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Whale watching regulation compliance trends and the implications for management off Sydney, Australia

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ABSTRACT

Humpback (*Megaptera novaeangliae*) whale watching off Sydney, Australia, has recently seen significant growth in both the commercial and recreational sectors. Concurrently, more commercial operators have extended the period during which they conduct commercial whale watching to include the migrations both to and from the breeding grounds. This means that more frequent whale watching now occurs from May to November each year and focusses on all age classes, including calves. In Australia whale watching is managed through regulations designed to control the behaviour of vessels around whales. This study compared commercial and recreational vessel compliance with key features of the whale watching regulations between two years, 2007 and 2010, and found varying but regular breaches. Low compliance, with its concomitant increase in risk of harm to whales, risks undermining the ability of the regulatory framework to minimise impacts on whales. Whale watching regulations need to go beyond developing rules for boat behaviour around animals and consideration should be given to how those rules are enforced and whether additional management measures, such as operator permits, should be required across the industry.

1. Introduction

The whale watching industry off Sydney, Australia, is focussed primarily on a population of humpback whales (*Megaptera novaeangliae*), considered *Vulnerable* under New South Wales (NSW) and Australian Government threatened species legislation. This population migrates from summer feeding grounds in Antarctica to tropical waters off Queensland for breeding and mating, before returning to Antarctica. The timing of these movements allows the whale watching season off Sydney to extend from mid-May to the end of November each year. Large increases in humpback population size, currently estimated at 10.9% per year [1], have resulted in an increased number of sightings and an enhanced interest in the whales, with boat based whale watching off Sydney increasing from 4000 participants in 2003 to 29,000 participants in 2004 [2]. Management of this fast growing activity is done using legislated whale watching rules that are designed to control the behaviour of boats around the whales.

The need for regulation is driven by the fact that the presence of whale watching vessels (commercial and recreational) has been shown to alter whale behaviour. Methods of boat approach, boat behaviour around the animals and the number of vessels present have all been shown to change humpback whale behaviour [3,4]. Responses include changes to respiration, direction of travel, time spent at the surface and dive behaviour [5–7]. Off Sydney, Gulessarian [8] showed that on the northern migration, humpback whales were more likely to remain quietly at the surface and take shorter, shallow dives when boats were within 1000 m. These changes raise concerns about the potential for impact on the recovery of this threatened species. The strong growth in the humpback whale population, utilising the waters off the east coast of Australia, suggests that any changes to behaviour to date have not been biologically significant, i.e. population growth is not inhibited. However, the increasing popularity of whale watching means assessment and management of interactions must be ongoing and responsive to changes in participation.

Internationally, the most common tool for managing potential impacts on whales is the implementation of regulatory or voluntary rules for boat behaviour. Carlson [9] describes the current whale watching regulations and guidelines from around the world, including 22 jurisdictions with regulations, 53 with guidelines, 15 with codes of conduct, 9 with guidelines for operators associations and 4 jurisdictions with decrees. Management tools include rules about the type of vessels that may be used, approach and tracking behaviour, and time limitations for encounters [10]. The most common minimum approach distance for whales is

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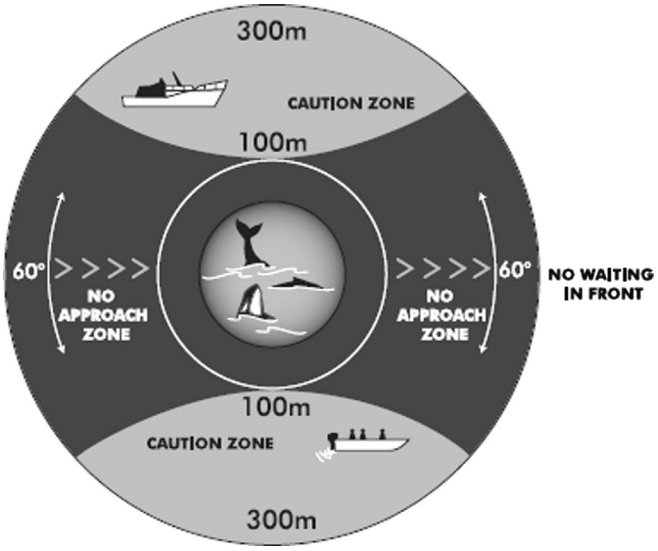

Fig. 1. Whale watching regulations reproduced from Australian National Guidelines for Whale and Dolphin Watching 2005.

100 m for adult animals and 200 m for groups with calves (where approach is not prohibited or discouraged), and the most common caution zone around whales is 300 m [9]. Off Sydney, boat behaviour around whales is regulated by the *Australian National Guidelines for Whale and Dolphin Watching 2005* [11] in Commonwealth waters (beyond 3 nm from the coast) and by the *National Parks and Wildlife Regulation 2009* in NSW waters (inside 3 nm). Consistency between these regulations was introduced in 2006. As a result, both regulations relate primarily to allowable approach distances to whales (300 m for groups with calves, 100 m for other groups), direction of approach (no waiting in front or following from behind) and the number of vessels allowed within a 300 m caution zone (no more than 3 vessels for any group). Vessels are required to move away from whales if they show signs of disturbance and commercial whale watching operators are encouraged to provide an educational component during their tours. Additional guidelines also apply to specific areas (such as within marine protected areas) or individual whales (such as Migaloo, a white humpback whale). A summary of the guidelines is provided in Fig. 1.

At the start of this study (2007), there were nine commercial whale watching operators using nine vessels for regular or charter whale watching tours off Sydney (pers. obs.). The majority of vessels focussed on the north bound whale migration in June and July, primarily viewing adult and juvenile whales. By the end of 2010, the industry had grown to 15 commercial operators using 17 vessels, many of which extended their period of operation to include the south bound migration when viewing focussed primarily on mothers and calves. Over the course of this study, there was also strong growth in the number of recreational boats participating in whale watching (pers. obs.). This growth is consistent with an Australia wide increase in the number of registered recreational vessels of 36.4% between 1999 and 2009, more than half of which are found on the east coast of Australia [12].

Growth in the whale watching industry has been strong and persistent [2]. It is therefore appropriate to consider any changes in whale watching activities and compliance with the current regulations in order to assess their effectiveness. This information will help to inform whether the current management system is likely to achieve its objective of minimising harm to the animals.

2. Material and methods

2.1. Data collection

Vessel compliance with whale watching regulations was collected from commercial whale watching vessels, Ocean Dreaming (2007) and Ocean Dreaming II (2010), ~200 passenger vessels. Between 26 May and 21 November 2007 and 19 May and 25 November 2010, humpback whale groups were tracked during their migration past the east coast of Australia. Subject to weather and passenger numbers, whale watching trips departed twice daily and lasted approximately 3 h. Search effort involved departing Sydney Harbour and travelling south during the northern migration and north during the southern migration, approximately one nautical mile offshore, until a group of whales was encountered. Once a group of whales was encountered they were followed either until the end of the cruise or until it was decided to search for another group. Boats were considered to be watching a group of whales when they were travelling in the same direction as the whales and were within 500 m of the animals for 3 or more surfacings. During an encounter, the behaviour of the whales and their distance and direction from the research vessel were recorded at every surfacing, where possible. The distance and direction of every vessel within 1000 m was also recorded and boats were assigned as either commercial whale watching operators or recreational vessels.

2.2. Data analysis

Compliance with regulations was considered separately for the northern migration (mid-May until the end of July) and southern migration (1 October until the end of November). Only groups with calves were considered in the analysis of compliance for the southern migration. Observations in August and September were excluded because August typically sees a mix of northerly and southerly migrating whales being watched, and September focusses on the offshore adult southern migration. Although a number of commercial whale watching vessels conduct tours during September, there are fewer whale watching participants during this period and it is common for whales to approach vessels (known colloquially as *mugging*). Including this period in the analysis would distort compliance results as it is often the whales that move to within 100 m of the boats rather than boats approaching close to whales. In 2010 a number of encounters in the presence of 1–3 commercial whale watching vessels were excluded from analysis as these groups were subject to experimental trials not discussed in this paper. This means proportionally fewer of these encounters are considered here.

The 2007 analysis considered 58 encounters from the northern migration and 16 encounters from the southern migration. In 2010, 51 encounters from the northern migration and 23 encounters from the southern migration were used. Distance and direction data were plotted using a custom made programme (Whale Tracks version 5, J. McLean) which allowed the proportion of whale surfacings at which vessels breached regulations to be calculated. Proportions were used to avoid the data being skewed by the amount of time spent with a particular group of whales. Fig. 2 provides an illustration of the information provided by Whale Tracks.

In 2007 and 2010 breaches relating to approach distance and number of boats within 300 m were determined. Consistent with the spirit of the legislation, the fourth boat to enter the area within 300 m of whales was the boat considered to be breaking the regulation. The maximum number of vessels watching the whales during an encounter was the assigned boat category. A number of long-term industry participants were of the view that they had been given informal permission to approach groups of whales with calves to 150 m (Sydney Whale Watching Association, pers. comm.). Consideration of compliance on the southern