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Integrating Multiple Perspectives Into an Impact Mitigation Program for Sustainable Whale and Dolphin Tourism Management

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Balancing the sustainable practices of whale watching and cetacean species conservation is an enormous challenge for the countries that rely on whale watching tourism industry. In this study, we employ the choice experiment method to estimate the tourists' heterogeneity preferences (THP) on different attributes to establish an impact mitigation program in Taiwan. We found that the scenario of integrated cetacean conservation and sustainable whale-dolphin watching has the highest welfare effects among all the proposed scenarios. Features that affect the differentiation of THP are: (1) tourists' awareness, and conservation attitudes, (2) nationality, and (3) monthly income. The findings from this research could assist the government and tour operators to tailor their policy and management strategy that respond to the present issues by focusing on time schedule management, vessel slowdown distance, set up maximum boat numbers, build-up operational guidance, and by establishing a conservation fund.

Keywords: choice experiment, sustainable tourism, whale watching, heterogeneous preferences, willingness-to-pay, tour attributes, management strategy

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INTRODUCTION

Around the world over the past few decades, the focus on marine mammals has shifted from hunting to watching (New et al., 2020). Whale-dolphin watching (WDW) is an activity involving watching cetaceans in their natural habitat for recreational, scientific and educational purposes (Würsig et al., 2009). It is a form of wildlife tourism and one of the fastest booming tourism segment in the world (Kuo et al., 2012). The market cap of the WDW industry is estimated to be more than US$2 billion annually (Mann, 2017). WDW is regarded as a panacea for cetacean species conservation and delivering economic opportunity across the world (Mustika et al., 2012; Buultjens et al., 2016). Hoyt (2001) claims that WDW provides crucial income for local communities, enhances the ability of scientists to study cetacean and their habitats for a long-term conservation and fosters tourist's awareness about cetaceans and the importance of preserving their habitats.

However, unsustainable practices could adversely affect the cetacean population. Therefore, for the sustainable future of WDW, it should encompass the sustainable development principle i.e., sustainable, environmentally friendly, and economically beneficial (O'Connor et al., 2009). The negative impacts on target mammals caused by the WDW tourism industry undermine the potential economical and education benefits (Bejder et al., 1999). Most of the countries that rely on the WDW industry have no rules or enforcement when it comes to regulating the tour operators.

Such an unregulated WDW industry has the potential to harm cetaceans and their habitats (Mann, 2017). On the other hand, if sustainably managed, WDW will contribute to the conservation of marine mammals and support local economies. However, the sustainability practices of tour operators' and their behavior around marine mammals are extremely concerning (O'Connor et al., 2009). To encourage the sustainable use of cetaceans and prevent them from going extinct, The International Whaling Commission (IWC) adapted a moratorium on commercial whaling in 1986 (Cisneros-Montemayor et al., 2010; Chen, 2011). The ever-increasing rate of public interest in viewing cetaceans in the wild is quite remarkable. Growing popular demand has led Asia to emerge as an important WDW destination in the world (Bejder et al., 1999; O'Connor et al., 2009).

Taiwan, a small island country in East Asia, has an outstanding potential for WDW because of its abundant and diverse cetacean resources (Hoyt, 2001; Chou, 2002). In 1990, Taiwan added all the cetacean species to a list of protected mammals under the Wildlife Conservation Law (Chou, 2002). Since then, Taiwan has shifted its focus from harvesting the cetacean species to protecting all of them (Chen, 2011). The Taiwan Cetacean Stranding Network (TCSN) was established, and the first official meeting was held in 1996. The Taiwan Cetacean Society (TCS) was subsequently founded in 1998. Thanks in large part to these developments, WDW has become a major tourist attraction and has grown considerably since 1997 (Chou, 2002). The East Coast of Taiwan is a popular tourist's destination for WDW, especially the trio counties Yilan, Hualien and Taitung are the prime attraction for the WDW tourism in Taiwan (O'Connor et al., 2009). The eco-certification label was first introduced in Hualien County to cope with the rising WDW tourism industry (Ku et al., 2014). However, as things stand at time of writing, there is no guidance, regulation, or law enforcement existing for this rapidly growing form of tourism in Taiwan. Consequently, an overload of tourists and uncontrolled WDW tour operators has serious implications on cetaceans, their habitats, and the coastal environment of Taiwan (Tseng et al., 2011).

Focusing on issues related to cetacean tourism and its management, past studies have centered on tourism's impacts on whale-dolphin behavior (Janik and Thompson, 1996; Orams, 2000; Lusseau and Higham, 2004; Tyack, 2008; Amrein et al., 2020), tourist vessel collisions (Waereebeek et al., 2007; Carrillo and Ritter, 2010), tour operator compliance (Sorongon, 2010; Sitar et al., 2016), tourist preferences (Kessler et al., 2014; Lee et al., 2019b; Lissner and Mayer, 2020), tour operator regulations (Giles and Koski, 2012; Chalcobsky et al., 2017), controlling tourist numbers and carrying capacity (Hoyt, 2005; Fernandes and Rossi-Santos, 2018), sustainable whale-watching (Orams, 2001; Hoyt, 2005; Lambert et al., 2010; Wearing et al., 2014; Buultjens et al., 2016; Lissner and Mayer, 2020), and charging fees to offer support for SWWT (Lee et al., 2019b; Lissner and Mayer, 2020; Malinauskaite et al., 2020). The explosive growth of the nature-based travel sector, along with the attendant threats to the environment and increased concern about protecting the remaining natural ecosystems have showcased major challenges to tourism development (Boo, 1990).

Excessive numbers of tourists will have serious consequences on a tourist destination (i.e., environmental, cultural, physical, economic, and social condition). When taking tourism capacity into account, balance has to be maintained between the environment and the quality of tourists' experiences (O'Reilly, 1986). The "limits of acceptable change" (LAC) is a valuable tool in operationalizing the concept of sustainability in a tourism destination (Ahn et al., 2002). Operations Management is likewise a key element for organizations in the industry to be able to achieve their goals related to improvement and productivity with minimum effort (Kumar and Suresh, 2009). The tourism industry may affect conservation efforts, and hence there is a need for sustainable financing mechanisms that suffice to cover the costs that can yield returns (Vaughan, 2000).

Based on the above review it is well-understood that there is need to establish an impact mitigation scheme for SWWT in cetacean watching sites. The proposed research can help WDW tour operators, government policy makers and researchers to achieve broad understanding into the THP on multiple attributes and levels related to cetacean watching. We present a systematic summarization of operations management, carrying capacity and limit of acceptable change, and sustainable financing in Section Literature Review. The Section Research Area and Method describes an overview of our study site, research method, CE and attribute design and the marginal willingness to pay (MWTP) for the hypothetical scenarios for SWWT management. Section Results, of this study presents tourists awareness and the main research results. Section Conclusion and Management Implication would summarize the discussion and the final section concludes.

LITERATURE REVIEW

Operations Management

As stated by Jackson (2009), organizing staff and time are both essential for any organization to achieve its goals. To protect cetacean's natural behavioral patterns, experts recommend that the "one third space and time rules" must be followed, in order for the whales to take a break from WDW activities (Hoyt, 2007). By the same token, the achievement of customer satisfaction and resource utilization are the objectives of operations management (Kumar and Suresh, 2009). According to Andrew Greasley, "operations management is about the management of the processes that produce or deliver goods and services" (Greasley, 2007). The WDW tour operators must demonstrate the time schedule and plan to the tourists who have signed up for the WDW activity (Ku et al., 2014). Coinciding with Taiwan starting cetacean-watching tour activities in 1997 (Chou, 2002), Taiwan's cetacean-centric tourism became one of the most rapidly growing tourism sectors in the world between 1994 and 1998 (Hoyt, 2001). This unprecedented development has resulted in management challenges and in competition among the tour operators (Tseng et al., 2011). Operations managers have the obligation to sustain the balance between customer service and resource utilization. In cases of failure to do so, the operation managers will face numerous challenges in their operations management

(Kumar and Suresh, 2009). However, the tour operators may have a feeling that following guidelines set by local or national agencies will reduce the customer satisfaction (Lewis and Walker, 2018). Cetacean species are dynamic and intelligent creatures, and many of their behaviors are unknown to us. Evidence shows that WDW activities have adverse effects on the cetacean species, and as a result, many countries have enforced guidelines to mitigate those effects (Sprogis et al., 2020). Largely, these guidelines obligate tour boat operators to reduce their speed when approaching cetacean species, maintain appropriate distance between the boat and the cetaceans, and determine the manner in which boats can approach them. The WDW tour operators must ensure that they meet the guidelines set by local or national agencies at all costs. If carefully implemented, their compliance can minimize the negative impacts on the cetacean species and ensure the economic and environmental sustainability of WDW activity (Lewis and Walker, 2018).

Carrying Capacity and Limits of Acceptable Change

Cetacean species use echolocation to connect with other conspecifics, for detecting prey and predators, to avoid obstacles, to orient and navigate and to gather information about their surroundings (Mann et al., 2000; Tyack, 2008). These marine mammals are also exposed to anthropogenic disturbances, such as vessel noise. These anthropogenic vessel noises can negatively impact the frequency, duration, redundancy and loudness of Cetacean vocalizations (Tyack, 2008). Different destinations have their corresponding carrying capacity levels. Moreover, the effect of carrying capacity today will not be same as it will be tomorrow. In other words, carrying capacity is a dynamic concept, and the capacity of a given locus is likely to change over time (Fletcher et al., 2017). Even though the tour operators might try to limit the number of their customers to avoid exceeding the carrying capacity of WDW activity (Higham and Lusseau, 2007), there is usually not enough information available for them on how to calculate it. Defining carrying capacity of WDW is thus the ultimate challenge for its sustainable management (Berrow, 2003). Initially the notion of carrying capacity was applied in the areas of recreation and transportation planning, wildlife and fisheries management, water-quality and air-quality management, and archaeological and anthropological studies (Carey, 1993). Rees (1996) suggested that if the carrying capacity is measured systematically, it will provide valuable area-based indicators of sustainability. The World Tourism Organization (UNWTO) defines carrying capacity as "the maximum number of people that may visit a tourist destination at the same time, without causing destruction of the physical, economic, sociocultural environment, and an unacceptable decrease in the quality of visitors' satisfaction" (UNWTO, 1981).

The LAC was developed to resolve the shortcomings of the notion of carrying capacity and it was intended to identify the required conditions and the ways to achieve them. The LAC addresses planners concerns about sustainability and how it can be accomplished (McCool, 1994). The LAC criteria is pivotal for sustainable WDW, since it is measurable and lends itself to standard accounting practices for effective management (Higham et al., 2008). In essence, the LAC is designed to attain balance in a socio-ecological system (Diedrich et al., 2011).

Sustainable Financing

As the world move toward sustainable development, a consensus is arising that tourism must also be environmentally sustainable (Macleod and Todnem By, 2007). According to Higham and Lusseau (2007), urgent research is needed for WDW operators and policymakers to better understand marine mammals, and for the conservation of the latter. The cost of protecting marine environment (Balmford et al., 2004) and protecting endangered species are extremely burdensome (Damania and Bulte, 2007). However, tourists could provide funding for the conservation of marine endangered species if there was a funding mechanism in place (Cárdenas and Lew, 2016). Not only are funding sources very limited (Gravestock et al., 2008), but the improper allocation of conservation funds may also lead to failures to reach stated conservation targets (Ressurreição et al., 2011). Vaughan (2000) claims that sustainable financing is essential to maintain the stability of long-term conservation practices. The European Commission defines sustainable financing as "the process of taking environmental, social and governance (ESG) considerations into account when making investment decisions in the financial sector, leading to more long-term investments in sustainable economic activities and projects" (European Commission, 2021). Establishing sustainable financing is urgently needed because tourist's fees have the potential to establish a sustainable financing mechanism to overcome specific challenges in conservation (Edwards, 2009; Thur, 2010).

To sum up, we integrate the perspectives of operations management, carrying capacity and limit of acceptable change, and sustainable financing into an impact mitigation program for sustainable whale tourism management.

RESEARCH AREA AND METHOD

Study Site

Taiwan is a small island country located at the edge of the Asian continental shelf (Ku et al., 2014) and is home to over one third of the recorded cetacean species worldwide. Taiwan has recorded 31 species in its waters, and therefore the chances of spotting whales and dolphins on the East Coast is between 80 and 90% per trip. The best time the tourists can go for WDW in Taiwan is between May and September. Each WDW cruise trip lasts between 2 and 3 h and will cost 800NTD to 1000NTD per person (East Coast National Scenic Area, 2017). This study chose four harbors located on the East Coast of Taiwan as its research scope (**Figure 1**). The reasons for selecting these harbors is because the East Coast of Taiwan is a reliable place to view cetaceans, primarily dolphins and whales (Ku et al., 2014; Chuang et al., 2020). The East Coast of Taiwan is an ultimate feeding ground for cetacean species because the Kuroshio Current and the coastal rivers bring many migratory fish species to the East Coast of Taiwan (Ku et al., 2014). Among locations with professional

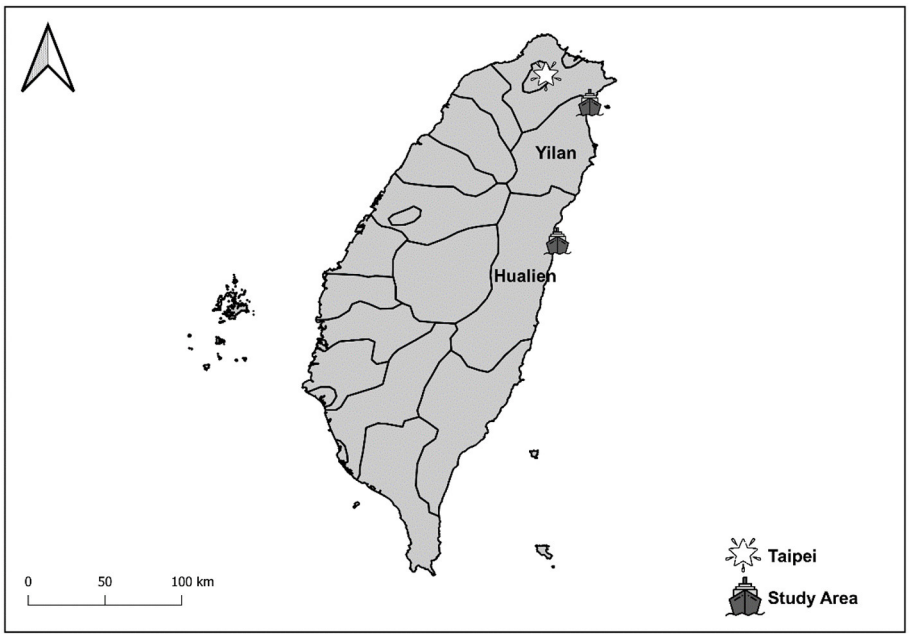


FIGURE 1 | Study area and sample points.

WDW operators, Wu-Shi port, Hualien port, Shi-ti port, and Chenggong port attract the most WDW tourists in Taiwan.

Wu-Shi port is located in Yilan County. In terms of WDW in Taiwan, Wu-Shi port is the biggest of all and has the largest number (10) of WDW companies. As such, it attracts a sizable volume of tourists (55% of respondents). Four of the WDW operators at Wu-Shi port have eco-labeling certifications and there are 12 WDW boats. Hualien port is the second largest port and likewise attracts a large number of tourists (41% of respondents), second only to Wu-Shi port. There are three WDW companies in Hualien, with two having eco-labeling certification and six WDW boats in total. Shi-ti port is also located in Hualien County. Compared to Wu-Shi port and Hualien port, Shi-ti port attracts a very small number of tourists (3% of respondents). There are three WDW companies and three boats operating there, one of which has eco-labeling certification. Finally, Chenggong port is situated in Taitung County, and it accounted for 1% of our tourist respondents. The reason for Chenggong port having a very low number of WDW tourists is that it has only one WDW company and one boat.

Choice Experiment Design for the Impact Mitigation of SWWT Management

The economic valuation of biodiversity is regarded as a vital element of decision making (Atkinson et al., 2014). The use of environmental valuation methods has increased significantly since the 1970's (Hanley et al., 1998a). The contingent valuation method (CVM) is well-established (Hanley et al., 1998a), widely used (Venkatachalam, 2004) stated-preference technique (Adamowicz et al., 1998) in the field of nonmarket valuation. The CVM is used to elicit preferences from respondents by using the simplest question format, usually involving binary choices between two alternatives (i.e., comparing the status quo with a hypothetical scenario; Portney, 1994; Carson, 2000; Kinghorn and Willis, 2008). However, the CV method has been found to have several issues (Carson, 2000), with these problems well-known among CVM researchers who have discussed them extensively (Loomis, 1987; Dalecki et al., 1993; Whitehead et al., 1993; Blamey et al., 1999). In particular, a large number of studies have criticized the CV method (Venkatachalam, 2004) for its "yea-saying bias." Irrespective of their true preferences to please the interviewer, respondents wanting to say "yes" for the marginal willingness to pay (MWTP; Mitchell et al., 1989).

The CE methodology attempts to overcome the limitations of traditional methods such as CVM (Hanley et al., 1998b). Incidentally, the Choice experiment (CE) has gained popularity in recent decades because the CE possesses many advantages over other valuation methods (Holmes et al., 2017). CE methodology is a superior valuation method to estimate the economic value of natural resources (Lee and Wang, 2017). In the peer-reviewed literature CE is the most commonly used approach, and its popularity is increasing steadily. In CE model, pre-defined scenarios which contain different attributes and levels are presented to the respondents (Kinghorn and Willis, 2008). In addition to that, the cost attribute (such as a tour fee) is the only attribute out of all the other attributes that influences the MWTP (Zong et al., 2017). To express the present situation, a status quo will be included as a baseline alternative (Hanley et al., 2001). This allows them to choose what they consider the most valuable attributes, as well as the tradeoffs they are willing to make, by comparing among potential and extant scenarios (Kinghorn and

Willis, 2008). Simply put, the CE method is an effective way to elicit information about preferences from individuals.

In the field of tourism and environment, the usage of CE methodology is considerably growing in recent years (Lee et al., 2019b). Several studies have been conducted to elicit preferences from respondents using CE methodology in the area of marine tourism (Semeniuk et al., 2009; Mcvittie and Moran, 2010; Wattage et al., 2011; Can and Alp, 2012; Börger et al., 2014). CE studies have also been carried out in the realm of WDW, such as one by Lee et al. (2019b), who examined tourists' preferences for whale watching tourism attributes, along with their MWTP for these various attributes. They found that the tourists' preference for WDW attributes were heterogeneous, and the tourists favored tour options that has additional provisional services, such as admission to the whale cultural village and museum. In their study, increased chance of whale watching and provision of interpretive services were both found to be statistically significant. Bach and Burton (2017) conducted their study at Shark Bay on the West Coast of Australia by using CE methodology to evaluate the visitors' experiences. The respondents showed a high level of care about the dolphins' welfare, as evidenced by their willing to pay an extra premium of AU$33 to lower the probability of tours interfering with the reproductive success of the dolphin population. The results also highlighted that unlike Australians, tourists from New Zealand and Europe were less likely to support the feeding of dolphins. In a study by Martone et al. (2020), the tourists reported they were willing to pay CA$302 for a higher chance of viewing whales, compared to having a chance to view otters. This preference was a powerful predictor for tourists' choice of wildlife-viewing tour packages on the West Coast of Vancouver Island, in British Columbia, Canada. To our best knowledge, only these aforementioned studies based on CE methodology have successfully determined the THP in the realm of whale and dolphin tourism.

To sum up, the aim of this study is to utilize the CE methodology to establish an empirical model encapsulating various characteristics of SWWT. Our research finding will provide much needed information on cetacean species conservation *via* establishing a conservation fund and an impact mitigation program for sustainable whale-dolphin tourism.

The Attribute Design of the Tourists' Preferences for SWWT

Time Schedule Management

Time management is one of the important aspects in the tourism industry (Botti et al., 2008). At present, however, there is no proper time schedule management agreement amongst the tour operators on the East Coast of Taiwan (status quo). Therefore, to give respondents an alternative to compare with the status quo, we added "set up time schedule management among tour operators" to regulate the resource management challenges in the cetacean watching industry in Taiwan (**Table 1**).

Vessel Slowdown Distance

Joy et al. (2019) examined the potential benefits of vessel slowdown on the resident killer whales in the southern Salish Sea area. Their results show that reducing vessel speeds when approaching cetacean species is expected to improve the creatures' habitat. So far, Taiwan has not established Exclusive Contact Zones (ECZ) guidelines for tour vessel operators. Therefore, to compare with the status quo which is "no management guidelines," we added "The boat should decelerate when encountering marine mammals within 50 m" and "The boat should decelerate when encountering marine mammals within 150 m" to regulate the vessel speed and approach zone, for the conservation of marine mammals (**Table 1**).

Maximum Boat Number

Janik and Thompson (1996) suggest that boat traffic should be managed cautiously when it comes to cetacean watching. They conducted their study on bottlenose dolphins at Moray Firth in Northeastern Scotland. Their results showed the bottlenose dolphins altered their natural behavior when they were exposed to boats for a long period of time. Since there are no ECZ guidelines in Taiwan, there is no limitation on the number of boats approaching the whale/dolphin pods. Therefore, to give respondents an alternative to compare with the status quo, we added "regulate the maximum number of boats to 4" and "regulate the maximum number of boats to 2" as options (**Table 1**).

Operational Guidance

There have been incidents recorded where tour vessels have struck cetaceans, causing injury or killing them, and in some instances, boats have accidentally been overturned by whales (Hoyt, 2009). So far, in Taiwan, the tour operators do not follow any operational guidance to safeguard themselves, their tourist charges, or the whale-dolphin pods. Therefore, to give respondents an alternative to compare with the status quo, we added "build up operational guidance for whale/dolphin watching boats" (**Table 1**).

Conservation Fund

Lee et al. (2019b) estimated tourists' willingness to donate to a fund for the conservation of whales in their case study from South Korea. The fifth attribute of our study is a monetary attribute (i.e., conservation fund), which could be utilized to protect the cetacean species in Taiwan. As of the time the study was conducted, there was no whale-dolphin conservation fund in Taiwan. Therefore, to give respondents an alternative to compare with the status quo, we added "50 NTD per person per visit, 100 NTD per person per visit, 200 NTD per person per visit, and 300 NTD per person per visit as alternatives."

The Questionnaire Design for Measuring Tourists' Preferences Toward the SWWT

Following the established design procedures of the CE methodology (Juutinen et al., 2011; Sriarkarin and Lee, 2018; Lin et al., 2020), the attributes and levels were decided upon after conducting a literature review covering impact mitigation programs, operations management, carrying capacity and LAC, and sustainable financing we also employed focus group discussions (FGDs) with government officers, WDW

TABLE 1 | Attributes and their levels with variable names used in the choice experiment.

Attributes	Levels	Variable name*
Time schedule management	a. Status quo-no time management	TSM±
	b. Setup time schedule management among tour operators	TSM+
Vessel slowdown distance	a. Status quo-no management guidelines	VSD±
	b. The boat should decelerate when encountering marine mammal in 50 m	VSD+
	c. The boat should decelerate when encountering marine mammal in 150 m	VSD++
Maximum boat number	a. Status quo-no limitation on number of boats	MBN±
	b. Regulate the maximum number of boats to 4	MBN+
	c. Regulate the maximum number of boats to 2	MBN++
Operational guidance	a. Status quo-no operational guidance	OG±
	b. Build-up operational guidance for whale-dolphin watching boats	OG+
Conservation fund	a. Status quo-no whale-dolphin conservation fund	CF
	b. $50 NTD/trip/tourist	
	c. $100 NTD/trip/tourist	
	d. $200 NTD/trip/tourist	
	e. $300 NTD/trip/tourist	

**The level of each attribute describes the basic alternative and level change for the impact mitigation program for sustainable whale-dolphin watching management.*

tour managers, and representatives of non-governmental organizations (NGOs) to inform our choice of attributes and levels. Based on the insights from different stakeholders we conducted a small-scale pilot study on May 2017. We built our final version of our questionnaire formulated on the pilot study. The final version of our research questionnaire contains three parts. The first part of the questionnaire introduces the survey and focuses on the tourist's awareness and behavior during their WDW trip. The second part of the questionnaire contained the CE, this part is of paramount importance from the standpoint of eliciting respondents' preferences for the potential WDW impact mitigation program. The choice sets as illustrated and presented in **Figure 2** encompassing various attributes and levels related to SWWT management (**Table 1**). In addition to that, the third part contained questions related to the respondents social and economics characteristics as presented in **Table 2**.

All the attributes and levels of the impact mitigation program for SWWT are summarized in **Table 1**. The combination of all these attributes gave rise to 180 possible profiles (2X3X3X2X5 = 180). To design our CE questionnaire, we utilized an orthogonal main effect design (OMED) present in the SPSS software. This OMED is widely used and applied in choice modeling studies (Louviere et al., 2000; Mangham et al., 2009; Semeniuk et al., 2009; Lee et al., 2019a). The OMED procedure reduced the 180 possible combinations to 25 alternative WDW management scenarios. The 25 alternatives were randomly organized into three sets (i.e., choice sets), such that every choice set contained the status quo, along with two proposed alternatives. The unreasonable and dominating combinations were deleted, which resulted in 16 combinations. Some examples of our choice set encapsulating aspects and levels of the impact mitigation program in sustainable WDW are illustrated in **Figure 2**. In the first version of the questionnaire, the first three choice sets were used, and so on to generate our 40 distinctive versions of the questionnaire. Due to the differences that present in the choice sets, this step was utilized to achieve reliable estimation results and to reduce bias of the questionnaire (Juutinen et al., 2011). Therefore, the respondents were presented with three choice sets each, among which they were asked to select their most preferable option.

The Choice Experiment Model

The CE is one of the non-market methods based on classical welfare economics, that can be used for the economic valuation of natural resources (Kinghorn and Willis, 2008; Vojáček and Pecáková, 2010). The conditional logit model (CL), which is used to demonstrate the respondents' average preferences, is the basis of CE analysis. The random parameter logit (RPL) and latent class model (LCM) are extensively used in applied economics for assessing preference heterogeneity. The RPL model is an extended model of the CL model. It is a highly flexible and the best model available to access individual preferences for each attribute in multiple discrete choices (Train, 2009; Juutinen et al., 2011). The LCM is used to identify group of visitors that have different preferences (Lee et al., 2019c). Even though the RPL model is attractive due to its ability to determine heterogeneity of preferences among individuals, the LCM model is actually superior for understanding preference heterogeneity among multiple groups, which is sometimes referred as "class membership" (Gupta and Chintagunta, 1994; Boxall and Adamowicz, 2002).

The CE model was derived from the Lancastrian consumer model and the random utility theory. By using the random utility model, the respondents are asked to choose their most

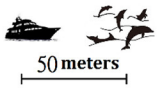
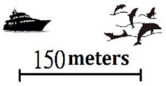
Choice set 1	Alternative1	Alternative2	Status quo
Time schedule management	 Increasing time Schedule management	 No management	 No management
Vessel slowdown distance	 Restrict the Idle distance to 50 meters	 Restrict the Idle distance to 150 meters	 No restriction
Maximum boat number	 Controlling the maximum number of boats in 4	 Controlling the maximum number of boats in 2	 No control
Operational guidance	 Build up the operational guidance	 No restriction	 No restriction
Conservation Fund	300 NT/trip/person	150 NT/trip/person	0 NT/trip/person.
Choice	□	□	□

FIGURE 2 | An example of choice experiments question used in CE for foreign tourists.

preferable options from a list of available alternatives (Lancaster, 1966; McFadden, 1973; Shoyama et al., 2013). The random utility model can be represented by the summation of two components:

$$U_{ni} = \beta_{ni} X_{ni} + \varepsilon_{ni} \quad (1)$$

where U_{ni} is the utility function that the researcher models for a decision maker "n" who faces a choice among alternatives "*i*." The first term, X_{ni}, on the right side of the Equation1 is the observable variable, and the second term, ε_{ni}, is the unobservable variable of the utility function, while β_{ni} is the utility parameter associated with the level change (Louviere et al., 2000; Train, 2009).

Following Hausman and Wise (1978) and Lin et al. (2020), the empirical utility function of the tourists' impact mitigation program preference can be expressed as:

$$V_i = ASC + \beta_1 TSM1_i + \beta_2 VSD1_i + \beta_3 VSD2_i + \beta_4 MBN1_i + \beta_5 MBN2_i + \beta_6 OG1_i + \beta_7 CF_i \quad (2)$$

where V_i is the utility function for SWWT, associated with alternative "*i*" and other attributes and levels. The alternative specific constant (ASC) is the status quo option for the WDW impact mitigation program for each alternative. β_i is the estimated coefficient of alternative "*i*." Where β_1 is the coefficient of the time schedule management; TSM_i represents the attribute level for the time schedule management at level 1; β_{2-3} are the coefficients of the vessel slowdown distance; $VSD1_i$ and $VSD2_i$ are the vessel slowdown distance at levels 1 and 2; β_{4-5} are the coefficients of the maximum number of boats; $MBN1_i$ and $MBN2_i$ are for the maximum number of boats at levels 1 and 2, respectively; β_6 is the coefficient of the operational guidance; OG_i is for the operational guidance at level 1; β_7 is the coefficient of the conservation fund ; and the variable CF_i represents the cost attribute.

The MWTP for SWWT can be estimated by the ratio of two parameters (Hensher et al., 2005) as written in Equation 3.

$$MWTP_i = \frac{-\beta_i}{\beta_{cfund}} \quad (3)$$

Where $-\beta_i$ is the attribute parameter of the sustainable whale/dolphin watching tourism, and β_{cfund} is the financial parameter of the conservation fund.

Hypothetical Scenarios for SWWT Management

The CE method was used to estimate the welfare effects under hypothetical scenarios based on estimated results from the RPL model (Sriarkarin and Lee, 2018; Lin et al., 2020) and was applied in bird-watching recreation reduction scenarios (Guimarães et al., 2014), eco-tour package scenarios (Zong et al., 2017), and reef recreational impact mitigation management (Lee et al., 2020). Therefore, we establish the hypothetical scenarios for SWWT management regarding the attributes and levels in **Table 1**. We calculate the corresponding MWTP following the

TABLE 2 | Tourist's demographics distribution in whale and dolphin watching sites.

Characteristic	All tourists	Domestic	Foreign
Number	595	466	129
Male	53.3%	51.9%	58.1%
Unmarried	61.7%	61.2%	62.0%
Age			
20–29	27.2%	24.5%	37.2%
30–39	30.8%	28.5%	38.8%
40–49	25.9%	27.9%	18.6%
50 and above	16.1%	19.1%	5.4%
Education			
High school and lower	17.0%	17.4%	15.5%
Undergraduate	57.3%	56.2%	61.2%
Graduate and above	25.7%	26.4%	23.3%
Joined the conservation organization	11.3%	11.2%	11.6%
First time to participate in whale dolphin watching activity	78.7%	72.6%	99.2%
Participating in the tour group during this trip	23.5%	26.2%	14.0%
Agree that the whale watching boat should chase the whales and dolphin	28.9%	26.8%	36.4%
Identify and understand the meaning of Eco-Label for whale watching activity in Taiwan	22.9%	24.2%	13.2%

results of Equation 3 for each SWWT scenarios by comparing the alternative options to the status quo. The scenarios for the potential programs are synthesized as follows.

The following hypothetical programs were created for the impact mitigation of WDW using attributes and changes:

- **Program A—Up close cetacean experiential tour:** This program focuses on establishing an operational guidance and a vessel slowdown distance of 50 m when approaching the whale-dolphin pods. Four boats can operate inside the ECZ at a given time to provide tourists a better experience watching the whale/dolphin pods. As for the time schedule management, we maintain the status quo.
- **Program B—Basic WDW management:** This program focuses on establishing an operational guidance and time schedule management among the tour operators for sustainable management of WDW. Four boats can operate inside the ECZ at the same time to experience the whale/dolphin pods at the distance of 150 m.
- **Program C—Profound tourist experience and cetacean conservation:** The third program focuses on enhancing the tourists' experience by maintaining the vessel slowdown distance at 50 m when approaching whale/dolphin pods. With conservation in mind, two boats can operate in the ECZ at the same time. An operational guidance is established among tour operators. As for the time schedule management, we maintain the status quo.
- **Program D—Integrated cetacean conservation and sustainable whale-dolphin watching:** Sustainable management of WDW: This program focuses on conservation of cetacean species and sustainable WDW by establishing an operational guidance and time schedule management among tour operators. Within the ECZ, two boats can operate at the same time while tourists experience watching whale/dolphin pods at the distance of 150 m.

Sampling Design and Survey Data

At 4% estimate bias and 95% confidence level, we assume that the local and international tourists have the same heterogeneity preferences for SWWT in Eastern Taiwan. Based on that, we decided the total number of respondents in WDW sites would be at 600. The CE surveys was conducted with 600 randomly selected tourists in the form of on-site interviews during the period from June 2017 to October 2017 in Hualien Port and in Wu-Shi Port, Taiwan. We chose Hualien Port and Wu-Shi Port because they handle 95% of the WDW tourists in Eastern Taiwan. The sample population of the study was made up of Taiwanese and foreign tourists (over 18 years). The respondents were selected randomly and only after they had finished the WDW activity. Their participation took the form of face-to-face interviews, which aided the respondents to better understand the questionnaire when necessary. We removed five respondents in our database analysis because of their incomplete answers. The used database consists of 595 respondents including 466 domestic and 129 foreign tourists. Out of 595 samples, 299 samples were from Hualien port and 296 samples were from Wu-Shi Port. A summary of the gathered statistical data is presented in **Table 2**.

RESULTS

Demographics and Tourist's Awareness

The share of male respondents from the survey is 53.3% and female respondents accounted for46.7%. Among all respondents, 61.7% were unmarried. As for age distribution, the majority of the respondents were in the cohorts of 30- to 39-years-old (30.8%), and 20- to 29-years-old (27.2%). In terms of education, 57.3% of the respondents had undergraduate university level and 25.7% had a master's degree or above. Most tourists (88.7%) don't hold membership with any conservation organization.

Most of the tourists (78.7%) were taking part in a WDW activity for the first time, while 76.5% tourists were independent tourists, in the sense that they were not part of any organized tour groups during this WDW activity. A majority (71.1%) of the tourists were concerned about the boats chasing whale/dolphin pods for a better view, and only 22.9% of the tourists could identify and understand the Eco-Label for WDW activities.

Support for Impact Mitigation Program

Most of the tourists (85%) prefer an alternative option to the status quo, which exhibits their support for the WDW impact mitigation program (**Table 3**). Out of 595 respondents, 466 were domestic tourists (i.e., Taiwan nationals) and 129 were foreigners (i.e., not Taiwan nationals). We found out that a

majority of both local (84.30%) and foreign tourists (89.1%) prefer an alternative option, whereas only a much smaller percentage of international (10.9%) and local tourists (15.70%) support the status quo. Overall, an overwhelming majority of the tourists (85.30%) would like to support the WDW impact mitigation program.

Estimation of Tourist Preferences for an Impact Mitigation Program in WDW

The RPL model is estimated using NLOGIT 5.0 to explore the level of each attribute to estimate the tourists' preferences for an impact mitigation program in WDW. The results of the RPL model are presented in **Table 4**, we found that the log-likelihood values of 821.7 and 934 exceed the critical value of chi square distribution of 29.14 and 38.93 on both sides, respectively, showing that the model is appropriate. The parameters on the left side, except for controlling the maximum number of boats (MBN_1) are at the 1% significance level. The significant and negative sign on the ASC coefficient implies that the tourists would support for an impact reduction program for the SWWT management.

On the right side, the parameters are significant, similar to what we observe in the left-hand side of the table. While the RPL model can capture unobserved heterogeneity, the RPL model is not capable of explaining the sources of heterogeneity (Boxall and Adamowicz, 2002). To effectively explain the sources of heterogeneity, the utility function should include the interactions of respondents' sociodemographic characteristics, attitudes, and perceptions with choice-specific attributes, such as the conservation fund. This helps the RPL model to capture the preference variation in connection with the random and conditional heterogeneity, therefore improving the goodness-of-fit (Revelt and Train, 1998; Hoyos, 2010).

The interaction of conservation fund (CF) with *location*, *income* and *chasing the marine mammals for a better view* gave us a new insight. First, according to the right side of **Table 4**, the interaction between conservation fund and location (CF*Location) shows that the tourists in Yilan are willing to pay less for the conservation fund compared to the tourists who experienced WDW in Hualien port. Second, the interaction between conservation fund and income (CF*Income) shows that the tourists with low income show strong support for the notion that there should be an impact mitigation program in WDW activities. Thirdly, the interaction between conservation fund and chasing the marine mammals for a better view (CF*Chase) reveals that the tourists who are willing to pay less money for a conservation fund do not prefer the idea of chasing marine mammals for a better view.

TABLE 3 | Tourists' preference to establish an impact mitigation program.

Research area / Alternative preference	All tourists ($n = 595$)	Domestic ($n = 466$)	Foreign ($n = 129$)
Status quo	14.70[a]	15.7[a]	10.9[a]
Alternative option	85.30[b]	84.3[b]	89.1[b]

[a]*Means the percentage of tourists who prefer the status quo.*
[b]*Means the percentage of tourists that chose alternative option to establish an impact mitigation program.*

TABLE 4 | Results of the random parameter logit model with interactions.

Attributes and levels	Coefficient (*t*-value)	Coefficient std (*t*-value)	Interaction with CF	
			Coefficient (*t*-value)	Coefficient std (*t*-value)
ASC	−2.34 (−4.88)***	3.26 (9.72)***	−2.69 (−5.90)***	3.88 (8.84)***
TSM+	0.24 (2.86)***	0.04 (0.09)	0.20 (2.06)**	0.12 (0.28)
VSD+	0.27 (3.35)***	0.44 (3.66)***	0.32 (3.37)***	0.55 (3.83)***
VSD++	0.38 (3.59)***	0.18 (0.56)	0.35 (2.79)***	0.38 (1.49)
MBN++	0.71 (7.27)***	0.45 (2.92)***	0.77 (6.42)***	0.47 (2.04)***
MBN+	−0.02 (−0.37)	0.25 (1.28)	−0.05 (−0.58)	0.46 (2.91)***
OG+	0.32 (5.80)***	0.10 (0.26)	0.35 (5.17)***	0.11 (0.36)
CF	−0.00595 (−10.48)***		−0.002 (−3.01)***	
CF*Location			−0.005 (−3.34)***	0.01(6.18)***
CF*Income			−0.005 (−3.66)***	0.007(3.13)***
CF*CHASE			−0.005 (−3.21)***	0.004(1.18)
Log–likelihood ratio	821.7		Log–likelihood ratio	934.0
Chi Square	$\chi^2_{0.01}(14) = 29.14$***		Chi Square	$\chi^2_{0.01}(21) = 38.93$***

***, **Significance at 1%, 5% level; ASC: alternative specific constants. Location: dummy variable, tourist in Yilan is as 1, otherwise as 0; Income: the median monthly income for tourists, dummy variable, higher monthly income (>$40,000 NTD) as 1, otherwise is 0; Domestic: dummy variable, agree to chase the whale and dolphin is 1, otherwise is 0.*

TABLE 5 | Results of heterogeneity preferences to establish an impact mitigation program.

Attributes and levels	Class 1 (29%)		Class 2 (59%)		Class 3 (12%)	
	Coef	***t*-value**	**Coef**	***t*-value**	**Coef**	***t*-value**
ASC	−2.42	−1.58	−0.711	−1.24	−7.04	−0.03
TSM+	−0.025	−0.09	0.157	1.36	0.385	1.18
VSD+	−0.267	−0.80	0.367	3.33***	0.190	0.70
VSD++	−0.067	−0.20	0.352	2.41**	0.462	1.11
MBN++	0.234	0.88	0.53	4.4***	1.39	3.39***
MBN+	−0.336	−0.95	−0.012	−0.13	0.193	0.66
OG+	−0.196	−0.79	0.402	5.21***	0.035	0.17
FUND	−0.01322	−4.74***	−0.00247	−3.79***	−0.00625	−3.40***
Class membership parameters			**Class1**		**Class2**	
			Coe.	***t*-value**	**Coe.**	***t*-value**
Constant			9.42	2.41**	10.22	2.61***
Higher income group			−4.90	−2.16**	−6.75	−3.0***
Tour group			−2.22	−1.90*	−4.02	−3.25***
Agree to chasing the marine mammal			2.40	2.5**	1.59	1.54
Able to recognize eco–label			0.91	0.92	2.37	2.19**
Higher education			1.41	1.48	2.88	2.75***
Willing to revisit			−0.686	−0.87	−1.59	−1.75*
Foreign tourists			−4.02	−2.86***	−4.24	−2.94***
Agree to keep appropriate distance with marine mammal			−2.64	−1.46	−0.903	−33.47
Number of choice sets				1785		
Log–likelihood Ratio				694.87		
Chi Squared				$\chi^2_{0.01}[42] = 66.2$		

****, **, *Significance at 1%, 5%, and 10% level.*

Tourist's Heterogeneity Preferences for an Impact Mitigation Program

This section utilizes the LCM model to estimate the difference in preferences among different groups of tourists, and the tourists' behaviors for the level of each attribute. The LCM analysis informs the existence of three latent class. **Table 5** shows that the respondent's income, education, nationality, tour group, behavior and awareness about marine mammals are statistically significant variables that explain tourists' group (i.e., class) membership. Latent class 2 is the largest, comprising 59% of the tourists. Latent class 2 is made up of domestic tourists with low income, higher education, ability to recognize the eco label on the vessel, and who not likely to experience additional WDW activities in the near future. The other latent class 1, comprising 29% of the sample, consists of low-income earners who expressed a behavior of chasing the marine mammals for a better view. Surprisingly, the class 1 and 2 members were individuals who came to the locations specifically to experience the WDW activity. The conservation fund (CF) attribute was at the 1% significance level among all the groups. The negative sign on the CF indicates that the tourists are not willing to contribute more for the conservation fund. As expected, the tourists showed heterogeneity preferences and we found a significant impact mitigation segment for SWWT management.

Comparison of Tourist's Demographics and Behavior for the Impact Mitigation Program

Based on the LCM results (**Table 5**), we can separate all the tourists in the sample into three groups. We estimated the tourist's demographics, behavior, and the level of awareness between the three groups by cross and chi-square analysis (**Table 6**). Class 1 consists of tourists who are 20–39 years old, most of whom are domestic travelers (86.8%) who would like to experience WDW activity individually, rather than by joining tour groups. They were not able to recognize the eco-label (91.9%) and, surprisingly, they had a higher education level (85.3%) compared to the other class groups, and also had mixed feelings about boats chasing marine mammals for a better view. Class 2 consists of young tourists (87.8%) whose monthly income is higher (20–60 k in NTD) that of the other class groups. They like to experience the whale and dolphin watching activity individually (as opposed to joining tour groups) and they prefer a smaller number of surrounding boats (86.5%). Their ability to recognize the eco-certification label (29.5%) was higher than that

TABLE 6 | The class groups comparison among tourist's demographics and the trip's behavior.

	Class group					
	Class 1 ***N* = 136**		**Class 2** ***N* = 386**		**Class 3** ***N* = 73**	
Domestic or Foreign tourists						
Domestic	118	86.8%	321	83.2%	27	37.0%
Foreign	18	13.2%	65	16.8%	46	63.0%
Chi–squire = 84.4, Sig < 0.001						
Age						
20–39 year–old	97	71.3%	339	87.8%	63	86.3%
40–59 year–old	25	18.4%	29	7.5%	7	9.6%
60 up year–old	14	10.3%	18	4.7%	3	4.1%
Chi–squire = 20.81, Sig < 0.001						
Monthly Income						
20–60 k	105	77.2%	314	81.3%	41	56.2%
60–80 k	11	8.1%	29	7.5%	11	15.1%
80 k above	20	14.7%	43	11.1%	21	28.8%
Chi–squire = 20.72 , Sig < 0.001						
Education						
Bachelor's Degree or below	116	85.3%	264	68.4%	62	84.9%
Master's Degree or above	20	14.7%	122	31.6%	11	15.1%
Chi–squire = 19.9, Sig < 0.001						
Travel form						
Individual	74	54.4%	341	88.3%	40	54.8%
Tour group	62	45.6%	45	11.7%	33	45.2%
Chi–squire = 86.07, Sig < 0.001						
Acceptable number of surrounding whale watching boats						
0–1 boats	102	75.0%	334	86.5%	61	83.6%
2–3 boats	18	13.2%	36	9.30%	11	15.1%
4 boats above	16	11.8%	16	4.10%	1	1.4%
Chi-squire = 17.45, Sig < 0.002						
Recognize the eco label[a] for whale watching activity						
Yes	11	8.1%	114	29.5%	11	15.1%
No	125	91.9%	272	70.5%	62	84.9%
Chi-squire = 29.09, Sig < 0.001						
Agree with whale and dolphin watching management						
Yes	107	78.7%	366	94.8%	70	95.9%
No	29	21.3%	20	5.2%	3	4.1%
Chi-squire = 35.09, Sig < 0.001						
Agree that whale and dolphin watching boat should keep a distance[b] from marine mammal						
Yes	109	80.1%	379	98.2%	72	98.6%
No	27	19.9%	7	1.8%	1	1.4%
Chi-squire = 62.17, Sig < 0.001						
Agree that whale and dolphin watching boat should chasing marine mammal for a better view						
Yes	68	50.0%	94	24.4%	10	13.7%
No	68	50.0%	292	75.6%	63	86.3%
Chi-squire = 41.55, Sig < 0.001						

$\chi^2_{0.05}(1) = 3.84$, $\chi^2_{0.05}(2) = 5.99$.

[a] *This Eco labels were certificated voluntarily and it's in charge of the NGO.*

[b] *Not including the case that the whale or dolphin actively close to the boat when boat was idle.*

of the other class groups. Class 3 is mostly made up of foreign tourists (63%) and they support establishing WDW management (95.9%). They strongly disagree with the boats chasing marine mammals for a better view (86.3%). Both class 2 (98.2%) and class 3 (98.6%) overwhelmingly agree that the boats should keep a minimum distance from marine mammals during their trips.

Although proximity to whales and dolphins enhances the tourist experience, Curtin (2008) claims that tourists are also

Hypothetical Scenarios	Time schedule management	Vessel slowdown distance	Maximum boat number	Operational guidance	WTP
Program I Up-close cetacean experiential tour	- NT/trip/person	50 meters 46.2 NT/trip/person	- NT/trip/person	54.3 NT/trip/person	100.5 NT/trip/person
Program II Basic whale-dolphin tour management	40.8 NT/trip/person.	150 meters 64.6 NT/trip/person.	- NT/trip/person	54.3 NT/trip/person.	159.7 NT/trip/person
Program III Profound tourist experience and cetacean conservation	- NT/trip/person	50 meters 46.2 NT/trip/person	120.0 NT/trip/person	54.3 NT/trip/person	220.5 NT/trip/person
Program IV Integrated cetacean conservation and sustainable whale-dolphin watching	40.8 NTD/trip/person	150 meters 64.6 NTD/trip/person	120.0 NTD/trip/person	54.3 NTD/trip/person	279.7 NT/trip/person

FIGURE 3 | The MWTP effects for impact mitigation program for sustainable whale and dolphin watching.

aware of the potential negative impacts on wildlife. To provide the "best" whale-dolphin watching experience for the tourists, the tour operators were found to be in the habit of chasing the whale/dolphin pods (Buultjens et al., 2016; Sitar et al., 2016; Prakash et al., 2019; Amrein et al., 2020). In contrast to chasing marine mammals for a better view, Orams (2000) argues that the tour operators do not need to chase the whale/dolphin pods to satisfy the tourists, since doing so does not greatly influence the satisfaction level of the latter. This is consistent with our results from **Table 6**, which reveal that the tourists belonging to class 1 (50%), class 2 (75.6%), and class 3 (86.3%) do not like the idea of chasing marine mammals for a better view, which is also supported by Prakash et al. (2019). On the other hand, the tourists from class 1 (80.1%), class 2 (98.2%), and class 3 (98.6%) agree that the tour boats should maintain appropriate distance from the marine mammals to minimize potential disturbances (Steckenreuter et al., 2011; Villagra et al., 2021). Tourists from class 1 (75%), class 2 (86.3%), and class 3 (83.6%) would like to enjoy whale-dolphin pods with less tour boats surrounding them.

MWTP Effects for the Hypothetical Scenarios of an Impact Mitigation Program in WDW Activities

In light of the documented negative impacts on wildlife-based tourism (Wilson and Tisdell, 2003), we developed four hypothetical scenarios as appropriate guidelines for a whale-dolphin impact mitigation program for sustainable WDW (**Figure 3**). The CE method has the benefit of allowing researchers to determine the welfare effects from the estimated coefficients of attributes, such that the attributes can be grouped together (Bergmann et al., 2006). Based the RPL model, program IV has the highest MWTP among all the programs (279.7 $NTD/trip/person), followed by program III (220.5 $NTD/trip/person), program II (159.7 $NTD/trip/person) and program I (100.5 $NTD/trip/person), respectively. The program for which the tourists have the highest preference combines the operational program, time schedule management among tour operators, and allowing two boats to operate at the distance of 150 m from the mammals in the ECZ. The proposed hypothetical scenarios could be used as an outline for WDW tour operators and policymakers for the SWWT in the post COVID-19 era.

DISCUSSION

This study aimed to construct (**Figure 4**) a whale-dolphin impact mitigation program established on the concepts of operations management, carrying capacity and LAC, and sustainable financing while prior research (Bach and Burton, 2017; Lee et al., 2019b; Martone et al., 2020; Schwarzmann et al., 2021) has investigated domestic tourists' preference heterogeneity, we take an alternative approach to exploring the preferences of tourists with regard to establishing an impact mitigation program for sustainable whale-dolphin tourism. Our results contribute to the extant literature by improving on previous studies that have neglected to draw comparisons between domestic and international tourists across different attributes, such as time schedule management, vessel slowdown distance, maximum boat number, operational guidance, and a conservation fund.

Our results affirmed that the tourists prefer to have an alternative SWWT impact mitigation program at WDW sites in Taiwan. Through the LCM results, we found three segmented groups of tourists with different preference heterogeneity regarding the WDW impact mitigation program in Taiwan. The second group had the highest preferences for the main attributes

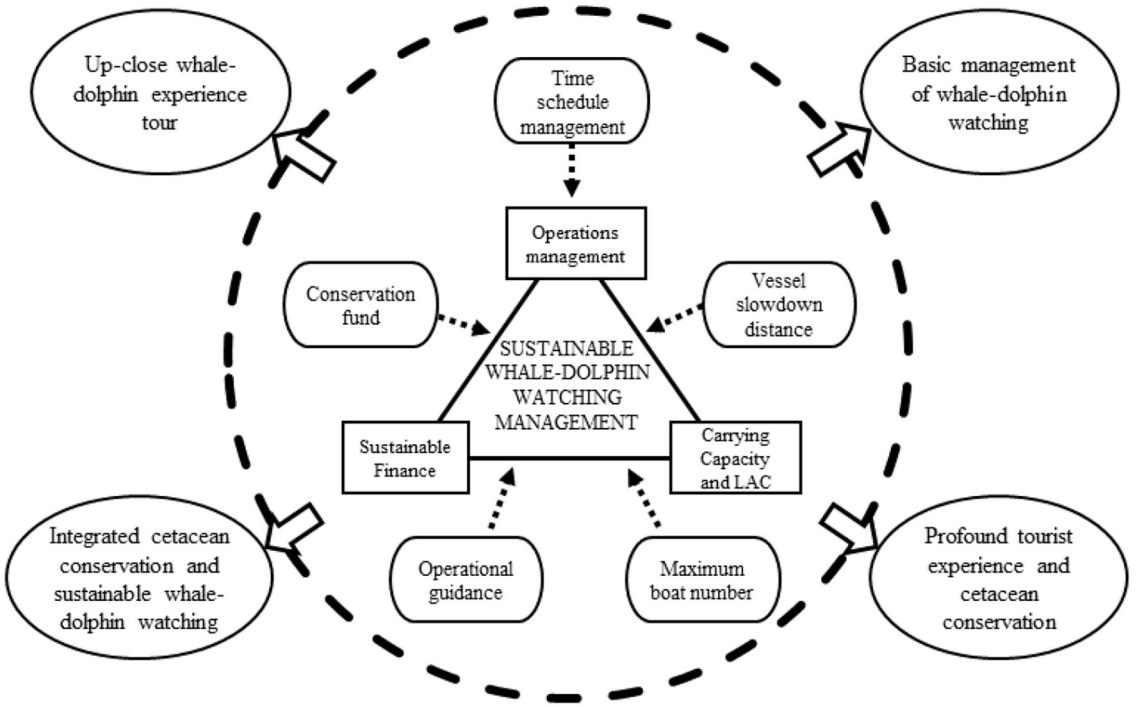


FIGURE 4 | Conceptual framework to establish an impact mitigation program for a sustainable whale-dolphin watching management.

out of other groups, except for the time schedule management. This group accounted for 59% of the respondents and had a higher education, low income, and were domestic tourists. They had knowledge of the Eco-certification label, so they were able to recognize it, and they strongly disagree with chasing the whale/dolphin pods for a better view.

A few studies have utilized the CE empirical results to develop a wide range of scenarios based on the specially chosen attributes and levels such as; land use scenarios in semi-arid watershed environments (García-Llorente et al., 2012), economic evaluation with management scenarios to improve the Nechisar National Park ecosystem (Eticha, 2016), multiple scenarios for sustainable national park management (Sriarkarin and Lee, 2018), and alternative scenarios to improve the ecosystem services of Sundarbans Mangrove Forest (Iqbal, 2020). Finally, we designed four hypothetical scenarios as shown in **Figure 3** as a guideline for establishing a SWWT impact mitigation program in Taiwan.

Our key evidence, in the form of the RPL and LCM results, reveals the whale/dolphin tour operators should incorporate time schedule management, vessel slowdown distance, maximum boat number, operational guideline, and a conservation fund, as effective elements for the promotion of sustainable WDW impact mitigation program in Taiwan (Lusseau and Higham, 2004; Tseng et al., 2011; Kuo et al., 2012; Amrein et al., 2020; Wu et al., 2020).

According to Chou (2002) and Chen (2011) long-term cutting-edge research, management, and conservation strategies are urgently needed in order to protect the unique species of Taiwan. It should be noted that the tourist's class 1 (78.7%), class 2 (94.8%), and class 3 (95.7%) expressed their concern for the conservation and sustainable utilization of whales/dolphins in Taiwan. Even so, most of the tourist's class 1 (81%), class 2 (29.5%), class 3 (15.1%), were not able to recognize the eco-label. The tour managers should therefore focus on setting up a conservation fund to raise awareness and promote sustainable WDW and long-term conservation of cetacean species. In terms of WDW tourists in Taiwan in 2015, there were 176,106 from Hualien and 233,922 from Yilan. Based on this data, if the tour operators implement the conservation fund, Hualien port and Wu-Shi port could generate 47 million and 37 million NTD, respectively, this money could support the long-term marine mammal WDW and conservation.

In Taiwan, there is no regulation to limit the number of boats in ECZ while approaching the cetacean pods. To reduce adverse impacts on cetaceans, The International Fund for Animal Welfare (IFAW) recommends that the maximum number of boats in the ECZ should be restricted to three while experiencing cetacean pods (Ifaw and Cetaces, 2009). Our suggestions from 'integrated cetacean conservation and sustainable whale-dolphin watching scenario' are in line with the guidelines set up by IFAW by limiting the maximum number of boats to two at a distance of 150 m to promote sustainable whale watching in Taiwan. If the tour operators follow our guidelines based on our findings and suggestions it could place Taiwan as one of the leading sustainable whale watching destination in the world.

CONCLUSION AND MANAGEMENT IMPLICATION

Taiwan is one of the world's leading WDW spots in the West-Pacific (Chen, 2011). Even though Taiwan amended the *Wildlife Conservation Law* on 23 June 1989 (Agoramoorthy, 2009), the move could not guarantee the public's respect for and awareness about the cetacean species that provide these creatures the full protection they deserve. As of time of writing and 20 years after the first WDW tourism operations began, there are still no proper regulations in place governing the tour operators in Taiwan. It is very hard to standardize the regulations and guidelines for the tour operators, and their recognition of their own self-interest in sustainable WDW needs to be cultivated to overcome this shortcoming.

Based on the information from the results and discussion, our research leads to the following policy and management implications for a sustainable WDW management: (1) Integrating time schedule management, vessel slowdown distance, maximum boat number, operational guideline, and conservation fund could maintain the balance between sustainable WDW and cetacean conversation in Taiwan. (2) A management plan should include the Integrated cetacean conservation and sustainable whale-dolphin watching scenario that emphasize on establishing an operational guidance, time schedule management, regulating the maximum number of boats to 2 and decelerate the WDW boats in 150 m when encountering cetacean pods. (3) Integrating the quantitative and qualitative data would assist the tour operators and policymakers to build target segmentation strategies to establish sustainable impact mitigation programs in Taiwan (Lee and Wang, 2017; Sriarkarin and Lee, 2018; Lee et al., 2019b,c, 2020; Lin et al., 2020). (4) The tourist's heterogeneity preference between three identified latent classes can inform about appropriate market segmentation for an impact mitigation program to achieve SWWT management in Taiwan. Finally, we have shown that our results have potential policy and management implications based on our significant results.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/**Supplementary Material**, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

AF and Y-CJ contributed to the data curation of this study. AF contributed to writing of the original draft and also helped in reviewing, editing, and visualization for this study. Y-CJ contributed to this study by doing the field survey, data collection, and formal analysis using SPSS software. C-HL designed the conceptualization, helped in funding acquisition, methodology, project administration, and supervision of the overall project. All authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fcosc.2022.837282/full#supplementary-material

REFERENCES

Adamowicz, W., Boxall, P., Williams, M., and Louviere, J. (1998). Stated preference approaches for measuring passive use values: choice experiments and contingent valuation. *Am. J. Agri. Econ*. 80, 64–75. doi: 10.2307/3180269

Agoramoorthy, G. (2009). Enforcement challenges of Taiwan's wildlife conservation and animal protection laws. *J. Int. Wildlife Law Pol.* 12, 190–209. doi: 10.1080/13880290903202690

Ahn, B., Lee, B., and Shafer, C. S. (2002). Operationalizing sustainability in regional tourism planning: an application of the limits of acceptable change framework. *Tour. Manag.* 23, 1–15. doi: 10.1016/S0261-5177(01)00059-0

Amrein, A. M., Guzman, H. M., Surrey, K. C., Polidoro, B., and Gerber, L. R. (2020). Impacts of whale watching on the behavior of humpback whales (*Megaptera novaeangliae*) in the coast of Panama. *Front. Mar. Sci*. 2020:301277. doi: 10.3389/fmars.2020.601277

Atkinson, G., Bateman, I. J., and Mourato, S. (2014). Valuing ecosystem services and biodiversity. *Nat. Balance* 6, 101–134. doi: 10.1093/acprof:oso/9780199676880.003.0006

Bach, L., and Burton, M. (2017). Proximity and animal welfare in the context of tourist interactions with habituated dolphins. *J. Sustain. Tour*. 25, 181–197. doi: 10.1080/09669582.2016.1195835

Balmford, A., Gravestock, P., Hockley, N., Mcclean, C. J., and Roberts, C. M. (2004). The worldwide costs of marine protected areas. *Proc. Natl. Acad. Sci. U. S. A.* 101, 9694–9697. doi: 10.1073/pnas.0403239101

Bejder, L., Dawson, S. M., and Harraway, J. A. (1999). Responses by Hector's dolphins to boats and swimmers in Porpoise Bay, New Zealand. *Mar. Mammal Sci.* 15, 738–750. doi: 10.1111/j.1748-7692.1999.tb00840.x

Bergmann, A., Hanley, N., and Wright, R. (2006). Valuing the attributes of renewable energy investments. *Energy Pol.* 34, 1004–1014. doi: 10.1016/j.enpol.2004.08.035

Berrow, S. D. (2003). *An Assessment of the Framework, Legislation and Monitoring Required to Develop Genuinely Sustainable Whalewatching. Marine Ecotourism.* Bristol: Channel View Publications. doi: 10.21832/9781873150436-008

Blamey, R. K., Bennett, J. W., and Morrison, M. D. (1999). Yea-saying in contingent valuation surveys. *Land Econ.* 1999, 126–141. doi: 10.2307/3146997

Boo, E. (1990). *Ecotourism: The Potentials and Pitfalls*. Washington, DC: World Wildlife Fund. p. 1.

Börger, T., Hattam, C., Burdon, D., Atkins, J. P., and Austen, M. C. (2014). Valuing conservation benefits of an offshore marine protected area. *Ecol. Econ*. 108, 229–241. doi: 10.1016/j.ecolecon.2014.10.006

Botti, L., Peypoch, N., and Solonandrasana, B. (2008). Time and tourism attraction. *Tour. Manag.* 29, 594–596. doi: 10.1016/j.tourman.2007.02.011

Boxall, P. C., and Adamowicz, W. L. (2002). Understanding heterogeneous preferences in random utility models: a latent class approach. *Environ. Resour. Econ*. 23, 421–446. doi: 10.1023/A:1021351721619

Buultjens, J., Ratnayke, I., and Gnanapala, A. (2016). Whale watching in Sri Lanka: perceptions of sustainability. *Tour. Manag. Perspectiv*. 18, 125–133. doi: 10.1016/j.tmp.2016.02.003

Can, Ö., and Alp, E. (2012). Valuation of environmental improvements in a specially protected marine area: a choice experiment approach in Göcek Bay, Turkey. *Sci. Tot. Environ*. 439, 291–298. doi: 10.1016/j.scitotenv.2012.09.002

Cárdenas, S. A., and Lew, D. K. (2016). Factors influencing willingness to donate to marine endangered species recovery in the Galapagos National Park, Ecuador. *Front. Mar. Sci*. 3:60. doi: 10.3389/fmars.2016.00060

Carey, D. I. (1993). Development based on carrying capacity: a strategy for environmental protection. *Glob. Environ. Change* 3, 140–148. doi: 10.1016/0959-3780(93)90002-3

Carrillo, M., and Ritter, F. (2010). Increasing numbers of ship strikes in the Canary Islands: proposals for immediate action to reduce risk of vessel-whale collisions. *J. Cetacean Res. Manag*. 11, 131–138.

Carson, R. T. (2000). *Contingent Valuation: A User's Guide*. Washington, DC: ACS Publications. doi: 10.1021/es990728j

Chalcobsky, B. A., Crespo, E. A., and Coscarella, M. A. (2017). Whale-watching in Patagonia: what regulation scheme should be implemented when the socio-ecological system is changing? *Mar. Pol*. 75, 165–173. doi: 10.1016/j.marpol.2016.11.010

Chen, C.-L. (2011). From catching to watching: moving towards quality assurance of whale/dolphin watching tourism in Taiwan. *Mar. Pol*. 35, 10–17. doi: 10.1016/j.marpol.2010.07.002

Chou, L.-S. (2002). Progress report of cetacean research and conservation in Taiwan. *Fish. Sci*. 68, 248–251. doi: 10.2331/fishsci.68.sup1_248

Chuang, L. Z., Chen, C.-L., Kung, C.-W., and Shih, Y.-C. (2020). A nuisance at sea: decoding tourists' comfort on whale watching vessels. *Ocean Coast. Manag*. 184:104915. doi: 10.1016/j.ocecoaman.2019.104915

Cisneros-Montemayor, A. M., Sumaila, U. R., Kaschner, K., and Pauly, D. (2010). The global potential for whale watching. *Mar. Pol*. 34, 1273–1278. doi: 10.1016/j.marpol.2010.05.005

Curtin, S. C. (2008). *Wildlife Tourism: Tourist Expectations, Experiences and Management Implications*. Poole: Bournemouth University.

Dalecki, M. G., Whitehead, J. C., and Blomquist, G. C. (1993). Sample non-response bias and aggregate benefits in contingent valuation: an examination of early, late and non-respondents. *J. Environ. Manag*. 38, 133–143. doi: 10.1006/jema.1993.1034

Damania, R., and Bulte, E. H. (2007). The economics of wildlife farming and endangered species conservation. *Ecol. Econ*. 62, 461–472. doi: 10.1016/j.ecolecon.2006.07.007

Diedrich, A., Huguet, P. B., and Subirana, J. T. (2011). Methodology for applying the limits of acceptable change process to the management of recreational boating in the Balearic Islands, Spain (Western Mediterranean). *Ocean Coast. Manag*. 54, 341–351. doi: 10.1016/j.ocecoaman.2010.12.009

East Coast National Scenic Area (2017). *Whale Watching*. Available online at: https://www.eastcoast-nsa.gov.tw/en/travel/whale-watching (accessed August 3, 2021).

Edwards, P. E. (2009). Sustainable financing for ocean and coastal management in Jamaica: the potential for revenues from tourist user fees. *Mar. Pol*. 33, 376–385. doi: 10.1016/j.marpol.2008.08.005

Eticha, A. (2016). *Economic Valuation of Nechisar National Park Ecosystem: Choice Experiment Approach*. (Master Thesis), Addis Abeba University, Addis Ababa, Ethiopia.

European Commission (2021). *Overview of Sustainable Finance*. European Commission. Available online at: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/overview-sustainable-finance_en (accessed August 2, 2021).

Fernandes, L., and Rossi-Santos, M. R. (2018). An integrated framework to assess the carrying capacity of humpback whale-watching tourism in Praia do Forte, Northeastern Brazil. *Adv. Mar. Vertebrate Res. Latin America*. 7:3. doi: 10.1007/978-3-319-56985-7_3

Fletcher, J., Fyall, A., Gilbert, D., and Wanhill, S. (2017). *Tourism: Principles and Practice*. London: Pearson UK.

García-Llorente, M., Martín-López, B., Nunes, P., Castro, A., and Montes, C. (2012). A choice experiment study for land-use scenarios in semi-arid watershed environments. *J. Arid Environ*. 87, 219–230. doi: 10.1016/j.jaridenv.2012.07.015

Giles, D. A., and Koski, K. L. (2012). Managing vessel-based killer whale watching: a critical assessment of the evolution from voluntary guidelines to regulations in the Salish Sea. *J. Int. Wildlife Law Pol*. 15, 125–151. doi: 10.1080/13880292.2012.678792

Gravestock, P., Roberts, C. M., and Bailey, A. (2008). The income requirements of marine protected areas. *Ocean Coast. Manag*. 51, 272–283. doi: 10.1016/j.ocecoaman.2007.09.004

Greasley, A. (2007). *Operations Management*. Newcastle upon Tyne: Sage.

Guimarães, M. H., Madureira, L., Nunes, L. C., Santos, J. L., Sousa, C., Boski, T., et al. (2014). Using Choice Modeling to estimate the effects of environmental improvements on local development: when the purpose modifies the tool. *Ecol. Econ*. 108, 79–90. doi: 10.1016/j.ecolecon.2014.10.015

Gupta, S., and Chintagunta, P. K. (1994). On using demographic variables to determine segment membership in logit mixture models. *J. Market. Res*. 31, 128–136. doi: 10.1177/002224379403100111

Hanley, N., Macmillan, D., Wright, R. E., Bullock, C., Simpson, I., Parsisson, D., et al. (1998a). Contingent valuation versus choice experiments: estimating the benefits of environmentally sensitive areas in Scotland. *J. Agri. Econ*. 49, 1–15. doi: 10.1111/j.1477-9552.1998.tb01248.x

Hanley, N., Mourato, S., and Wright, R. E. (2001). Choice modelling approaches: a superior alternative for environmental valuatioin? *J. Econ. Surveys* 15, 435–462. doi: 10.1111/1467-6419.00145

Hanley, N., Wright, R. E., and Adamowicz, V. (1998b). Using choice experiments to value the environment. *Environ. Resour. Econ*. 11, 413–428. doi: 10.1023/A:1008287310583

Hausman, J. A., and Wise, D. A. (1978). A conditional probit model for qualitative choice: discrete decisions recognizing interdependence and heterogeneous preferences. *Econometrica* 1978, 403–426. doi: 10.2307/1913909

Hensher, D. A., Rose, J. M., Rose, J. M., and Greene, W. H. (2005). *Applied Choice Analysis: A Primer*. Cambridge: Cambridge University Press. doi: 10.1017/CBO9780511610356

Higham, J. E., Bejder, L., and Lusseau, D. (2008). An integrated and adaptive management model to address the long-term sustainability of tourist interactions with cetaceans. *Environ. Conserv*. 2008, 294–302. doi: 10.1017/S0376892908005249

Higham, J. E., and Lusseau, D. (2007). Urgent need for empirical research into whaling and whale watching. *Conserv. Biol*. 2007, 554–558. doi: 10.1111/j.1523-1739.2006.00580.x

Holmes, T. P., Adamowicz, W. L., and Carlsson, F. (2017). *Choice Experiments. A Primer on Nonmarket Valuation*. Berlin: Springer. doi: 10.1007/978-94-007-7104-8_5

Hoyos, D. (2010). The state of the art of environmental valuation with discrete choice experiments. *Ecol. Econ*. 69, 1595–1603. doi: 10.1016/j.ecolecon.2010.04.011

Hoyt, E. (2001). *Whale Watching 2001: Worldwide Tourism Numbers, Expenditures, and Expanding Socioeconomic Benefits*.

Hoyt, E. (2005). Sustainable ecotourism on Atlantic islands, with special reference to whale watching, marine protected areas and sanctuaries for cetaceans. *Biol. Environ*. 2005, 141–154. doi: 10.1353/bae.2005.0005

Hoyt, E. (2007). *A Blueprint for Dolphin and Whale Watching Development*. Washington, DC: Humane Society International.

Hoyt, E. (2009). Whale watching. *Encycl. Mar. Mammals* 7:280. doi: 10.1016/B978-0-12-373553-9.00280-7

Ifaw, S., and Cetaces, O. (2009). *Pacific Islands Regional Guidelines for Whale and Dolphin Watching*. Surrey Hills, VIC: IFAW.

Iqbal, M. H. (2020). Valuing ecosystem services of Sundarbans Mangrove forest: approach of choice experiment. *Glob. Ecol. Conserv*. 24:e01273. doi: 10.1016/j.gecco.2020.e01273

Jackson, V. P. (2009). Time management: a realistic approach. *J. Am. Coll. Radiol*. 6, 434–436. doi: 10.1016/j.jacr.2008.11.018

Janik, V. M., and Thompson, P. M. (1996). Changes in surfacing patterns of bottlenose dolphins in response to boat traffic. *Mari. Mammal Sci*. 12, 597–602. doi: 10.1111/j.1748-7692.1996.tb00073.x

Joy, R., Tollit, D., Wood, J., Macgillivray, A., Li, Z., Trounce, K., et al. (2019). Potential benefits of vessel slowdowns on endangered southern resident killer whales. *Front. Mar. Sci*. 6:344. doi: 10.3389/fmars.2019.00344

Juutinen, A., Mitani, Y., Mäntymaa, E., Shoji, Y., Siikamäki, P., and Svento, R. (2011). Combining ecological and recreational aspects in national park management: a choice experiment application. *Ecol. Econ*. 70, 1231–1239. doi: 10.1016/j.ecolecon.2011.02.006

Kessler, E., Harcourt, R., and Bradford, W. (2014). Will whale watchers sacrifice personal experience to minimize harm to whales? *Tour. Mar. Environm*. 10, 21–30. doi: 10.3727/154427314X14056884441662

Kinghorn, N., and Willis, K. (2008). Valuing the components of an archaeological site: an application of Choice Experiment to Vindolanda, Hadrian's Wall. *J. Cult. Heritage* 9, 117–124. doi: 10.1016/j.culher.2007.05.006

Ku, K.-C., Chen, T.-C., and Ying, T.-C. (2014). A collaborative reference model for monitoring whale-watching quantity in the Hualien coastal area, Taiwan. *Ocean Coast. Manag*. 95, 26–34. doi: 10.1016/j.ocecoaman.2014.04.013

Kumar, S. A., and Suresh, N. (2009). *Operations Management*. Delhi: New Age International.

Kuo, H.-I., Chen, C.-C., and Mcaleer, M. (2012). Estimating the impact of whaling on global whale-watching. *Tour. Manag*. 33, 1321–1328. doi: 10.1016/j.tourman.2011.12.015

Lambert, E., Hunter, C., Pierce, G. J., and Macleod, C. D. (2010). Sustainable whale-watching tourism and climate change: towards a framework of resilience. *J. Sustain. Tour*. 18, 409–427. doi: 10.1080/09669581003655497

Lancaster, K. J. (1966). A new approach to consumer theory. *J. Polit. Econ*. 74, 132–157. doi: 10.1086/259131

Lee, C.-H., Chen, Y.-J., and Chen, C.-W. (2019a). Assessment of the economic value of ecological conservation of the Kenting Coral Reef. *Sustainability* 11:5869. doi: 10.3390/su11205869

Lee, C.-H., Chen, Y.-J., Huang, Y.-S., and Chen, C.-W. (2020). Incorporating integrative perspectives into impact reduction management in a reef recreation area. *Water* 12:111. doi: 10.3390/w12010111

Lee, C.-H., and Wang, C.-H. (2017). Estimating residents' preferences of the land use program surrounding forest park, Taiwan. *Sustainability* 9:598. doi: 10.3390/su9040598

Lee, C.-K., Mjelde, J. W., Kim, T.-K., Lee, E., and Choi, Y. (2019b). Willingness-to-pay for whale tour attributes using a choice experiment. *Asia Pacific J. Tour. Res*. 24, 606–617. doi: 10.1080/10941665.2019.1610001

Lee, C.-L., Wang, C.-H., Lee, C.-H., and Sriarkarin, S. (2019c). Evaluating the public's preferences toward sustainable planning under climate and land use change in forest parks. *Sustainability* 11:3149. doi: 10.3390/su11113149

Lewis, S., and Walker, D. (2018). *Global Best Practice Guidance for Responsible Whale and Dolphin Watching: Tourism Activities Involving Wild Cetaceans. A Guide by the World Cetacean Alliance With Support From ClubMed*. ClubMed: Brighton.

Lin, Y.-H., Hong, C.-F., Lee, C.-H., and Chou, Y.-A. (2020). Integrating multiple perspectives into an ecotourism marketing strategy in a Marine National Park. *Asia Pacific J. Tour. Res*. 25, 948–966. doi: 10.1080/10941665.2020.1805474

Lissner, I., and Mayer, M. (2020). Tourists' willingness to pay for Blue Flag's new ecolabel for sustainable boating: the case of whale-watching in Iceland. *Scand. J. Hospital. Tour*. 20, 352–375. doi: 10.1080/15022250.2020.1779806

Loomis, J. B. (1987). Expanding contingent value sample estimates to aggregate benefit estimates: current practices and proposed solutions. *Land Econ*. 63, 396–402. doi: 10.2307/3146296

Louviere, J. J., Hensher, D. A., and Swait, J. D. (2000). *Stated Choice Methods: Analysis and Applications*. Cambridge: Cambridge University Press. doi: 10.1017/CBO9780511753831

Lusseau, D., and Higham, J. (2004). Managing the impacts of dolphin-based tourism through the definition of critical habitats: the case of bottlenose dolphins (*Tursiops* spp.) in Doubtful Sound, New Zealand. *Tour. Manag*. 25, 657–667. doi: 10.1016/j.tourman.2003.08.012

Macleod, C., and Todnem By, R. (2007). Performance, conformance and change: towards a sustainable tourism strategy for Scotland. *Sustain. Dev*. 15, 329–342. doi: 10.1002/sd.319

Malinauskaite, L., Cook, D., Davíð*sdóttir, B., Ögmundardóttir, H., and Roman, J. (2020). Willingness to pay for expansion of the whale sanctuary in Faxaflói Bay, Iceland: a contingent valuation study. *Ocean Coast. Manag*. 183:105026. doi: 10.1016/j.ocecoaman.2019.105026

Mangham, L. J., Hanson, K., and Mcpake, B. (2009). How to do (or not to do)… designing a discrete choice experiment for application in a low-income country. *Health Pol. Plan*. 24, 151–158. doi: 10.1093/heapol/czn047

Mann, J. (2017). *Deep Thinkers: Inside the Minds of Whales, Dolphins, and Porpoises*. Chicago, IL: University of Chicago Press. doi: 10.7208/chicago/9780226387505.001.0001

Mann, J., Connor, R. C., Tyack, P. L., and Whitehead, H. (2000). *Cetacean Societies: Field Studies of Dolphins and Whales*. Chicago, IL: University of Chicago Press.

Martone, R. G., Naidoo, R., Coyle, T., Stelzer, B., and Chan, K. M. (2020). Characterizing tourism benefits associated with top-predator conservation in coastal British Columbia. *Aquatic Conserv*. 30, 1208–1219. doi: 10.1002/aqc.3320

McCool, S. F. (1994). Planning for sustainable nature dependent tourism development: the limits of acceptable change system. *Tour. Recreat. Res*. 19, 51–55. doi: 10.1080/02508281.1994.11014708

McFadden, D. (1973). *Conditional Logit Analysis of Qualitative Choice Behavior*. Berkeley, CA: The University of California.

Mcvittie, A., and Moran, D. (2010). Valuing the non-use benefits of marine conservation zones: an application to the UK Marine Bill. *Ecol. Econ*. 70, 413–424. doi: 10.1016/j.ecolecon.2010.09.013

Mitchell, R. C., Carson, R. T., and Carson, R. T. (1989). *Using Surveys to Value Public Goods: The Contingent Valuation Method. Resources for the Future*. New York, NY: Taylor & Francis. doi: 10.4324/9781315060569

Mustika, P. L. K., Birtles, A., Welters, R., and Marsh, H. (2012). The economic influence of community-based dolphin watching on a local economy in a developing country: implications for conservation. *Ecol. Econ*. 79, 11–20. doi: 10.1016/j.ecolecon.2012.04.018

New, L., Lusseau, D., and Harcourt, R. (2020). Dolphins and boats: when is a disturbance, disturbing? *Front. Mar. Sci*. 7:353. doi: 10.3389/fmars.2020.00353

O'Connor, S., Campbell, R., Cortez, H., and Knowles, T. (2009). *Whale Watching Worldwide: Tourism Numbers, Expenditures and Expanding Economic Benefits, a Special Report From the International Fund for Animal Welfare*. Yarmouth, MA: Economists at Large, 228.

Orams, M. B. (2000). Tourists getting close to whales, is it what whale-watching is all about? *Tour. Manag*. 21, 561–569. doi: 10.1016/S0261-5177(00)00006-6

Orams, M. B. (2001). From whale hunting to whale watching in Tonga: a sustainable future? *J. Sustain. Tour*. 9, 128–146. doi: 10.1080/09669580108667394

O'Reilly, A. M. (1986). Tourism carrying capacity: concept and issues. *Tour. Manag*. 7, 254–258. doi: 10.1016/0261-5177(86)90035-X

Portney, P. R. (1994). The contingent valuation debate: why economists should care. *J. Econ. Perspectiv*. 8, 3–17. doi: 10.1257/jep.8.4.3

Prakash, T. S. L., Gangodawila, N., Jayakody, S., Makandura, G., and Amarasinghe, N. (2019). Current perceptions and the need for a strategic plan for the whale watching industry in Mirissa, Sri Lanka. *African J. Hospital. Tour. Leisure* 8, 1–16.

Rees, W. E. (1996). Revisiting carrying capacity: area-based indicators of sustainability. *Populati. Environ*. 17, 195–215. doi: 10.1007/BF02208489

Ressurreição, A., Gibbons, J., Dentinho, T. P., Kaiser, M., Santos, R. S., and Edwards-Jones, G. (2011). Economic valuation of species loss in the open sea. *Ecol. Econ*. 70, 729–739. doi: 10.1016/j.ecolecon.2010.11.009

Revelt, D., and Train, K. (1998). Mixed logit with repeated choices: households' choices of appliance efficiency level. *Rev. Econ. Statist*. 80, 647–657. doi: 10.1162/003465398557735

Schwarzmann, D., Shea, R., Leeworthy, V. B., Hastings, S., Knapp, L., and Tracy, S. (2021). *Whale Watching in Channel Islands National Marine Sanctuary: A Stated Preference Study of Passengers' Willingness to Pay for Marine Life Improvements*. Silver Spring, Maryland, Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries.

Semeniuk, C. A., Haider, W., Beardmore, B., and Rothley, K. D. (2009). A multi-attribute trade-off approach for advancing the management of marine wildlife tourism: a quantitative assessment of heterogeneous visitor preferences. *Aquatic Conserv*. 19, 194–208. doi: 10.1002/aqc.990

Shoyama, K., Managi, S., and Yamagata, Y. (2013). Public preferences for biodiversity conservation and climate-change mitigation: a choice experiment using ecosystem services indicators.

Land Use Pol. 34, 282–293. doi: 10.1016/j.landusepol.2013.04.003

Sitar, A., Wright, A., Peters-Burton, E., Rockwood, L., and Parsons, E. (2016). Boat operators in Bocas del Toro, Panama display low levels of compliance with national whale-watching regulations. *Mar. Pol.* 68, 221–228. doi: 10.1016/j.marpol.2016.03.011

Sorongon, P. (2010). *Human-Cetacean Interaction in Bohol, Philippines: An Evaluation of Compliance to Code of Conduct During Whale Watching and Its Effect to Cetacean Behavior*. Quezon City: University of the Philippines.

Sprogis, K. R., Videsen, S., and Madsen, P. T. (2020). Vessel noise levels drive behavioural responses of humpback whales with implications for whale-watching. *Elife* 9:e56760. doi: 10.7554/eLife.56760

Sriarkarin, S., and Lee, C.-H. (2018). Integrating multiple attributes for sustainable development in a national park. *Tour. Manag. Perspectiv.* 28, 113–125. doi: 10.1016/j.tmp.2018.08.007

Steckenreuter, A., Harcourt, R., and Möller, L. (2011). Distance does matter: close approaches by boats impede feeding and resting behaviour of Indo-Pacific bottlenose dolphins. *Wildlife Res.* 38, 455–463. doi: 10.1071/WR11048

Thur, S. M. (2010). User fees as sustainable financing mechanisms for marine protected areas: an application to the Bonaire National Marine Park. *Mar. Pol.* 34, 63–69. doi: 10.1016/j.marpol.2009.04.008

Train, K. E. (2009). *Discrete Choice Methods With Simulation*. Cambridge: Cambridge University Press.

Tseng, Y.-P., Huang, Y.-C., Kyle, G. T., and Yang, M.-C. (2011). Modeling the impacts of cetacean-focused tourism in Taiwan: observations from cetacean watching boats: 2002–2005. *Environ. Manag.* 47, 56–66. doi: 10.1007/s00267-010-9567-2

Tyack, P. L. (2008). Implications for marine mammals of large-scale changes in the marine acoustic environment. *J. Mammal.* 89, 549–558. doi: 10.1644/07-MAMM-S-307R.1

UNWTO (1981). *Saturation of Tourist Destinations: Report of the Secretary General*. Madrid: World Tourism Organization, Spain.

Vaughan, D. (2000). Tourism and biodiversity: a convergence of interests? *Int. Affairs* 76, 283–297. doi: 10.1111/1468-2346.00134

Venkatachalam, L. (2004). The contingent valuation method: a review. *Environ. Impact Assess. Rev.* 24, 89–124. doi: 10.1016/S0195-9255(03)00138-0

Villagra, D., García-Cegarra, A., Gallardo, D. I., and Pacheco, A. S. (2021). Energetic effects of whale-watching boats on humpback whales on a breeding ground. *Front. Mar. Sci.* 7:1208. doi: 10.3389/fmars.2020.600508

Vojáček, O., and Pecáková, I. (2010). Comparison of discrete choice models for economic environmental research. *Prague Econ. Pap.* 19, 35–53. doi: 10.18267/j.pep.363

Waereebeek, K. V., Baker, A., Félix, F., Gedamke, J., Iñiguez, M., Sanino, G. P., et al. (2007). *Vessel Collisions With Small Cetaceans Worldwide and With Large Whales in the Southern Hemisphere, an Initial Assessment*. Rio de Janeiro: Latin American Journal of Aquatic Mammals. doi: 10.5597/lajam00109

Wattage, P., Glenn, H., Mardle, S., Van Rensburg, T., Grehan, A., and Foley, N. (2011). Economic value of conserving deep-sea corals in Irish waters: a choice experiment study on marine protected areas. *Fish. Res.* 107, 59–67. doi: 10.1016/j.fishres.2010.10.007

Wearing, S. L., Cunningham, P. A., Schweinsberg, S., and Jobberns, C. (2014). Whale watching as ecotourism: how sustainable is it? *Cosmopolit. Civil Soc.* 6, 38–55. doi: 10.5130/ccs.v6i1.3714

Whitehead, J. C., Groothuis, P. A., and Blomquist, G. C. (1993). Testing for non-response and sample selection bias in contingent valuation: analysis of a combination phone/mail survey. *Econ. Lett.* 41, 215–220. doi: 10.1016/0165-1765(93)90200-V

Wilson, C., and Tisdell, C. (2003). Conservation and economic benefits of wildlife-based marine tourism: sea turtles and whales as case studies. *Hum. Dimens. Wildlife* 8, 49–58. doi: 10.1080/10871200390180145

Wu, H., Peng, C., Huang, H., Jefferson, T. A., Huang, S.-L., Chen, M., et al. (2020). Dolphin-watching tourism and indo-Pacific humpback dolphins (*Sousa chinensis*) in Sanniang Bay, China: impacts and solutions. *Eur. J. Wildlife Res.* 66, 1–9. doi: 10.1007/s10344-019-1355-6

Würsig, B., Perrin, W. F., and Thewissen, J. (2009). *Encyclopedia of Marine Mammals*. Cambridge, MA: Academic Press.

Zong, C., Cheng, K., Lee, C.-H., and Hsu, N.-L. (2017). Capturing tourists' preferences for the management of community-based ecotourism in a forest park. *Sustainability* 9:1673. doi: 10.3390/su9091673

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