMBER: The ***survey*** you are participating in today ***is only to find out your opinion*** about this matter. We are simply interested in finding out how you would vote ***IF*** an actual referendum would take place.

Past studies have found that many people say that they agree with a program like this when they are asked their opinion in a survey, but they actually vote ‘No’ when the actual voting takes place. In other words, respondents have a tendency to say things in the survey that they do not really mean to do. Researchers are not sure why people do this. It may be because it feels good to say ‘yes’ in a survey when people do not actually have to pay. Or it may be to please the person dropping off the survey.

We are requesting that you would answer based on how you would really vote if there will be an actual poll. Please vote positively in this survey only if you are really willing to pay a surcharge in your electricity bill for Whale Shark Conservation Program.

11. Would you vote in favor of *Whale Shark Conservation Program*?

The *Whale Shark* Conservation Program would mean that you and the other households in Sorsogon would pay a fixed monthly surcharge of PhP__ _ through the electricity bill. Remember that the surcharge of PhP__ _ will be collected every month for 5 (or 10) years. All the money that will be raised will go to the *Whale Shark Trust Fund to finance the Conservation Program* described above.

☐ Yes (Go to Number 15)

☐ No (Go to Number 12)

12. If you voted ‘NO’, what are the reasons why you did not vote for the program? Please tick the most appropriate answers (limit your answers to 3).

☐	I do not think the conservation of Whale Sharks is worth doing
☐	I do not believe that the money I will pay will actually be used for Whale Shark Conservation.
☐	I think that other species are more important than Whale Sharks.
☐	I do not like adding the amount to my electricity bill. Find other alternative means except electricity surcharge.
☐	A lot of poor people will be affected
☐	I prefer giving money to humanitarian cause instead
☐	I do not earn enough money that can pay for the Program
☐	Only people who directly benefit from Whale Shark conservation should pay for this
☐	Only those from higher income groups should pay for this.
☐	Others (pls. specify)

13. IF you voted 'NO' to the proposal of setting up the Whale Shark Conservation Program given that this will cost your household a monthly payment of <bid> over 5 years, is there any amount that you would be willing to give to support the Whale Shark Conservation Program?

☐

Yes (Go to Number 14)

☐

No (Go to Number 16)

14. If YES, what amount would this be? <Currency> _____/month
- - - - (Go to Number 15)

15. If you voted 'Yes', what was it about the Conservation program that convinced you to vote positively for it? Check the most appropriate answers (limit your answers to 3).

	The whale shark is a special animal and should be protected
	It is high time that people in Sorsogon do something concrete about protecting the whale shark in Donsol
	This initiative can lead to more protection efforts for other endangered species in the country.
	Other, please specify

16. Before you began answering this questionnaire, did you think there were real threats to whale sharks as described? Please check your answer.

☐

Yes

☐

No

17. Please rank the following according to how effective you think they would be in encouraging people to contribute to a Whale Shark Conservation Fund. **Write number 1 in the box** for the method you think is **most effective**, and then **2, 3, 4, etc. for the methods you think are less effective**.

	<i>Rank (1, 2 and 3)</i>
Provide more information to the public about the problems of Whale Shark	
Provide more information about the charitable organizations and their activities so people know the channels how to help	
Create more transparency and accountability about how to help	
Rely on celebrities to promote and disseminate information about the importance of protecting whale sharks	
Make it convenient for people to donate	
Get organizations to publicize their activities	
Others, specify	

You’ve almost finished answering this survey. At this point, we’d like to give you a chance to think back and further evaluate your answer to the referendum question I asked you earlier regarding the Conservation Plan to protect whale sharks.

18. How certain are you that you would vote 'YES'/'NO' in Question Number 11 if such an election whether to implement Whale Shark Conservation Program were to really take place?

Completely sure/Definitely vote YES/NO	
Somewhat sure	
Not very sure	
Not sure at all	

19. When you decided on your vote, did you believe the information provided in this survey with regards to the status of the whale sharks? Please check your answer.

☐

Yes

☐

No

20. If no, why not? Please limit your answers to 3.

21. When you decided on your vote, did you believe that the Whale Shark Conservation Program will actually be effective in saving the Whale Sharks? Please check your answer.

☐

Yes (Go to #23)

☐

No (Go to #22)

22. If no, why not? Please check the most appropriate answers (limit your answers to three)?

	1. The funds may not be used to support the program activities due to graft and corruption
	2. The funds may not be used to support the program activities since the government may channel it to other uses
	3. The funds may not be remitted on time by the collecting agency
	4. Others, pls. specify

23. When you decided on your vote, did you like the proposal to collect people’s contribution as a surcharge on their electricity bill?

☐

Yes (Go to #26)

☐

No (Go to #24)

24. If No, why not? Please check your answer/s. (Limit your answer to three).

	a. The electricity bill is always increasing. I'm afraid that paying for the Conservation program will further cause the increase of my bill.
	b. I can't see any connection between electricity and whale shark conservation – it doesn't have any basis.
	c. Not everyone is connected to SORECO – how can you collect from those not connected?
	d. The collection should not be mandatory every month - why can't we just pay when we want to?
	e. Monthly collection is too complicated - why not make this an annual payment?
	f. SORECO is not bound by law to do this – I don't know what will make them agree to do this task for Whale Shark Conservation Program.
	g. Others, pls. specify :

25. If you don't agree to the electricity bill surcharge, do you have other suggestion as means of collecting payment from the people of Sorsogon for Butanding Conservation Program?

1.
2.
3.

We are almost finished but before we wrap up, we'd like to ask some general information about you and your household that we will use as basis for analyzing your answers.

SECTION 4: Household Data

Household Water Services

26. What is the main source of drinking and cooking water in the house?
Please check all applicable.

Private or shared water connection	
Own shallow well/hand pump	
Bottled water	
Water vendor	
Public (communal) tap	
Public (communal) well or hand pump	
River/Spring	
Rain water	
Other (please specify)	

27. How much was your household's own water bill last month? Or if you share the bill, how much was your share?

Monthly water bill	PhP
--------------------	-----

Electricity

28. Does your household have electricity?

☐

Yes

☐

No (Go to Number 31 & following)

29. Does your household pay the entire electricity bill, or share the bill with anyone outside your household?

Household paid entire bill	
Shared bill with someone else	

30. How much was your household's own electricity bill last month? Or, if you share the bill, how much was your share?

PhP_____ - last month

31. What is the main fuel used for cooking in the house? Please check your answer.

Electricity	
Bottled Gas (LPG)	
Kerosene	
Charcoal	
Firewood	
Others	

House Characteristics

32. Does your household own this house/apartment? Please check one.

Own	
Rent	
Provided by Employer	
Others, pls. Specify	

33. How many rooms does your house have (excluding the kitchen and bathrooms)

of rooms_____

Socioeconomic profile of the HOUSEHOLD HEAD-respondent (information should pertain to source of information).

34. How old are you?

Age	
-----	--

35. Gender

☐

Male

☐

Female

36. Civil Status

☐

Single

☐

Married

☐

Others, please specify_____

37. Religion

Roman Catholic	
Protestant	
Islam (Muslim)	
Buddhism	
Hindu	
Confucianism	
No religion	
Other (please specify)	

38. Are you able to read newspaper? Please check one.

☐	Able to Read
☐	Yes, but with some difficulty in understanding
☐	No, I can't read it

39. Highest Educational Attainment. (PLEASE GIVE the highest level attended on the left column. For example, college – 4th year)

No formal schooling	
Elementary	
High school	
Vocational	
College	
Master's	
Higher than Master's degree	

40. Please list number of household members per age group

Children (<12 yrs)	
Teens (13-17 yrs)	
Adults (above 18 yrs)	

41. How many in your family, including yourself, are earning cash income?

☐

Male

☐

Female

42. Please check the average monthly HOUSEHOLD income bracket where your household belongs (include the cash earnings of all family members who are working or gainfully employed, including yourself). Please check one.

Below PhP 5000	
PhP 5,000-10,000	
PhP 10,001-15,000	
PhP 15,001-20,000	
PhP 20,001-25,000	
PhP 25,001-30,000	
PhP 30,001-35,000	
PhP 35,001-40,000	
PhP 40,001-45,000	
PhP 45,001-50,000	
PhP 50,000 & above	

43. Please indicate ***how many*** items your household owns for each of the following

Fan	
Radio	
Television	
Refrigerator	
Washing Machine	
Motorcycle	
Air conditioner	
Computer	
Car	

Economic Status and Access to Credit

44. How would you classify the economic status of your household relative to others in this country? Please check one.

Much better than most people (rich)	
Better than most people (relatively well off)	
About average	
Below average	
Much worse than average	
Don't know	

45. How easy would it be for your household to borrow PhP 5,000 from a bank or someone who was not a relative?

Very Easy	
Somewhat easy	
Somewhat difficult	
Very Difficult	
Impossible	
Don't know/not sure	

46. In the past year, did your household make donations to any charitable causes?

☐ Yes

☐ No

47. Are you a member of any environmental organizations?

☐ Yes

☐ No

48. Did you discuss the questions in this survey with other household members before you answered them?

☐ Yes (Go to Number 49) ☐ No (Go to Number 52)

49. If Yes, which of the following best describes how your household answered the questions in this survey?

I discussed some of the questions with others, but the answers I gave represented my own opinions	
We discussed together how to answer the questions together and gave our household's best judgment	
Others (pls. specify)	

50. How much time do you think you spent discussing the questions with other members of your household?

≤5 minutes	
6-15 minutes	
16-30 minutes	
31-60 minutes	
> 60 minutes	

51. Do you think your answers to the questions would have been different if you had been able to discuss them with other members of your household?

☐ Yes

☐ No

☐ Don't Know

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Mobilizing Resources for Marine Turtle Conservation in Asia: A Cross-Country Perspective

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INTRODUCTION

Marine turtles are important, not only for their economic and intrinsic value, but because the presence of an adequate population of marine turtles is often an indicator of healthy marine ecosystem (Perrine, 2003). Of the seven species of marine turtles, four are classified by the International Union for the Conservation of Nature and Natural Resources (IUCN) as critically endangered, while two are in the next-highest risk category IUCN, 2002).

The marine turtles' status in Asia is of interest for two reasons. First, human activity in the region presents a wide variety of threats, including excessive and illegal harvesting for meat,



Photo by Gerald Cubitt

shells, skin and eggs; habitat loss from development of beaches; destructive fishing methods such as dynamite fishing and use of drift nets; and pollution from shipping and tourism. Many of these threats are increasing rapidly with economic growth (IUCN, 2002; Safina, 2006). Second, marine turtles are a migratory species; their habitat is shared among a large number of countries such as China, the Philippines, Cambodia, Thailand, Malaysia, Vietnam and Indonesia. Coordinated policies to conserve marine turtles are thus likely to be *more* effective than those pursued by countries on their own. There is evidence of willingness of countries in East and Southeast Asia to collaborate but so far the measures taken have not been adequate to the challenge.¹

¹ An example is the Turtle Islands Heritage Protected Area (THIPA) which is a transboundary protected area initiated in 1997, and has been jointly implemented by the Philippines and Malaysia.

This paper reports the results of a comparative research project carried out in China, Thailand, the Philippines and Viet Nam. It explored the prospects for increased regional or national efforts to conserve marine turtles in Asia; whether Asians value turtles more for their use as food, shells, etc., than for non-use values; whether Asians are aware of marine turtles and their plight; and whether there is sufficient local willingness to pay to support larger conservation efforts.

Using a common survey instrument, we applied the contingent valuation method (CVM) to assess the willingness of local populations to pay for the conservation of marine turtles. We estimated local willingness to pay and explored how a variety of payment vehicles affected people's decisions to support national and regional conservation plans. The survey instrument included an extensive set of attitudinal questions that allowed us to assess the relationship between respondents' attitudes, socioeconomic characteristics, and willingness to pay.

The surveys were administered by dropping off questionnaires at people's residences, using similar procedures and protocols in each study country. Altogether 3,680 respondents participated in the survey; these were randomly selected spreading across all administrative districts in Beijing, Ho Chi Minh City, Hanoi, Bangkok and Davao City. The most populous of these cities is Beijing with over 15 million people; the smallest is Davao City in the Philippines, with about one million. Average annual per capita income ranges from 540 USD for Ho Chi Minh City/Hanoi to 2,490 USD for Bangkok. There are also variations in culture and familiarity with the uses of marine turtles.

ATTITUDES TOWARDS ENVIRONMENT, WILDLIFE AND MARINE TURTLES

We asked respondents to rank ten public policy issues: economic problems, poverty, education, health, crime/violence/inequality, government/good governance, infrastructure, environment, terrorism, and relations with other countries. The survey revealed that people in all four countries accord relatively low priority to environmental protection. Only in Beijing does it appear among people's top three concerns. While environmental concerns do not feature as priority concerns, over 70% of the respondents in all four countries agree that environmental problems are not properly taken care of.

Table 1: Social and Economic Priorities

Rank	Beijing N=600	Davao City N = 847	Bangkok N=789	Ho Chi Minh City/Hanoi N=1,444
1	Economic problems	Economic problems	Economic problems	Economic problems
2	Good Governance	Poverty	Poverty	Good Governance
3	Environment	Good Governance	Good Governance	Education

N = the total number of respondents surveyed.

Among environmental issues, we assessed how strongly people feel about the protection of wildlife. Respondents were asked to rank nine environmental issues: air pollution, water pollution, solid waste, loss of endangered species, deforestation, traffic congestion, soil erosion, global warming, and destruction of coral reefs. In none of the cities did wildlife conservation appear in the top three environmental concerns.

Table 2: Environmental Priorities

Ranking	Beijing N=600	Davao City N = 847	Bangkok N=789	Ho Chi Minh City/Hanoi N=1,444
1	Air pollution	Deforestation	Traffic congestion	Air pollution
2	Water pollution	Solid waste	Deforestation	Water pollution
3	Traffic congestion	Air pollution	Air pollution	Deforestation

N = the total number of respondents surveyed.

Among the top three priorities, there are few surprises. It appears that people are primarily concerned with environmental problems that affect their daily lives. Davao City was the only city where a non-urban issue (deforestation) ranked first, probably because it is located close to natural forests and has faced increasing incidences of flooding.

Studies have highlighted that conservation efforts for less-known species have less public appeal than species that are more charismatic, cute or familiar (Tisdell and Wilson, 2006). If this is the case, marine turtles may have fairly strong appeal. First, as Table 3 reveals, the marine turtle is not an obscure species. Asians are familiar with them, although they may not have seen live turtles, or consumed their meat or eggs. These are, after all, urban populations with access to television, and as our survey results suggest, this may be more

important source of information about environmental issues than formal education.

Table 3: Familiarity and knowledge about marine turtles

	Beijing N=600	Davao City N = 847	Bangkok N=789	Ho Chi Minh City/ Hanoi N=1,444
Have you ever seen a live Marine Turtle?	53%	67%	57%	24%
Have you ever eaten marine turtle eggs or meat?	3%	9%	7%	2%
Have you ever purchased or owned a product made from the shell of a marine turtle?	6%	4%	10%	5%
Do you watch Discovery Channel, or National Geographic or any television show or video document about marine turtles or other animals?	81%	79%	98%	78%
Marine turtles have cultural value in some societies in Indonesia, Thailand, China and Malaysia (temple ceremonies, ‘release of life’ ritual, etc	44%	27%	51%	45%
Marine turtles lay their eggs on land.	80%	77%	85%	84%

Figures shown are percentage of people who said ‘yes’ and who gave correct answers to knowledge questions.

N = the total number of respondents surveyed

Second, respondents in the five cities surveyed showed common preferences for marine turtles. The survey asked respondents to prioritize six endangered species for priority of allocation of conservation resources; the species were marine turtles, dugongs, whalesharks, Philippine eagles, black-faced spoonbills and Javan rhinos. In all cases, marine turtles were ranked either first or second. ²

² The survey was conducted by dropping off a questionnaire and information packet with each household and collecting it later. It is possible that some respondents read the entire survey instrument -- including the willingness to pay question about turtle conservation -- before filling out the attitudinal questions. If so, this may partially explain the high-ranking for marine turtles. But it does not explain the relatively low ranking for environmental issues and for wildlife conservation among environmental issues. So we have some confidence that the high priority accorded to marine turtles is not an artifact of the survey instrument.

Table 4: Ranking for priority in resource allocation

Rank	Beijing N=600	Davao City N = 847	Bangkok N=789	Ho Chi Minh City/Hanoi N=1,444
1	Marine turtles	Marine turtles	Dugongs	Javan rhino
2	Dugongs	Philippine eagles	Marine turtle	Marine turtles
3	Whale sharks	Dugongs	Whale sharks	Dugongs

N = the total number of respondents surveyed.

However, an individual may be concerned about animals in general or specific species, without taking action to prevent their extinction. He or she may assume that someone else will or should solve the problem. There is some evidence of this in the survey results. When 57% to 65% of respondents strongly agree that “*it is everyone’s duty to ensure that plants and animals as we know them today will exist for mankind in the future*”, we might conclude that most people have “pro-environmental” attitudes. When making personal trade-offs, however, there is a notable drop in supporting opinions. Only 4% of the respondents in Davao strongly agreed that ‘*governments should raise taxes for more endangered species protection*’. The percentage of ‘strongly agree’ in the other cities was similarly low.

THE POTENTIAL FOR PRIVATE CONTRIBUTIONS FOR MARINE TURTLE CONSERVATION

In order to assess willingness to pay (WTP), we constructed a hypothetical marine turtle conservation program. We provided information about the importance of marine turtles to coastal and oceans ecosystems; described the threats and risks of extinction; and introduced a hypothetical marine conservation program. We then asked respondents whether they would be willing to contribute to the program by paying a monthly surcharge on their electricity bills for a period of five years.

We adopted this payment vehicle because focus group discussions conducted prior to our pre-tests and surveys revealed a distinct lack of enthusiasm for taxes as a payment vehicle. Among the explanations offered was that people believe they are already too highly taxed or do not believe the taxes will be effectively collected or used. Distaste for taxes as a payment vehicle is a finding of many contingent valuation studies, not only in East and Southeast Asia (Bateman et al, 2002; Champ et al , 2003).

We therefore tried to assess people's willingness to pay for conservation through an alternative payment vehicle: a surcharge attached to each household's electricity bills. We looked at two variants: a mandatory charge and a voluntary charge. In the mandatory payment scheme, respondents were presented with a hypothetical referendum and asked to vote for or against a specified monthly surcharge on all household electricity bills for a period of five years. Respondents were told to assume that if more than 50% voted to pass the referendum, the surcharge would be imposed on all households regardless of how they voted. In the voluntary payment scheme, respondents were asked whether they would voluntarily make a private contribution, with no assurance that anyone else would pay it.

We asked separate groups of respondents their willingness to pay for one of three marine turtle conservation packages: (i) a region-wide program financed through a mandatory charge, (ii) a region-wide program financed through voluntary contributions, and (iii) a national program financed through a mandatory charge.

The region-wide programs would involve the collaboration of many countries, including the four surveyed. In principle, the likelihood of success of the regional program would be greater than that of a single-country program, given the species' transboundary habitat. For the region-wide program to be financed by the mandatory charge system, over 50% of respondents in each of the four countries would have to vote in favour for the program to be implemented. In other words, respondents were told to assume that if the referendum did not pass in one of the countries, the international effort would not go ahead.

1,249 respondents were randomly selected to respond to the region-wide program with mandatory payment; 1,220 to the region-wide program with voluntary payment; and 1,211 to the single-country program with mandatory payment. Each set of respondents was divided into five groups, each of which was asked to give a yes-or-no response to one of five amounts, or bid levels, ranging from 0.02 USD to 7.5 USD per month.³

Our findings show that, while respondents are familiar with marine turtles and believe them to be important, they are not concerned to a degree that would lead them to make personal trade-offs by making private contribution. Table 5 shows that only the lowest surcharge (0.02 USD) would pass a referendum in all four countries. For Davao City,

³The results are from parametric estimates assuming normal distribution

Bangkok, Hanoi and Ho Chi Minh city, the referendum would also pass at next lowest bid prices which were 0.1 USD, 0.25 USD and 0.5 USD respectively. The second lowest bid for Beijing was 0.5 USD and only 48% of the respondents voted to pass the referendum. At bids of 1 USD and above, the referendum would not pass in any of the countries.

Table 5: The number of respondents saying ‘Yes’ to each bid under the Regional Mandatory Program

Bid (US\$/month/hh)	Beijing	Davao	Bangkok	HCMC&Hanoi
(.02USD)	30 (75)	32 (56)	39 (67)	78 (81)
0.1		30 (56)		
0.25			37 (66)	
0.5	19 (48)			68 (69)
(1USD)	16 (40)	17 (28)	20 (36)	44 (44)
2USD		17 (31)		
2.5 USD			18 (33)	
(5 USD)	8 (20)	11 (20)	7 (13)	17 (17)
7.5USD	2 (5)			20 (21)

The shaded rows are the three common bid values used in all four countries. However, Bids 2 and 4 are set differently.

Figures in parenthesis are percentages of ‘Yes’ responses from the number of respondents in the split sample.

For each city surveyed, we found that respondents were willing to make only small payments. In the Regional Mandatory Conservation Program, the mean WTPs for Davao City were 0.17 USD/household/month and for Ho Chi Minh City and Hanoi at 0.83 USD/household/month.¹ MWTP for the two higher income cities were 1.16 USD and USD 1.41 per month per household for Beijing and Bangkok respectively. These values are comparable to the WTP values for other species from studies in Asia⁴.

⁴ MWTP (Mean Willingness to Pay) for the black-faced spoonbill in Macao was estimated at 9.51 MOP (1.19USD)/household/month [8]. MWTP for Philippines’ whale sharks0.5USD/household/month for whalesharks [9] where as the estimated lump sum contribution to conservation measures for the Philippines eagle was 63 US\$/household [10]. Estimated MWTP for the Javan Rhino based on CVM study conducted in Vietnam was 0.21USD USD/household/month [11]

Table 6: The number of respondents saying ‘Yes’ to each bid under the Regional Voluntary Program

Bid (US\$/month/hh)	Beijing	Davao	Bangkok	HCMC&Hanoi
(.02USD)	29 (73)	36 (60)	42 (81)	60 (65)
0.1		38 (69)		
0.25			31 (61)	
0.5	23 (58)			60 (61)
(1USD)	20 (50)	18 (33)	19 (35)	27 (29)
2		17 (30)		
2.5			20 (38)	
(5 USD)	7 (18)	11 (19)	9 (17)	20 (20)
7.5USD	3 (8)			11 (12)

The shaded rows are the common bid values used in all four countries. However, Bids 2 and 4 are set differently

Figures in parenthesis are percentages of ‘Yes’ responses from the number of respondents in the split sample

We also found no significant difference in the level of support for variations in the conservation programs we offered. With the exception of HCMC/Hanoi, where results suggest that respondents would be willing to pay significantly higher for the mandatory program, respondents in Beijing, Davao City and Bangkok appear to be indifferent. Nor were there significant differences in the MWTP between international and national scale of efforts. Again, HCMC/Hanoi is the exception where the MWTP for the conservation efforts is higher for the international scale conservation efforts.⁵

One encouraging finding is that a significant percentage of respondents would voluntarily pay, regardless of whether or not other people paid. Moreover, while the estimated MWTP values presented earlier are indeed low

⁵ We asked separate groups of respondents their WTP for a national and a (larger) international program, partly with the intention of using this as a “scope” test to see if respondents were making rational choices. However, there is reason to believe that such “external” scope tests are unrealistic; valuation is an inherently comparative process (M. Hanneman, personal communication). For this reason, we do not believe that the apparent scope-insensitivity of respondents invalidates our findings.

and lower than WTP values in developed countries for endangered species, given the large income difference between the US and the four countries surveyed, this difference in mean WTP was not unexpected. For example, the average US citizen was willing to pay 7.5USD/hh/month (Loomis et al, 1996) for the spotted owl and 2.77 USD/hh/month for the gray-blue whale (Bulte and Van Kooten, 1999). But Gross National Income per capita for a US citizen in 2005 was nearly 16 times higher than that of Thailand.⁶

Thus, even if those who agreed to make voluntary contributions are not in the majority, and are willing to make only small contributions, they do constitute a potential source of finance for conservation.

SUMMARY AND CONCLUSIONS

Marine turtles play an important role in the ecology and well-being of coastal and open ocean environments. However, as a result of the adverse consequences of human activities, marine turtles have become endangered (Tisdell and Wilson, 2002). Action is needed to ensure the survival of most species of marine turtles. This cross-country study was conducted to estimate the willingness to pay of local people for marine turtle conservation.

A sample of 3680 household heads from Beijing (China), Davao City (Philippines), Bangkok (Thailand) and HCM/Hanoi (Vietnam) was surveyed for this study. Most respondents were articulate in providing both positive and negative answers to the WTP questions, as well as in giving their opinions about issues related to marine turtle conservation. Multivariate logit analysis revealed that income, bid values and the years of schooling were significant determinants of respondents' responses to the WTP elicitation question. The results also showed that cultural differences *per se* were not an important determinant of demand for marine turtle conservation.

Our survey results show that Asians were familiar with marine turtle. But a substantial sample showed zero WTP for marine turtle conservation. Our attitudinal survey showed that environmental conservation (e.g. endangered species protection) was a relatively low priority for respondents, who placed more importance on problems related to the economy, poverty and governance.

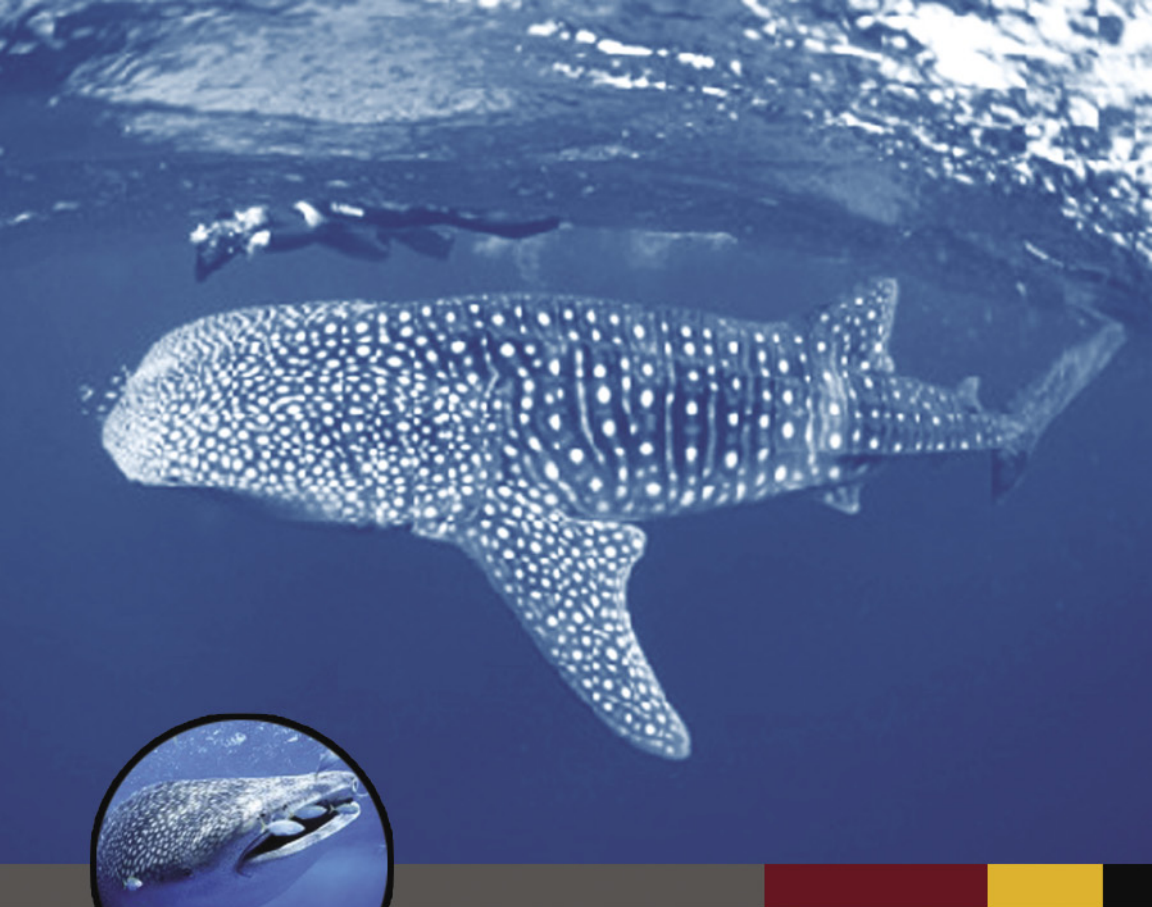
⁶ From World Bank's country statistics, GNI per capita for the US in 2005 was 43,740 US\$.

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**Willingness to Pay for
Whale Shark Conservation
in Sorsogon, Philippines**

Anabeth L. Indab

Willingness to Pay for Whale Shark Conservation in Sorsogon, Philippines

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INTRODUCTION

Societies continually make choices that affect their welfare. Tradeoffs are typically difficult to make, especially in a developing country where even basic needs are sometimes hard to finance. It then becomes an empirical question whether people from a developing country perceive any benefit from what can be considered as a non-essential good like the preservation of certain endangered species and would therefore be willing to sacrifice certain things for it. This study explored this particular issue in the case of whale sharks in Sorsogon, Philippines using contingent valuation methodology (CVM) to capture the value to people of preserving the species.

One of the most publicly known endangered species found in Philippine waters is the whale shark (*Rhincodon typus*), known as the world's largest fish. It has a migratory nature, making it vulnerable to a wide range of threats, hence requiring collaboration of various nations for its protection. The World Conservation



Photo courtesy of www.tourism.albay.gov.ph

Union (IUCN) has declared this species as vulnerable. Likewise, in 2002, the Convention on International Trade in Endangered Species (CITES) listed whale sharks on its Appendix II, which regulates international trade in species whose survival in the wild may be threatened if levels of trade are not regulated.

The town of Donsol in Sorsogon Province, the Philippines has the biggest known concentration of whale sharks in the world (cited by Jamoralin, n.d.). Donsol, Sorsogon is located on the southernmost island of Luzon. The November 2004 issue of *TIME* magazine identified the

whale shark interaction program in Donsol waters as the “Best Place for an Animal Encounter.” However, despite the precarious condition of this species and the privileged position of Donsol as ‘whale shark capital’ of the world, certain factors threaten the continuous migration and presence of whale sharks in the area. The local government of Donsol municipality is already investing in the protection of whale sharks in the area; however, its resources are not enough to cover all activities needed to be done. Toward this end, it is imperative to look at the viability of implementing a more comprehensive conservation program for whale sharks in Sorsogon.

This chapter uses contingent valuation methodology to estimate the willingness of Sorsogon residents to pay to preserve the continuous presence of whale sharks. The focus of this study is to determine whether or not such economic value or benefit for whale shark preservation exists for citizens of a developing country. If such value does exist, would such potential revenue be enough to cover funds for the implementation of a conservation program? The study also extracts some rough estimates to capture certain use values of whale shark that might be a relevant consideration in making an informed policy decision on whale shark conservation in Sorsogon.

The study used the CVM design common to all the chapters in this book, as described in Chapter 2. The principal findings are presented below.

RESULTS AND ANALYSIS

Socio-economic Data

Based on the 2000 Family Income and Expenditures Survey (FIES) of the National Statistics Office (NSO), Sorsogon had an average monthly household income of PHP 6,300 (approximately the same as that obtained in the survey) and an average monthly household expenditure of PHP 5,800 (Table 3). Also based on NSO records, food accounted for the bulk (53%) of the total family expenditure.

While whale shark conservation is not a household essential, it is a charismatic good that could potentially be subject to a warm glow response and even ‘yea saying’. As such, aside from using drop-off as the survey method and including budget reminder in the cheap talk, the study only targeted respondents who were considered as household financial decision-makers, banking on the assumption that they would be more objective with

Table 3. Demographic Information

Characteristic	Value
Number of Households	
Sorsogon Province	125,191
Sample Observations	588
Mandatory Payment Samples	293
Voluntary Payment Samples	295
Sample Observation Characteristics	
Age (average)	42
Gender: Male (% to total)	43.2
Civil Status: Married (% to total)	77.72
Educational Attainment (no. of years)	10.16
Ave. Monthly Household Income (PhP)	6,052 (121)
Sorsogon Province HH Economic Characteristics ^{1/}	
Ave. Monthly Household Income in PhP (\$)	6,300 (126)
Ave. Monthly Household Expenditure in PhP (\$)	5,800 (116)
Ave. Monthly Household Savings in PhP (\$)	500 (10)

Note: 1/ Reference: Sorsogon Physical Framework Plan

regards their respective households' financial standing. This explains why the majority of respondents were married, approximately half of them were male, and all of them were adults mostly currently employed (Table 3).

Using the drop-off survey method, a response rate of 98 percent was achieved; out of the 600 questionnaires distributed, 588 usable questionnaires were retrieved. For further consideration of potential biases, the WTP responses of the 588 observations were subjected to certainty consideration. Based on the study of Champ and Bishop (2001), when less certain WTP respondents were treated as if they had responded negatively, a statistically significant hypothetical bias disappeared. Uncertainty about the answer provided to a valuation question implies uncertainty about the tradeoff between the amenity in question and the monetary good, and therefore needs to be addressed prior to welfare estimation.

Incorporating uncertainty responses in the actual analysis requires that the positive WTP responses of those who answered 'Not very sure' or 'Not sure at all' to the WTP certainty question are changed to a negative response to the referendum question.

Results show that the uncertainty is not really considerable, the

“How certain are you that you would vote “YES”/”NO” in Question Number 11 if such an election whether to implement Whale Shark Conservation Program were to really take place?

Completely sure/Definitely vote YES/NO	
Somewhat sure	
Not very sure	
Not sure at all	

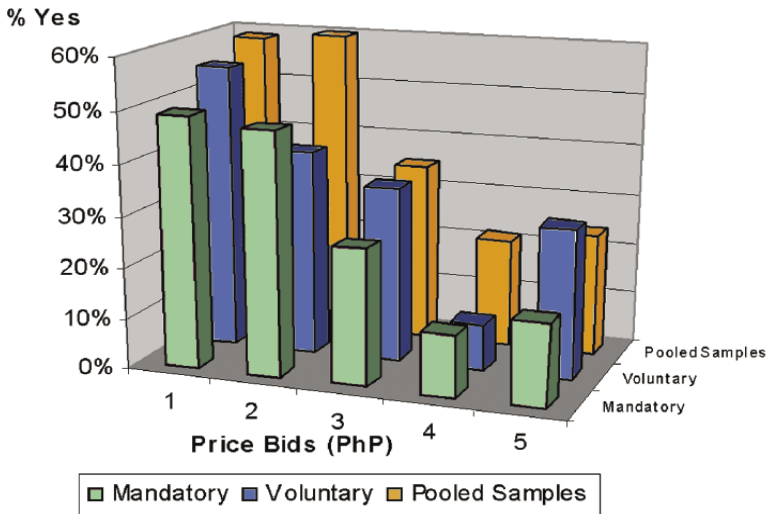
highest change being in the initial bid price (PhP 1), with 4 percent of positive WTP converted to negative WTP (i.e., from 50 to 46 percent) (Table 4). All the other bids registered a 1-2 percent decline in Yes WTP answers. The minimal certainty adjustment signifies a good sign of the respondents’ understanding about the hypothetical scenario.

Table 4. Distribution of WTP Responses

Bid Price PhP (\$)	Total Number of Observations	YES Response (%)	
		Uncensored	Adjusted to Certainty
1 (0.02)	118	50	46
5 (0.10)	119	39	38
10 (0.20)	121	33	32
50 (1.00)	115	17	15
100 (2.00)	115	16	15

The 588 observations were divided into two groups, with approximately half of them responding to the WTP question under a mandatory type of payment and the other half to a voluntary type of payment. Factoring in the certainty consideration, results of the WTP question show that if there will be a referendum voting that would require mandatory payment for the implementation of whale shark conservation program, the referendum in Sorsogon would not probably pass. As Figure 1 shows, the lowest bid used in the survey was already PhP 1 (\$0.02) and yet only a little over 40 percent of the observations in the mandatory split sample survey expressed a positive WTP on this bid level. To use a bid lower than this level would no longer be taken seriously by the respondents as it would appear ridiculously low or without any real economic value. Likewise, only a borderline majority would agree even to a voluntary type of payment for conservation.

Figure 1. % Respondents with WTP



Logistic Regression

Models and Hypothesized Signs

Table 5 outlines the hypothesized direction of effects of explanatory variables on WTP based on theoretical expectations and empirical regularities. The variables are categorized into three: Attitude and Awareness, Program Design and Socioeconomic Characteristics. Familiarity with whale sharks, particularly the experience of seeing a live one (SEEN), and knowledge of whale sharks (SCORE1) are expected to affect WTP positively. The perceived threat to whale sharks (THREAT) and people's trust and belief regarding the current situation (BELIEF) are also expected to affect WTP positively.

The bid price (WTPAMT) would negatively affect WTP, implying that as prices increase, the demand for the good, or in this case willingness to buy, decreases. Various socioeconomic indicators are also predicted to influence WTP in different directions. Age (AGE), gender (SEX), and civil status (STATUS) have no predetermined sign because both younger and older residents, male or female, married or single could likely prefer such environmental good. Educational attainment (EDUCATTAIN), membership in environmental organizations (ENVTORG), and monthly household income (REVINC) are expected to affect WTP positively also.

An initial multivariate logit regression analysis was done using Stata to identify the factors associated with responses to the WTP question. Preliminary analysis reveals that some of the independent variables used are either not significant or are highly correlated with other variables. Hence, these variables were excluded in the succeeding logit regression analyses.

Several data sets were generated: one for the raw (uncensored) data/sample responses, another for protest response-adjusted data; set and another for certainty-adjusted WTP responses. Overall, three models were considered in the logit/econometric analysis using selected covariate specifications related to socioeconomic characteristics.

Table 5. Hypothesized Direction of Effects of Explanatory Variables on WTP

Significant Variable	Description	Expected Direction/ Sign
Attitude and Awareness		
Seen	Seen a live whale shark	+
Score1	Knowledge score	+
Threat	Threat to whale sharks	+
Believe	Belief in the description of the situation described	+
Program Design		
Payveh	Payment design (mandatory and voluntary)	+/-
Bid	Bid price	-
Elctrcbill	Liked the proposal to collect people's contribution as surcharge on their electricity	+
Socio-Demographics		
Age	Age of the respondent	+/-
Sex	Gender of the respondent	+/-
Status	Civil status of the respondent	+/-
Educattain	Educational attainment in years	+
Tothh	Total number of household members	+/-
Envtorg	Membership in environmental organization	+
Revinc	Total monthly income of the household	+

These three models considered two alternative approaches in dealing with protest votes: (a) consider the ‘protest No’ responses as legitimate zero valuation (Model 1) and (b) censor the protest votes (Model 2). Supporting the former approach, Halstead, Luloff and Stevens (1992) criticized that the censoring of protest bids may aggregate WTP estimates in a manner that is not easily predicted. On the other hand, Lindsey (1994) argued that when the CV survey is designed as a referendum, it is less concerned whether a zero response represents a true valuation and is more focused on whether or not it reflects intended behavior. The referendum model is less stringent in terms of the classification of protest because protest reasons are mostly legitimate influences upon actual behavior. A parallel argument was provided by the study of McGuirk et al. (1984), which states that protest bids “should be considered legitimate WTP bids as respondents are essentially valuing a proposed policy, not just a commodity.”

Model 3 deals with certainty responses wherein the answers of respondents who are not certain with their positive WTP response were converted to a negative answer to the valuation question. Loomis and Ekstrand (1998), in a study of the Mexican spotted owl, recognized that survey respondents may be uncertain about their values for threatened and endangered species. They used a follow-up question asking how certain respondents are about their ‘yes’ and ‘no’ answers. The study reported that incorporating uncertainty tends to lower WTP estimates although such adjustments do not improve the estimates’ efficiency.

Estimates of the Models

Overall, the behavior or direction and significance of the variable in the various models did not register any significant change, although there was an improvement of the overall performance of the model or the Pseudo R² in the Adjusted to Protest model (Model 2) (Table 6).

The dependent WTP variable (yes = 1 and no = 0) is regressed against a *Constant* term, price bids (Bid), income (Revinc), household size (Tothh), years of schooling (Educatt), age (Age), gender (Sex), civil status (Status), and membership to environmental organization (Envorg). The majority of variables had positive coefficients, however, only Revinc and Bid variables turned out to be highly significant.

Table 6. Statistics of Important Variables Included in the Preliminary Logit Analysis

Variable	(Model 1) Uncensored	(Model 2) Adjusted to Protest	(Model 3) Adjusted to Certainty
Bid	-0.17*** (0.00)	-0.02*** (0.00)	-0.17*** (0.00)
Age	0.00 (0.00)	0.01 (0.01)	0.01 (0.01)
Sex	0.06 (0.19)	-0.06 (0.26)	0.11 (0.19)
Status	-0.38* (0.23)	-0.24 (0.32)	-0.39* (0.23)
Educattain	-0.05 (0.03)	0.02 (0.05)	-0.02 (0.03)
TotHH	0.04 (0.04)	0.10** (0.05)	0.04 (0.04)
Revinc	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Envtorg	0.07 (0.26)	0.18 (0.41)	0.15 (0.27)
Constant	-0.32 (0.58)	-1.21 (0.82)	-0.92 (0.59)
Pseudo R2	0.07	0.22	0.07

Notes: Standard error values in between parenthesis.

*** at 1% level of significance

** at 5% level of significance

* at 10% level of significance

Consistent with *a priori* economic expectations, the Income variable is significant at 0.01 level of significance and positively associated with a higher WTP for whale shark conservation. The Bid variable also turned out highly significant in all models (as expected) with a negative influence on the probability of the respondent saying ‘yes’ to the WTP question. This means that the larger the bid value presented to the respondent, the less willing the respondent would be to pay for whale shark conservation.

Effects of Payment Vehicles

The survey samples were disaggregated in terms of payment vehicle. Of the total 600 respondents, 588 were deemed valid and included in the

analysis. A total of 293 respondents were asked about their willingness with regards to mandatory payment for the conservation of whale sharks while 295 respondents were asked regarding voluntary payments. The study applied hypothesis testing using logistic regression to assess payment design (Mandatory vs. Voluntary) effect. If the P-value for the dummy variable of payment design (Payveh) is less than the conventional 0.05, it will result in the non-rejection of the H_0 . It would then imply that there is no difference between pooling the data or treating the data by payment design.

$$\begin{aligned}
 H_0: E(WTP_{\text{mandatory}}) &= E(WTP_{\text{voluntary}}) \\
 H_a: E(WTP_{\text{mandatory}}) &\neq E(WTP_{\text{voluntary}})
 \end{aligned}$$

To start off, the socioeconomic characteristics (Tothh, Age, Educatt and Revinc variables) of the respondents were compared. The T-test results show no statistical difference on the characteristics of the respondents for the payment design group comparison.

The regression results (Table 7) show that some important variables such as Bid and Revinc were highly significant and had the expected signs but the payment design was not a significant factor affecting the respondents' WTP decision. The respondents' indifference to payment design justifies the pooling of samples in the regression analyses shown earlier.

Table 7. Logit Regression Results for Payment Design Effect

Variable	Coefficient	Std Error
Bid	-0.02 ***	0.00
Age	0.01	0.01
Sex	0.11	0.19
Status	-0.39 *	0.23
Educattain	-0.02	0.03
Tothh	0.04	0.04
Revinc	0.00 ***	0.00
Envtorg	0.15	0.27
Payveh	0.03	0.19
Constant	-0.94	0.60
Pseudo R ²	0.08	

Notes:
 *** at 1% level of significance
 ** at 5% level of significance
 * at 10% level of significance

WTP Estimates

Parametric (univariate and multivariate models) and non-parametric welfare estimation results were compared to assess the consistency and behavior of survey data and how these might affect the WTP estimates. Similar to the multivariate models, logit equations were generated for the univariate models. The parametric results for the logit univariate models were consistent in that the bid coefficients were negative and significant.

Table 8 shows that median and mean WTP have practically zero values for both univariate and multivariate estimates, except in Model 2, or Adjusted to Protest model since a lot of negative WTP samples were dropped. The non-parametric estimate generated a positive but relative low mean WTP value ranging from PhP 17 (\$0.34) to PhP 35 (\$0.70) per household per month.

Table 8. Parametric and Non-parametric Mean WTP Estimates in PhP and (\$)/HH per month

	(Model 1) Uncensored	(Model 2) Adjusted to Protest	(Model 3) Adjusted to Certainty
Multivariate Model	0	46 (0.92)	0
Univariate Model	0	38 (0.76)	0
Non-parametric Estimate	18 (0.36)	35 (0.70)	17 (0.34)

The results are not implausible as they are found consistent with the socioeconomic characteristics of the samples, particularly the income factor. The estimate is consistent with the survey results of a very low positive WTP response even to the lowest bid, signifying a possible failure for a referendum for implementing a whale shark conservation program and also only a borderline majority agreeable to a voluntary type of payment.

Motivation for WTP Responses

Perception of Environmental Issues and Familiarity with Whale Sharks

The majority of respondents (82%) believed that the environment is not properly being cared for. The three main environment-related concerns were solid wastes, deforestation, and water pollution. But though they generally believed environment is neglected, still the environment does not rank as a top priority among the other national concerns (Table 9).

Table 9. Respondents' Perception on Environment and Natural Resources Issues

Issue	% of Observations
National Priorities	
Economic problems (Ranks 1 st)	43.71
Poverty (Ranks 2 nd)	29.25
Environment (Bottom rank among other issues)	0.68
Environment not cared for	81.63
3 Most Important Environmental Problems	
Solid wastes	31.29
Deforestation	26.87
Water pollution	11.73
Total Observations	588

Regarding familiarity with whale sharks, although 70 percent of the respondents had not seen a live whale shark, the majority of them had a good level of knowledge of the said species. As Table 10 shows, most respondents got high scores in the four general questions pertaining to whale sharks; almost half of them got the perfect score.

Table 10. Assessment of Importance of Species and Knowledge of Whale Sharks

Indicator	% of Observations
Seen a Live Whale Shark	25.34
Knowledge of Whale Sharks	
Whale shark is the largest fish in the world	74.32

The Conservation Program's Perceived Effectiveness and Acceptability

Regarding details provided in the Conservation program, the majority (81.12%) of respondents recognized that there are real threats to the existence of whale sharks (Table 11). Results also showed that respondents, who believe in the effectiveness of the conservation program, are more inclined to give a positive WTP response.

Table 11. Perceptions on the Proposed Conservation Program

Group	% of 'Believes/Accepts' Observations				
	Threats	Status	Program Effectiveness	Electricity bill surcharge	Total Respondents
All Observations	81.12	90.65	67.69	32.65	588
Respondents with WTP	94.05	97.30	92.43	80.00	185
Respondents with no WTP	75.19	87.59	56.33	10.92	403

On the proposal to collect contribution as surcharge of the electricity bill, only a few respondents (32.62%) agreed to such a scheme (Table 10). Most respondents who gave a negative WTP response consistently answered that they do not like the electricity bill surcharge. At first glance, this may appear to be a valid ground for considering a negative WTP response on the basis of Program component (payment vehicle) rejection as a clear case of protest response. But a closer probing of responses to the debriefing questions revealed that the primary reason for non-acceptance of the electricity bill surcharge proposal was the respondents' fear of the electricity bill increasing with the whale shark conservation fee. This information, reinforced by the economic status of households in Sorsogon, bolsters the assumption that these respondents are merely expressing that they could not afford further strain on their finances.

Willingness to Support the Conservation Program

Having established the respondents' attitude toward environmental issues and familiarity with whale sharks, other motivation questions were asked to look at the respondents' potential commitment to support the conservation program. More than half of the respondents (60.71%) strongly agreed that everyone is responsible for ensuring that plants and animals, as they are known today, will exist for mankind in the future. This suggests that the respondents hold a perceived bequest value. Likewise, some strongly agreed on their existence value, saying that the endangered species are important even if they don't get to see them. But though they agreed in principle on the importance of preserving endangered species, when it comes to actual cash outlay to finance the cause, only a few (9.69%) strongly agreed to give cash donations and fewer still (5.27%) agreed to increase taxes in order to pay for endangered

species conservation (Table 12).

Table 12. Respondents’ Opinions on Endangered Species Issues

Issue	% of Observations
It is everyone’s duty to ensure that plants and animals as we know them today will exist for mankind in the future	60.71
Endangered species are important even if I don’t get to see them	29.08
Citizens should contribute to endangered species conservation by making cash donations to this cause	9.69
Government should raise taxes to pay for more endangered species protection	5.27
Total Respondents	588

COSTS OF WHALE SHARK CONSERVATION

The cost of conservation is not cheap. Based on the experience of other conservation programs, roughly PHP 7.38 million (USD 148,000) is needed to enhance the existing conservation project of Donsol’s local government and implement a more comprehensive whale shark conservation program in Sorsogon (details provided in Annex B). This estimate does not yet include the yearly operation and maintenance to keep the proposed comprehensive program going. What the study’s results are saying is that the Philippines cannot afford to pay for this cost (Table 13). Wildlife conservation efforts that depend on public funds often face major systemic barriers hampering effective conservation. There is chronic under-funding of wildlife conservation efforts in developing countries and this is a clear signal that the international community has to do something if it wishes to conserve whale sharks. Whale sharks are migratory in nature and the scale and urgency of the response toward their conservation require a significant amount of resources and international collaborative partnerships.

Below are the main components and costs of the proposed Whale Shark Conservation Program:

- 1. Integrated Coastal Development Program (ICDP) for habitat protection
 - a) Community-based Butanding Conservation Management

- b) Delineation of municipal waters boundary: marine protected area, tourism zone, fishing zone with restriction on fishing gear use and specifications
- c) Regular patrolling of Donsol waters
- d) Regular monitoring of the physical, chemical and biotic quality of Donsol waters
- e) Capacity-building in terms of human resources, knowledge, and facilities
- f) Public education, awareness and information program

Table 13. Estimated Minimum Cost of Implementation: USD 62,000

Management Cost	USD
Community organizing	
4 CO's full-time working with communities (USD 4,000/person/year)	16,000
Education and training	
12 seminars	12,000
Education and training materials	3,000
Law enforcement	
1 full-time patrol boat, crew and maintenance	10,000
Information dissemination	
Weekly radio broadcasts	2,000
12 public meetings	6,000
Visitor centers (2) (annualized over 10 years)	3,000
Planning activities	
1 full-time ICDP planner and technical guide	6,000
4 planning workshops (USD 1,000/workshop)	4,000
TOTAL	62,000

Source: Benefits and Costs of Coral Reef and Wetland Management, Olango Island, Philippines. by: Alan T. White, Michael Ross, Monette Flores, Tetra Tech EM Inc., CRMP. CRMP Document Number: 04-CRM/2000

2. Research and establishment of a data gathering system for scientific and technical information on whale shark. This will provide vital information for the identification of proper coastal management options and for the formulation of basis or guidelines for setting limits/carrying capacity for the tourism sector

Table 14. Estimated Minimum Cost of Implementation: PHP 4 million

Activity	Cost in million PHP (\$)
1. Whale shark specific genetic identification marker	2.15 (43,000)
Obtaining samples: Labor and travel	0.50 (10,000)
Development & testing of genetic ID marker Labor and laboratory supplies	1.5 (30,000)
Report preparation	0.15 (3,000)
2. Collection of biological data & staff training	1.38 (27,500)
Travel & subsistence (2biologists)	0.32 (6,400)
Training workshop	0.21 (4,200)
Travel	0.05 (1,000)
Accommodation & subsistence	0.63 (12,500)
Equipment	0.015 (3000)
Follow-up visits	0.013 (2,500)
3. Biotelemetry of Whale Sharks to identify migration routes	0.75 (15,000)
	(approx value)

Source: Fowler, Sarah. 2000. Whale Shark Rhincodon typus Policy and Research Scoping Study. Nature Conservation Bureau, UK

Exchange Rate: PHP 50 = 1 USD

IMPLICATIONS FOR WHALE SHARK CONSERVATION

The survey results show that the people are aware of and concerned about environmental issues, including the precarious condition of whale sharks in Sorsogon. They are not, however, able or willing to pay for the implementation of the Conservation Program because poverty, employment, and other economic concerns take precedence over environmental issues. This result confirms the ubiquitous notion about developing countries and environmental improvements. Solow (1993) summarized the problem in the following way: “The poor countries seem to have a choice between cooperating in the degradation of their own environment or acquiescing in their own poverty.” Choe et al. (1996) pointed out that the policy message for developing countries seems to be to «wait until your economy has grown more before spending much effort trying to take care of the environment.»

Table 15. Approximate Benefit and Cost Values Related to Whale Shark Conservation in Sorsogon

Benefit and Cost	Value in '000 PHP (‘000 USD)
Potential Revenue of the Conservation Program	0
Use (Non-Consumptive) Value of Whale Sharks	35,000 (700) per year ^{1/}
Program Cost	7,375 (148) ^{2/}

Notes:

1/ Manila Times, August 2006.

2/ Excluding yearly operation and maintenance cost and the potential foregone use value.

Aside from the ecological or biological value of whale sharks, the Philippines would gain significant economic benefits if whale sharks are protected. Eco-tourism through whale shark watching is continually gaining ground as a strong economic force in the region. In 1998, Sorsogon had only about 900 visitors; in recent years, the area saw an average of 8,000 tourists every whale shark season, a third of whom are foreigners (Adrao, April 14, 2005, *personal correspondence*). This industry creates about 1,000 seasonal jobs. In 2005, the World Wildlife Fund (WWF) reported that whale shark watching contributed at least PHP 35 million to the country's economy during the whale shark season from February to May. This income includes revenues from additional jobs created and increased income of the food, transportation, and hotel sectors. Such income is vital and serves as a lifeline to Sorsogon and nearby areas.

Aside from tapping the support of the international community through bilateral and multilateral cooperation, the Philippine government should explore other conservation financing mechanisms. A WWF-funded study by Koteen (2004) listed the multilateral agencies that provide species conservation funding. The list includes the Global Environment Facility (GEF), the United Nations Development Programme (UNDP), United Nations Environment Program (UNEP), and the World Bank. Some multilateral agencies, such as regional development banks, provide loans to governments rather than grants or donations. Regional development banks are also beginning to collaborate with the GEF to leverage additional resources for species conservation. Koteen's study also provides a menu of schemes that governments can use to stabilize and even increase allocations for species conservation such as earmarking revenues collected through various fiscal instruments (e.g., government bonds, lotteries, premium-priced motor vehicle license plates, wildlife stamps, and tax incentives) (Table 14).

Table 16. Options for Financing Conservation

Financing Mechanism	Source of Revenue
Government Revenue Allocations	
Taxes and bonds earmarked for conservation	Taxpayers, investors
Real estate and development taxes	Property owners, property developers
Lottery revenues	Gamblers
Premium-priced motor vehicle license plates	Vehicle owners
Wildlife stamps	Postal customers, hunters, fishers
Economic instruments to stimulate environmental investment	Investors
Debt relief	Donors, governments, NGOs
Grants, Donations, and Loans	
Bilateral and multilateral agencies	Donor agencies
Foundations	Individuals, corporations
Conservation trust funds	Multi-source
Nongovernmental organizations	NGO members and supporters
Private sector	Private companies

Source: Koteen 2004.

Our CV survey results show zero or close to zero welfare values. With meager available resources, people in a developing country like the Philippines are not willing to pay for the conservation of wildlife. The government, as it stands now, has a limited budget to provide basic services for its citizens, so funding for species conservation is expectedly low. Financing of conservation programs, therefore, necessitates assistance from the international community. Be that as it may, there is also a lot at stake for the Philippines in ensuring the continuous existence of whale sharks, and the country will do well to explore alternative financing options for conservation.

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**Saving the Philippine Eagle:
How Much Would It Cost and
Are Filipinos Willing to Pay for It?**

**Dieldre S. Harder,
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INTRODUCTION

The Philippine Eagle (*Pithecophaga jefferyi*) is one of the largest and most powerful birds in the world. Like most raptors, it has a massive, narrow-arched bill and enormous claws. It measures one meter in height and has a wingspan of about two meters. It is monogamous and shares with its mate chick-rearing responsibilities. The eaglet is usually cared for over 17 months, on a nest found on top of a tree about 30 m above the ground. The Philippine Eagle lives in forests and is highly territorial. It was discovered in 1896 only, with the first nest found in 1963 (<http://www.brainyencyclopedia.com>). It is found on four islands only of the country: Luzon, Samar, Leyte, and Mindanao. Sightings have been reported mostly in Mindanao, where conservation efforts are currently concentrated. However, the bird has been seen also recently in Samar and the Sierra Madre in Luzon (www.philippineagle.org).

The bird was placed under a protected status during the Marcos Administration in 1970 reportedly through persistent lobbying by Charles Lindbergh¹ who described the Philippine Eagle as the “world’s noblest of fliers.” It was subsequently declared as the national bird during the Ramos regime in 1995². Recently, the World Center for Birds of Prey based in Boise, Idaho has named it as the rarest of all large forest eagles (Agence France-Presse 2004). Bueser et al. (2003) placed the number of



Photo courtesy of Philippine Eagle Foundation

¹ Charles Lindbergh, an American pilot best known for making the first solo trans-Atlantic flight in 1927. He worked as representative of the World Wildlife Fund (WWF) and traveled to the Philippines several times from 1969 to 1972.

² The Philippine Eagle was declared as the national bird on 4 July 1995 through Presidential Proclamation No. 79. This status makes hunting it illegal and enables allocation in the national budget for its protection.

Philippine Eagles in Mindanao at somewhere between 82 and 233 pairs, based on an analysis of 1991-1998 data on remaining forest land area and using the mean nearest neighbor distance between breeding pairs of 12.74 km. According to the Regional Eagle Watch Teams (REWTs)³, however, only 153 Philippine Eagles have been actually seen and recorded as of March 2004.

Deforestation accounts for the rapid decimation of this important bird species; hence, one can say that the status of this national bird reflects the status of the Philippine forests. For this reason, the conservation of the Philippine Eagle has been used by several nongovernment organizations (NGOs) as their rallying point regarding the country's forest conservation efforts since the 1980s.

Conservation Efforts for the Philippine Eagle

The Government's efforts to save the Philippine Eagle started in 1970 with the creation of the Monkey-eating Eagle Conservation Program. (Monkey-eating Eagle was the original name given to the species upon discovery.) This move was a long-delayed response to the call made during the 1965 Conference on the International Union for the Conservation of Nature and Natural Resources (IUCN) in Southeast Asia held in Bangkok, Thailand. Specifically, the wounding, taking, selling, exchange and/or export, possession, and killing of the Philippine Eagle are prohibited under Presidential Administrative Order No. 235 passed on 25 August 1970. The following month (9 November 1970), the Philippine Eagle was declared as a protected bird through Republic Act 6147. This Act provides for the preservation of the eagle and appropriation of funds for such purpose (Molinyawe et al. 1999).

In 1977, the Government established the Philippine Eagle Research and Nature Center (PERNC) in Davao City. PERNC, now known as the Philippine Eagle Center (PEC), is the center of Philippine Eagle conservation efforts in the country (Molinyawe et al. 1999). It focuses on:(a) captive breeding⁴, (b) research on its habitat and breeding habits, and (c) information dissemination. With the declining number of Philippine eagles due to the continued destruction of their forest habitat and illegal hunting and capture for illicit trade, the conservationists face a big challenge.

³The REWTs are made up of volunteers who monitor sightings of the Philippine Eagle in selected sites.

⁴The female Philippine Eagle reaches sexual maturity after five years, and the male at seven years. The female nests once every two years, laying one egg only (Molinyawe et al. 1999).

In 1986, the Department of Environment and Natural Resources (DENR) placed PERNC under the Protected Area Management Board's (PAMB) Philippine Raptors Conservation Program based in Manila.⁵ Not wanting to leave Davao City, the PERNC staff resigned and formed the Philippine Eagle Foundation, Inc.⁶ (PEF). This group has since then continued the various conservation activities initiated in Mindanao as an NGO.

PEF has faced tough challenges. In the absence of government funding, its staff worked without pay for several months in 1987. It was only in late 1988 when PEF was able to obtain funding from the Frankfurt Zoological Society for the construction of staff quarters, a reception building, and new cages. Later, it also received a grant from MacArthur Foundation, enabling it to expand its 2.0-hectare forest habitat to its current 8.5-hectare Philippine Eagle Center. It likewise received funds from Canada Fund, Philippine-Australia Community Assistance Program (PACAP), Peregrine Fund, and Japanese Embassy to build its education building in support of grassroots education initiatives.

In 1995, the PEF Board of Trustees launched an intensive campaign to raise funds from the corporate sector, realizing that external donor funds may not be sustainable. It launched the 'adopt-an-eagle/nest-scheme', which costs USD 1,800 per eagle. Several private firms, such as Caltex Oil Company, American Express, Pilipinas Shell, and Bank of Philippine Islands, participated in the scheme. The Foundation also launched "A Peso for Pag-asa⁷ Campaign." Del Monte (an agribusiness firm in Mindanao) supported this campaign by promoting the Philippine Eagle's protection in its packaging materials and offering a counterpart amount equivalent to to whatever the PEF could raise from the said campaign. A similar scheme was also adopted by Pilipinas Bank, which launched the 'wildlife savings account' that offers a PhP 100 rebate to PEF for every PhP 1,000 deposit made through this account. These fund-raising programs have had varying levels of success; some were short-lived and no longer active.

Additional funds come from entrance fees – about 150,000 people visit the center each year. The Foundation also raises revenues through training activities and from the use of its production facilities. Funds from these

⁵ The DENR argued that conservation activities for the Philippine Eagle should not only be done in Mindanao, but on the other islands as well.

⁶ PEF is a non-stock, non-profit organization, independent of the government, dedicated to the conservation and protection of the Philippine Eagle.

⁷ Pag-asa (Tagalog for 'hope') is the first Philippine Eagle born in captivity.

sources are used to support the Center's operations.

The improved financial situation boosted the breeding program of PEF. It had its first fertile egg laid in 1987, although it failed to hatch. After the training of its two staff members in the United States with support from the Peregrine Fund, PEF successfully hatched its first two eagles in captivity in 1992⁸. To complement these captive breeding initiatives, the Foundation launched the 'adopt-a-nest scheme' wherein villagers get paid for finding and protecting eagle nests. It initiated livelihood projects in some areas to obtain community participation in protecting the eagles and their habitat (www.philippineeagle.org). As of 2004, PEF has 29 Philippine Eagles in its care. Fifteen of these were bred in the Foundation's 8.5 hectares of lush green rainforest which is home also to a wide variety of native birds and wildlife. The Foundation took the first major step of releasing a captive bred eagle in April 2004.

Outside of Mindanao, the Protected Area and Wildlife Bureau (PAWB) is responsible for protecting the Philippine Eagle and other endangered bird species. This government agency is under the DENR's Philippine Raptors Conservation Program (PRCP) initiated in 1989. PRCP aims to: (a) conserve the Philippine Eagle and other endangered birds of prey in the wild and in captivity; (b) expand scientific research; and (c) provide a venue for an extensive public education on the Philippine Eagle and other wildlife. Basically, these are the same objectives as those of the PEF in Mindanao, but carried out with much limited resources as PRCP is totally dependent on government funding. Its conservation efforts are largely seen in the maintenance of the Center for Philippine Raptors (CPR) within the Makiling Botanic Gardens of the University of the Philippines Los Baños (UPLB) in Laguna Province, northern Philippines. The CPR serves as a rescue and rehabilitation center for confiscated, donated, and abandoned raptors. It is also a venue for scientific research, public education, and captive breeding facility.

The Mindanao Program under the PEF and the programs in the rest of the country were finally coordinated in May 1995, through a five-year Memorandum of Agreement (MOA) with DENR. This agreement re-established a formal partnership between the government and the private sector toward the conservation of the Philippine Eagle. Another five-year MOA between the two parties was signed on 26 February 2001, allowing the PEF to implement the Philippine Eagle Conservation Program (PECP)

⁸ The Captive Breeding Program uses a combination of natural pairings and cooperative artificial insemination of females.

in Mindanao. The PEF remains as the leading organization in conservation breeding, population habitat study, monitoring, protection, rehabilitation, and information, education and communication (IEC) activities for Philippine Eagle conservation in the country.

THE CHALLENGE: MEETING THE COST OF A CONSERVATION PROGRAM

The preceding discussion shows the status of the Philippine Eagle and the threats to its survival. Saving the Philippine Eagle, an endangered species threatened everyday by the loss of its forest habitat, seems an insurmountable task. While the PEF has played a major role in its conservation, available funds are limited to sustain enhanced conservation efforts against the rising threats.

Insufficient funds are a ubiquitous problem facing conservation programs everywhere, however, it is more serious in developing countries like the Philippines. Government funds to conserve the Philippines Eagle, for instance, ranged from merely less than half a million pesos (USD 8,900) in 1991 to at most PhP 25 million (USD 446,591) in 1998 (Table 1). The 1998 level has been unsurpassed in subsequent years, which only had annual budgets of close to five million pesos (USD 8,900). This budget represents roughly less than 0.01 percent of the total DENR budget, but accounts for a substantial part (15%) of the Protected Area Wildlife Bureau (PAWB) budget in 2004.

The government budget is supplemented by allocation from private institutions, mainly, the Philippine Eagle Foundation, (PEF) Inc. The PEF's 2004 Annual Report indicates that it was able to raise PhP 17.5 million, significantly higher than the PhP 12.4 million raised in 2003 and the PhP 11.6 million in 2002. PEF's contribution comes from various sources (e.g., grants and donations, proceeds from the "Eagle Adoption Program," and visitors' entrance fee to the PEC).

While the PEF has been relatively successful in generating funds to support its activities, it recognizes that a lot of effort still needs to be done to conserve the Philippine Eagle. For one, it hopes to expand the land area of its present full-capacity breeding center. It also wants to enhance protection efforts for eagles in the wild through more community-based projects. Presently, there is a big knowledge gap on the science aspect of the eagle's conservation. PEF hopes to intensify efforts on field research to understand better the bird's breeding habit, lifespan, nesting habits, among others. Two other main expansion

Table 1. Government Funds for the Conservation of the
Philippine Eagle.

Year	Maintenance and Other Operating Expenses	Personnel Services	Capital Outlay	Total Annual (PhP)
1990	741,000			741,000
1991	441,000			441,000
1992	580,000	161,000		741,000
1993	615,000	126,000		741,000
1994	1,000,000			1,000,000
1995	815,000			815,000
1996	856,000			856,000
1997	8,084,000			8,084,000
1998	22,836,000		3,000,000	25,836,000
1999	9,029,000			9,029,000
2000	7,029,000			7,029,000
2001	5,245,000			5,245,000
2002	4,978,000			4,978,000
2003	4,978,000			4,978,000
2004	4,978,000			4,978,000

Source: Project Profile of Philippine Raptors Conservation Program

areas are in the extension of the program's activities to the other parts of the country and in helping in the habitat restoration efforts for the Philippine Eagle, particularly in Eastern and Central Mindanao where most of the wild population exists. All these activities will require more resources (manpower, financial, expertise) than what the PEF and other players in the field could afford (Dennis Salvador, personal communication). The various elements of a Comprehensive Mindanao Philippine Eagle Conservation Program, based on consultations with PEF scientists, are presented in Appendix 1.

The research team estimated the budgetary requirement for a 10-year Comprehensive Mindanao Philippine Eagle Conservation Program (Table 2). The budget amounts to PhP 1.13 billion, given some assumptions on the cost and level of activities (Appendix 2: Box 1). It includes provision for communities that will participate in protecting the eagle's habitat. These communities will be compensated for the opportunity cost of their time, based on similar actual expenditures in PEF pilot sites. As Table 2 shows, the amount needed to support a 10-year comprehensive conservation program is much higher than what the government (PhP 5 million annually) and even PEF (PhP 17 million in 2004, a big component of which goes to personnel cost) can provide, given their current budget/revenue situation. The question then that begs to be asked is: From where could the additional funding for the conservation program be secured? Note that the PEF is already getting support from a number of international donors and private/corporate sector to support its activities in Mindanao. These efforts, albeit successful, still fall short of what could be accomplished given more funds.

This research project was motivated by the basic question: Are Filipinos willing to pay to increase conservation efforts that would improve the probability of survival of the Philippine Eagle? From this, other concerns are raised. In particular, for those who are willing to pay, how much are they willing to contribute? What motivates households' decision to pay or not pay? What factors affect decision to pay and what do citizens think about the proposed conservation program to save the Philippine Eagle?

4.2 Significance of the Study

The Philippine Eagle is ecologically important. Like human beings, they are on top of the food chain; they regulate the population of flying lemurs, bats, and snakes, including other animals that oftentimes become pests in agricultural lands, such as monkeys and rodents. The extinction of the eagle could result in overpopulation of their preys, thus, disturbing the balance of nature (Molinyawe et al. 1999).

In its mission statement, the Philippine Eagle Foundation “*believes that the fate of the vanishing Philippine Eagle, the health of our environment, and the quality of Philippine life are inextricably linked. We are therefore committed to promote (sic) the survival of the Philippine Eagle, the biodiversity it represents, and the sustainable use of our forest resources for future generations to enjoy.*” This statement reflects the connection between saving the eagle and its habitat and rescuing thousands of other

threatened plants and animals.

Table 2. Budgetary Requirements for a 10-year Operation of the Mindanao Comprehensive Philippine Eagle Conservation Program, 2005.

Budget Item	Sub-component	Budget (PhP)
Education	Teachers' Education	5,560,000
	Broadcasters' Education	2,560,000
	Hunting/Gatherer's Education	2,380,000
	Forest resources users' Education	3,010,000
Habitat preservation	Field Research	33,680,000
	Protected Area Establishment	100,000,000
	Comprehensive site development	480,000,000
Population augmentation	Conservation breeding (5 eaglets)	10,000,000
	Pre-release (site characterization)	5,000,000
	Post-release Monitoring	40,000,000
Limiting or modifying human activity and development	Management of Philippine Eagle	300,000,000
Critical habitat protection	Critical Habitats (Livelihood support)	150,000,000
TOTAL (Present value over a period of 10 years)		1,132,190,000
Annualized value (at 4% real rate of discount)		139, 588, 774

The Philippine Eagle, being the national bird, is a source of pride for the country. It symbolizes hope, power, and strength. As such, one could surmise that Filipinos would regard its continued existence as a priority concern. However, the Philippine Eagle conservation is just one of the many environmental concerns facing Filipinos. Most likely, environmental problems may just be one of the concerns of Filipinos. A study that maps out the priorities of Filipinos is thus important to provide a proper perspective among conservation organizations in the development of their programs, particularly, if they concern mobilizing support from the public.

More to the point, the possibility of generating funding support from the public for the conservation program is an important contribution of this study. The study is designed with the premise that the importance one attaches to a 'good' could be inferred from how much one is willing to pay to secure that good. So, if the Philippine Eagle is important to the people, one would then expect that they would be willing to pay an amount of money for its conservation and protection to prevent its extinction. Is this observation true among Filipinos, many of whom are considered poor? Would they consider the Philippine Eagle conservation a priority concern? How many do so and are willing to pay to support this program? Does the form of collection (mandatory vs. voluntary) and payment vehicle (water utility bill vs. electric utility bill) matter to people? If citizens (or some of them) are in fact willing to pay (WTP), is it important to assess the potential revenue from their WTP relative to the cost of implementing a comprehensive conservation program? Answers to these questions are going to be useful in designing fund-raising activities in support of conservation efforts for the Philippine Eagle.

Finally, on theoretical grounds, the study hopes to contribute to four areas.

First, the study allowed us to assess the extent of the market for conservation program such as this. Specifically, it sought to answer: Do citizens' treat the Mindanao Comprehensive Eagle Conservation Program as a local good (something that only those from Mindanao should pay) or is it viewed as a national/public good (the Philippine Eagle, being a national bird)? To determine the extent of the market, we tested if the WTP of Metro Manila households differ (hypothesized to be lower—they being farther from Mindanao) from the WTP of Davao households. If the difference in WTP values between the on-site (Davao) and off-site (Metro Manila) households was not significant, this means the conservation program could be viewed as a national good and that the eagle's conservation is just as important to off-site residents as it is to local or on-site residents. The market extent could therefore be viewed as national.

Second, the study establishes whether the public is sensitive to the scope of the conservation program—is the WTP for a National Comprehensive Eagle Conservation Program higher than the WTP for a Mindanao Comprehensive Eagle Conservation Program? For this test, only the data generated from the Davao households were utilized.

Third, the study analyzed if Filipino households are sensitive to the mode of payment. Two sub-tests were carried out to address this issue: 1) Is the WTP of voluntary donation different from the WTP if payment is made mandatory? 2) Is the WTP from an electric surcharge different from the WTP using surcharge to water bill?

Fourth, given that contingent valuation methodology (CVM) is a costly tool to use — will the use of black and white (B&W) photographs (an attempt to bring down cost) affect the resulting WTP value? Put another way; is the use of colored photographs value- enhancing?

While these various tests are methodological in nature, their results could have important implications in the policy recommendations presented at the end of this paper. Moreover, each of these methodological concerns is the subject of a more in-depth analytical discourse in four separate papers, written together with this research report.

RESULTS AND ANALYSIS

The study used the CV design common to all the chapters in this book, as described in Chapter 2. The principal findings are presented below. Details are provided in the Appendices to the chapter.

Priority Concerns of Filipinos and Attitudes toward Philippine Eagle Conservation

Economic problems (inflation or rising prices of basic commodities, economic crisis, etc.) were indicated as the top priority concern of the respondents in both study sites (Metro Manila - 49%, Davao Region - 45%). This is followed by poverty, which was ranked first by 19 percent and 18 percent of respondents from Davao and Manila, respectively (Table 3). Some Metro Manila (13%) and Davao (14%) households considered governance as the first priority. On the other hand, a significant portion of the respondents felt that all the problems posed to them are serious and should be given priority by the government. Very few respondents (less than 1%) considered environmental problem as a top priority. In fact, only 9 percent and 7 percent of Davao and Manila respondents, respectively, included environmental problem in their top three priority concerns.

Table 3. Priority Social and Environmental Problems in the Philippines, 2005.

Problem	Davao	Metro Manila
	1 st priority (%)	
Problems of the country		
a. Economic (e.g., inflation)	45	49
b. Poverty	19	18
c. Education	<1	2
d. Health	-	<1
e. Crime/violence, inequality	<1	1
f. Government and governance	14	12.5
h. Environment	<1	<1
i. Terrorism	-	<1
k. Others	<1	-
Did not provide ranking/deemed many of the concerns as equally important	20	16
Environmental problems		
a. Air pollution	14.5	31
b. Water pollution	5	4
c. Solid wastes	29	28
d. Loss of endangered species	6	3
e. Deforestation	22	12
f. Traffic noise/problems	-	3
g. Soil erosion	<1	1
i. Enhanced greenhouse effect	2	2
j. Destruction of coral reefs	1	-
Did not provide ranking/deemed many of the concerns as equally important	20	16

When asked of their topmost environmental concerns, Manila respondents mostly cited air pollution (31%) and solid wastes (28%). In Davao, solid wastes (29%) was indicated as number one, followed by deforestation (22%) and air pollution (15%). Less than 1 percent of respondents from both Metro Manila and Davao chose endangered species conservation as a paramount environmental problem. However, it was included in the top 10 environmental priorities by 46 percent of respondents in Davao and 26 percent in Metro Manila.

Overall, the survey shows that environment concerns, specifically endangered species conservation, have a low priority among Filipino households. The poor economic performance of the country and rising poverty level for many years

now have led Filipinos to clamor for economic reforms to address poverty/equity as well as concerns on political governance. Among the environmental concerns, those closely linked to human welfare like pollution, solid wastes, and deforestation are deemed more important than animal protection, for example. This is consistent with results obtained during the FGDs wherein human-welfare related concerns were viewed far more important than concerns for the welfare of endangered species in the country.

The same conclusion can be drawn by looking closely at the information in Appendix 3 obtained from Davao households using mandatory water bill surcharge as the payment mechanism. The respondents were classified into two groups; each group was given a different scale of the conservation program (national vs. Mindanao conservation program). As shown, the top three social problems are economic, good governance, and poverty. Environment remains of low priority.

Among the environmental problems, deforestation was the primary concern of households in Davao, followed by solid wastes and air pollution. Endangered species conservation ranked fourth to fifth only. When probed further, the Philippine Eagle emerged as the priority endangered species, followed by marine turtle. Dugong was a far third. It is highly plausible that the respondents chose the Philippine Eagle because the study was about it. The problem on anchoring is one aspect that should be rectified by similar studies in the future.⁹

How do Filipinos view endangered species conservation as an environmental cause?

Consistent with the information obtained from Table 3 and Appendix 3, Table 4 shows that the majority of the respondents view other environmental concerns as more important than endangered species conservation, with 58 percent saying that the government should invest more on helping people than on the protection of endangered species. Still, it is worth noting that 90 percent viewed it as everybody's duty to protect plants and animals to ensure their continued existence, and that 84 percent agreed that poaching of wildlife species should be punishable by law. Despite this strong sentiment, only 54% agreed that citizens should contribute cash money for this cause (70% in Metro Manila and 40% in Davao). Only a few (22%) favored the use of tax money to fund this cause.

⁹ It is possible not to reflect in the title that the study is particularly about the Philippine Eagle, but endangered species conservation in general, since, indeed, the latter is the real focus of the study.

Table 4. Attitudes and Perceptions of Filipinos on Endangered Species Conservation, 2005.

Attitude and Perception	Agree and Strongly Agree Response (%)		
	Manila n=159	Davao n=172	Pooled n=331
a. The government should raise more funds to deal with environmental programs in this country.	83	77	80
b. There are more important environmental concerns than endangered species conservation.	71	67	69
c. Poaching of wildlife species should be punishable by law.	84	83	84
d. It is everyone's duty to ensure that plants and animals as we know them today will exist for mankind in the future.	92	88	90
e. Citizens should contribute to endangered species conservation by making cash donations to this cause.	70	40	54
f. The government should raise taxes to pay for more endangered species conservation.	19	25	22
g. The government should invest in helping people before it spends money on endangered species.	65	52	58
h. Households who earn more income should pay higher taxes in order to pay for endangered species conservation.	53	52	53
i. Endangered species conservation should not be a priority concern of the government.	12	28	20
j. Endangered species are important even if I don't get to see or interact with them	77	76	76

Are Filipinos familiar with their national bird and its plight?

Filipinos have a high degree of familiarity with the Philippine Eagle and its endangered status, including some of the recent development on this species (e.g., naming a Philippine Eagle after the country's Vice President and the captive breeding program for this species (Table 5). The majority of household respondents from both study sites knew that the Philippine Eagle is the country's national bird. As can be expected, more households in Davao had seen a live eagle (85%) and visited the Philippine Eagle Center run by PEF (76%) compared with only 59 percent and 16 percent in Metro Manila, respectively. However, a greater number (83%) of respondents in Metro Manila were well acquainted with the status of Philippine Eagle as an

endangered species than in Davao (60%). This information was most likely obtained through the media. Interestingly, many (40%) in Davao did not believe that the Philippine Eagle is threatened. It is possible that the greater visibility of the eagles in the area accounts for this belief.

Table 5. Knowledge of the Philippine Eagle, Metro Manila and Davao Region, 2005.

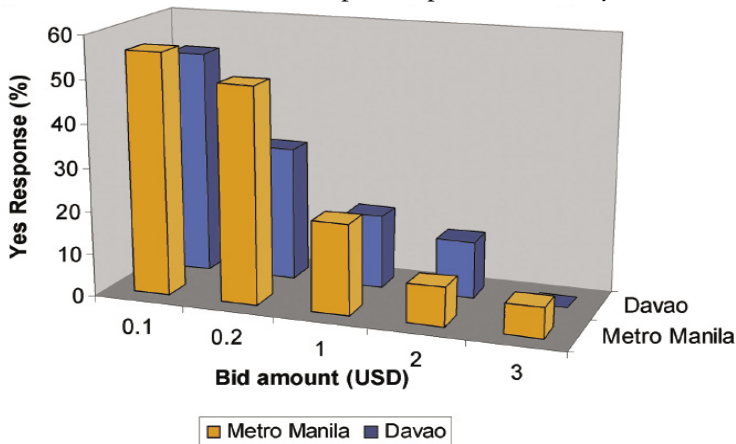
	Davao	Metro Manila	Chi ²	Sig
Seen a live Philippine Eagle	146 (85)	94 (59)	30.3	0.00***
Believe the Philippine Eagle is threatened	103 (60)	132 (83)	18.7	0.00***
Visited the PEF Center	130 (76)	26 (16)	116	0.00***
The Philippine Eagle is the national bird	156 (91)	133 (84)	2.75	0.10*
First captive-bred eagle is Pag-asa	142 (83)	90 (57)	25.1	0.00***
An eagle was named after Vice President Noli De Castro	138 (80)	113 (71)	3.47	0.06*

Willingness to Support Philippine Eagle Conservation Program

Will the low priority given by the respondents to environmental concerns in general and endangered species conservation in particular be reflected in their willingness (or lack thereof) to support an endangered species conservation program, such as the one for the Philippine Eagle? The answer appears to be affirmative as shown in Appendix 5 and Figures 2a-2e.

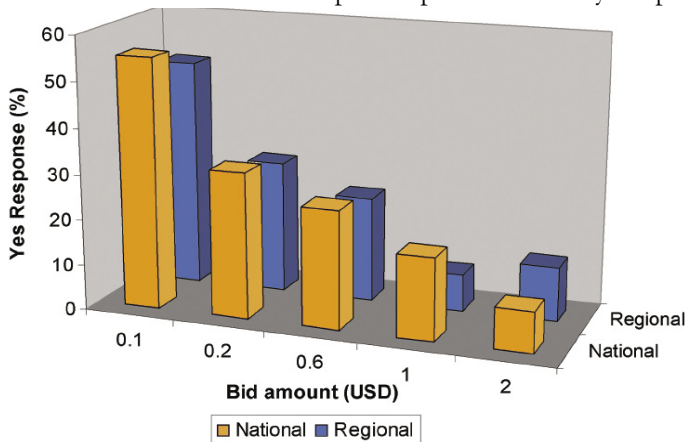
Twenty-six percent of on-site and off-site respondents who received different bid levels were willing to support the proposed conservation program. In general, Figure 2a shows that a greater percentage of Metro Manila respondents (30%) were willing to pay for the program compared with Davao respondents (23%) across all bid levels. This could be due to the fact that the Philippine Eagle is the national bird and is thus considered a national good.

Figure 2a. Distribution of ‘Yes’ Responses per Bid Level by Extent of Market



Similarly, Appendix 5 shows that only 26 percent gave their overall support for the scope of conservation (regional vs. national program). Except for the highest bid, more Davao respondents indicated willingness to pay for a national rather than just a regional eagle conservation program (Figure 2b). This could imply that respondents wanted an expansion of the current conservation efforts to Leyte and other parts of Luzon known to be habitats also of the Philippine Eagle.

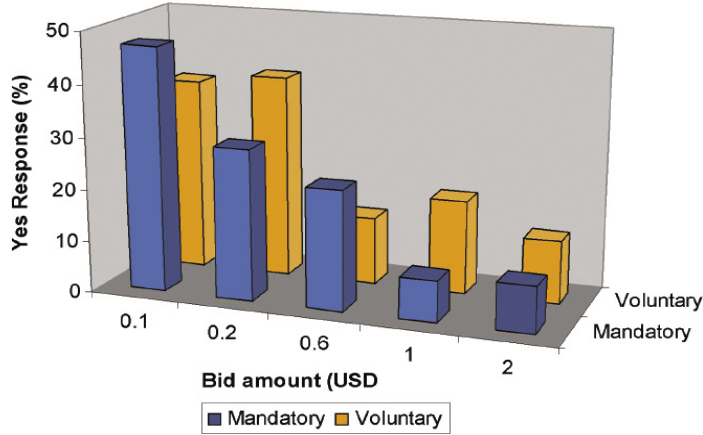
Figure 2b. Distribution of ‘Yes’ Responses per Bid Level by Scope of Market



With regards the payment vehicle, less than a fourth (23%) of the respondents expressed their support for the Mindanao Comprehensive Eagle Conservation Program. While it appears in Figure 2c that the majority of respondents prefer the voluntary over mandatory scheme for some bid levels (USD 0.2, USD 1, and USD 2), Appendix 5 shows that the same percentage

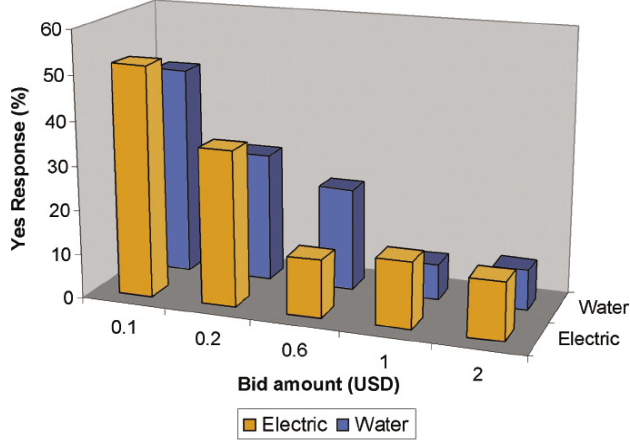
(23%) of respondents in each sample expressed support to the program across all bid levels.

Figure 2c. Distribution of ‘Yes’ Responses per Bid Level by Payment Vehicle



The sub-sample on collection mechanism generated only 24 percent affirmative WTP responses for the program (Appendix 5). In general, given the different bid levels, a slightly higher number of respondents in the electric bill sample were willing to pay compared with the water bill respondents (Fig 2d). As discussed earlier, both collection mechanisms were controversial due to pending tariff rate increases.

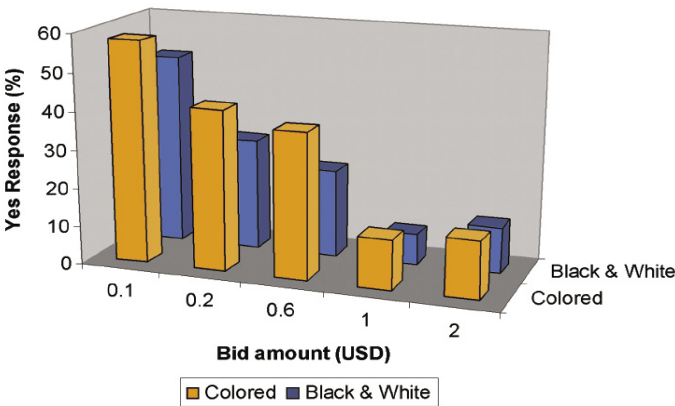
Figure 2d. Distribution of ‘Yes’ Responses per Bid Level by Collection Mechanism



With regards presentation formats, those who received questionnaires with colored pictures registered a higher percentage of respondents who were willing to support the program than those who were given questionnaires with black and white pictures (Fig. 2e). Overall, 28 percent of all respondents in

this sub-sample were willing to pay for eagle conservation (Appendix 5). This indicates that presentation formats affected the respondents’ decision whether or not to support the regional eagle conservation program.

Figure 2e. Distribution of ‘Yes’ Responses per Bid Level by Questionnaire Packaging



In general, the demand behavior of respondents for this ‘environmental good’ was consistent with the demand theory for any normal economic good. This means that the proportion of those who are WTP/saying ‘yes’ to the ‘environmental good’ decreases as price/bid level¹⁰ increases. Overall, the proportion of those willing to support the program ranged from 23 percent to 30 percent only, with slight variations across sub-samples of household respondents (see Table 8).

The data clearly show that the referendum, which asked if Filipinos would vote to support the proposed conservation program, did not pass — bad news for those promoting conservation of endangered species in the country.

Why are the majority of household-respondents not willing to support the proposed Philippine Eagle Conservation Program?

To assess if the hypothetical nature of the product was influencing the WTP decision, respondents were asked a series of follow-up questions on the various aspects of the conservation scenario.

It appears that the description provided in the survey instrument on the status of the Philippine Eagle and the threats it faces was found believable by 80 percent of Metro Manila respondents but 60 percent only of the Davao

¹⁰ The five bid levels were derived from a series of focus group discussions with various groups of people; these were subsequently randomly assigned to the household respondents.

respondents. As noted earlier, the closer interaction of Davao residents with the Philippine Eagle seems to convey to some that the eagles' existence is not really under threat. Also, some respondents opined that the implementation of this program would be hindered by corruption. Similarly, 65 percent and 70 percent of the Metro Manila and Davao respondents, respectively, found the proposed conservation program credible; some indicated that they see no reason to doubt the scientific soundness of the various components and their importance to the conservation program. Appendix 4 provides more details on the responses on this topic by the different sub-groups of respondents.

On the credibility of the proposed institution to spearhead the conservation program, about 60 percent for both Metro Manila and Davao respondents believed that the PEF is the best organization for this task, given its experience. Those who expressed doubt on PEF's capacity cited as reasons its limited manpower and support base in the entire island of Mindanao. They would like the program to be managed by a government agency.

More than half (about 60%) of the respondents though did not like the payment vehicle and the proposed collection mechanism (i.e., a surcharge to the utility bill). The main reasons given are: (1) they doubt that the utility company would agree to making the collection for and on behalf of the conservation program without charging a fee and because it has no legal mandate to do so; and (2) they were unwilling to have their utility bill increased further (either due to income constraint or lack of trust on the utility company).

Except for problems associated with the payment vehicle (which most probably reflects also the problem with making the payment per se, in general), it appears that the the majority of respondents found the overall conservation scenario credible. If the scenario is deemed credible enough, what then are the major reasons for the respondents not wanting to support the conservation program?

The main reason is income constraint (62%), which is consistent with the respondents' prioritization of the country's problems as discussed in the earlier section (Table 6). Many (56%) opined that asking the poor to pay for/ contribute to this program would be too much of a burden to them¹¹, a reason closely related with the income constraint. A few (11%) said there are more pressing concerns affecting human beings that should be given priority over concerns for animals. Those who expressed distrust on the government and implementers of the program also cited this as main reasons for not paying.

The latter answer is considered a protest bid, and hence, was dropped from the analysis.

Table 6. Reasons for ‘No’ Response across Location, Manila and Davao Region, 2005.

Reason for ‘No’ Bids	Manila	Davao	All
1. Cannot afford the amount	63 (60)	75 (64)	138 (62)
2. Philippine Eagle conservation is not worth doing	2 (2)	1 (1)	3 (1)
3. Other species are more important than the Philippine Eagle	12 (11)	3 (2.5)	15 (7)
4. Majority of the poor will be affected	61 (58)	64 (55)	125 (56)
5. Prefer giving money to humanitarian cause	11 (10.5)	14 (12)	25 (11)
6. Only people who directly benefit from eagle conservation should pay		1 (1)	
7. Higher income group should pay more		15 (13)	
8. Other reasons	6 (6)	6 (5)	12 (5)
Willing to pay lower amount (for ‘no’ bids)	40 (38)	34 (29)	74 (33)
Average lower amount	19.87	13.19	16.72
Unwilling to pay any lower amount	65 (62)	83 (71)	148 (67)
Reasons for unwillingness to pay a lower amount			
1. Cannot afford to pay the amount	42 (65)	39 (50)	81 (55)
2. Only people who directly benefit from eagle conservation should pay	5 (8)	4 (5)	9 (6)
3. Only those with higher income should pay	15 (23)	27 (32.5)	42 (28)
4. Others	7 (11)	7 (8)	14 (9)

¹¹ In fact, the survey instrument indicated that the very poor will be exempted from the program.

The main reasons of the respondents who expressed support for the conservation program are mainly (Table17): (a) The Philippine Eagle is the national bird (symbol of the country) and therefore must be protected (70%); b) This effort could lead to the protection of other endangered species in the country (50%); and c) The comprehensive program will be effective in saving the Philippine Eagle (40%).

Table 7. Reasons for 'Yes' Response across Location, Metro Manila and Davao Region, 2005.

Reason for 'Yes' Bids	Metro Manila (%)	Davao Region (%)	All (%)
1. The Philippine Eagle is a symbol of the country	68	72	70
2. The comprehensive conservation program can protect the Philippine Eagle	38	41	40
3. Trust in the leadership of the Philippine Eagle Foundation	38	33	36
4. Filipinos should do their share in protecting the national bird.	41	41	41
5. Effort will lead to protection of other endangered species	53	46	50
6. Others	2	8	5

How Much are Filipino Households Willing to Pay?

The mean WTP for the various sub-groups of household respondents was estimated using the analytical techniques given in section 6.2.1 for parametric approach following the logistic distribution formula for the mean of a non-negative random variable used by Hanemann (1989) and the non-parametric technique by Turnbull (1976). The latter was also used to estimate the median WTP. Table 8 shows the mean and median WTP per month of households who responded 'yes' to the conservation program. The WTP estimates using the parametric and non-parametric approaches are close to each other, implying robustness of the estimates.

For Metro Manila respondents, the mean WTP is PhP 34 per month as surcharge to the electricity bill; the Davao respondents are willing to pay PhP 26 per month. A statistical test (log likelihood ratio test) shows no significant difference in these values, showing that on-site and off-site communities have the same WTP for this environmental good/cause, regardless of whether the conservation program is going to be implemented only in Mindanao. This could also be interpreted to mean that the conservation program is viewed as a national 'good,' rather than a local one.

Table 8. Willingness to Pay Estimates using Parametric and Non-parametric Approaches.

	Parametric Restricted Mean WTP	Non-parametric Turnbull Mean (Median)
By Location (% Yes)		
Manila (30)	34	22 (27)
Davao (23)	26	17 (18)
All (26)	30	19 (23)
By Scope (% Yes)		
National (29)	25	18 (23)
Regional (24)	21	15 (19)
All (26)	23	17 (21)
By Payment Vehicle (%Yes)		
Mandatory (23)	20	14 (18)
Voluntary (24)	26	16 (22)
All (26)	22	15 (20)
By Collection Mechanism (%Yes)		
Electric (24)	25	17 (22)
Water (23)	20	14 (18)
All (24)	22	16 (20)
By Photograph Presentation (%Yes)		
Colored (33)	31	22 (28)
Black & white (24)	21	15 (19)
All (28)	26	18 (23)

By income group, the non-parametric estimates for the pooled sample of Davao and Metro Manila respondents show that willingness to pay increases with income. The WTP is PhP 23/month, PhP 22/month, and PhP 14/month for high, middle, and low-income groups, respectively. This is consistent with the 'yes' responses to the WTP question for Philippine Eagle conservation, which decline with income. Parametric WTP estimates by income level for mandatory vs. voluntary, water vs. electric bill, national vs. regional, and colored vs. black and white are given in Appendix 5.

The above observations are likewise consistent with the scope test results for the conservation good. The test of significant difference reveals similarity in the mean WTP value for the national conservation program (PhP 25/month) and the regional conservation program (PhP 21/month). This insensitivity to scope implies that household respondents are willing to pay a certain minimal amount for conservation of endangered species; it is up to the program implementers to decide on the scale of activities to be supported by the collected amount. Moreover, the respondents are willing to spare so much amount only and would not likely pay more for a greater scope of the environmental good.

Regarding payment vehicle, the voluntary mean WTP of PhP 26 monthly, though higher than the PhP 21 per month for mandatory payment, is also not significantly different. Again, this indicates that Filipinos are only willing to commit a given sum of money to support this cause and are indifferent in the way the payment is to be made, whether mandatory or voluntary.

Of the two utility bill surcharges considered, the mean WTP for electricity surcharge is PhP 25 per month while it is PhP 20 per month for water surcharge. Just like in the other comparative analysis of mean WTPs, the log likelihood test of statistical difference indicated no significant difference between the two utility bill payment schemes. This means that it does not matter if collection will be made through the water bill or electricity bill. In the final analysis, however, what will matter is where potential revenue collection will be greater. This would tend to favor electricity bill collection because electric service covers a greater area than the water service.

Does the use of colored photographs affect the household-respondents' willingness to support the program and, consequently, their WTP amount?

The statistical test shows it does. Thirty-three percent of the household respondents who received survey instruments with colored photographs said 'yes' to the conservation program while only 24 percent of respondents with black & white photographs gave affirmative answers. Also, the mean WTP of those with colored pictures is PhP 31/month, which is significantly higher than the PhP 21/month WTP from the other group -- a difference of about 48 percent. This implies that 'packaging' of the good tends to be value adding and influences the overall perception on the importance of the good being evaluated.

The findings further suggest that fund-raising efforts to mobilize contributions to support conservation goals will meet greater success if the ‘good’ is presented in color. The study was not able to probe in-depth the reasons for the value-adding element of the use of colored photographs but this can be subjected to further analysis using FGDs in future research, preferably as a pre-survey activity, which was also suggested in the NOAA Panel Recommendations on CVM Guidelines (1993).

Moreover, while data collection can be less costly using black & white photographs, this could result in underestimation of the value of the environmental good, particularly when the use of colored photographs, being a closer approximation of reality, would lead to the revelation of the good’s truer value.

The factors influencing the decision to pay were determined using the logistic regression model. The results for the sub-groups used in the on-site vs. off-site comparison are given in Table 9. As shown, bid levels, income, and gender have significant effects on the WTP of household respondents from Davao Region, with males being more likely to pay for the program than females. Income is likewise the only significant variable. For the various sub-groups analyzed in this project, only income and bid levels significantly affected the WTP decision. These variables exhibit theoretical validity as both are shown to be a decreasing function of willingness to pay.

Benefit Aggregation and Comparison with Cost of Conservation

Earlier it was mentioned that the referendum did not pass since less than 60 percent of the respondents voted to support the proposed conservation program; in fact only 23-31 percent said ‘yes’ to the program (Table 8).

This section looks into the question of whether or not the proposed conservation program will pass the benefit-cost criterion, on the assumption that only those who said ‘yes’ would in fact pay for the program. In other words, ***will the benefit derived by this segment of the populace exceed the cost of the Philippine Eagle Conservation Program?***

Table 10 presents the basic data used for this analysis and the resulting estimated values. The analysis adopts two sets of assumptions: (1) only those from the Davao Region households would pay for the conservation program

Table 9. Determinants of WTP for Davao (on-site) and Metro Manila (off-site), 2005.

Variable	Davao Region (on-site)	Metro Manila (off-site)	Pooled
Bid	-.0238825*** (-4.20)	-.0257912*** (-4.89)	-.0251625*** (-6.50)
Age	-0.0076785 (-0.45)	-0.0154097 (-1.09)	-0.0111035 (-1.04)
Gender (male=1; 0 otherwise)	.715139* -1.65	0.495512 -1.16	.5989815** -2.03
Hhy	.0000324* -1.9	0.00000814 -0.5	.0000195* -1.66
Constant	-0.4878993 (-0.60)	0.7447976 -1.01	-0.3168919 (-0.57)
LR chi2 (4)	30.52	39.24	70.1
Prob>chi	0	0	0
Pseudo R square	0.1676	0.2098	0.1889

* - significant at 10%;

** - significant at 5%;

*** - significant at 1%

and (2) the relevant households from the whole country will pay. The survey data reveal that on the average, 26 percent of the household-respondents for both Metro Manila and Davao Region were willing to pay a mean WTP of PhP 30 per month (or PhP 360 per year) as a surcharge to their electricity bill to support the Mindanao Comprehensive Philippine Eagle Conservation Program.

The estimated potential benefits (aggregate WTP) from those who said 'yes' to the program amount to PhP 64.9 million for Davao Region only, or up to PhP 1.43 billion, if the whole country is considered as the relevant population. This assumes that only 26 percent of the households will actually be willing to pay.

The simple comparison of benefits and costs shows that the benefit-cost criterion would not be met if the benefit would be estimated for Davao Region only. Significantly, a very high benefit-cost ratio of about 10.25 is realizable if the relevant population would be the entire country.

Disaggregating Davao Region and the whole country by income level (high, middle, and low) enabled the estimation of the willingness to pay per group

Table 10. Benefit-Cost Comparison, Proposed Mindanao Comprehensive Philippine Eagle Conservation Program, 2005.

Aggregate Benefits and Costs	Davao Region	Philippines
Number of households (2005)	1,067,764	17,571,495
Percentage of households with electric connection (2004)	65%	87%
Percentage of respondents willing to pay (Pooled data based on Davao and Metro Manila respondents)	26%	26%
Mean WTP per month (PhP)	30	30
Mean WTP per year (PhP)	360	360
Potential total benefits (WTP) per year	64,962,762	1,430,881,981
Cost of conservation per year (annualized value using 4% real discount rate, PhP)	139, 588, 774	139,588,774
Potential net benefit per year (PhP)	-74,626,012	1,291,293,207
Benefit-cost ratio	0.46	10.25

(Table 11). The total benefits summed across income groups fall short of the conservation cost if applied only for Davao Region. However, benefits are nearly eight times the projected cost if they include the whole country.

One of the analyses done in this project indicated that there is no significant difference in the WTP values of on-site and off-site household-respondents. This implies that the geographic extent of the market could indeed be national, and probably something that is to be expected a priori — the Philippine Eagle being the national bird. If the country will be used as the project area, then the conservation program is worth undertaking. It is to be noted that even if only a tenth (a very conservative estimate) of those who said 'yes' would end up paying, the conservation program would still pass the benefit-cost criterion.

One could easily point out that the cost of collecting the Fund has not yet been taken into account. However, even if the cost of the conservation program is assumed to increase several folds (anything less than 10X or 8X), the conservation program could still make it in terms of efficiency.

One could also design a fund-raising program to target only major cities and it is likely that funds could be raised, even if the WTP per household is small. This is because while the individual household is willing to pay a low

Table 11. Benefit-Cost Comparison by Income Level, Proposed Mindanao Comprehensive Philippine Eagle Conservation Program, 2005.

Aggregate Benefits and Costs	Davao Region	Philippines
Number of households (2005)	1,067,764	17,571,495
Percent (%) of HH per income group		
- high income	10	11
- middle income	53	46
- low income	37	43
Percent (%) of respondents willing to pay		
- high income	22	30
- middle income	30	29
- low income	13	21
Mean WTP per year (PhP)		
- high income	384	276
- middle income	240	264
- low income	120	168
Potential Total Benefits (WTP) per year (PhP)		
- high income	9,444,432	162,660,032
- middle income	40,676,683	621,785,484
- low income	6,101,502	264,086,918
Total (PhP)	56,222,618	1,048,532,435
Cost of conservation per year (annualized value using 4% real discount rate, pesos)	139,588,773	139,588,774
Potential net benefit per year (pesos)	-83,366,156	908,943,661
Benefit-cost ratio	0.40	7.5

amount of less than a dollar per month, the aggregate potential amount of revenue that could be raised can be substantial and could already pay for a big part (if not all) of the cost of the proposed endangered species conservation program.

CONCLUSIONS AND POLICY RECOMMENDATIONS

Overall, the study showed that funds may be raised for endangered species conservation activities by mobilizing citizens' willingness to pay for the Philippine Eagle Conservation. This is despite findings that environmental concerns in general and endangered species conservation in particular are not priority concerns among Filipinos.

The aggregate benefits of conservation turned out to be 10 times greater than the cost of conservation at the national scale. This calculation includes the provision of a big allowance for cost of collection (not included in the cost calculation) and the possibility of targeting only the major cities in the country for such fund-raising efforts. Measures to tap this potential should be explored by conservation groups, especially since the study indicated a high level of awareness among Filipinos of the endangered status of the Philippine Eagle as well as a high level of knowledge and appreciation of its importance to society.

The above main result was achieved despite the following observations:

- Only a small percentage of the population is willing to pay. The referendum on mandatory payment presented to close to 1,300 households in Davao Region and Metro Manila obtained a vote ranging from 23 percent to 31 percent only of the household-respondents. Only 24 percent of the close to 200 household respondents expressed willingness to donate to support a similar program, even if the payment scheme would be voluntary.
- The high proportion of “no” response is mainly due to income constraint and concern for the poor who will be affected by the mandatory scheme, and the belief that humanitarian concern should be given higher priority over concern for animals. The lack of belief on the willingness of the utility company to accept the collection responsibility is also a major concern for many of the respondents. A few expressed the belief that the money will end up being used for a different purpose, given the reported corruption in government agencies.
- The parametric mean WTP values are generally small, ranging from PhP 20 to PhP 34 per month as surcharge to the utility bill; the non-parametric mean is even lower at PhP 14-PhP 22 per month. There are slight variations in the mean WTP by scope of market (Davao vs. Metro Manila); by scope of the conservation program (national vs. regional/Mindanao); by payment vehicle (mandatory vs. voluntary), and by collection mechanism (water utility surcharge vs. electricity utility surcharge), but the differences are statistically insignificant.

The results also point out that the households’ willingness to pay

is insensitive to the scope of the program, mode of payment, and payment vehicle. The lack of significant difference between on-site and off-site respondents also implies a wider scope of market for the good -- the Philippine Eagle being the national bird. Interestingly, the use of colored photographs tends to have a value-adding effect on the WTP for the environmental good. This point to the importance of packaging the environmental good and indicates that the respondents' appreciation of the environmental good can be heightened by visual presentation. A more in-depth analysis of the reasons for value-enhancing effects is recommended.

APPENDIX 1

The Comprehensive Mindanao Philippine Eagle Conservation Program¹²

To abate habitat loss, bolster the wild population, and protect breeding pairs and ensure the survival and productivity of the Philippine Eagle on Mindanao Island, five mitigation techniques are being proposed, each having a set of activities to be conducted within a span of 10 years. This approach would conserve four major forest blocks in Eastern, Central, and Southern Mindanao (Appendix Table 1) along with eagle nest sites and territories found there. Combined, these forest blocks would cover 4,275,084 hectares of forest, which is almost 78 percent of the total forest cover (5,470,302.00) for Mindanao Island as of the 1997 spot mapping data of DENR.

Appendix Table 1. List of Major Forest Blocks Targeted for Preservation and Management in Mindanao Island for the Next 10 Years.

Forest Block	Province	Forest Cover (ha)	Total per forest block (ha)
Eastern Mindanao Corridor	Agusan del Sur	674,922	2,173,053
	Agusan del Norte	192,399	
	Surigao del Sur	322,600	
	Surigao del Norte	152,329	
	Davao Oriental	315,502	
	Davao del Norte	515,301	
Mount Apo Range	Cotabato Province	506,618	1,021,919
	Davao City/Davao del Sur	515,301	
Central Mindanao	Bukidnon	493,383	675,427
	Misamis Oriental	182,044	
Mount Busa and Sarangani	South Cotabato/Sarangani Province		404,685
Total Area			4,275,084

The plan's population augmentation component will also result in the soft release (i.e., hacking) of five eaglets at Mount Apo Natural Park where a semi-permanent release site (i.e., hack site) is being maintained. One eaglet will be released every two years. Once each eaglet has learned to hunt on its own (this

¹² Designed by scientists of the Philippine Eagle Foundation.

can last at least two years), it will be translocated to suitable habitats elsewhere in Mindanao. Below are the major mitigation techniques.

A) Education – the education component of this 10-year program will implement problem-specific education projects (i.e., projects to discourage deforestation, hunting and shooting, and irresponsible use of forest resources) to resolve direct conflicts between humans and eagles. These specific projects are:

1. Teacher's Education Project: change attitude and create awareness on the youth
2. Broadcaster's Education Project: change public attitude through broadcast media
3. Upland Hunter's/Gatherer's Education Project: reduce shooting or trapping (whether done accidentally or deliberately) of eagles
4. Forest Land-user's Education Project: increasing awareness of the potential disturbances brought about by forest exploitation or land-use (e.g., logging, mining) that may affect the eagles.

B) Habitat Preservation –the eagle areas will be declared as critical habitats, municipal or provincial wildlife sanctuaries, critical watersheds, or protected areas.

This technique will involve field research to gather ecological information on which to base management plans for eagle habitats. Activities toward the declaration of forest habitats as protected (e.g., critical eagle habitats, municipal watersheds, ancestral domains, protected areas, or whichever is appropriate) will also be included.

To sustain research and monitoring and to regulate, if not deter, human disturbance within these sites, the capability of parabiologists, Regional Eagle Watch Teams, and LGU personnel will be strengthened. The parabiologists are local people trained to gather field data.

C) Population Augmentation – restocking or release of captive-bred birds to become surplus birds that will replace old or mature individuals that have died.

The main activities include: a) breeding through natural pairing techniques and cooperative artificial insemination; b) rearing in isolation; and c) hacking.

Release of birds into the wild will be monitored closely to learn more about the behavior of the Philippine Eagle and to ensure its protection.

D) Limiting or Modifying Activity and Development – restrictive strategies to mitigate impacts from numerous types of development and human activity (e.g., logging and mining).

E) Declaration of Eagle Habitats as Protected Areas at Different Scales

The Philippine Eagle Foundation is working to conserve the Philippine Eagle through three levels of species conservation targets, namely: individual eagles, nesting territories, and home ranges. The declaration of nesting sites/territories as critical habitats at the local and national level seeks to protect important breeding grounds. The Philippine Eagle shows strong nest site fidelity (i.e., nesting on the same place and sometimes on the same tree for long years). Installing legal protection for nesting sites and implementing a sound management plan for these sites, which often overlap with human communities, are therefore important.

APPENDIX 2

Box 1: Assumptions for the Cost Estimation of the Comprehensive Mindanao Philippine Eagle Conservation Program¹³

Area Assumptions:

1. 10 new protected areas (PAs) will be established in the Mindanao region.
2. Each PA averages 50,000-60,000 hectares, covering 6-10 communities/sitios.
3. The habitat space requirement for a pair of eagles is 17,000 hectares.

Cost Assumptions:

1. The estimated cost of PA establishment is USD 20,000. This amount includes community education, advocacy, meetings, and site characterization until a PA bill is achieved.
2. For livelihood support, PhP 10 million/PA per year is needed over a period of three years.
3. Site development is estimated to cover 2,400 hectares per PA (buffer zone). This zone needs rehabilitation and development. The cost is placed at PhP 48 millions/PA or PhP 20,000/ha (DENR figure).
4. Pre-release cost is PhP 5 million (10 sites at PhP 0.5 million/site) for 10 years; Post release monitoring is PhP 4 million/year for 10 years.
5. Survival: 2 out of 10 eagles in the wild (w/o human intervention); increasing the area under protection increases the chances of survival to 60 percent.
6. Critical habitat area: 6 critical habitat/forest blocks or a total of 24 critical habitats ; 2-3 sitios compose each critical habitat; livelihood support would be PhP 200,000/community or sitio over 3 years.

Project Outputs

1. A total of 4,275,084 hectares of forests are protected at different scales.
2. Nesting sites/territories inherent within these forest blocks are declared as critical habitats at the local and national level.
3. Ten captive-bred eaglets are released into the wild.
4. There will be better understanding of the Philippine Eagle's ecology and the factors limiting population numbers within four major forest blocks.
5. More breeding pairs are secured and breeding success is ensured.

¹³ Based on discussions with PEF scientists.

APPENDIX 3

Social, Environmental, and Endangered Species Priority Concerns

Appendix Table 3. Priority Concerns of Davao Residents, 2005.

Social Problem	National		Regional		All	
	Freq (%)	Rank	Freq (%)	Rank	Freq (%)	Rank
a. Economic (e.g., inflation)	96 (57)	1	108 (59)	1	204 (58)	1
b. Poverty	24 (14)	2.5	17 (9)	3	41 (12)	3
c. Education	4 (2)	4.5	10 (5)	4	14 (4)	4
d. Health	3 (2)	4.5	0		3 (1)	
e. Crime/violence, inequality	1 (1)		1 (1)		2 (1)	
f. Government and governance	24 (14)	2.5	32 (17)	2	56 (16)	2
g. Infrastructure	1 (1)		0		1 (3)	
h. Environment	1 (1)		1 (1)		2 (1)	
i. Terrorism	1 (1)		1 (1)		2 (1)	
j. Relations with other countries	0		0		0	
Others	3 (2)		1 (1)		4 (1)	
Did not rank, wrong ranking, no answer	12 (7)		12 (7)		24 (7)	

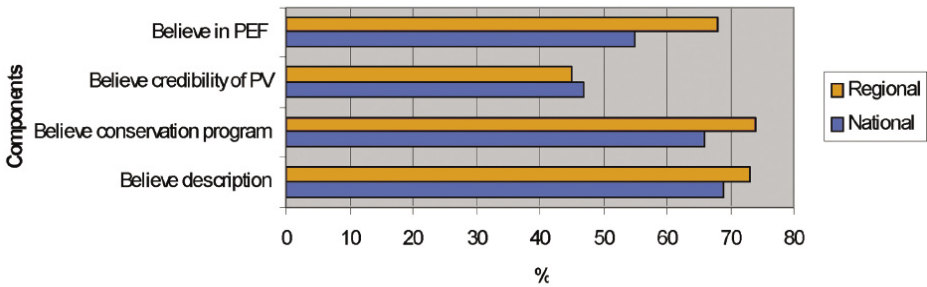
Environmental Problem	National		Regional		All	
	Freq (%)	Rank	Freq (%)	Rank	Freq (%)	Rank
a. Air pollution	31 (18)	3	28 (15)	3	59 (17)	3
b. Water pollution	15 (9)	4	10 (5)	5	25 (7)	4.5
c. Solid waste	42 (25)	2	55 (30)	1	97 (27)	2
d. Loss of endangered species	9 (5)	5	15 (8)	4	24 (7)	4.5
e. Deforestation	52 (31)	1	47 (26)	2	99 (28)	1
f. Traffic noise/problems	3 (2)		5 (3)		8 (2)	
g. Soil erosion	2 (1)		1 (1)		3 (1)	
h. Enhanced greenhouse effect	3 (2)		8 (4)		11 (3)	
i. Destruction of coral reefs	2 (1)		1 (1)		3 (1)	
Did not rank, no answer	11 (7)		13 (7)		24 (7)	

Priority Species	National		Regional		All	
	Freq (%)	Rank	Freq (%)	Rank	Freq (%)	Rank
a. Dugong	9 (5)	3	14 (8)	3	23 (6)	3
b. Rhino	2 (1)		0		2 (1)	
c. Marine Turtle	23 (14)	2	17 (9)	2	40 (11)	2
d. Whale Shark	2 (1)		3 (2)		5 (1)	
e. Spoon Bill	2 (1)		0		2 (1)	
f. Philippine Eagle	125 (74)	1	143 (78)	1	268 (76)	1
Did not rank, no answer	7 (4)		6 (3)		13 (4)	

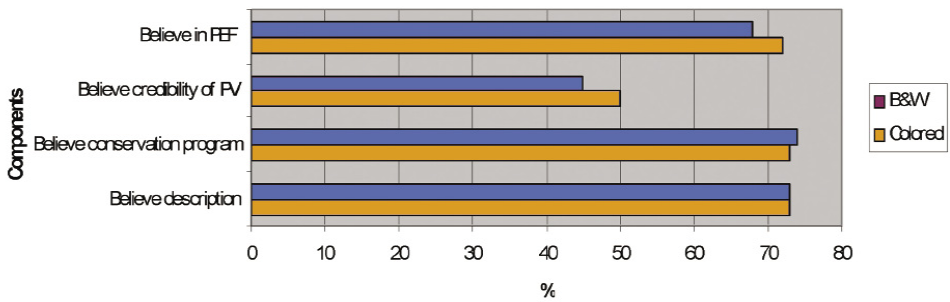
APPENDIX 4

Respondents' Perception of the Contingent Valuation Scenario

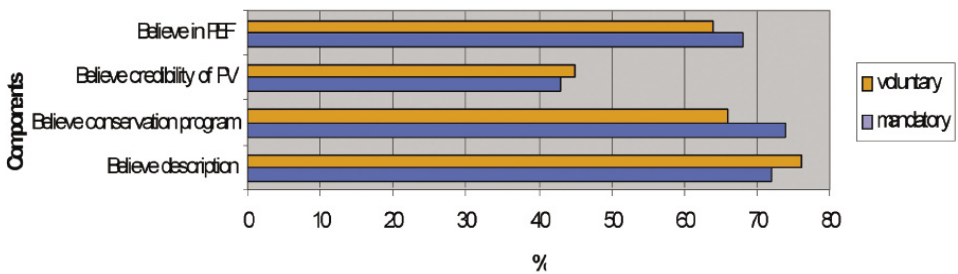
Perceptions on the Components of the CV Scenario



Perceptions on the Components of the CV Scenario



Perceptions on the Components of the CV Scenario



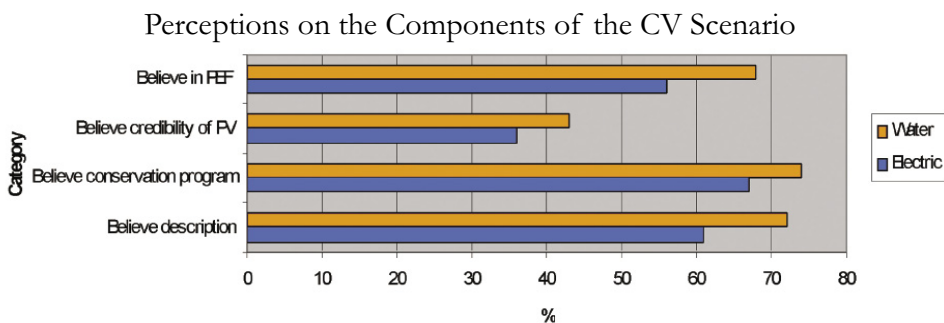
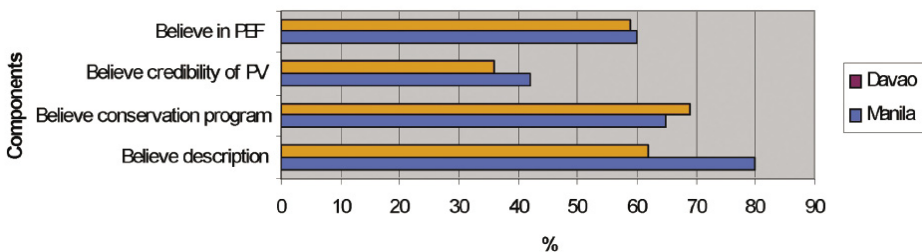


Figure 3. Perceptions on the Components of the CV Scenario



APPENDIX 5

Willingness to Pay (WTP) and 'Yes' Response by Income Level and Subgroup of Respondents

Income Level	NATIONAL		REGIONAL		ALL	
	Mean WTP	'Yes' Response (%)	Mean WTP	'Yes' Response (%)	Mean WTP	'Yes' Response (%)
High	59	63	28	40	35	53
Middle	26	29	26	28	32	28
Low	16	17	13	15	16	16
Total	(25)	29	(21)	24	(26)	26

Income Level	COLORED		BLACK & WHITE		ALL	
	Mean WTP	'Yes' Response (%)	Mean WTP	'Yes' Response (%)	Mean WTP	'Yes' Response (%)
High	49	56	28	40	35	46
Middle	40	40	26	28	32	33
Low	21	21	13	15	16	18
Total	(32)	33	(21)	24	(26)	28

Income Level	MANDATORY		VOLUNTARY		ALL	
	Mean WTP	'Yes' Response (%)	Mean WTP	'Yes' Response (%)	Mean WTP	'Yes' Response (%)
High	25	40	73	57	47	48
Middle	25	28	26	26	26	27
Low	12	14	12	15	13	15
Total	(19)	23	(21)	23	(21)	23

Income Level	WATER		ELECTRIC		ALL	
	Mean WTP	'Yes' Response (%)	Mean WTP	'Yes' Response (%)	Mean WTP	'Yes' Response (%)
High	25	40	17	25	27	31
Middle	25	28	17	29	27	28
Low	12	14	17	17	14	15
Total	(19)	23	(26)	24	(22)	24

Income Level	MANILA		DAVAO		ALL	
	Mean WTP ^a	'Yes' Response (%)	Mean WTP ^a	'Yes' Response (%)	Mean WTP ^a	'Yes' Response (%)
High	21	37	32	22	23	30
Middle	23	29	20	30	22	29
Low	19	28	10	13	14	21
Total	-	30	-	23	-	26

^a Non-parametric mean WTP (all entries on mean WTP, except for Metro Manila and Davao, are parametric estimates),

Figures in parenthesis are midpoint WTP for parametric estimates.

APPENDIX 6: LIST OF ACRONYMS

CPR	-	Center for Philippine Raptors
CVM	-	Contingent Valuation Method
DENR	-	Department of Environment and Natural Resources
FGD	-	Focus group discussion
IEC	-	Information, education, and communication
IUCN	-	International Union for the Conservation of Nature & Natural Resources
MOA	-	Memorandum of Agreement
MVP	-	Minimum Viable Population
MBG	-	Money-back guarantee
NOAA	-	National Oceanic and Atmospheric Administration
NGO	-	Nongovernment organization
PEC	-	Philippine Eagle Center
PACAP	-	Philippine-Australia Community Assistance Program
PERNC	-	Philippine Eagle Research and Nature Center
PRCP	-	Philippine Raptors Conservation Program
PAMB	-	Protected Area Management Board
PPM	-	Provision Point Mechanism
REWT	-	Regional Eagle Watch Teams
UPLB	-	University of the Philippines Los Baños
WTP	-	Willingness to pay

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Above all, to our Almighty God, who inspired us throughout the project to "soar on wings like eagles; to run and not grow weary; to walk and not faint..."

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Willingness to Pay for Conservation of the Vietnamese Rhinoceros

Truong Dang Thuy

Willingness to Pay for Conservation of the Vietnamese Rhinoceros

Truong Dang Thuy

INTRODUCTION

The Problem

According to Vietnam's Biodiversity Action Plan, the extinction rate of the country's endangered species in the past decades has been higher than that of the world and 1,000 times higher than the natural extinction rate. The most dangerous threats to biodiversity are the expansion of economic (cultivation) activities, poaching, and deforestation. Among the more than 350 endangered species in Vietnam, the Vietnamese Rhinoceros is the most endangered. The number of Rhinos has decreased from 15-17 in 1970 to 5-7 today (Cat Tien National Park, 2005). The Vietnamese Rhinos have been observed not to have breeding activities in recent years. As such, they could be extinct in the near future (Cat Tien National Park, 2005).



Photo courtesy of www.rhinoresourcecenter.com

The rhinos and elephants are the two biggest land animals on earth. Among the five species of rhinos in the world, three are found in Asia: Indian Rhino (the greater one-horned rhinoceros), Javan Rhino (the lesser one-horned rhinoceros), and Sumatran Rhino (Asian two-horned rhinoceros). Foose and Strien (1997) view them as “among the most remarkable animals on earth and are of great cultural importance in Asia.”

The rarest among Asian rhinos, the Javan Rhino, is found in Indonesia and Vietnam. Its population is reported to be fewer than 75 (Foose and Strien, 1997). In Vietnam, only 5-7 Javan Rhinos remain. (The Vietnamese Rhino is a subspecies of the Javan Rhino.) They live in Cat Loc Rhino Conservation

Area located in Cat Tien National Park, which has a total area of 30,635 ha. These rhinos are now under threat; the cultivation activities of a minor ethnic group living in the rainforest are impinging on the rhinos' area. Moreover, these people compete with the rhinos for the same source of food.

There have been many efforts to relocate this ethnic group from the conservation area, but these have been unsuccessful. For one, the group has historically lived in isolation, relying on the forest for its existence. The people are extremely poor, with a desperately low level of education and skills. Without a significant and sustained support, their chance of surviving in a new environment is slim. On the other hand, funds for moving and resettling them, which would be very large, are not available.

The Cat Loc Rhino Conservation Area was established with funding from the government of the Netherlands and Vietnam, as part of a bigger program to maintain the biodiversity of Cat Tien National Park. This program was coordinated by the World Wildlife Fund and ended in June 2004.

The situation calls for a program to protect the rhinos. However, such a program would require much funding because the cost of moving and resettling people currently living in the area is high. In addition, because the rhinos are too few, some breeding interventions are required, which also require a lot of money.

On the other hand, protecting the rhinos provides some benefits. In particular, the continued presence of the rhinos would contribute to biodiversity. It would also mean that forests would be available to serve as home to other species as well. Moreover, rhinos could provide some recreational value since Cat Tien National Park is now open to tourists. Rhinos are also of great cultural importance to Vietnamese; they are mentioned in many legends.

Endangered species are non-marketable goods and there is a lack of information on their economic value and the mechanisms to capture non-market economic value. Thus, this research aims:

- To determine whether or not Vietnamese are willing to pay for the Vietnamese Rhino's conservation.
- To determine the Vietnamese's awareness of and attitudes toward the Rhino's conservation.
- To calculate the cost of a conservation program for the Vietnamese Rhino.

- To measure the economic value of and potential revenue from such a conservation program.
- To recommend funding mechanisms for the conservation program.
- To examine the determinants of the Vietnamese' willingness to pay.

RESULTS AND ANALYSIS

The study used the CV design common to all the chapters in this book, as described in Chapter 2. The principal findings are presented below.

Respondents' Profile

The survey required that the respondents should be the household head or a working member. The respondents aged 18-82 years, averaging 39 years. Their average schooling years was 12.15 years, higher than that of the country. Household size was 4.7 persons on the average (Table 3).

The monthly household income of HCMC respondents was USD 222, slightly higher than the Hanoi respondents' (USD 204). The average income of both survey groups was USD 213, of which USD 15.2 was spent on electricity.

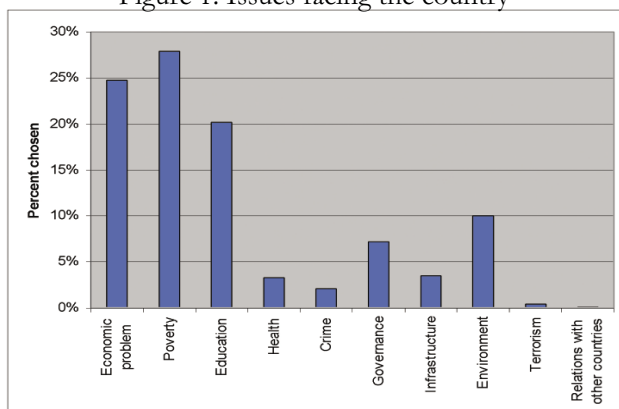
Table 3. Respondents' profile.

Variable	Mean	Standard deviation	Range
Age	38.85	14.1	18-82
Education	12.15	3.77	0-27
Household size	4.7	2.25	1-25
Monthly HH Income (USD)	212.8	160.31	31.25-937.50
Monthly electricity bill (USD)	15.2	14.93	0.625-125

Respondents' Prioritization of Issues Facing the Country

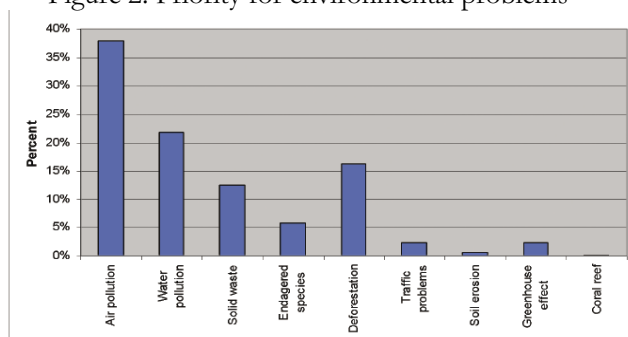
Seventy-seven percent of the respondents said that Vietnam does not properly take care of its environment. However, only 10 percent viewed environment as the most important issue. Most of the respondents indicated poverty, economic problem, and education as the three most important problems (Figure 1).

Figure 1. Issues facing the country



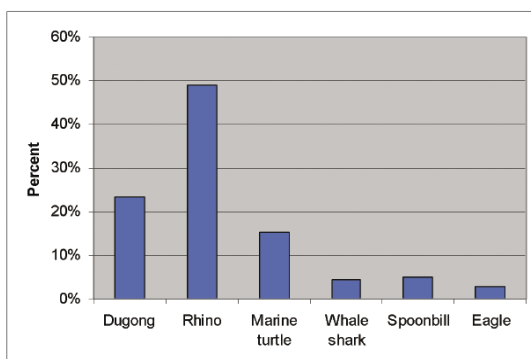
Among the environmental issues, the most important for them are air and water pollution, deforestation, and solid waste management. Endangered species was of high priority to only 6 percent of the respondents (Figure 2).

Figure 2. Priority for environmental problems



The Vietnamese Rhino was identified as the endangered species most deserving of protection (Figure 3). However, this result could be biased as some respondents could have read through the questionnaire before answering it. This is one shortcoming of the drop-off survey method.

Figure 3. Priority over endangered species



Attitudes Toward Endangered Species Conservation and Knowledge of the Vietnamese Rhino

The survey showed that people put some value on endangered species conservation. More than half of the respondents strongly agreed that poaching of wildlife species should be punished by law; 16.5 percent strongly agreed and 49 percent agreed that endangered species are important even if they don't get to see or interact with them. When asked about bequest value, 29 percent strongly agreed and 47.5 percent agreed that it is everyone's duty to ensure that plants and animals as we know them today will exist for mankind in the future. In brief, existence and bequest value are important to most respondents.

While the majority of respondents agreed or strongly agreed that endangered species should be a priority concern of the government, most of them thought there are more important problems than endangered species. Moreover, 63 percent said there are more important environmental concerns than endangered species conservation; while 66 percent believed the government should invest in helping people before it spends money on endangered species. This is consistent with the respondents' prioritization of issues facing the country.

Although the majority of respondents put value on endangered species conservation, not as many agreed when that money should be devoted to endangered species conservation. Ten percent strongly agreed and 34 percent agreed that the government should raise more funds for the country's environmental programs. Seven percent strongly agreed and 36 percent agreed that citizens should contribute to endangered species conservation by making cash donations to this cause. On the other hand, 7 percent strongly agreed and 24 percent agreed that government should raise taxes to pay for more endangered species protection.

With regards the respondents' knowledge of the Vietnamese Rhino, 19 percent reported that they have seen a live rhino. This could be over-reported for no one can see Vietnamese Rhino. It is possible that they have seen a rhino in other countries.

Only 53.7 percent correctly answered that rhinos come in different sizes, shapes, and colors; 8 percent answered incorrectly and 38.3 percent indicated "don't know."

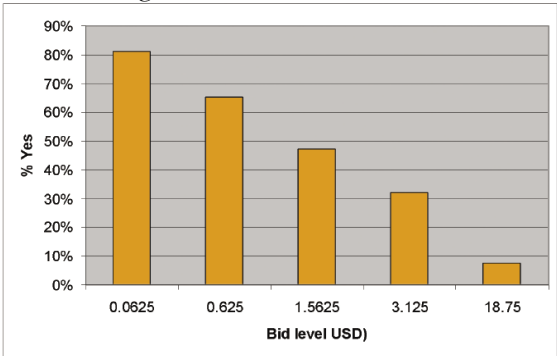
The majority (70.4%) indicated that some communities could still obtain some benefits from rhinos without hunting them such as through tourism.

Responses to the WTP question

This chapter is the only one that used a mandatory one-time payment through the electricity bill (as opposed to a monthly payment over five years). This was in part because the Vietnamese Rhino is already critically endangered; an up-front payment that could promptly be made available for conservation would increase the credibility of the scenario.

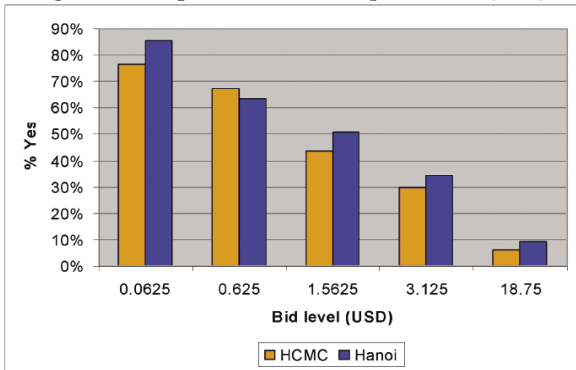
Figure 4 shows the responses to different bid levels: 81 percent voted for the program at the lowest level of bid and 8 percent at the highest level. This indicates a well-behaved survivor function with most of the respondents voting at the lowest bid level and most of the respondents rejecting the highest bid level. Intuitively, the majority of respondents would vote for the program at USD 1.50.

Figure 4. The survivor function.



No significant difference was detected in the WTP responses of the two cities. Slightly more Hanoi respondents voted for the program at all bid levels, except at USD 0.625, than did HCMC respondents (Figure 5).

Figure 5. Responses to WTP questions by city.



Reasons for Unwillingness to Pay

Of those who were not willing to pay for the conservation program, the top reason was affordability (Table 4). Forty-one percent of those who said “no” to the program indicated that they could not afford the payment: 20 percent of those who were unwilling to pay said so at the lowest bid level and 64 percent at the highest level.

The second top most reason is that the respondents did not believe their payment will be actually used for rhino conservation. For the third reason, 23 percent indicated that they do not like adding the payment to their electricity bill.

Table 4. Reasons for voting “no” to the WTP question.		
Reason	Frequency	%
I cannot afford that amount.	148	41
I do not think conservation of the Rhino is worth doing.	27	7
I do not believe that the money I pay will actually be used for Rhino conservation.	137	38
I do not like adding the amount to my electricity bill.	82	23
Only people who will directly benefit from the Rhino conservation should pay for this.	41	11
I think that other species are more important than the Rhino.	34	9
The majority of the poor will be affected.	101	28
Only those from higher income groups should pay for this.	84	23
I prefer giving money to humanitarian causes instead.	60	16
Others	35	10

Respondents indicated concern for equity; nearly one-third said that the majority of the poor will be affected by the proposal and 23 percent wanted only those from higher income groups to pay for the conservation program. Bid levels do not affect these responses.

Reasons for Willingness to Pay

Two-thirds of the respondents said that the rhino is a special species that needs to be protected; 40 percent said it is high time for Vietnamese to protect the rhino. Only one-third chose the reason that the program would be able

to attract counterpart funding. On the other hand, more than half believed that the program could lead to more protection efforts for other endangered species in Vietnam. This indicates a high potential for collecting payments for conserving the rhino as well as other endangered species in Vietnam, which has never been done before.

Table 5. Reasons for willingness to pay.

Reason	Frequency	%
The rhino is a special animal and should be protected.	320	68
I like the idea that we could get matching funds from international organization as long as we can provide counterpart funding.	157	33
It is high time that people in Vietnam do something concrete about protecting the rhino - since this is the center of illegal trade in the world.	190	40
This initiative can lead to more protection efforts for other endangered species in the country.	245	52
Others	30	6

Validity of Scenario Design

The scenario design appeared to be credible to the respondents. The majority of them accepted the description of the current situation of the Vietnamese Rhino (86%); half preferred the electricity surcharge as payment vehicle. Two-thirds of them believed the Electricity Company (EC) would agree to collect fund. Moreover, 69 percent believed the proposed conservation program would be effective in saving the rhino.

The main reasons for rejecting the proposals were corruption (41% of those who were not willing to pay), the EC is not bound by law to do the collection (50%), and there is no connection between the rhino and electricity (60%).

Also, 73 percent of the respondents who were unwilling to pay did not want the collection to be mandatory. The respondents likewise expressed worry that with the electricity bill always increasing, the mandatory contribution to the conservation program would increase also, and that because not all households have electricity connection, payments could not be collected from all the households.

The Bid Function

The following variables were subjected to a regression analysis:

- Bid levels (USD)
- City (dummy, Hanoi = 1)
- Last month electricity bill (USD)
- Monthly household income (USD/month)
- Schooling years (year)
- Age (year)
- Gender (male = 1)
- Households size (total number of household members)
- Marital status (married = 1)
- Member: a dummy variable to identify whether or not the respondent is member of an environmental organization (yes = 1). It is noted that only 3 percent of the sample were members of some environmental organizations.

Table 6 shows the regression results; the bid levels, as expected, statistically affected the respondents’ willingness to pay.

Table 6. Logit regression results.

Dependent Variable	Coefficient	Standard Error
Bid (USD) (*)	-0.20	0.024
City (Hanoi=1)	0.17	0.192
Electricity bill (USD)	0.004	0.007
Income (USD)	0.0002	0.001
Schooling year	0.02	0.026
Age	-0.01	0.008
Gender (male=1)	0.27	0.182
Household size	0.03	0.043
Marriage (married=1) (*)	-0.43	0.258
Member	0.06	0.528
Constant	0.21	0.565
Log likelihood	-363	
Pseudo R-square	0.17	

(*) Significant at 10%.

Except bid level and marriage, no other variables statistically affected WTP. The result implies that married respondents tended to be less willing to pay for the rhino’s conservation.

The variable “City” is insignificant, indicating that the WTP values of respondents in the two cities do not differ. This is consistent with the above analysis.

Income does not affect WTP, indicating that respondents from both the lower and higher income groups have the same preference regarding the rhino's conservation. Similar findings were observed regarding age, gender, and household size.

WTP Estimates

Applying equation (14) for a non-parametric WTP estimate, the mean and median WTP of USD 2.57/household (HH) was obtained. The estimate is slightly higher for Hanoi (USD 2.86) than HCMC (USD 2.25).

Using the bid function and applying equation (16) for a parametric WTP estimate, a WTP of USD 2.88/HH was obtained, which is slightly higher than the non-parametric estimate. It is noted that using the bid function with bid only results in a WTP of USD 2.84/HH.

The WTP of USD 2.50/HH, the lowest estimated value, is low but considerable since it is equivalent to 1.2 percent of the household monthly income.

Adjustment for Certainty

The questionnaire included a follow-up question on certainty in answering the WTP question. After responding to the WTP question, the respondents were asked how certain they were of their vote. For a conservative WTP estimate, those who said "yes" to the program, but then expressed uncertainty about their answers were classified as "no" respondents.

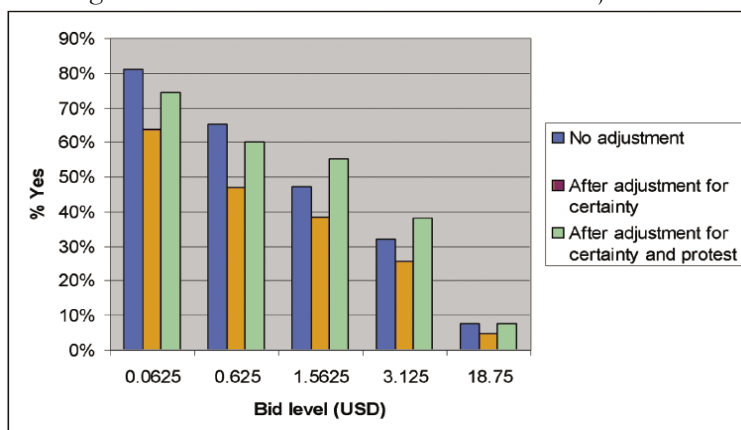
Figure 6 shows the survivor function, which indicates the probability of voting for the conservation plan at each bid level, before and after adjustment for certainty. The probability of voting for the program is lower after adjustment, especially at the two highest bid levels.

The non-parametric WTP estimate after adjustment becomes USD 1.84/HH.

Adjustment for Protest Votes

Those who put some value on the rhino's conservation but said "no" to the WTP question could be considered protest voters. This is because they do not believe in the conservation program or some of its features. Protest voters could be identified through the debriefing questions. The following two

Figure 6. Survivor function before and after adjustment.



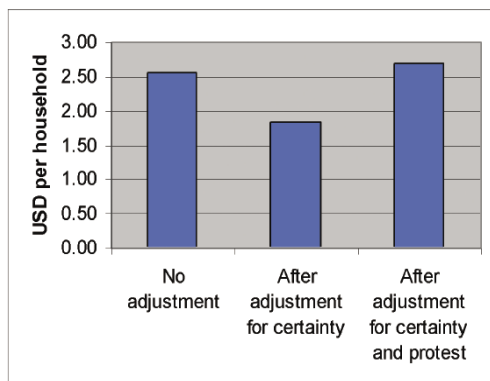
reasons for not voting for the program could be considered as protests:

- I do not believe that the money I pay will actually be used for Rhino Conservation. (This indicates that the respondents do not trust the institution that is implementing the program.)
- I do not like adding the amount to my electricity bill. (This indicates that the respondents do not like the payment vehicle.)

Figure 6 presents the survivor function before and after adjustment for certainty and protest. While adjustment for certainty lowers the probability of the “yes” vote, adjustment for protest increases it. At the third and fourth bid levels, the probability becomes even higher than that with no adjustment.

The non-parametric WTP estimate after adjustment for certainty and protest is USD 2.69/HH.

Figure 7. Estimated WTP.



Cost of and Potential Revenue for the Vietnamese Rhino Conservation Program

The managers of Cat Tien National Park estimated the total cost of the rhino conservation program at USD 3.75 million as initial investment (mainly for moving and resettling the minor ethnic group living in the NP) and USD 60,000 annual operating cost (Cat Tien NP, 2005 and Institute of Ecology and Biological Resources & Department of Forestry, 1998). This amount would cover all the activities described in the scenario, except captive breeding. On the other hand, using the lowest estimated WTP of USD 2.50/HH, the total potential revenue from both Hanoi and HCMC is USD 5.8 million.

The potential revenue is not much higher than the costs and may not pass a sensitivity test. On the other hand, some positive aspects have been noted. Most important of these is the finding that people put value on rhino conservation and are willing to pay a non-zero amount for it, even if this is quite a new thing in Vietnam. The estimated total potential revenue considered two cities only; Vietnam has other big cities that could contribute to the Vietnamese Rhino Conservation Program. The potential of obtaining counterpart funding from international organizations or other countries should not be discounted also.

CONCLUDING REMARKS

This study applied the contingent valuation method to measure willingness to pay for the conservation of the Vietnamese Rhino. The country's two biggest cities - Hanoi and Ho Chi Minh City – were surveyed; 800 questionnaires were distributed. Although payment for environmental goods, especially endangered species, is quite new to Vietnamese, the respondents were willing to pay at least USD 2.50/HH for rhino conservation.

The study found that the potential revenue is higher than the estimated cost of conservation. In collecting the payment, using the electricity bill appears to be the most efficient way. Although some respondents said that there is no connection between the rhino and electricity and thus collecting payment for rhino conservation through the electricity bill is strange, the majority of respondents agreed that this is the cheapest way to collect since almost the entire country is connected to the electricity service.

The socioeconomic characteristics have no statistically significant effect on WTP, indicating that different groups might have the same preference

regarding rhino conservation.

The study also showed that although people are willing to pay some amount for rhino conservation, endangered species conservation is not high in their priority list of environmental problems. Similarly, the environment is not in their top three important problems of the country. However, this might change when the country's income increases, given that the environment is a "luxury good" (Freeman, 2003). But by the time income becomes high enough to foster the demand for environmental goods and services, it could be too late to protect the environment, particularly the Vietnamese Rhino.

With regards the research method, the drop-off survey worked well in the two cities. Most of the questionnaires were collected after two days. However, there were a few cases where respondents with low education could not answer the questionnaire by themselves. This implies that the drop-off method may not work well in the rural areas.

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The Economic Value of Black-faced Spoonbill Conservation in Macao

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INTRODUCTION

Background

Biological resources are valuable to current and future generations, providing people with important goods and services (OECD, 2002). However, poor conservation and management have resulted in degradation of the health and integrity of biological resources as well as the benefits derived by humans. Recent estimates suggest that 40-100 species become extinct worldwide each day (Chambers and Whitehead, 2003).

Wild biodiversity decline is of global concern (McNeely and Scherr, 2003) and economists have given increasing attention to it (Tisdell and Wilson, 2006). Many factors threaten wildlife; among them habitat conversion to other uses (such as urban development) and human (over)exploitation are the best



Photo by Jin Jianjun

known (Bulte and Horan, 2003). The preservation of these animals requires that the individual species is protected and its habitat conserved. The costs of such conservation to society can usually be measured. To determine the economic efficiency of specific protection programs, it is necessary to compare these costs with estimates of the benefits of preservation (Chambers and Whitehead, 2003).

However, estimating the non-market benefits from endangered species conservation is not easy since there is no market for wildlife conservation. The contingent valuation method (CVM) (Mitchell and Carson, 1989) is the most widely used empirical method for measuring the non-market benefits of environmental goods, such as the preservation of wildlife species, as it can create hypothetical markets to elicit people's willingness to pay (WTP).

An appealing aspect of CVM is that it can, in principle, estimate the total economic value of any environmental amenity in question (Bandara and Clem, 2004). The economic valuation of protecting a specific species using CVM has received growing attention from academics, such as Loomis and Ekstrand (1998) on the Mexican spotted owl in the USA; White et al. (2001) on threatened mammals in Britain; Macmillan et al. (2002) on wild goose in UK; Giraud et al. (2002) on Steller sea lion in the USA; Chambers and Whitehead (2003) on wolves in Minnesota, USA; Bandara and Clem (2004) on Asian elephant in Colombo, Sri Lanka. Most of these studies, however, were done in developed countries. This study estimates the benefits of conserving an endangered species in a developing country – the black-faced Spoonbill in Macao, China.

The Problem

The black-faced Spoonbill (*Platalea minor*) is a globally endangered species (IUCN, 2006) due to its small known world population, which can be found only on the east fringe of Asia (BirdLife International, 2000). Its known world population was only 1,206 in 2004 (Yu, 2004).

The black-faced Spoonbill is a relatively small wading bird with, as its name suggests, an elongated spoon-shaped bill. It is a migratory bird that breeds in the temperate region during summer. It migrates to subtropical and tropical regions in the south during autumn and winter, and returns to the northern breeding sites in early spring.

Its population is believed to continue to decline due to serious threats to its wintering and breeding grounds, including reclamation, coastal development, pollution, hunting and human disturbance (ICUN, 2006). Among these, habitat destruction due to the alteration and drainage of wetlands for aquaculture and industrial development is probably the biggest threat to the survival of the black-faced Spoonbill. Because a large proportion of the bird's population concentrates in a few places only during winter, the bird's susceptibility to these threats is heightened.

Macao is an important destination for black-faced Spoonbills' overwintering; fifty such birds spent the 2003/2004 winter there. Macao, a Special Administrative Region (SAR) of China, is situated at the estuary where the Pearl River and the West River meet the sea. With many neighboring islands and rivers, the current speed of West River is relatively low, causing serious

silting to occur at the coastal region of these islands. The mudflats associated with Macao's mangroves have different layers of deposits rich in organic matter, which attracts the black-faced Spoonbill to winter. The activities of the black-faced Spoonbill in Macao were first recorded in 1990. To protect this endangered species, the Macao SAR government declared the 45-ha area as the first ecological zone in 2001, which is used to provide good conditions for different migratory birds (including black-faced Spoonbills) in search of food and resting places and to protect other endangered species such as mangroves (Environment Council, 2002). Some ecologists estimate that if the black-faced Spoonbill's habitat can be properly conserved, there could be 127 black-faced Spoonbills in Macao by 2008 (Leung, 2003).

However, Macao is a small place, with a total area of about 27.3 km², composed of the Macao peninsula and the islands of Taipa and Coloane. Macao had a population of 448,495 people in 2003, with an average population density of about 16,428 inhabitants per km² (Statistics and Census Department, 2003). The annual gross domestic product (GDP) significantly increased from USD 7,309 million in 1997 to USD 11,574 million in 2005, which is 58% growth over eight years. With the rapid economic and tourism development in the past decades, land shortages have become a more serious problem than before. People tend to ignore the economic value of endangered species or biodiversity conservation, which can be gained by preserving the ecological zone in the long term. Some large-scale development or construction projects near or in the ecological zone may degrade the natural environment, resulting in the loss of economic benefits from endangered species conservation. Policymakers or planners concerned with endangered species conservation as a strategy for sustainable development may need to justify its economic benefits.

In view of the above, this study aims to measure the non-market benefits of black-faced Spoonbill conservation in Macao based on the local residents' preferences to help policymakers make better policies. This study can enrich the literature on the application of stated preference methods in developing countries for studying the household preferences and behaviors to reveal the value of the wildlife conservation.

RESULTS AND ANALYSIS

The study used the CV design common to all the chapters in this book, as described in Chapter 2.

General Information

The final survey was conducted from the 30th of September through the 17th of October 2005. Among the 1200 households, we approached 670 households. 160 households were not available because there was no one in the house or the house was being rented out to persons who were not Macao citizens or the persons were not the target respondents. 80 households declined to be involved in the survey. The final number of respondents was 430 and the response rate was 64%. After assessing for missing and inconsistent answers to the valuation questions, the researcher obtained a sample of 400 useable observations for further analysis. Among these valid questionnaires, 200 respondents were asked their WTP for the black-faced Spoonbill conservation plan using the voluntary payment vehicle, and the other 200 were asked their WTP using the mandatory payment vehicle.

Socioeconomic Characteristics of the Respondents

Table 1 shows the descriptive statistics of the main socioeconomic characteristics of the sample. To check the non-response bias, the researcher compared the demographic and socioeconomic characteristics of the survey respondents with the Macao census data on the characteristics of the Macao population as a whole. The survey data were found to be close to the Macao average.

Table 1. Main socioeconomic characteristics of the respondents

Variable	Description	Sample average		Macao average ^a
		Mean	Std. dev.	
AGE	Age	35.33	12.64	-
GENDER	1 = male, 0 = female	0.54	0.50	0.48
CIVSTAT	1= married, 0 = unmarried	0.60	0.49	-
EDUC	Education of respondents (1= No formal schooling, 2= Elementary, 3= High school,4= College,5= Master's or above)	3.28	0.76	-
NP	Number of household members living together	3.54	1.33	3.18
NP15	Number of household members less than 15 years old	0.62	0.83	0.51
INCOME	Total household income (MOP/month)	15908	14252	15304

^a Statistics and Census Department (2003).

The mean age of the respondents was 35.33 years. Fifty-four percent of them were male and about 60% were married. The average educational level was between high school and college. Specifically, 47.50% had finished high school and 36% had finished college education. The mean household size was around 3-4 persons, with a mean of less than one person under 15 years of age. The average household income was around MOP15,908/month (US\$1,988/month).

Table 2 reports the main socioeconomic characteristics of the respondents according to the payment vehicle. The mean age of the respondents in the voluntary payment vehicle (35 years) is similar to that in the mandatory payment vehicle (35.6). In both cases, there were more males than females. The education level of the respondents in the voluntary payment vehicle was higher than that in the mandatory payment vehicle, but the difference is not significant. The mean household size for both groups was 3-4 people. Forty-two percent of the voluntary payment households and forty-seven percent in the mandatory payment households had children under 15 years of age. The average household income was around MOP 15,304/month (USD 1,913/month) and MOP 16,513/month (USD 2,064/month) for the respondents in the voluntary payment vehicle and in the mandatory payment vehicle, respectively. A two-sample t-test for differences in means of the socioeconomic variables of the two groups shows no statistical differences. Therefore, one can assume that any differences in WTP levels across the two survey versions are related to treatment effects, and not due to demographic or socioeconomic characteristics.

Table 2. Main socioeconomic characteristics of the sample, voluntary vs. mandatory payment vehicle

Variable	Voluntary (n=200)		Mandatory (n=200)		t-statistics
	Mean	Std. Dev.	Mean	Std. Dev.	
AGE	35.04	12.57	35.63	12.71	-0.4475
GENDER	0.55	0.50	0.54	0.50	0.3004
CIVSTAT	0.58	0.50	0.63	0.48	-1.0874
EDUC	3.32	0.76	3.24	0.75	1.1146
PEOPLE	3.53	1.37	3.55	1.29	-0.1504
NP15	0.57	0.82	0.68	0.84	-1.2311
INCOME	15304	10910	16513	16971	-0.8680

Attitudes Toward the Problems Faced by the Government

Almost half (46%) of the respondents indicated social problems as the biggest problem faced by the government, followed by economic problems and environment (Table 3).

Table 3. Respondents’ opinions on the biggest problem faced by the government

Problem	Number of respondents	Percentage	Importance rank
Economic problems	90	22.1%	2
Social problems	188	46.1%	1
Infrastructure	58	14.2%	4
Environment	64	15.7%	3
Terrorism	2	0.5%	6
Others	6	1.5%	5

The majority of the respondents (74.5%) thought that the environment and natural resources in Macao were not properly taken care of.

In terms of the three most important issues related to nature and human impact on the natural environment, the respondents did not give much weight to endangered species conservation (Tables 4-6). Only 4.7% of them considered endangered species conservation as the most important environmental problem in Macao and only 5.75% ranked it as the second most important environmental problem. The respondents gave greater importance to air pollution, water pollution, solid waste management, enhanced greenhouse effect and traffic noise problems.

Table 4. Respondents’ most important environmental problem in Macao

Problem	Number of respondents	Percentage	Importance rank
Air pollution	178	44.50%	1
Water pollution	55	13.75%	3
Solid waste management	39	9.75%	4
Endangered species conservation	19	4.75%	6
Deforestation	19	4.75%	6
Traffic noise/problems	31	7.75%	5
Enhanced greenhouse effect	56	14.00%	2
Others	3	0.75%	8

Table 5. Respondents' second most important environmental problem in Macao

Problem	Number of respondents	Percentage	Importance rank
Air pollution	78	19.50%	2
Water pollution	91	22.75%	1
Solid waste management	73	18.25%	3
Endangered species conservation	23	5.75%	7
Deforestation	34	8.50%	6
Traffic noise/problems	56	14.00%	4
Enhanced greenhouse effect	41	10.25%	5
Others	4	1.00%	8

Table 6. Respondents' third most important environmental problem in Macao

Problem	Number of respondents	Percentage	Importance rank
Air pollution	56	14.00%	4
Water pollution	63	15.75%	3
Solid waste management	86	21.50%	1
Endangered species conservation	48	12.00%	6
Deforestation	24	6.00%	7
Traffic noise/problems	65	16.25%	2
Enhanced greenhouse effect	53	13.25%	5
Others	5	1.25%	8

Knowledge and Attitudes Toward Endangered Species Conservation

The respondents were asked to choose one endangered species that is most deserving of protection from the four endangered species in Macao. They are Chinese white dolphins, mangrove, black-faced Spoonbills and white sea eagles. The results show that the black-faced Spoonbill was ranked as the third priority.

To elicit the respondents' attitudes toward endangered species conservation, 10 statements were presented and the respondents were asked to state their opinions on a scale of 5 to 1, with 5 as 'strongly agree' and 1 as 'strongly disagree'.

As Table 7 shows, the majority (76.3%) strongly agreed or agreed that there are more important environmental concerns than endangered species

conservation. This result is consistent with previous findings. More than three quarters (80.8%) of the respondents had existence values for the endangered species as they strongly agreed or agreed that “it is everyone’s duty to ensure that plants and animals as we know them today will exist for mankind to enjoy in the future.” Half (strongly) agreed that citizens should contribute to endangered species conservation by making cash donations to this cause. The majority had altruism values for endangered species as they strongly agreed or agreed with the statement that “endangered species are important even if I don’t get to see or interact with them.”

Table 7. Attitudes of respondents toward endangered species conservation

Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Question 1	89 (22.3%) ^a	234 (58.5%)	7 (1.75%)	33 (8.25%)	37 (9.25%)
Question 2	61 (15.3%)	244 (61.0%)	5 (1.25%)	35 (8.75%)	55 (13.75%)
Question 3	143 (35.8%)	202 (50.5%)	8 (2.00%)	21 (5.25%)	26 (6.50%)
Question 4	104 (26.0%)	219 (54.8%)	8 (2.00%)	31 (7.75%)	38 (9.50%)
Question 5	32 (8.0%)	169 (42.3%)	19 (4.75%)	56 (14.00%)	124 (31.00%)
Question 6	61 (15.3)	228 (57.0%)	9 (2.25%)	58 (14.50%)	44 (11.00%)
Question 7	18 (4.5%)	124 (31.0%)	49 (12.25%)	51 (12.75%)	158 (39.50%)
Question 8	91 (22.8%)	203 (50.8%)	7 (1.75%)	30 (7.50%)	69 (17.25%)
Question 9	78 (19.5%)	167 (41.8%)	14 (3.50%)	62 (15.50%)	79 (19.75%)
Question 10	39 (9.8%)	148 (37.0%)	18 (4.50%)	68 (17.00%)	127 (31.75%)

Question 1: The government should raise more funds to deal with environmental programs.
 Question 2: There are more important environmental concerns than endangered species conservation.
 Question 3: Poaching of wildlife species should be punishable by law.
 Question 4: It is everyone’s duty to ensure that plants and animals as we know them today will exist for mankind to enjoy in the future.
 Question 5: Citizens should contribute to endangered species conservation by making cash donations to this cause.
 Question 6: Endangered species are important even if I don’t get to see or interact with them
 Question 7: The government should raise taxes to pay for more endangered species protection.
 Question 8: The government should invest in helping people before it spends money on endangered species.
 Question 9: Households who earn more income should contribute more to endangered species conservation
 Question 10: Endangered species conservation should be a priority concern of the government.
^aNumbers in parentheses show percentage of response to different issues on endangered species conservation.

Three questions were posed to find out the respondents' knowledge of the black-faced Spoonbill. The survey results showed a substantial lack of previous knowledge of this endangered species. The majority (68.5%) of the respondents reported that they had not seen a live black-faced Spoonbill in wild. Only half of the respondents knew that the black-faced Spoonbill is a migratory bird. About 46.5% of the respondents agreed that some communities could benefit from black-faced Spoonbill conservation, such as through ecotourism. Only 51.25% of the respondents knew that the black-faced Spoonbill is an endangered species.

Benefit Estimation

Non-parametric estimation

Before doing the regression analysis, it is useful to look first at some non-parametric analyses of willingness to pay.

Entire sample

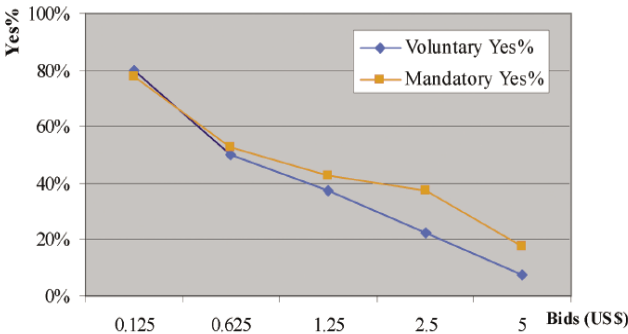
Table 8 shows the results obtained from the mandatory payment vehicle (PV) and the voluntary payment vehicle if all responses are included for analysis. As expected, the ‘yes’ response monotonically decreases (increases) as the offer amount goes up (down). This is always a key marker of the validity of a dichotomous choice survey (Blaine et al., 2005). In addition, the mandatory payment vehicle elicited higher WTP values at four bid levels than did voluntary payment vehicle.

Table 8. Proportion of “yes” responses and estimates of acceptance probability

Bid (MOP)	Entire sample		Voluntary Payment Vehicle		Mandatory Payment Vehicle	
	“Yes” responses (n=80)	Probability (%)	“Yes” responses (n=40)	Probability (%)	“Yes” responses (n=40)	Probability (%)
1	63	78.75	32	80.00	31	77.50
5	41	51.25	20	50.00	21	52.50
10	32	40.00	15	37.50	17	42.50
20	24	30.00	9	22.50	15	37.50
40	10	12.50	3	7.50	7	17.50

Figure 1 illustrates the bid curve for both the voluntary payment vehicle and the mandatory payment vehicle data.

Figure 1. Bid curve of the voluntary and mandatory PV of the entire sample



This study used the lower-bound estimation method (Bateman et al., 2002) to estimate the mean WTP since it provides a conservative value. Table 9 shows the mean WTP estimation results obtained from both the voluntary payment vehicle and the mandatory payment vehicle as well as their 95% confidence intervals.

Table 9. Mean WTP estimation results

	Mean WTP MOP (USD)	Standard error MOP (USD)	95% confidence interval MOP (USD)
Voluntary	8.43 (1.05)	0.64 (0.08)	7.18-9.68 (0.90-1.21)
Mandatory	12.25 (1.53)	1.09 (0.14)	10.11-14.39 (1.26-1.80)
Entire sample	10.34(1.29)	0.54(0.06)	9.27-11.41(1.16-1.43)

For the voluntary payment vehicle sample, the mean WTP is MOP 8.43 (USD 1.05) per household per month in 5 years as a surcharge on household water bill. For the mandatory payment vehicle sample, it is MOP 12.25 (USD 1.53).

From Table 9, it can be seen that the 95% confidence intervals of the mean WTP values from the voluntary payment vehicle and the mandatory payment vehicle do not overlap. It can be concluded that the mean WTP from the mandatory payment vehicle is significantly higher than that from the voluntary payment vehicle (Duffield and Patterson, 1991; Loomis, et al., 1997).

Adjustments for protest and uncertainty responses

Protest Responses

As is standard, a follow-up check question was asked after the WTP

question for both voluntary and mandatory payment vehicle surveys to determine whether those refusing to pay represent a valid representation of their valuation of the good or indicate a protest against some features of the simulated market. (See Chapter 2 for details of this procedure.)

For the voluntary payment vehicle sample, a total of 121 respondents answered 'no' to the WTP question across all five bid amounts. Among them, 56 respondents voted 'no' to one of the non-protest categories, which indicate that they seriously took the commitment to pay. On the other hand, 65 respondents selected one of the protest categories.

Of the respondents in the mandatory payment vehicle, 109 voted 'no' to the referendum question across the five bid amounts. Among these zero WTP respondents, 46 respondents cited as reasons not being able to afford the amount of payment and considering other species as more important than the black-faced Spoonbill. They were considered as valid zero WTP. The other 63 answers were regarded as protest or scenario rejection responses.

Following what has been observed in the literature, the protest responses in the censored sample were removed from the sample because they were considered as not indicative of the respondents' 'true' values.

Certainty

Respondents were asked how certain they were in making the payment if the proposed conservation program would be implemented. A five-point scale was used with 1 as "very uncertain" and 5 as "very certain." The majority indicated their certainty. Only one respondent (0.5%) in the voluntary sample and two respondents (1%) in the mandatory sample stated they were not certain about their answers to the WTP question. These unsure responses were adjusted, i.e., respondents who expressed degrees of uncertainty to the dichotomous choice WTP question were reclassified as "no" responses to the WTP question. This approach is similar to the method used by Champ et al. (1997).

Table 10 shows the bids and the resulting 'yes' responses for both the voluntary and mandatory payment vehicles after the protest responses were removed and uncertain responses were adjusted. The corresponding bid curves are shown in Figure 2.

Table 10. Bids and proportion of yes-answers for the censored sample

Bid (US\$)	Voluntary PV			Mandatory PV		
	Total	Yes	Yes (%)	Total	Yes	Yes (%)
0.125	36	32	88.89	35	31	88.57
0.625	25	20	80.00	30	21	70.00
1.25	26	15	57.69	28	17	60.71
2.5	24	9	37.50	25	13	52.00
5	24	3	12.50	19	7	36.84
Total	135	79	58.52	137	89	64.96

Figure 2. Bid curve of the censored sample

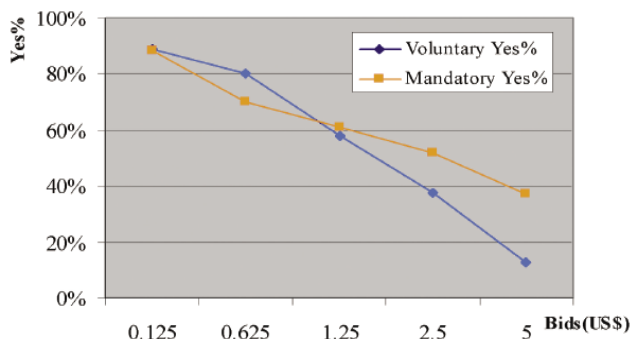


Table 11 shows the corresponding mean WTP estimation results obtained using the lower-bound estimation method on both the voluntary and mandatory payment vehicle data as well as their 95% confidence intervals.

Table 11. Mean WTP estimation results for the censored sample

PV	Mean WTP MOP (USD)	Variance MOP (USD)	95% CI MOP (USD)
Voluntary PV	13.22(1.65)	1.41(0.18)	10.46-15.98(1.31-2.00)
Mandatory PV	19.29(2.41)	1.39(0.17)	16.57-22.01(2.07-2.75)
Entire sample	16.26(2.03)	0.71(0.09)	14.86-17.66(1.86-2.21)

For the voluntary payment vehicle data, the mean WTP of the Macao residents for black-faced Spoonbill conservation is MOP 13.22 (USD 1.65) per household per month as a surcharge on household water bill in next 5 years. It is MOP 19.29 (USD 2.41) in the case of the mandatory payment vehicle data. As can be seen in Table 12, the 95% confidence intervals of the mean WTP values from both voluntary and mandatory payment vehicles do not overlap. This confirms that the mean WTP values from the two payment vehicles are significantly different.

Parametric Estimation

The parametric estimation conducted in this study is the logit estimation of the linear utility function by maximum likelihood estimation method. The estimation analysis used the Econometrics Package Limdep Nlogit 3.0 (Greene, 2002).

Entire sample

Table 12 shows the estimation results from the voluntary payment vehicle, the mandatory payment vehicle and the pooled data (combining or pooling observations from both the voluntary payment vehicle and the mandatory payment vehicle responses). The regression results show that the coefficients of BID are all negative and significant at 1% level in the voluntary payment vehicle case, the mandatory payment vehicle case and the pooled data. This result was expected and indicates that the probability of saying ‘yes’ decreases with the increase of prices. This confirms the findings in the non-parametric estimation method with clear statistical significance.

Table 12. Logit estimation results using the entire sample

Parameter	Voluntary	Mandatory	Pooled
	Coeff. (S. E)	Coeff. (S. E)	Coeff. (S. E)
CONSTANT	0.79(0.24)***	0.67(0.22) ***	0.70(0.16) ***
BID	-0.10(0.18) ***	-0.06(0.01) ***	-0.07(0.01) ***
Mean WTP (MOP)	8.08	11.12	9.39
95% CI (MOP)	4.73-11.43	6.12-16.12	6.43-12.35
LL _U	-109.34	-123.95	-235.71
LL _R			-272.74
Pseudo R ²	0.19	0.10	0.14
Observations	200	200	400

Note: *** Significant at $p<0.01$. 95% confidential intervals were obtained by the so-called delta method (Greene, 2000).

The mean WTP from the voluntary payment vehicle data set is about MOP 8.08 (USD 1.01) per household per month as a surcharge on the household water bill in the coming 5 years, that from the mandatory payment vehicle is about MOP 11.12 (USD 1.39), and that from the pooled data is MOP 9.39 (USD 1.17).

Here, a likelihood ratio (LR) test was used to test if the mean WTP from the mandatory payment vehicle is different from the mean WTP from the voluntary payment vehicle. The null hypothesis of the LR test is: Bn

(voluntary) = B_n (mandatory), where B_n (voluntary) and B_n (mandatory) are the coefficients in the logit equations for the voluntary payment vehicle data set and the mandatory payment vehicle data set, respectively. The LR test statistic is given by

$$\lambda_{LR} = -2[LL_R - (LL_{UM} + LL_{UV})]$$

where LL_R is the log likelihood of a single logit equation (i.e., the restricted model) estimated using the pooled data set; LL_{UM} is the log likelihood of the unrestricted model using the mandatory payment vehicle data set and LL_{UV} is the log likelihood of the unrestricted model estimated using the voluntary payment vehicle data set.

This statistical test follows a chi-square distribution, with degrees of freedom equal to the sum of the number of coefficients in the two unrestricted models minus the number of coefficients in the restricted model. It yielded a chi-square of 78.9, compared with the critical chi-square values with two degrees of freedom (in this case) at five percent and one percent significance levels, which are 5.99 and 9.21, respectively. The test statistic is larger than the critical values both at the five percent and one percent significance levels. Thus, the null hypothesis that the independent variables affect the dependent variable at the one percent significance level is rejected. The estimated mean WTP of the mandatory payment vehicle is significantly different from that of the voluntary payment vehicle.

To evaluate the variables influencing the respondents' responses, a logit model with some socioeconomic characteristics of the respondents was used. The dependent variable used was whether or not a person was willing to pay the amount asked during the survey. The independent variables are some perception and socioeconomic variables (Table 13). In the pooled model, a dummy "VOLUNT" variable was included, which indicates whether payment was voluntary or mandatory.

Table 14 shows the regression results and coefficient estimates with standard errors (in parenthesis) and probabilities (indicated by asterisks). The model estimation results show that the signs of the main variables (BID, INCOME and MENVTO) are consistent with expectations of the demand theory and that the goodness of fit, in terms of correct predictions and pseudo R^2 , was acceptable.

Table 13. Definitions of variables included in the logit models

Variable	Definition
BID	The bid used
PVSUIT	Dummy variable, 1 if the respondent thought the payment vehicle chosen was appropriate; 0 otherwise
PROTSPO	The respondent's belief on whether or not the conservation program could help save the black-faced Spoonbill, 1 = Believe, 2 = Average, 3 = Don't believe
AGE	Age of respondents
PEOPLE	Total number of household members
INCOME	Total household income (1000MOP/month)
PET	Dummy variable, 1 if have pets in household; 0 otherwise
MENVTO	Dummy variable, 1 if a member of any environmental organization; 0 otherwise
VOLUNT	Dummy variable, 1 if voluntary payment vehicle; 0 if mandatory payment vehicle

Table 14. Logit estimation results with socioeconomic variables included

Variable	Voluntary	Mandatory	Pooled
VOLUNT	-	-	-0.47(0.26)*
CONSTANT	-0.24(1.17) ^a	-0.40(1.03)	2.25(0.64)***
BID	-0.19(0.04)***	-0.07(0.02)***	-0.10(0.01)***
PVSUIT	2.05(0.55)***	2.65(0.45)***	-
PROTSPO	-0.29(0.35)	-0.55(0.27)**	-0.89(0.19)***
AGE	-0.03(0.02)	-0.02(0.02)	-0.02(0.01)**
PEOPLE	-0.27(0.19)	0.28(0.16)*	0.04(0.99)
INCOME	0.23(0.05)***	0.03(0.01)***	0.06(0.01)***
PET	0.93(0.57)*	1.76(0.55)***	1.22(0.33)***
MENVTO	2.76(1.20)**	2.67(1.43)*	1.65(0.85)*
LL _U	-61	-78	-183
LL _R	-134	-137	-270
Pseudo R ²	0.55	0.43	0.32
% Correct predictions	85.43%	80.9%	77.27%
Observations	199	199	398

^aNumbers in parentheses are standard error. *** Significant at $p < 0.01$, **Significant at $p < 0.05$,

*Significant at $p < 0.1$.

As shown in each regression, the “BID” variable is negative and highly statistically significant; the probability of saying “yes” to the valuation questions clearly declines as bid levels increase. This also confirms the findings in the non-parametric estimation method with clear statistical significance.

As for the socioeconomic and perception variables, some consistent impacts are found. In particular, coefficients on INCOME are positive and significant at 1% level in all three regressions. This result supports the hypothesis that the probability of the respondent saying 'yes' to the WTP question increases with household income. The coefficients for MENVTO are positive and significant in three models. This is understandable because usually environmentalists are more concerned about environmental problems and they would like to pay more for the environmental goods than non-environmentalists. In the pooled model, the AGE variable is negative and significant, which means that the probability of a 'yes' response decreases as the respondent's age increases. Two possible explanations for this sign are that the older a person, the lower his/her expectations of future consumption of this public good, or it could be due to the different education and values of older people. Interestingly, the coefficients for PET are positive and significant, indicating that the household who likes animals would contribute more to the endangered species conservation. The coefficients of PROTSOP in the mandatory model and the pooled model are negative and significant as expected, indicating that if a respondent thought the conservation program would successfully contribute to the black-faced Spoonbill conservation in Macao, the probability of acceptance would be higher. The PVSUIT coefficients in both voluntary and mandatory models are positive and significant. This suggests that a respondent who thinks the payment vehicle used in the survey is appropriate would have a higher probability of answering 'yes' to the WTP question.

The regression results are also consistent with the qualitative findings presented earlier on the impacts of payment method. The dummy variable VOLUNT is negative and significant in the pooled model, which suggests that the voluntary payment vehicle has a significant and negative effect on the respondents' WTP. If the payment vehicle is mandatory, the respondents would have a higher probability of answering 'yes' to the WTP question.

Similarly, a LR test of the equality of the logit coefficient yielded a chi-square of 262, which is much greater than the critical chi-square values of 14.1 at the 0.05 significance level and 18.5 at the 0.01 level, with seven degrees of freedom. Thus, the null hypothesis is also rejected. It can be confirmed further that the mean WTP from the mandatory payment vehicle is significantly higher than that from the voluntary payment vehicle.

Based on the logit estimation results, the mean WTP values in the voluntary, mandatory and pooled models are MOP 9.09 (USD 1.14), MOP 9.88 (USD

1.25) and MOP 9.51 (USD 1.19), respectively, per household per month in the coming 5 years.

Censored sample

Table 15 shows the estimation results of logit analysis for the voluntary payment vehicle, the mandatory payment vehicle and the pooled data if the protest responses are excluded from the samples and the uncertain answers are adjusted.

Table 15. Logit estimation results using the entire sample

Parameter	Voluntary Coeff. (S. E)	Mandatory Coeff. (S. E)	Pooled Coeff. (S. E)
CONSTANT	1.67(0.31)***	1.34(0.28) ***	1.49(0.20) ***
BID	-0.10(0.02) ***	-0.05(0.01) ***	-0.08(0.01) ***
Mean WTP (MOP)	16.57	24.77	19.79
LL _U	-70	-81	-154
LL _R	-92	-89	-181
Pseudo R ²	0.23	0.08	0.15
% Correct predictions	76%	69%	72%
Observations	135	137	272

Note: *** Significant at $p < 0.01$.

As expected, the BID coefficients for the three cases are negative and significant at 1% level. The mean WTP obtained from the censored sample is higher than that from the entire sample. The mean WTP values obtained from the voluntary payment vehicle, mandatory payment vehicle and pooled data are MOP 16.57 (USD 2.07), MOP 24.77 (USD 3.10), and MOP 19.79 (USD 2.47) per household per month in the coming 5 years, respectively.

Also a likelihood ratio was used to test the coefficient equality of the logit equations used to estimate WTP. The calculated value is 60, which is larger than the chi-square critical value of 5.99 at the 0.05 significance level and 9.21 at the 0.01 significance level with two degrees of freedom. The mean WTP from the mandatory payment vehicle is again significantly larger than that from the voluntary payment vehicle.

Table 16 presents the results for the voluntary payment vehicle and the mandatory payment vehicle as well as the pooled data if the socioeconomic variables are considered as independent variables in the WTP estimation.

The estimation results show that the censored data can significantly

improve the goodness of fit of the models in terms of pseudo R^2 and percentage of correct predictions. The coefficients of BID are all negative and significant at 1% level in the three models, as expected. The coefficients of INCOME are also positive and significant, which is consistent with the economic theory. PET is positive and significant, which again supports the hypothesis that the household with a pet has a higher probability to say 'yes' to the WTP question on endangered species conservation. The dummy variable VOLUNT is negative and significant in the pooled model, which indicates that the mandatory payment vehicle can increase the probability of respondents saying 'yes' to the WTP question. The likelihood ratio also indicates that the mean WTP from the mandatory payment vehicle is significantly larger than that from the voluntary payment vehicle.

Based on the estimation results, the mean WTP values obtained from the voluntary data, the mandatory data and the pooled data are MOP 18.03 (USD 2.25), MOP 38.56 (USD 4.82) and MOP 25.13 (USD 3.14) per household per month in the coming 5 years, respectively.

Table 16. Logit estimation results with socioeconomic variables for the censored sample

Variable	Voluntary	Mandatory	Pooled
VOLUNT	-	-	-0.95(0.42)**
CONSTANT	-1.34(1.96)	1.90(1.42)	-0.13(0.99)
BID	-0.29(0.06)***	-0.07(0.02)***	-0.13(0.02)***
PVSUIT	1.95(0.83)**	2.08(0.64)***	1.55(0.42)***
PROTSPO	0.29(0.52)	-0.32(0.39)	-0.55(0.29)*
AGE	0.03(0.03)*	-0.01(0.02)	0.002(0.01)
PEOPLE	-0.51(0.29)*	0.27(0.20)	0.01(0.14)
INCOME	0.37(0.09)***	0.20(0.05)***	0.20(0.03)***
PET	2.45(1.17)**	1.98(0.84)**	2.07(0.62)***
MENVTO	5.82(1.83)***	-	2.90(1.34)**
LL _U	-29	-46	-88
LL _R	-92	-86	-179
Pseudo R^2	0.68	0.47	0.51
% Correct predictions	91%	87%	84%
Observations	135	134	269

^a Numbers in parentheses are standard error. *** Significant at $p < 0.01$, **Significant at $p < 0.05$, *Significant at $p < 0.1$.

Mean WTP from Two Payment Vehicles

Using both non-parametric and parametric (univariate and multivariate) analysis, a statistically significant difference in WTP responses in two payment vehicle comparisons is found. The elicited WTP is higher under a mandatory payment method than a voluntary one, which is consistent with the theory of Carson et al. (2000) and some recent observations (Timothy, 2001; Fehr and Schmidt, 2001; Ryan, 2007). It is observed that Macao residents moderately preferred the mandatory payment to the voluntary payment. Respondents thought that other households should pay also the same specified amount for providing a public good as what they are paying.

One explanation for this observation is the traditional economic concept of "free riding" and "truth telling". If survey respondents are assumed to answer CV questions "truthfully" (i.e., as if they are faced with a true economic choice to voluntarily contribute), free riding might be used to predict that the stated WTP under voluntary payment would be lower than the elicited WTP under the mandatory scheme (Champ et al., 2002; Ryan, 2007). Another explanation is that under a voluntary payment, the Nash equilibrium exists, in which the level of public good provided is strictly below the level provided under a mandatory provision rule (Timothy, 2001). Fewer individuals will be willing to pay to help provide public goods in a voluntary situation than in a mandatory one.

Extrapolation of WTP Benefits

The total benefits of black-faced Spoonbill conservation in Macao can be estimated by aggregating the mean WTP values to get the total WTP amount.

This study used the simple transferring point estimate (STPE) approach to extrapolate the total benefits of the black-faced Spoonbill conservation in Macao. Feather and Hellerstein (1997) found that the accuracy of the results obtained from STPE is better compared with the results from the benefits function transfer approach (BFTA), which tends to create large biases when a major difference exists in the value of the non-market commodity to the different social segments in the same society. Hadker et al. (1997); Loomis and Ekstrand (1998); Loomis et al. (2000); Chambers and Whitehead (2003); and Bandara and Clem (2004) used the STPE method to aggregate the mean WTP values.

This study found significant effects of payment vehicle. To reduce these

effects, the mean WTP derived from logit estimation of the pooled data set was used to extrapolate the total WTP. Comparing Table 13 with Table 15 and Table 16 with Table 17, the models with covariates are found to be superior to the model without covariates in terms of the goodness of fit (Pseudo R^2 or percentage correction predictions). Hence, the mean WTP values from the models with covariates were used for aggregation. According to the logit estimation results with socioeconomic variables included for the entire sample (i.e., including all the zero responses), the mean WTP is MOP 9.51 (USD 1.19) per household per month in 5 years. If all Macao households (about 149 thousand in 2005) are considered, the WTP is MOP 1.39 (USD 0.17) million per month. This amounts to an annual value of MOP 16.68 (USD 2.1) million. As the payment will be made over a period of 5 years, the total net present discounted value of these annual amounts, at 5% real rate of discount, equals MOP 75.83 (USD 9.48) million. Based on the scenario that the fund could then request international organizations to provide the same amount of money, or more, according to the money raised locally, the total benefits would double to MOP 151.66 (USD 18.96) million.

Using the censored sample only, the mean WTP from the logit estimation results with socioeconomic variables included in the pooled data is MOP 25.13 (USD 3.14) per household per month in 5 years. For the household size, 32% was deducted from the whole population to allow for protest and uncertain responses, which means that the WTP of those with protest bids and uncertain answers was treated as zero. The resulting number of households was 101,320. Finally, a WTP of MOP 2.55 (USD 0.32) million per month for the conservation of black-faced Spoonbills in Macao was obtained. This amounts to an annual value of MOP 30.55 (USD 3.82) million. The total present discounted value of these annual amounts, at a 5% real rate of discount, equals MOP 136 (USD 17) million for a period of 5 years. Also based on the scenario of having counterpart funds from international organizations, the total benefits would double to MOP 272 (USD 34) million.

Cost Estimation and Benefit-Cost Comparison

The black-faced Spoonbill conservation would involve opportunity costs and management costs. Officials of the Environmental Council of Macao SAR government estimate the management costs to be about MOP 1.5 (USD 0.2) million every year. The question that needs to be considered is what would be the opportunity cost of protecting the black-faced Spoonbill in the ecological zone.

The opportunity costs of a protected area are the future economic benefits from the land being lost by the landholder. In a perfect market situation, the market value of a property, if freehold, should represent its economic value (Tisdell et al., 2005). Because the land under consideration is government owned and is not readily marketable, the study obtained a comparable land quite close to the ecological zone. The latter was sold by the Lands, Public Works and Transport Bureau of Macao SAR government to Great China Limited Company. The file says "36640 m²...reclaimed land...[priced at] MOP16,300,000" (Imprensa Official of Macao SAR government, 2006). Since the 15-ha ecological zone is quite similar to the sold land, the former was valued at MOP 66.73 million. However, another 40-ha ecological zone is mainly wetland or river bank. Based on consultations from researchers in Macao and Hong Kong, the value of this zone is priced at 10% of the sold land, which is about MOP 17.80 (USD 2.23) million. Thus, the total opportunity cost of the ecological zone is about MOP 84.53 (USD 10.57) million. The total cost of the conservation program in 5 years is about MOP 90.03 (USD 11.50) million.

With regard to the social cost-benefit analysis (CBA), even when the conservative aggregation results used were based on the entire sample, the total benefits of black-faced Spoonbill conservation in Macao (MOP 151.66) are greater than the total costs (MOP 90.03). Thus, it can be concluded that setting aside the critical habitat for black-faced Spoonbill conservation would result in net benefits, which could increase the social welfare.

Moreover, it is possible that the benefits of preserving the habitat of the black-faced Spoonbill may be significantly greater than indicated by just the willingness to pay to conserve this single species (Tisdell et al., 2005). This is because this habitat is also home to other valued wildlife species. Given that some of these other species and the ecosystem where they reside have economic value, the economic benefit from conserving the habitat of the black-faced Spoonbill could exceed that attributed to the black-faced Spoonbill alone. Based on the experiences of the Maipo natural area in Hong Kong, in addition to providing benefits for the local residents, the conservation of the black-faced Spoonbill and its habitat is expected to attract tourists from neighboring regions to Macao, such as from Hong Kong and the mainland of China, which can generate other benefits.

CONCLUSIONS AND POLICY IMPLICATIONS

Conclusions

Determining the value of conserving an endangered species that has little or no market context has proved to be a difficult task. Conducting a valid and reliable valuation study would be very useful in generating a better and more comprehensive information base for policy formulation and decision making (Turner et al., 2003). This study employed the dichotomous choice contingent valuation method to value the economic benefits of black-faced Spoonbill conservation in Macao based on public's preferences.

Our survey results show that the public did not consider environmental issues as the biggest problem facing the government, although the majority of the respondents thought the environment and natural resources in Macao are not properly taken care of. Much emphasis was put on social and economic problems. With regard to the most important environmental problem in Macao, endangered species conservation was similarly not given priority compared with air and water pollution. The results also reveal that the majority have existence values and altruism values for endangered species conservation. However, the public's knowledge of the black-faced Spoonbill, the good to be valued in this study, was relatively poor.

A split sample design was used to investigate the effect of two different payment vehicles. One was a mandatory surcharge on household water bill every month in 5 years and the other was a voluntary surcharge on household water bill every month in 5 years. Data showed that the mean WTP is significantly higher under the mandatory payment method than the voluntary one. These results are consistent with the theory of Carson et al. (2000) and observations of Timothy (2001) and Ryan (2007).

The logit regression analysis reveals that the probability of a "yes" response to the valuation question varies with a number of explanatory variables in a reasonable and expected fashion, thereby offering some support for the construct validity of this CV application. Household income, age, bid level, pet and perceptions of the valued good were significant determinants of the respondents' responses to the WTP question. The high predictive power and statistical reliability of the models obtained in this study suggest that a carefully designed CV study can be successfully conducted in developing countries to measure the non-market benefits for rare and endangered species conservation.

To obtain the total benefits of the black-faced Spoonbill conservation in Macao, the study used the estimation results of the pooled model in order to remove the payment vehicle effect. If the entire sample (including all zero answers) was considered, the conservative total benefit estimate is MOP 75.83 (USD 9.48) million. But if the protest responses are removed and uncertain answers to the WTP question are adjusted, the total benefits would reach up to MOP 136 (USD 17) million. Considering the scenario that the fund could be matched by some international organizations, the total benefits would be doubled for each case. The total costs of the conservation program was estimated at MOP 90.03 (USD11.25) million.

With regard to the social cost-benefit analysis, the study found that even if the conservative aggregation result based on the entire sample was used, the total benefits of black-faced Spoonbill conservation in Macao (MOP 151.66 million) are still greater than its total costs (MOP 90.03 million).

The good valued in this study is an endangered species and the public is not very familiar with it. In the context of a CV survey, the in-person interview would appear to face some potentially serious limitations. A relatively new survey mode called drop-off was used to give the respondents more time to obtain information on the good to be valued and to think seriously about their valuations; this method was expected to increase the reliability of the estimation results. The study results show that this survey method can be potentially employed in the context of a developing country.

The results of the hypothetical and real WTP experiment show that the mean hypothetical WTP is not significantly different from the real WTP. The ratio of hypothetical WTP to real WTP is about 1.22. This is a starting point for conducting experiments to test the reliability of the stated preference methods in Macao.

Policy Implications

The findings of the study provide some implications that can be useful to inform decisions and policies about black-faced Spoonbill conservation in Macao.

The survey results reveal that the public's knowledge of the black-faced Spoonbill is relatively poor. The extent of respondents' knowledge of environmental goods significantly influences their stated demand for these and by implication, actual demand (Tisdell and Wilson, 2006).

Increased investments in public education and communication programs can enhance the knowledge, attitudes and perceptions of people about black-faced Spoonbill conservation and environmental conservation. This will contribute to the reduction of the damage to the natural habitat of black-faced Spoonbills and will encourage the public to be willing to pay more for a better management and conservation of the ecological zone.

Further, the payment vehicle would have a significant impact on people's stated willingness to pay for the black-faced Spoonbill conservation in Macao. The study found that the mandatory payment is moderately preferred to the voluntary payment by Macao residents. People behave as if they care about fairness in terms of providing a public good. Respondents thought that other households should also pay the same specified amount as they would. Thus, based on the results of this study, policymakers should be careful about the impacts of the payment context on the public's stated willingness to pay to encourage fund contribution to environmental programs.

The empirical results show that the Macao public does have a positive WTP for the conservation of black-faced Spoonbill in Macao. This implies that a significant economic value will be lost through any large-scale development that would destroy the species' habitat. Moreover, the proposed conservation program passed the social cost-benefit analysis. To protect the benefits of the public and increase the social welfare, policymakers would be wise to place more weight on the conservation of black-faced Spoonbills by banning activities that degrade their natural habitat and to requiring all economic activities close to the habitat to be subjected to environmental impact assessment (EIA).

The black-faced Spoonbill is a beautiful and rare bird. The experiences of the Maipo natural area in Hong Kong suggest that it may have a high use value to sightseers. If the ecological zone can be managed as an ecotourism park, it could attract more visitors to Macao. This would contribute to the development of the area's tourism industry and the improvement of environmental awareness of the public in Macao.

Because of the presence of other species, the total benefits of preserving the habitat for black-faced Spoonbill may be significantly higher than indicated by the willingness to pay to conserve this single species (Tisdell et al, 2005). This suggests that our goal should be to maximize conservation efficiency by sustaining the whole ecosystem in which the black-faced Spoonbill exists.

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An Experiment on Hypothetical and Real Willingness to Pay

Jin Jianjun

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INTRODUCTION

The contingent valuation method (CVM) is the most frequently-used method to elicit respondents' willingness to pay (WTP) for environmental public goods (Mitchell and Carson, 1989; Bishop and Romano, 1998; Carson et al., 2001). However, there are debates about whether or not CVM can measure accurately the respondents' maximum WTP (Diamond and Hausman, 1994; Portney, 1994). The nucleus of the controversy is the extent to which hypothetical choices in CVM correspond to real economic choices (Carlsson and Martinsson, 2001). The actual WTP can be compared with the hypothetical WTP to assess the validity of a CVM study (Freeman, 2003). This kind of comparison is often called a test of criterion validity.

We conducted an experiment on Macao respondents to test whether or not the mean WTP in a hypothetical market differs from that in a real market. This, in turn, could be used to infer the extent of hypothetical bias in the large-scale CVM study about black-faced Spoonbill conservation in Macao reported elsewhere in this book. The experiment involved two independent treatments:

Treatment 1: WTP in a hypothetical (hyp) market

Treatment 2: WTP in a real cash market.

The hypothesis to be tested is:

$$H_0: \text{WTP (hyp)} = \text{WTP (real)}$$

EXPERIMENTAL DESIGN

Selection of the Good

The ultimate goal of CVM is to value public goods. However, the difficulty of bringing non-deliverable public goods to the laboratory led to the use of private goods in the experimental setting. Murphy and Stevens (2004) believe that the familiarity and convenience of using private goods are likely to elicit accurate

willingness to pay estimates. However, the goods selection must be able to share the characteristics of the target good used in the large scale CVM surveys.

For the good selection, following Loomis et al. (1997), first, the good needs to be one that is infrequently purchased and for which there is a fair amount of price dispersion in the market, so that most people would not be familiar with the market price. The objective is to minimize the likelihood that the respondent would simply try to use the market price in responding to the WTP question. Second, a good with readily observable characteristics is desirable, so there would be minimal ambiguity about the product. Third, to distinguish this experiment from others, the good needs to be relevant to the black-faced Spoonbill conservation study in order to validate the WTP estimation in the CVM study.

Given these characteristics, the experiment used a t-shirt with a picture of a black-faced Spoonbill printed on it.

Subject Recruitment

The subjects involved in this experiment were recruited from the respondents for the final questionnaire survey on the black-faced Spoonbill conservation in Macao. An invitation letter was included in the last part of the questionnaire (see Appendix A). After finishing the survey questionnaire, the respondents were asked if they would be interested in participating in a scientific study that involved interview experiments. They were offered MOP100 (~ US\$12) in cash to participate in the experiment. Individuals who agreed to participate in the study were asked to choose a mutually convenient date and time for the interview. They were phoned two days before the experiment began to make sure that they would really be able to participate in the experiment.

Experiment Questionnaires

The experiment involved two different experimental groups referred to as the “hypothetical group” and the “real group”. A short written description of the t-shirt was given to all the subjects. The interviewer read aloud the description and responded to any questions that the respondents had regarding the good. Then the interviewer gave the subjects a written copy of the survey and asked them about their preferences regarding the t-shirt. The study used the payment card elicitation method. Each subject was presented with a series of amounts of money ranging from \$1.00 to \$2.25 in 25-cent increments, and asked to put a “√” on “I would buy” or “I would not buy” for each price given

(Table 1). The full script is provided in Appendix B.

Table 1. Price of the t-shirt that the experiment respondents were willing to pay

No	Price (US\$)	Would buy	Would not buy
1	1.00	_____	_____
2	1.25	_____	_____
3	1.50	_____	_____
4	1.75	_____	_____
5	2.00	_____	_____
6	2.25	_____	_____

The hypothetical group’s subjects were asked their hypothetical WTP for the t-shirt. As in a large scale CV study, one cheap talk description was included before the WTP question to reduce the hypothetical bias. After the WTP question, the subjects were asked about their maximum WTP for the t-shirt using an open-ended question. If they indicated unwillingness to buy the t-shirt at any price, they were asked to give their reasons.

On the other hand, the real WTP group’s subjects were given a real opportunity to participate in the t-shirt auction. The auction mechanism used was the Becker-Deegoot-Marschak (BDM) (Lusk et al., 2004). Aside from its simplicity, the BDM is an incentive compatible auction mechanism where bidders truthfully reveal the amount they would be willing to pay. It is considered to elicit the best response irrespective of the strategies adopted by the players.

The rules of the BDM mechanism are straightforward. Each player or subject was given a sheet of paper indicating the six price offers shown in Table 1 and asked to check either the “would buy” or “would not buy” column for each stated price. After the subjects finished answering, the interviewer collected the answer sheets and randomly drew a sale price from a jar containing all the prices listed in Table 1. Any subject, who submitted a bid greater than or equal to the drawn price, received the good and paid an amount equal to the sale price. The others who bid lower than the sale price did not pay and went home without the good.

In the real group experiment, the subjects were asked to think over the amount they were willing to pay and to give their true preferences. They were told that overbidding increases the likelihood that they will have to pay more for the good than desired, while underbidding increases the likelihood that they will not get the chance to buy the good. Finally, the subjects were also debriefed.

RESULTS AND ANALYSIS

Background Characteristics

A total of 77 respondents showed up for the experiment. Of these respondents, 40 were randomly included in the real group, and the remaining 37 became the hypothetical group. Table 2 shows the socioeconomic information of the subjects in the experiment and in each group.

Table 2. Respondents' main socioeconomic information

Variable	All participants		Hypothetical group		Real group		t-statistics
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	
AGE	32.26	13.54	32.89	13.60	31.68	13.63	0.39
GENDER	0.39	0.49	0.35	0.48	0.43	0.50	-0.66
CIVSTAT	0.44	0.50	0.46	0.51	0.43	0.50	0.30
EDUC	3.40	0.71	3.35	0.68	3.45	0.75	-0.61
PEOPLE	3.88	0.90	3.92	0.80	3.85	1.00	0.33
NP15	0.61	0.75	0.65	0.82	0.58	0.68	0.43
NEM	1.83	0.71	1.86	0.71	1.80	0.72	0.40
DONACH	0.75	0.59	0.76	0.72	0.75	0.44	0.05
DONAENVI	0.14	0.35	0.14	0.35	0.15	0.36	-0.18
MENVTO	0.05	0.22	0.03	0.16	0.08	0.27	-0.94
PET	0.30	0.46	0.22	0.42	0.38	0.49	-1.52
INCOME	12506.49	8058.38	12337.84	8081.23	12662.50	8136.96	-0.18

The average age of the subjects was 32, a few years lower than the average age of the whole sample for the questionnaire survey (35). Male accounted for only 39% of the subjects. This is understandable because in Macao, men usually do not like to participate in any public experimental activities. The subjects' average educational level was between senior high school and college in all three cases (3.40), which was a bit higher than the average educational level of the respondents in the final questionnaire survey (3.27). The reason for this is that perhaps a person who has a higher educational level would more likely to participate in a research or experiment.

The average number of household members was 3-4 with a mean less than one person below 15 years old. On the average, about two household members earned income. Of the all respondents, 75% had donated to a charitable cause in the past year; this is higher than the average of the survey sample (57%). Thirty percent of the respondents indicated having pets in their households, which is also higher than the average of the survey sample (24%). The mean

household monthly income was about MOP12506 (US\$1563), a little lower than the average of the whole sample (MOP15897). This could be because rich people care more about their time and leisure.

A two-sample mean comparison test shows that none of the socioeconomic characteristics of the hypothetical group is different from that of the real group.

Mean WTP Comparison

No zero WTP was found in the hypothetical group. However, in the real group, five subjects indicated zero WTP. Four of them did so because they said they didn't like the t-shirt at all. One said he did not like to attend any auction activities.

The WTP elicitation method used in both groups was the payment card (PC). However, when the PC WTP data was being analyzed, it was not clear what assumptions should be made about the respondent's true WTP. The standard procedure is to assume that the true WTP is the mid-point between the amount at which the respondent said "yes" and the amount at which he/she said "no" (Cameron and James, 1987, Ryan, 2007). Such an approach allows the WTP to be estimated indirectly without regression techniques and therefore no assumptions have to be made about either the functional form of the utility function or the appropriate method of analysis (Ryan, 2007). Thus, this study adopted the mid-point approach to estimate the mean WTP (Table 3).

Table 3. Mean WTP results of the experimental groups (US\$)			
	Mean WTP	Std. Dev.	95% CIs
Hypothetical	1.78	0.35	1.08-2.47
Real	1.45	0.72	0.05-2.86

As Table 3 shows, the 95% confidence intervals (CI) of the derived hypothetical WTP are completely contained within the 95% CI of the real WTP, suggesting that the hypothetical WTP is not significantly different from the real WTP (Loomis et al., 1997). The ratio of the hypothetical mean WTP to the real mean WTP is about 1.22.

Next, to identify the characteristics of those who are more (less) willing to pay for the T-shirt, the data were subjected to ordinary least squares (OLS) regression to estimate the attitudes toward payment as a function of a set of

behavioral and demographic variables. These variables include age, household monthly income, WTP for the conservation program in the questionnaire survey, etc. Tables 4 and 5 present the regression results for both hypothetical and real groups, respectively, when the WTP obtained from the mid-point approach was used as the dependent variable.

Table 4. OLS regression results for the hypothetical group

Variable	Coefficient	Std Error	t-value	p-value
Constant***	12.51	2.74	4.57	0.00
AGE	0.03	0.03	1.02	0.32
EDUC	-0.40	0.68	-0.59	0.56
QWTP	0.04	0.03	1.58	0.12
INCOME**	0.00	0.00	2.23	0.03

Note: *** Significant at $p<0.01$. ** Significant at $p<0.05$.

The regression results show that, for the hypothetical group, the coefficient of INCOME is positive and significant at 5% level, as expected. This finding suggests that for the subjects in the hypothetical group, income is one determinant for their WTP. The subject who has more household income would be willing to pay more for the valued good.

Table 5. OLS regression results for the real group

Variable	Coefficient	Std Error	t-value	p-value
Constant	0.07	4.28	0.02	0.99
AGE*	0.16	0.09	1.86	0.07
EDUC*	4.93	2.61	1.88	0.07
QWTP**	0.09	0.04	2.27	0.03
INCOME	0.00	0.00	1.17	0.25

Note: ** Significant at $p<0.05$. * Significant at $p<0.1$.

For the real group, the estimated results show that the coefficient of the age variable is statistically significant at 10% level with a positive sign. This indicates that the older subjects would be willing to pay more for the t-shirt than the younger subjects. The reason for this could be that the t-shirt is not fashionably designed. Similarly, the coefficient of education variable appears to be significant at 10% level with the expected positive sign. This sign indicates that the higher the education level, the higher the willingness to pay for the t-shirt. The variable QWTP is the WTP amount for the black-faced Spoonbill conservation program in the final questionnaire survey. The coefficient for QWTP is positive and significant at 5% level, as expected. This indicates that the person who has a higher WTP for the conservation program would pay more for the t-shirt.

DISCUSSION

The experiment results found no significant differences between the derived hypothetical mean WTP and the real mean WTP. The ratio of the hypothetical mean WTP to the real mean WTP is about 1.22. The findings of this study can be compared with those of Bishop et al. (1992), where the mean hypothetical WTP exceeded actual WTP by a factor of 1.23 and the two estimates were not found to be significantly different.

Several factors could explain this finding. First, a cheap talk script was used in the hypothetical group. The respondents were reminded of their budget constraints and asked to consider seriously their WTP. This may have reduced the hypothetical bias of the hypothetical group. On the other hand, the subjects in the real group were asked to give their true willingness to pay. They were told that overbidding will cause them to pay more and underbidding will cause them to lose the chance to get the valued good. These two scripts can result in the respondents in both the hypothetical group and the real group telling their true WTP. Second, the subjects in this experiment were recruited from the large scale questionnaire survey for the black-faced Spoonbill conservation in Macao. It is possible that the respondents who were interested in the conservation program may also be the ones who participated in the experiment. They had a better knowledge about black-faced Spoonbill. Hence, the respondents would have a greater probability to give a true WTP for the t-shirt, a useful proxy for the valued good in the large scale CVM survey study. The last possible reason could be that the sample size for the experiment is small.

This experiment indicates that the respondents in Macao behaved rationally in that the hypothetical mean WTP in the experiment is not significantly different from the real mean WTP. However, since the good used in this experiment is a private good (i.e., it has different characteristics from the public good), it may not be appropriate therefore to use the experiment results to calibrate the mean WTP of the large scale questionnaire survey.

APPENDIX A

INVITATION LETTER

Dear Mr./Ms.

Some recent studies found that people in some situations are willing to pay different amounts for the same goods. To find out how Macao people respond to different settings, an experiment will be run. The experiment is financed by the Economy and Environment Program for Southeast Asia (EEPSEA) and is conducted by researchers from the University of Macau.

You are chosen to participate...

120 persons will participate in the experiment from the whole Macao residents. Twelve sessions, 10 participants for each, will be held. This implies that a small number of people will get together and answer the questions. We would therefore like to invite you to participate in one of these meetings that will take place at the University of Macau at:

Saturday, 15/10/2005	10:00 – 10:30 _____	11:00 - 11:30 _____
	14:00 – 14:30 _____	15:00 - 15:30 _____
	16:00 – 16:30 _____	17:00 - 17:30 _____
Sunday, 16/10/2005	10:00 – 10:30 _____	11:00 - 11:30 _____
	14:00 – 14:30 _____	15:00 - 15:30 _____
	16:00 – 16:30 _____	17:00 - 17:30 _____

The meeting will begin with a short introduction of the survey. We will then ask you to answer a number of questions. We will serve coffee, tea and cake.
You will receive 100MOP at the end of the meeting.

It is important that you answer...

But participation is voluntary. Your answers will be kept strictly confidential, and the results will be published in a way that no single person can be identified. We ask you to fill out the attached and give it to our enumerators when they come to pick up the questionnaire. If you have any questions or would like to know more about the survey, please contact Ms. Jin Jianjun at 3978526 or the enumerator.

With best regards,

Jin Jianjun
PhD Candidate of University of Macau

Your decision

I, _____ hereby confirm that I would like to participate in the meeting at _____(time), ____/08/2005(date) (Please mark your preferred time for the meeting).

In case we need to contact you, please provide your phone number below.

Thank you for confirming your participation in the meeting.

Address: _____ Telephone: _____

APPENDIX B

SCRIPTS FOR HYPOTHETICAL AND REAL WTP EXPERIMENT

Good morning/afternoon. We would like to thank you very much for coming here. Your participation in this game is very important to our research on the public's willingness to pay for the black-faced Spoonbill conservation. The experiment you are going to participate in is about an auction of a t-shirt (*The interviewer shows the t-shirt to the group*).

The t-shirt you are going to auction is made of 100% cotton, with one black-faced Spoonbill print on it. The small picture showing triple E is the symbol of Economy and Environment Program for Southeast Asia, the sponsor of this research. The purpose of this auction is to see how much you would be willing to pay for this t-shirt. Any income got from this auction will be used for the conservation activities of black-faced Spoonbills in Macao.

Please be informed that the main purpose of this auction study is to raise the awareness of the public about the conservation of black-faced Spoonbills in Macao. We are not advertising t-shirts of any brand. These t-shirts are exclusively produced for this game only. They are not sold in the market. The game you are playing here is very helpful for us in understanding how people make decisions in different situations.

(*Pass a sample t-shirt around to give everyone the opportunity to physically inspect it*). Do you have any questions?...

Hand out the answer sheet...

For Group A:

Suppose you would be asked to participate in an auction for this t-shirt (hold it in front). Please let us know your if you are willing to pay for it by putting $\surd$ on "Would buy" or "Would not buy" at each price we provide in a table in your answer sheet. There are six prices, presented in six rows in the answer sheet. You will make six choices. For each price given, please put a $\surd$ on "Would buy" if you think you would buy it at the corresponding price, or place $\surd$ on "Would not buy" if you think you would not buy the t-shirt at that price.

Some recent studies found that people in hypothetical situation always give higher willingness to pay values than people in real situation. We call this a 'hypothetical bias'. To make sure that we can get an accurate research result, we'd like to ask you to think carefully about your decision and tell us the true amount that you are willing to pay for this t-shirt.

Table 1. Prices of the t-shirt that you are willing to pay			
No	Price (USD)	Would buy	Would not buy
1	1.00	_____	_____
2	1.25	_____	_____
3	1.50	_____	_____
4	1.75	_____	_____
5	2.00	_____	_____
6	2.25	_____	_____

1. What's the maximum amount that you are willing to pay for this t-shirt?
_____USD
2. If you would not buy this t-shirt at any price given above, please tell us your reasons:
 - a. I don't like this t-shirt
 - b. The price is too high
 - c. I don't like auction activities
 - d. Others, please specify:_____
3. How certain is your answer?
 - a. Very certain
 - b. Certain
 - c. Average
 - d. Not certain
 - e. Not certain at all

When the respondents finish answering, the monitor will collect all the answer sheets. Then the respondents are paid for participating by an accounting (in private) set at the back of the room.

For Group B:

You are given a chance to bid for this t-shirt. In this game, you must honor your bid (i.e., real payment is involved). One of you will be randomly selected to draw one piece of paper from this jar. This jar contains six pieces of paper, each representing six prices. The prices vary from \$1 to \$2.25 (see the prices and corresponding random numbers in the table below). The amount of payment will be decided by the randomly chosen price.

For example, if the randomly drawn price is \$1.50 and if you state that you would buy the t-shirt at **\$1.50 or above**, you will get the t-shirt and pay **\$1.50**. Those whose stated amount is lower than \$1.50 don't have to pay. The random draw will ensure that each price will have one out of six chances of being chosen. Everyone pays the **SAME** amount of money indicated by the random drawn price.

Do you have any questions?

Hand out the answer sheet...

Now please let us know how much you are willing to pay for the t-shirt by putting $\surd$ on "Would buy" or "Would not buy" at each price given in the answer sheet. There are six prices, presented in six rows in the answer sheet. You will make six choices, each time specifying whether you are willing to buy the t-shirt at the given price. You may choose either "Would buy" or "Would not buy" in each of the six prices.

When you indicate your choice, please think over about your willingness to pay. Overbidding increases the likelihood that you will have to pay more for the good than desired, while underbidding increases the chance that you will not get the opportunity to buy the good.

Do you have any questions?

Now please fill out the answer sheet.

Table 2. Prices of the t-shirt that you are willing to pay

No	Price (USD)	Would buy	Would not buy
1	1.00	_____	_____
2	1.25	_____	_____
3	1.50	_____	_____
4	1.75	_____	_____
5	2.00	_____	_____
6	2.25	_____	_____

1. What's the maximum amount that you are willing to pay for this t-shirt? _____USD
2. If you would not buy this t-shirt at any price given above, please tell us your reasons:
 - a. I don't like this t-shirt
 - b. The price is too high
 - c. I don't like auction activities
 - d. Others, please specify: _____
3. How certain is your answer?
 - a. Very certain
 - b. Certain
 - c. Average
 - d. Not certain
 - e. Not certain at all

Once you have answered all the questions, please raise your hand and an assistant will approach you to collect your answer sheet.

(Collect the answer sheets. Randomly choose one ID number and ask the subject indicated by the ID number to draw a price from the jar. Announce the price chosen. Ask those who give bids higher than the chosen price to buy the t-shirt.)

Finally, the subjects are paid for participating and get the goods they have bought by an accounting (in private) set at the back of the room.

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Conclusions

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This book has explored the attitudes of residents of four Asian countries to the conservation of endangered species under a wide range of circumstances and the implications for conservation financing. We assessed the willingness to pay (WTP) to conserve specific endangered species in four countries, for five species, using voluntary and mandatory payments via water or electricity bills, with tests for the sensitivity of respondents to colored vs. black & white photographs in the questionnaire, the hypothetical nature of the scenario, and the scope of the conservation program to be financed.

These variations gave us insights into the differing results that variations in research technique might produce and allowed us to calibrate our degree of confidence in the results. Methodological issues are discussed in the first section of this chapter; findings about attitudes, willingness to pay and conservation finance are discussed in the second. In general, our variations in research technique produced small, consistent and predictable variations in outcome that lead us to believe that our findings are robust. Our overall finding is that willingness to pay is, in most cases quite low.

METHODOLOGICAL ISSUES

Drop-off Questionnaire

After conducting the usual focus groups and pre-tests, we conducted our contingent valuation surveys by dropping off the questionnaire at randomly selected households and collecting it a few days later. At collection time, enumerators checked for and elicited any missing information.

Our motives for using this format were: (a) to reduce any “please-the-interviewer” bias that might cause respondents to exaggerate their WTP; and (b) to control research costs by reducing the amount of time enumerators needed to spend with respondents. Our main fear was that, without enumerators present, a large share of households would fail to complete the questionnaires.

This problem did not materialise. Response rates were good: as high as 98% in the Philippine whale shark survey. Costs were controlled to the extent that we could affordably survey more than 6,000 households. We did not conduct a controlled comparison of in-person vs. drop-off surveys to verify the extent of the bias reduction. One unanticipated effect of this method is a partial loss of control over the order in which items in the questionnaire were read by respondents. i.e. respondents had the opportunity to skip ahead. By doing so, they could discover that the WTP scenario dealt with a specific endangered species; this could bias their responses in earlier sections of the questionnaire about the importance of various species. We suspect that this did occur.

Colored Photographs

Not surprisingly, the sub-study on this issue for the Philippine eagle showed higher mean WTP in response to colour photographs - almost 50% higher. Of course we have no way of knowing whether color or black & white photos elicited a response that more closely approximates real WTP. Aside from the small sub-set used for test purposes, all our surveys used colored photographs.

Payment Vehicles

We were somewhat surprised that payment vehicles did not make a large difference to willingness to pay. The choice of water vs. electricity bills made some difference in Thailand and Vietnam where there were political controversies surrounding these utilities or more even coverage of the population by one utility than the other. The number of people saying “yes” in Thailand might have been higher if the country was not going through a controversial privatization of the electricity authority at the time. Results varied slightly from country to country and even across bid levels but, in general, people were not markedly more willing to pay through a mandatory scheme than a voluntary one.

Our focus groups revealed that utility bills are generally more acceptable (or less unacceptable) payment vehicles than alternatives like taxes. The follow-up questions in our survey instruments did reveal some doubt that the payments collected by the utility would actually be used for conservation. One of the follow-up questions showed that what sometimes appeared to be objections to the payment vehicles were actually an unwillingness to pay per se.

However, we must point out an important difference between utility bills as part of a research instrument vs. their use to collect revenue in a real-world situation. While it is a simple matter to attach a single species to a utility bill, it would be impractical to do this for a multiplicity of species or environmental causes.

Real vs. Hypothetical

The experiment with spoonbill T-shirts in Macao found that hypothetical WTP exceeded real WTP by a modest factor of 1.22. This duplicates almost exactly the findings of Bishop et al (1992). This lends support to the findings of our hypothetical contingent valuation surveys.

Scope Test

Our marine turtle study found little difference in willingness to pay for a national vs. region-wide program. Nor was there much difference in a national or sub-national conservation program for the Philippine eagle. However, we do not believe this apparent insensitivity to scope invalidates our findings.

First, it is possible that respondents did not care about the size of the program – only about its effectiveness. While our scenarios were different in scope they did not give respondents reason to believe that one scope would be more effective than the other. Conservation programs of apparently equal effectiveness should elicit similar WTP.

Second, all our scope tests were external – i.e. different scenarios were presented to different sub-samples of respondents. (An internal scope test would offer both alternatives to the same respondents.) There is reason to believe that external scope tests are unrealistic. People simply do not form their preferences this way - they form them by making comparisons between alternatives.

RESULTS

Attitudes

The environmental attitudes expressed were remarkably similar across the four countries. People are generally well-informed (80% have seen a television documentary about marine turtles; 83% of Manila residents know that the

Philippine eagle is endangered). Macao was an exception; its residents were not very familiar with spoonbills. The majority of the respondents in all countries (and 80% of Filipinos) believe that the environment is not being well cared for. But few people gave environmental degradation high priority as a national problem. Only in Beijing did it rank among the top three, perhaps reflecting the extreme and highly visible pollution afflicting that city. In every city, economic problems ranked first, while poverty (closely related) or governance ranked second.

Within the category of environmental problems, species loss was not among the top three in any of the populations surveyed. Air pollution was consistently in the top three for every city. Deforestation was ranked first only in Davao City, Philippines, a small city near a hinterland.

Willingness to Pay

The following table summarizes the main quantitative findings of the study:

Species	Mean WTP in USD/ h'hold/mo	Mean WTP as % of monthly h'hold income	Aggregate WTP in USD millions	Would a referendum pass at USD 1/mo ?
turtle: Beijing	0.96	0.17	3.36	No
turtle: Davao City	1.35	0.79	0.28	Yes
turtle: Bangkok	1.03	0.18	2.09	Yes
turtle: HCMC/ Hanoi	0.28	0.13	0.65	No
whaleshark: Sorsogon	0	0	0	No
eagle: Davao City	0.52	0.27	8.5	Yes
eagle: Manila	0.68	0.15	11.4	Yes
rhino: HCMC/ Hanoi	0.38	0.18	7.19	No
spoonbill: Macao	3.14	0.16	34	Yes

Notes:

These are parametric estimates, which differ slightly from figures in some of the previous chapters. Non-parametric estimates provide lower-bound estimates.

We judge that a referendum would pass if more than 50% of respondents say they would vote Yes if every household were required to pay the specified amount.

Given the attitudes expressed, it is not surprising that WTP to conserve endangered species is relatively low. Mean willingness to pay is well below a dollar a month, with relatively prosperous Macao an exception. A large number of people were unwilling to pay any amount for species conservation. The dominant reasons were “I cannot afford it” or “The poor will not be able to afford it”. Next in importance was a perception that the funds raised would not actually be used for conservation.

Determinants of WTP

Within countries, WTP increased with income and education, proving a basic validity test. Once income is controlled, the respondent's country of residence is not a significant determinant of WTP. This is consistent with our findings about environmental attitudes, which are similar across countries.

Policy Implications

Our cost-revenue comparisons showed variations across countries. Most of the households surveyed in the Philippines were unwilling to pay even USD 0.02 cents per month for whale shark conservation, meaning that potential revenue is essentially nil. The situation in other countries and species is less bleak. Even small per capita contributions from a large population can add up to large amounts. Conversely, a high amount per household from even a fairly small population (i.e. Macao) can also yield high revenue.

Having said that, the harsh reality is that mobilizing these contributions would be difficult. The payment vehicle we explored was a “check-off” for a conservation program on a household's monthly utility bill. While this might work once, it is not feasible to put check-off boxes on utility bills for every species or environmental cause. In the long run, these efforts must be

financed primarily out of general government revenue or “user-pay” schemes like environmental service payments.

If we treat our study as a social cost-benefit analysis of conservation - without considering the feasibility of actually mobilizing revenue - we find varying results from country to country. Of the cases in which we have cost data, benefits would exceed costs for the Philippine eagle by a ratio of 8 to 1 (if benefits accrue to all Filipinos); for the Vietnamese rhino (1:5 to 1); and for the spoonbill in Macao (1:5 to 1). Costs would exceed benefits by a wide margin for the Philippine eagle (if benefits accrue to residents of Davao City only) and the whale shark in the Philippines. We lack information on costs of an effective turtle protection program. In general, the CBA results support the proposition that these species have sufficient value to local people to be worth protecting - even if mobilizing the revenue to do so may be difficult.

An important implication of our findings is that the traditional prescription of “raising awareness” is unlikely to yield results: people in Asia are already well-informed about the existence and plight of endangered species. Efforts to develop conservation finance mechanisms should therefore be directed in a different and more difficult direction: improving the trustworthiness of government tax collection and expenditure systems. Conservation agencies might play a role in this by working with governments to set up trust funds in which public funds could be deposited with confidence. Charities could also explore the potential for voluntary contributions revealed by this study; their efforts should go primarily into identifying the relatively small segment of the population that is willing to contribute and to developing cost-effective ways of collecting payments. Eventually, as incomes rise and governance improves, Asia’s ability to pay for conservation will increase. In the meantime, contributions from the international community will continue to be important in conserving what is, after all, a global resource.

