

High Levels Of Non-Compliance With Whale-watching Regulations in Bocas del Toro, Panama and Effects of Non-Compliance on Bottlenose Dolphin Behavior

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ABSTRACT

Dolphin injury and mortality is occurring due to a lack of compliance with whale-watching regulations and a lack of management of this type of tourism in Bocas del Toro, Panama. The resident population of bottlenose dolphins (*Tursiops* spp.) in Bocas del Toro consists of approximately 200-250 individuals. The repetitive, out of control, unmanaged dolphin-watching encounters are placing their livelihood at greater risk. In the last three years (2012-2013), 10 resident dolphins are known to have died due to boat strikes. However, it is possible that there are many more casualties that have gone unreported. This study conducted boat-based surveys from July to September in 2013, to evaluate compliance levels with Panamanian whale-watching regulations and how compliance, or lack thereof, affected dolphin behaviors. During all of the dolphin encounters with whale-watching boats Panama's whale-watching regulations were violated. Approximately 67% of the time, boat operators were in violation of the dolphin-watching policy by being closer than 100 meters away. Only 33% of the time did operators have their engines off or idle while they were closer than 50m. Only 58% of dolphin-watching interactions observed consisted of 1- 2 boats at one time; 42% percent of the time there were 3 to 15 boats present. In one encounter alone (sighting #63) there were a total of 36 different boats around dolphins to a maximum of 15 boats at one time. For 70 minutes of this 86 minute encounter, boats were closer than 50m to dolphins. The study also discovered that several behaviours increased when vessels were non-compliant with the regulations. Results from this study showed a high level of non-compliance with Panama's whale-watching guidelines, and validates that dolphins in Bocas Del Toro are threatened if unmanaged whale-watching continues.

INTRODUCTION

Over the past twenty years, the Panamanian town of Bocas del Toro has evolved from a location consisting of small-scale indigenous communities, to a site for commercial plantations, and then to a high volume tourism destination for Panamanians and foreigners. Visitors and locals alike have noticed the rapid increase in unsustainable tourism and its repercussions for marine species and habitat (Rodríguez 2005; Kayes 2005; Guzmán 2003; Bedi 2009; Windevoxhel & Heegde 2008). Reid et al. (2007) suggested there was an urgency for visiting Bocas Del Toro in the *Lonely Planet* guide to Panama: "Unfortunately, the secret is out, and although locals have thus far welcomed the increase in tourism, bulldozers have already started clearing land for condos and resorts...It's difficult to predict the future of the islands, but this is certain – see Bocas now, as the unspoiled beauty of the islands won't last forever" (p. 681).

Dolphin-watching is one of Bocas del Toro's most popular tourist attractions. However it currently unmanaged. Over the past 10 years researchers working in the Bocas Del Toro region have obtained results showing that there is a high probability that dolphin-watching boats are causing negative effects on dolphin behavior, distribution and communication (e.g. May-Collado & Wartzok 2008; May-Collado et al. 2012; May-Collado & Quiñones-Lebrón 2014). Observations have been made of up to 25 dolphin-watching boats following and encircling dolphin groups including groups with mother-calf pairs (May-Collado et al. 2012). In an interview by Claiborne (2010), local Bocas resident and activist Lui Mou expressed concern for Bocas del Toro's unmanaged tourism and how support for protection is needed:

"Now however, there are numerous boats all over Bocas but a common regulation and control is missing...no limit or control of how many of the 100 boats or people can go on these tours at the same time, which puts a lot of pressure on the animals and nature, and their environmental carrying capacity becomes too small under this stressful atmosphere...For me it is a very sensitive/delicate topic and situation, since having more than 10-15 boats following and circling a couple of dolphins all day long, every single day, or having 100, sometimes 200, tourists snorkeling within the same area frequently, is evidently mistreating the nature and its animals...This place needs someone...who really cares about this area and its communities, and invests in them" (p.viii).

Concerns over the viability of the resident bottlenose dolphin (*Tursiops* spp.) population in Bocas Del Toro is one of the most obvious repercussions of this impact of rapid unmanaged tourism. Between 2012-2014, 10 resident dolphins were known to have been killed as the result of boat strikes (Panacetacea 2013). As this population is small (approximately 200-250 individuals), the level of mortality had raised alarms among experts, making the initiation of baseline research on dolphin-watching in the region an urgent matter (May-Collado et al. 2012; IWC 2013; Panacetacea 2013; Barragan-Barrera et al. 2014).

In 2007, official whale-watching regulations were established in Panama (via Resolution ADm/ARAP No. 01, 2007) to manage whale-watching activities. However a lack of implementation of these regulations and apparent high levels of non-compliance with the requirements of the regulations by dolphin-watching tour operators (such as failing to obey the a maximum approach distance of 100m) led the IWC Scientific Committee to:

"strongly recommend that the Panamanian authorities enforce the relevant whalewatching regulation (ADM/ARAP No. 01) and that they particularly promote adherence to dolphin watching guidelines, especially boat numbers and approach speeds and distances" (p. 319 in IWC 2013)

Moreover the IWC Scientific Committee also:

"recommended continued research to monitor this dolphin population and the

impacts of tourism on it" (p. 319 in IWC 2013).

As a result of the recommendation of the IWC Small Cetacean Sub-committee (IWC 2013), further evaluation of the level of whale-watching guideline compliance and the effects of compliance, or lack thereof, on dolphin behavior was conducted, as presented in this paper.

METHODS

This study was conducted at the Archipelago of Bocas del Toro from July to September 2013. This small group of islands is located at 9° 20' 0" N and 82° 15' 0" W, off Panama's northeast Caribbean coast close to the border with Costa Rica (Windevoxhel & Heegde 2008).

Two types of boat-based surveys were conducted to measure levels of compliance with whale-watching guidelines, and dolphin behavior changes in response to whale-watching activity. The surveys were conducted from small boats ranging from 19 feet to 30 feet long, with either a 75 hp or 90 hp four-stroke outboard motor. Data was collected from 0700-1600 hrs (weather and accessibility permitting). To minimize noise disturbance the motor was turned off when dolphins were in a 100 meters radius from the research boat. Boat-base surveys were conducted throughout the Archipelago (off of Isla Popa Uno, Shark Hole, Dolphin Bay, Pastores, Almirante, Solarte, Loma Partida, Bocas del Drago, T. Oscura, Bahia Honda, Osa Perezoso, San Cristobal, Basimentos, Punta Caracol, Isla Peresosos). However, Dolphin Bay was where the majority of observations were made to the popularity of this location for whale-watching trips (May-Collado et al. 2012).

Behavioral observations commenced as soon dolphins were sighted in the study area. The length of encounters with dolphins (start and finish) was noted, the location of encounter, weather and sea state, and the number of boat presents. Every minute from the start of the encounter to the end, dolphin behaviors (using the following categories: forage, shallow dive, deep dive, disappear, rest, surface, socialize, play, sexual, mill, slow travel, fast travel, aerial, aggressive) was recorded. Moreover, any out of the ordinary or potentially significant activities were also recorded, such as any physical interaction or serious harassment initiated by whale-watching tour operators. When dolphin-watching or other vessels are present during dolphin encounters, the second type of observational began. Like the behavioral surveys, every minute data was collected, however information was recorded on the number of boats present, the type of boat, and the distance of boats to dolphins. The boats' actions were also recorded every minute (approach speed, direction of approach, engine status, and type of maneuvering with respect to dolphins observed: circling, chasing, following, etc).

RESULTS

A total of 63 dolphin encounters were recorded from June through September 2013. Of which 16 of the sightings were control encounters with no boat traffic, 24 of the encounters only had travelling boats or canoes in proximity to dolphins, 21 encounters occurred where there were dolphin-watching boat interactions.

According to Panama's whale-watching regulations, whale-watching boats are required to maintain a distance of 100 meters from cetaceans, and must maintain a distance of 200 meters from other whale-watching vessels. During all of the dolphin encounters where whale-watching boats were present Panama's whale-watching regulations were violated at some time by approaching closer than 100 meters away from dolphins. Approximately 67% of the time, boat operators were non-compliant by being closer than 100 meters away. Only 33% of the time did operators have their engines off or idle while they were closer than 50m, and thus not only were boats in close proximity but dolphins were also potentially being harassed (see Figure 1 for the frequency of different types of boat-operator behavior in close proximity for dolphins). Boat operators were also observed driving straight through the middle of dolphin groups (12 incidences recorded), circling dolphins (13 frequencies recorded), and leaving the site at high speeds (17 occurrences).

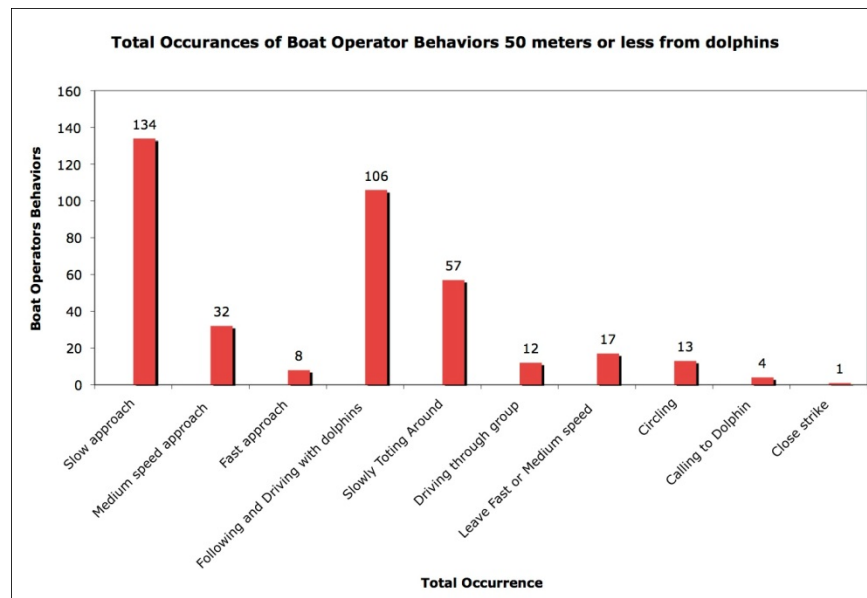


Figure 1. Maneuvering activities and tour operator behavior by whale-watching vessels while within 50m of dolphin groups.

The Panamanian government's whale-watching regulations state that no more than 2 boats should simultaneously follow cetaceans – this also is not being obeyed. Only 58% of the 1,389 minutes of dolphin-watching interactions observed consisted of 1 or 2 boats at one time. For 42% percent of the time there were 3 to 15 boats present. Within one interaction (referred to as sighting #63) a total of different 36 boats were recorded interacting with the dolphins over a period of 83 consecutive minutes (10:05am to 11:28am), with the maximum number of boats recorded at one time was 15 vessels. For a

consecutive 70 minutes of this sighting boats were 50 meters or less of the dolphins. Figure 2 below shows how few occurrences were recorded for essential behaviors like foraging and resting during this encounter. The most prevent behavior found was dolphins “disappearing” (underwater) for a total of 43 minutes, a probable result of dolphins trying to avoid the dolphins-watching vessels.

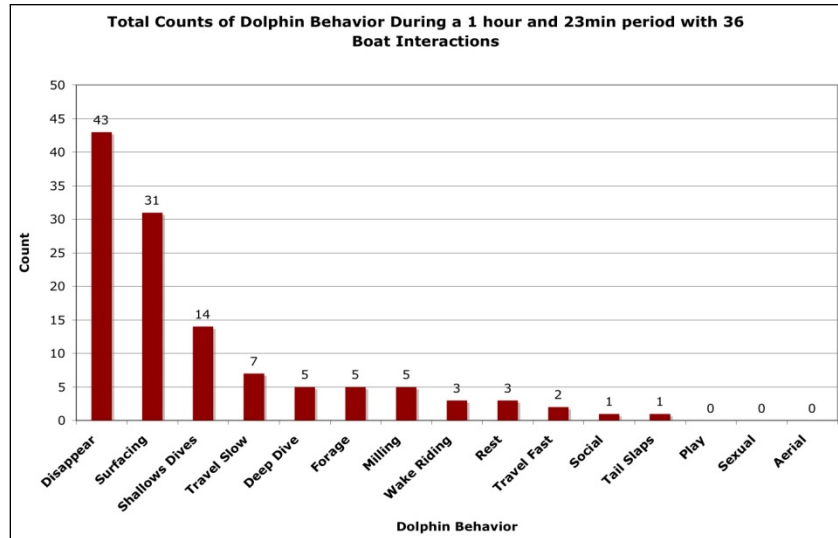


Figure 2. The total count of dolphin behaviors within the 83 minutes duration of encounter #63.

Similarly, there is a clear difference in dolphin behaviors between periods when whale-watching vessels were compliant with regulations, and when they were not compliant. Figure 3 illustrates that there was a 48% increase in dolphin “disappearance” behavior when dolphin-watching boat operators were not following distance regulations. Many classes of dolphin activity increased when boat operators were non-compliant: slow travel increased 45%, shallow dives increased 56%, deep dives increased approximately 49%, and tail slaps increased 18%. Interestingly, “resting” and “aerial” behavior increased as well.

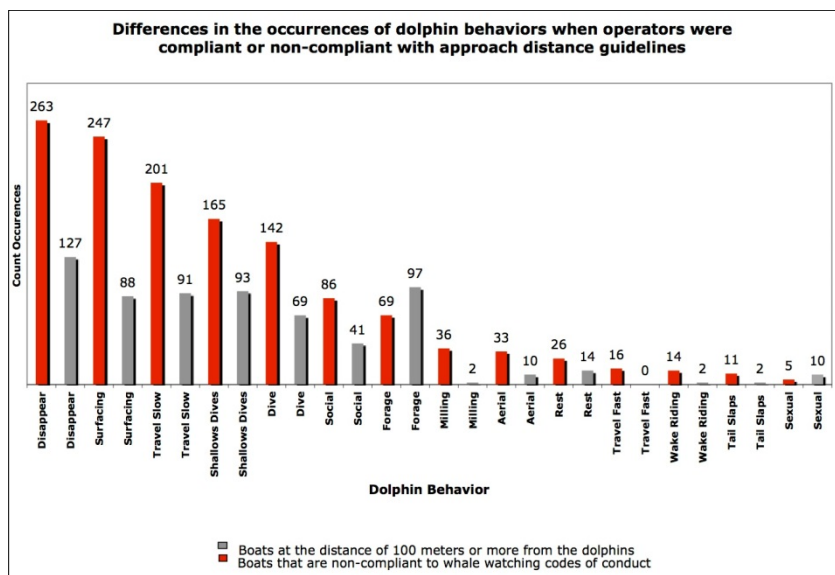


Figure 3. A comparison of the dolphin behaviors with dolphin-watching boats at the distance of 100 meters or less versus boats at a distance of 100 meter or more.

DISCUSSION

This study provides evidence that whale-watching boat operators in Bocas del Toro are not complying with Panamanian whale-watching regulations (ADM/ARAP NO. 01, 2007). It also, suggests that bottlenose dolphin behavioral changes are due to whale watching non-compliance with regulations.

Although the Panamanian government plans to develop a procedure for dolphin-watching licensing, provision of these licenses should include operator training and certificates for dolphin-watching best practice. Sustainable tourism workshops for the community and whale-watching boat operators are urgently needed in Bocas Del Toro. These workshops and courses should provide general bottlenose dolphin information (basic biology, threats, and behaviors) specific to the resident bottlenose dolphin population, as well as information about the science behind the impacts of whale-watching on cetaceans and whale-watching management best practices from around the world, such as IWC-defined “whale ecotourism” operations (Parsons et al. 2006). Finally it should be required that all dolphin-watching vessels place the whale-watching regulations in a visible location on board their vessels, so tourists can be aware of the regulations.

By educating the community of Bocas del Toro about their residential dolphin population with local awareness campaigns, a spirit of self-policing could hopefully be instilled. Developing a community interest in dolphin conservation and stewardship could help the “bottom up” management of dolphin-watching tourism. However, the Panamanian

Government needs to be more pro-active in providing scientists and operators the means to develop a long-term strategic plan to monitor and help manage the industry in the region. Results from this study showed a high level of non-compliance with Panama's whale-watching guidelines, and validates that dolphins in Bocas Del Toro are threatened if unmanaged whale-watching continues.

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