



Analysis

The value of whale watching to local communities in Baja, Mexico: A case study using applied economic rent theory



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ARTICLE INFO

Article history:

Received 16 June 2015

Received in revised form 30 December 2015

Accepted 13 March 2016

Available online 22 April 2016

Keywords:

Species conservation

Gray whale

Environmental valuation

Bahia Magdalena

ABSTRACT

Nature-based tourism can provide opportunities for local stewardship and create incentives to support habitat and conservation of marine species where there is pressure on local habitat. We investigate the local economic value of Eastern Pacific gray whales (*Eschrichtius robustus*) to two communities in Baja California Sur, Mexico, that benefit from nature-based tourism associated with the whales. Using a producer side approach and data for 2006, we estimate the economic rent associated with whale watching in 2006 and then examine the distribution of that rent among local stakeholders. We find a substantial local value associated with the presence of gray whales, with the largest share (two-thirds) going to the whale watching owner-operators. Our findings suggest that increasing the whale watching price in 2006 would have been a cost-effective strategy for increasing the rent captured locally from whale watching. Finally, we conclude with a brief assessment of developments since 2006.

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1. Introduction

Loss of biodiversity is one of the most pressing environmental problems of our time. Many scientists agree that biodiversity is not only essential to the earth's ecosystems but also crucial for our own long-term survival (Gowdy, 1997). In light of this concern, the conservation of species, communities and habitats has become an issue demanding strategies at the global and local scales (MEA, 2003). Nature-based tourism may be helpful in this regard. Its advocates argue that nature-based tourism gives resource users motivation to protect local wildlife and ecosystems since this helps to attract visitors and the resulting economic activity benefits the community (Gössling, 1999). In contrast, detractors argue such indirect approaches to species conservation lack sufficient linkage between personal behavior and outcomes, thereby contributing to the failure of many community-based schemes (Ferraro and Kiss, 2002; Mansuri and Rao, 2004). Notwithstanding these concerns, efforts to value the benefits from nature-based tourism and communicating these values to resource managers and industry can help to spur these activities in support of conservation. However, too often valuation concerned with nature-based tourism concentrates on non-resident use and non-use values and does not take proper account of the benefits for local livelihoods (Martinez-Alier, 2002). As a result, conservation planning may not adequately quantify and include

local values when evaluating potential conservation strategies (Wunder, 2000; Martinez-Alier, 2002).

Quantifying local values may be particularly important for migratory wildlife species, such as the Monarch butterfly, numerous waterfowl species and whale species such as the Eastern Pacific gray whale (*Eschrichtius robustus*). While gray whales are valued globally for their importance as a charismatic mammal species, their conservation depends in part upon preserving critical habitat at the local level. It is at the latter scale that conflicts related to conservation may be most acute and, consequently, where the need to recognize and support livelihood benefits may be most desirable. In this paper, we use economic rent theory to estimate the “asset” value of the Eastern Pacific gray whale to two Mexican communities on the Pacific coast of Baja, Mexico. Both Puerto Adolfo Lopez Mateos (PALM) and Puerto San Carlos (PSC) offer nature-based tourism relying on the local presence of this species. In addition to determining the size of the economic rent accruing to each community, we determine its distribution among the various local stakeholders, and conduct comprehensive sensitivity analysis. We find that the economic rent accruing locally from whale watching activities is quite substantial but that the results differ between the two communities due to heterogeneous situations.

Taking a total economic value perspective, the use values arising from nature-based tourism consist of the national or international recreational use values (as consumers) and the values generated for local livelihoods (as producers). Are both sets of values equally valid? The issue is one of standing and who should have it (Whittington and MacRae, 1986). In one sense, our research addresses the question of whose values should count and who can impose a particular language of valuation (Martinez-Alier, 2002). Quantifying the local value of

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charismatic species adds to a more pluralistic value perspective that not only includes monetary values at the global level, but also encourages recognition of local values and community ties with the natural environment. Of course, there are other values besides recreational values associated with the ecosystems, species and services more generally that are associated with the Eastern Pacific gray whale. For example, gray whales may provide a local non-consumptive use value for local communities and non-use (existence) benefits arise more distantly from their conservation. There is also a downside when local fishing operators have conflicts with whale conservationists over fishing access, which has occurred occasionally in southern Baja. However, in this paper we take a more narrow approach and focus on the local producer benefits from whale watching activities alone.

Non-market valuation associated with outdoor recreation usually relies on expressed preference methods such as the contingent valuation method or revealed preference methods such as the travel cost method (Loomis and Larson, 1994), or may be practiced using newer deliberative or discrete choice methods (Naidoo and Adamowicz, 2005). While these methods appear highly suitable for assessing non-local and non-consumptive use values associated with species conservation, production theory may offer a more valid context for measuring local livelihood values associated with the non-consumptive use of local wildlife (Barbier, 2000). In the case of nature-based tourism, local people are often the producers of wildlife viewing tours, so that the production function approach to valuation would seem particularly suitable. However, studies investigating the value of wildlife from a production or supplier perspective are rare.

A related concept for valuing an exploited natural resource is natural resource or economic rent. This concept is rooted in production theory, but recently it has gained traction as a measure of environmental income in the context of poverty alleviation (Sjaastad et al., 2005). Economic rent is the net income generated by natural resources and measured as the amount over and above what is required to compensate all factors of production at their opportunity cost prices (Ricardo, 1817). Natural resource rent is arguably an appropriate indicator of the contribution of natural resources to human welfare. Economic rent analysis is widely applied to investigate resource scarcity, effective taxation, and changes in management policies, and to quantify net social returns from the development or use of natural resources. In addition, distributional impacts of natural resource use can be assessed using rent theory (Griffin et al., 1976). While rent theory is commonly used in the analysis of consumptive natural resource activities such as fisheries or mining (Figueroa, 1999; Gunton, 2004), it can be useful when considering non-consumptive use of natural resources, particularly in the tourism context (Prieto-Rodriguez and Gonzalez-Diaz, 2008; Paziienza, 2011).

Eastern Pacific gray whales (*E. robustus*) offer a particularly interesting case for estimating values for a charismatic species at the local level. The whales migrate along the Pacific Coast between breeding lagoons in the state of Baja California Sur in north western Mexico to feeding grounds in the Arctic. This migration draws nature-based tourists from all over the world, making the gray whale an international whale watching icon. However, since 1999 Mexican law has required that all commercial whale watching in the Mexican portion of the range must be done with local tour operators. Thus, local livelihood benefits are significant.

Only a few economic studies measuring the welfare benefits associated with whales exist, as opposed to the economic or socio-economic impacts of whale watching activities.² For example, Loomis and Larson (1994) assess the consumer surplus arising from ocean-based and shore-based viewing of Eastern Pacific gray whales using the contingent valuation method, while Lyssenko and Martínez-Españeira (2012) also use contingent valuation to value

the benefits from whale conservation in Eastern Canada, particularly in light of entanglements in fishing nets and substantive value to whale watchers. Both studies consider only consumer side values and, therefore, do not examine the producer aspect and the important benefits accruing to local suppliers of whale watching tours. More generally, Bulte and van Kooten (1999) focus on estimating marginal willingness-to-pay measures for existence value related to minke whales, again concentrating on consumer benefits. To our knowledge, no economic studies use economic rent theory to determine an “asset” value for whales involved in whale watching.

The objective of this paper is to determine the local value of gray whales directly associated with whale watching activities in Bahia Magdalena and using a novel economic rent theory approach. We disaggregate and further analyze this local use value, taking into account various stakeholders and the differences in resource characteristics of the two whale watching communities of Bahia Magdalena. This approach excludes economic impacts from accommodation facilities, food services, and other whale-related recreational activities, as well as cultural and other non-whale watching values, but adds important local community-based values to the international consumer values for Eastern Pacific gray whales measured previously. Finally, we suggest potential strategies for local people to increase their net benefits from whale watching activities.

2. Ecology of the Eastern Pacific Gray Whale

There are two remaining populations of gray whales in the northern Pacific Ocean. The larger eastern population experienced two intensive exploitation phases, one in the 1800s and a second in the early 1900s. In 1972, the International Whaling Commission (IWC) passed conservation measures that allowed the population to double by 1995 (Buckland and Breiwick, 2002). The most recent population counts in 2006/2007 yielded an abundance of approximately 19,000 whales, with the assessment that there is a high probability that the population is at “optimum sustainable population” size, as defined by the US Marine Mammal Protection Act (NOAA, 2015). However, at present further growth of the Eastern Pacific stock is unlikely. Under-nourishment, low recruitment, and declines in the primary food source in recent decades suggest that the eastern population has reached its carrying capacity (Le Boeuf et al., 2001; Moore et al., 2001; Perryman and Lynn, 2002). In contrast, the receding ice pack in the gray whales summer habitat, due to global climate change, appears to be having little influence on population growth of the Eastern Pacific gray whale (Brandon and Punt, 2013). Ultimately, the main threat to the eastern population may be the decline of its prey rather than any changes in environmental conditions influencing its habitat (Urbán et al., 2003).³

The eastern population has the longest migration route of all mammals, covering from 8000 to 10,000 km over the course of 2 months (Rugh et al., 2001). Between December and March, the whales use the shallow waters of the lagoons to bear and nurse their young, conserving energy for the long northern migration in spring. However, not all lagoons are equally important for calf production.⁴ Whales enter the more northerly lagoons in the Baja California peninsula earlier and, consequently, reside there for longer periods than in the more southerly lagoons, such as Bahia Magdalena (Rugh et al., 2001). The Bahia

³ In addition to the environmental factors that are influencing stock size, some small scale harvesting by aboriginal groups is taking place. Between 2003 and 2007, the IWC allowed a total catch of 620 Eastern Pacific gray whales with a maximum of 140 in any 1 year (IWC, 2004).

⁴ In recent decades, Laguna Ojo de Liebre has been the most important breeding lagoon with 53% of all calves born, followed by the northern part of Bahia Magdalena (12%), Laguna San Ignacio (11%), Laguna Guerrero Negro (9%), and the middle and south part of Bahia Magdalena (5%) (Rice et al., 1981).

² For information about the economic impacts from whale tourism in Mexico and other Latin American countries, see Hoyt and Iniguez (2008).

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