



Whale-watching in Patagonia: What regulation scheme should be implemented when the socio-ecological system is changing?

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ABSTRACT

Whale-watching began informally at Península Valdés in 1973. The activity primarily targeted southern right whales (*Eubalaena australis*). Since the early 1970s the number of people sailing out on whale-watching trips increased from several tourists a year to more than 100,000 in 2014. In this paper the fluctuations in the number of passengers, the biological changes and the socio-economic factors that influenced the development of the activity were reviewed. There are effectively four periods in the history of the development of whale-watching in Península Valdés. These periods correspond to international events, whilst some are related to domestic matters. The development of whale-watching regulations in relation to these events is also reviewed. Although the current whale-watching regulation scheme is appropriate, there are some aspects that could be improved by making the rules easier to be altered and modified, i.e., an adaptive management approach. As a case study the regulation prohibiting watching whale mothers with newborns, before August 31st every year, is examined, including the problems that boat operators face while attempting to comply with this regulation. Many of these problems arise due changes in the biological system (i.e. whale population growth).

1. Introduction

Globally, whale-watching has increased exponentially in recent decades [1,2]. Whale-watching has been defined as any activity involving sighting or listening any species of whale, dolphin or porpoise from the air, land or vessel tours with commercial purpose [3]. More than 13 million people travel around the world to experience whale-watching, spending more than US\$ 2.1 billion during 2008 [2]. In Latin America, each year, there are more than 885.000 whale-watchers that spent more than USD\$ 278 million [4]. This rapid rise in the level of whale-watching activity has led to many governments to pay attention to the way that whale-watching is conducted, and introduce management frameworks to reduce the impacts of the activity on targeted whales and their habitats. Managing whale-watching activities can be achieved by imposing a set of legal regulations for whale-watching practices, developing a set of voluntary guidelines, or an admixture of both [5]. Whale-watching is often considered as an economically profitable alternative to whaling, whilst generating awareness of, and commitment to, environmental conservation in tourists [6].

In Argentina, wildlife tourism, and in particular whale-watching,

has gained significant importance at the national level, but the real economic and social significance is generally noted at the provincial and local levels. Whale-watching started in Patagonia 40 years ago [7]. This location is known internationally as a whale-watching location due to activities carried out at Puerto Pirámides, in the Península Valdés Protected Area, in the Province of Chubut. More recently, whale-watching has started to develop in San Antonio Bay, Golfo San Matías, in the Province of Río Negro (Fig. 1). In both localities the target species of whale-watching activity is the southern right whale (SRW) *Eubalaena australis*.

The development of whale-watching in the region has had multiple root causes, including population growth, both of human settlements and whales, and changes in attitudes towards wildlife and conservation and a general blooming of worldwide nature-based tourism [8]. In this context, the provincial governments in Argentina tried to regulate the way that people interact with, and profit from, nature and especially the non-consumptive exploitation of marine mammals. These whale-watching regulations, at times, are established before a change in the activity takes place; but on other occasions, the regulations are reactive to changes in activities. In this paper the way in which whale-watching on SRW has developed in Península Valdés was reviewed. The timing,

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Fig. 1. Map of locations where the whale-watching of Southern right whales take place in Patagonia.

and the reason why, regulations were enacted and whether or not these regulations were adequate or changed (qualitatively or quantitatively) the way whale-watching activities were managed were considered. Also the way the activity was currently carried out and the level of compliance of the whale-watching operators with the current regulations was assessed.

2. Methods

Published information on the biology and population trends of the SRW in the Península Valdés area was reviewed. Data were also collected from historical records on the development of SRW whale-watching activities in Puerto Pirámides (Province of Chubut) from its inception. The sources consulted included the owners of whale-watching companies; the official records held by the Tourism Office and previously published information. Rules, guidelines and regulations that govern whale-watching activity were also collated. Access to the official number of passengers that sailed for whale-watching trips in Puerto Pirámides, was granted to the researchers. All these data were combined and divided into significant periods, mainly related to fluctuations in the number of passengers taking trips. Four distinct periods were identified, and linear models were fitted to highlight trends in the number of passengers for three of these periods [9].

In order to investigate compliance with regulations by the whale-watching companies, the crews of all of the operating companies were interviewed. At least two random members of the crew from each company were interviewed face-to-face (from October 2015 to January 2016). Fourteen interviews were conducted; all of them gave their explicit permission to be interviewed and recorded. The interviews were carried out individually and lasted approximately 30 min. The questionnaire had 11 open-ended questions and each member of the crew was encouraged to elaborate their answer [10]. Most of the questions required the estimation of percentages and two of the questions investigated perception of those interviewed on the whale-watching activity and changes in regulations. Categories for the percentages were established *a posteriori* and descriptive statistics on the frequency of the answer were calculated [10].

3. Results and discussion

3.1. Historic development

3.1.1. Early seventies: dawn of whale-watching in Patagonia

3.1.1.1. Southern right whale biology. Southern right whales arrive at Península Valdés every year between May and December, typically peaking in their abundance in September [11]. In this area, the whales are found nearshore, and it is possible to watch breeding groups, solitary individuals and as the season progresses, mothers with calves. In the early 1970s, southern right whales were seen nearshore the outer ridge of Península Valdés and in Golfo San José (Fig. 1), a bay used by this species to mate and give birth. By this time, the global population of SRW was threatened, driven to near extinction by commercial whalers [12]. Although, by 1971, births of SRW were recorded in the Península Valdés area, it was not until 1973 that some mothers were recorded spending the whole breeding season in the Golfo Nuevo with their calves (Fig. 1).

3.1.1.2. Whale-watching. Since its inception, whale-watching in Puerto Pirámides was performed by only a few companies. Most of the owners of these companies claimed that they started their activities in the early 1970s, albeit only taking a few people on trips each year. If we are to pin point the specific year whale-watching started in Patagonia, it could be considered 1973, because some local people who owned small boats started to sail with 2 or 3 tourists per trip to watch the whales (http://www.hydrosport.com.ar/nosotros_449.html). By 1974, however, an aluminum factory was sited in Puerto Madryn, a 6000 inhabitant town at the very end of Golfo Nuevo. This factory started to bring new immigrants into the region. The level of whale-watching activity increased steadily from 1973 to 1986, albeit at a slow pace; although there is no official information on whale-watching tourism for this period. Only in 1987 did the government start to record the statistics on the number of tourists involved in this activity (Fig. 2).

3.1.1.3. Regulatory framework. In the early years of whale-watching

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