

Annex M

Report of the Sub-Committee on Whalewatching

Members: Urbán (Chair), Carlson (co-Chair), Alps, Amerson, Chen, Crespo, Funahashi, Gallego, Hall, Haug, Holm, Iñiguez, Isobe, Johnson, Luna, Melcón, Oosthuizen, Palazzo, Parsons, Reeves, S., Rendell, Reyes, Ritter, Rodríguez, Rojas-Bracho, Rose, Seakamela, Simmonds, Sironi, Sitar, Stachowitsch, Stelle, Vikingsson, Weinrich, Willson, Wulff.

1. OPENING REMARKS

Urbán welcomed members to the sub-committee and noted the priority items identified by the Scientific Committee: (1) assess the impacts of whalewatching on cetaceans (methods and results of changes in behaviour and movement patterns, methods and results of physiological changes to individuals, and methods and results of demographic and distributional changes); and (2) review whalewatching in the western United States. In addition, the following items were identified: (1) review reports from Intersessional Working Groups: Modelling and assessment of whalewatching impacts (MAWI) steering group, swim-with-whale operations, in-water interactions, populating the Five-Year Strategic Plan Whalewatching Handbook, and guiding principles for data collection forms from platforms of opportunity; (2) review progress on the Five-Year Strategic Plan for Whalewatching; (3) consider information from platforms of opportunity of potential value to the Scientific Committee; (3) review whalewatching guidelines and regulations; (4) consider emerging whalewatching industries of concern; and (5) progress on previous recommendations.

2. ELECTION OF CHAIR AND APPOINTMENT OF RAPPORTEURS

Urbán was elected Chair, Carlson was elected Co-chair, and Rose was appointed rapporteur.

3. ADOPTION OF AGENDA

The adopted Agenda is given as Appendix 1.

4. REVIEW OF AVAILABLE DOCUMENTS

The documents available to the sub-committee were identified as: SC/66a/WW01-WW18, SC/66a/SH23, SC/66a/SM13, Mahanty *et al.* (2015), Minton *et al.* (2015) and Ritter *et al.* (2015).

5. ASSESS THE IMPACTS OF WHALEWATCHING ON CETACEANS

At SC/64 (IWC, 2013, p.61), the Committee strongly recommended more research and monitoring on the impacts of tourism in Bocas del Toro, Panama. This recommendation was reiterated in 2013 (IWC, 2014a, p.56) and 2014 (IWC, 2015a, p.57). At SC/65b, the Committee also recommended the pursuit of social science research in Bocas del Toro in relation to the human dimensions of dolphin-watching tourism (IWC, 2014b, p.326); also see SC/66a/WW15 and SC/66a/WW16 and Item 12.

In Dolphin Bay (the location in the Bocas del Toro archipelago where the majority of whalewatching occurs), dolphins are exposed to high noise levels from dolphin-

watching tour boats on a daily basis. SC/66a/WW05 evaluated the effect of noise levels on whistles acoustic structure by analysing recordings obtained in 2007, 2008 and 2012 under various boat interaction conditions. Ambient noise levels for these recordings and for each whistle within these recordings were measured for a number of standard frequency variables and duration. Noise levels increased with boat presence; however, there was also significant variation among years but results indicated that 8% of the variation in whistle minimum frequency was explained by the interaction between noise levels and year. In contrast, 16%, 22%, and 11% of the variation in whistle ending frequency, peak frequency, and duration, respectively, were explained by year. These results indicated that while annual variations in noise levels can significantly affect dolphin communication, dolphins show great plasticity in coping with these changes. However, changes in noise levels only explained a small percentage of the variation in dolphin whistle structure, suggesting that other cues (e.g. mode of approach) and other sensory modalities (e.g. vision) associated with these boat-dolphin interactions may be more important contributors to changing dolphin acoustic behaviour.

SC/66a/WW06 examined dolphin whistle structure in the presence of three boat types that varied in mode of approach and duration of exposure: transport (no approach, short exposure), research (controlled approach, long exposure), and dolphin-watching (uncontrolled approach, long exposure). Results indicated that dolphins emitted similar whistles in the presence of the research and transport boats. In contrast, dolphins in the presence of tour boats emitted whistles that were highly modulated, longer, lower in ending and peak frequency, and wider in frequency range (delta frequency) than those emitted in the presence of the research/transport boats. The authors noted that understanding how different watercraft sources affect dolphin communication is crucial for managing and protecting dolphin habitat.

It was noted that discussion of these papers, the latter of which used a robust research design with three 'treatments' to compare impacts on vocalisations, was difficult without their authors in attendance. The sub-committee **agreed** that a concerted effort should be made to bring the authors of these papers to SC/66b.

SC/66a/WW07 described 15 dead dolphins found in Bocas del Toro from 2009-14. Some of these dolphins had injuries caused by boat propellers, while others had been entangled in fishing nets. The large number of boats of various types and the speeds at which they approach and leave the main dolphin-watching location, as well as competition among boat captains, are likely resulting in fatal encounters (May-Collado *et al.*, 2014). Over four months in 2012, seven animals were found dead. Necropsies of five of these animals revealed injuries from propellers. In 2013, two dolphins were found (one juvenile) but cause of death could not be determined due to advanced decomposition. During 2014, a number of live dolphins were seen with fresh and healed propeller wounds and cuts. In addition, one dolphin was observed with tumour-like growths of unknown origin. This animal swam on its side and showed signs of severe malnourishment. Plans for renovation and expansion of the

Bocas airport in the near future may increase the number of tourists visiting the area, which is already growing with the new arrival of cruises ships from Cartagena. There are concerns that this situation will increase demand for dolphin-watching and consequently will increase the rate of fatal dolphin-boat encounters. Samples will be collected to assess the dolphins' microbial fauna and stress hormones in 2016.

The intention of collecting stress hormone data was welcomed. In response to a question about effort, it was noted that the region has no stranding network, so much of the information on dead dolphins is collected opportunistically and concentrated within the archipelago. Without a stranding network, it is difficult to know whether or how often carcasses wash up outside of the archipelago. The area has a great deal of boat activity and it is assumed that a fair number of dolphins that strand are found, but there may be many more that are missed or simply not reported by locals who find them. The sub-committee **recommended** that research in the area should increase effort outside of the archipelago, to determine if the number of strandings is truly concentrated within the archipelago or whether this seeming concentration is an artefact of effort. Regardless, it was noted that, given there are only 250 animals in the entire archipelago and 100 found routinely in Dolphin Bay, the carcasses that are found represent a big percentage of the population.

SC/66a/WW12 described a study undertaken during July-September 2013 on dolphin behavioural changes in relation to tour boat exposure in Bocas del Toro. Due to the large number of boats and intense dolphin-watching activity throughout the study site, a boat-based hybrid methodology to evaluate changes in dolphin behaviour and monitor boat operator compliance with Panamanian dolphin-watching regulations was used rather than standard scan samples. Observations of dolphins outside the archipelago with no tour boats present served as a control. An AIC analysis of observed dolphin behaviour and several other factors indicated that both foraging and socialising decrease with boat presence, reinforcing the results of previous work in the area that drew similar conclusions (May-Collado *et al.*, 2014). Boat presence was also found to increase 'slow travel' and dolphins were more likely to 'disappear' and remain underwater. Sexual behaviour, resting and long dives were likewise less likely to occur with increasing boat numbers. Social behaviour was more likely to be observed when boat numbers decreased. The authors stressed that management to control these impacts is urgently required.

The sub-committee **agreed** with this conclusion and **recommended** that some areas in the archipelago, particularly in Dolphin Bay, that are important to foraging and resting be off-limits to tour boats (i.e. be designated as refuges), as the presence of such vessels appears to disrupt these activities.

During discussion, it was noted that the two differing methodologies used in SC/66a/WW11 (see next paragraph) and SC/66a/WW12 (Markov Chain analysis and AIC analysis, respectively) produced similar results, thus serving as good checks on each other. One member recalled his visit to Bocas del Toro 15 years ago, when the dolphin-watching situation was clearly unmanaged and chaotic. He expressed concern that the situation appears to be unchanged. It was noted that while the government has issued regulations, enforcement is poor to non-existent (IWC, 2013; 2014a; 2015a; 2015b) (see Item 12). Non-governmental organisations are attempting to improve the situation, but to date positive outcomes have been limited.

SC/66a/WW11 analysed dolphin behavioural transitions in Bocas del Toro, using transition matrix models, a time-sequencing analytical technique now widely applied to explore the potential impacts of tourism on cetaceans. First-order, time discrete Markov chain models were used to assess the effect of tour boat activities on dolphin behavioural transition probabilities in both control and impact scenarios. Data were also used to construct dolphin activity budgets. Additionally, a Generalised Log Linear Mixed Model (GLMM) was fitted to a subset of the data containing only females with dependent calves to assess the effects of tour boats on this vulnerable age-sex class. The Markov chain analysis revealed that in the presence of tour boats, dolphins were less likely to stay in a socialising state and were more likely to begin travelling, and were less likely to begin foraging while in a travelling state. Additionally, the time-activity budgets showed that foraging decreased as an effect of tour boat presence, and travelling increased, indicating a shift in the important relationship between these two activities. The results of the GLMM showed that females with dependent calves are less likely to forage and more likely to travel when tour boats are present. These behavioural responses are likely to have energetic implications for individuals through two possible mechanisms: reduced energy acquisition and increased energy expenditure. The effect of lost foraging opportunities and increased physical demands may be more pronounced for nursing females, whose physiological demands are higher and can potentially lead to poor reproductive outcomes and reduced fitness of individuals.

The sub-committee welcomed this paper and the application of sophisticated modelling techniques to the data being collected.

SC/66a/WW10 presented preliminary estimations of population size and residency patterns for Bocas del Toro's dolphin population, using capture-recapture data from 2004-2013. Preliminary analysis suggests that the dolphin group in Dolphin Bay ranges from 72 to 87 dolphins. This group is divided into two 'communities'. The larger community had a low recapture (1-5 months) and residency rate (7.7% to 38.5%) and a wider distribution within the archipelago. The smaller community was restricted to Dolphin Bay (the main dolphin-watching location) and consisted of an estimated 37 animals with a high recapture (5-13 months) and residency rate (38.5% to 100%). This smaller community was further organised into four sub-units. Communities also differed in their levels of associations, with the larger community showing loose associations while the smaller community had several regular, long-term associations. The authors called for this dolphin population to be considered for threatened status by the IUCN.

This research project is ongoing. It was suggested that the research team in Bocas del Toro should undertake modelling to determine whalewatching exposure down to the individual level (Christiansen *et al.*, 2014a; Pirota *et al.*, 2015a).

Using previously published data from the Caribbean, SC/66a/SM13 assessed the degree of genetic isolation of the dolphins in Bocas del Toro. At SC/65a, Barragán-Barrera *et al.* (2013) described a unique mtDNA haplotype for this population, suggesting a high degree of isolation. SC/66a/SM13 used microsatellite data to compare the Bocas population to a neighbouring population in Costa Rica and to other populations in the Caribbean. Bocas dolphins are isolated but, despite the absence of photo-identification evidence, DNA evidence shows there is some genetic flow from Panama to Costa Rica.

The sub-committee **commended** the authors of these papers for the impressive body of evidence – genetic, behavioural, and acoustic, from modelling, and in the future hormonal – that it has amassed, and is amassing, to demonstrate the significant negative impact the dolphin-watching situation in Bocas del Toro is having on the local dolphin population. This compelling evidence continues to support strong recommendations for additional protections for these dolphins.

It was also once again noted that dolphin-watching in Dolphin Bay is functionally uncontrolled. It was noted that the failure for the management situation to improve can largely be attributed to the fact that several different agencies are involved in regulating tourism in the region and coordination and accountability are poor. The sub-committee **agreed** that on-going research, much of it reported here, continues to support its previous recommendations (IWC, 2013, p.61; 2014a, p.56; 2015a, p.57) and reiterated its **recommendation** that the Panamanian authorities enforce the relevant whalewatching regulation (ADM/ARAP No. 01) and in particular promote adherence to requirements regarding boat number and approach speed and distances (see also Item 12).

SC/66a/WW13 discussed the presence of whales in San Matías Gulf, Argentina. Whales are commonly observed during the winter and early spring. In 2012, law N°4,066 authorised whalewatching under an experimental framework. This experimental programme, enforced by the Environment and Sustainable Development Secretary of the Río Negro Province, authorised four tourism companies to develop whalewatching in the San Antonio Bay Marine Protected Area and requested scientists from Comahue National University to monitor whalewatching activity and assess its environmental, social and economic impact. The programme evaluated the current status of southern right whales in San Matías Gulf, collecting data on distribution, abundance and social structure, as well as on emerging whalewatching. Aerial and boat-based surveys were carried out in August, September and October 2014, using tour boats during whalewatching trips. Vessels were less than 10m in length, carrying a maximum of 10 passengers. Spatial distribution showed high monthly and inter-annual variability. In 2014, there were a total of 145 whalewatching trips. Scientific observers monitored 98 of these (effort=176.8 hours). For these encounters, 45% were of solitary individuals, 26% were non-sexually active groups, 17% were mother-calf pairs and 12% were breeding groups. Of 105 encounters monitored for impact, 82% lasted fewer than 20 minutes, with a maximum of 64 minutes. Group composition changed as the whalewatching season progressed, with breeding groups at maximum abundance in mid-August.

The sub-committee welcomed this paper. During discussion, it was noted that the population appears to be thriving, which is encouraging, and the occupation of new areas throughout San Matías Gulf may be due to original habitat reaching carrying capacity. It was noted that it would be good to photo-identify these whales to see if individuals that are targeted repeatedly by whalewatching vessels are moving into other areas; Argentine research groups that specialise in photo-identification should be able to advise the researchers working in this region. It was noted that the work here is acquiring baseline data from which changes in distribution and habitat use can be measured. Once this baseline is established, photo-identification studies can start towards determining if any continuing redistribution arises from increasing population or is a genuine shift in habitat use.

It was noted that the provincial authorities in Río Negro, Argentina, are invested in managing the situation in San Matías Gulf, which is encouraging. It was also noted that recovering whale populations are reoccupying coastal areas throughout South America, which represents an excellent opportunity to begin long-term studies before whalewatching expands into these regions. The sub-committee **recommended** that the Commission take advantage of this opportunity and support research projects in these areas.

SC/66a/SH23 reported on recent research relevant to port operations and hydrocarbon exploration activities operating in the Gulf of Masirah, an area of known importance to the Arabian Sea humpback whale (ASHW). The development of port and supporting transport infrastructure presents an opportunity for tourism to start in the area. It is hoped that mitigation measures recently developed for whalewatching will be transferable to other industries operating in the area. Based on data describing ASHW habitat use, seismic surveys conducted in the Gulf during late 2014 implemented the most stringent seismic survey mitigation measures yet in Oman. Even so, one whale was struck, although it was re-sighted in the area several days later. This, together with re-sightings of the same whales within the survey area, provide initial indications that whales did not leave the area despite the on-going threats/stress presented by the survey. It was noted this would be an issue of potential concern if whalewatching tours move into the area.

Concern was expressed by several members that the increasing accessibility of the area will almost certainly result in this endangered humpback population being subject to even greater tourism pressures, in addition to other threats. It was noted that as recently as 20 years ago, this area was essentially wilderness. Now there are more roads and more human activity. For example, fishing (some vessels of which hold 4km of drift net) is increasing, port numbers are growing, and seismic surveys are occurring with greater frequency. As for tourism, new five-star hotels are opening in the new city of Duqm, targeting businessmen now but also of interest to tourism operators. It is assumed that in the near future whalewatching from Duqm will become established. In response to a question regarding distribution, it was noted that it is not yet known how far beyond the currently studied area in Oman these humpbacks range. In January 2015, a workshop was held in Dubai (funded by the US Marine Mammal Commission), attended by all ASHW range states, to discuss cooperative research and management of this endangered population (Minton *et al.*, 2015). The important habitats are known in Oman, but whales are also seen in Pakistan and whaling records show that there was a concentration of animals off the coast of Gujarat, as well as elsewhere in India.

Recognising the difficulties at the time of keeping up to date on the wealth of research on whalewatching activities, in particular the impacts of these activities on cetaceans, a paper summarising recent whalewatching research was presented to the sub-committee (Parsons *et al.*, 2004) at SC/56. This was deemed to be a useful review of recently published articles, so similar digests were requested in following years. SC/66a/WW08 is the 12th in this series of reviews, detailing a summary of whalewatching research published since SC/65b. Those studies related to impacts of whalewatching on whales are summarised in Table 1. The sub-committee welcomed this paper, as always, and thanked Parsons for presenting the information in table form, which will make the information more accessible.

Table 1

Summary of studies on the impacts of whalewatching on cetaceans described in SC/66a/WW08. It should be noted that inclusion in this table does not suppose endorsement of the findings or recommendations of the various studies by the sub-committee.

Species	Location	Methodology	Key findings	Reference
Common bottlenose dolphin ¹	Bay of Islands, New Zealand	Photo-identification	<ul style="list-style-type: none"> - Population decline reported with high calf mortality rates and low recruitment. - Better enforcement of current legislation recommended. 	Tezanos-Pinto <i>et al.</i> (2015)
Common bottlenose dolphin ¹	Doubtful Sound, New Zealand	Experimental boat approaches with passive acoustic monitoring	<ul style="list-style-type: none"> - Groups with mother-calf pairs were significantly less cohesive and coordinated when tourism boats were audible. - Dolphins were also more acoustically active when boats were closer; also while boats were heading away. - Dolphins also altered call frequency and duration in response to boats. - Precautionary management and mitigation of underwater noise recommended. 	Guerra <i>et al.</i> (2014)
Common bottlenose dolphin ¹	Doubtful Sound, New Zealand	Theoretical optimal dive model, focal follows	<ul style="list-style-type: none"> - The study suggested that males and females may perceive the risk of boat traffic differently. - Although both sexes may experience energetic costs because of altered behaviours in response to boat traffic, the energetic costs to females may be higher. 	Symons <i>et al.</i> (2014)
Common bottlenose dolphin ¹	Moray Firth, Scotland	Passive acoustic monitoring, Bayesian hierarchical modelling	<ul style="list-style-type: none"> - Boat presence nearly halved acoustic foraging activity in the short-term, but there was no relationship with noise level. - An increasing number of boats decreased the amount of acoustic foraging behaviour. - Motorised boats that interacted with dolphins eliciting a greater response than those that did not interact; sailing boats and stationary vessels produced a negligible response. 	Pirota <i>et al.</i> (2015a)
Common bottlenose dolphin ¹	Moray Firth, Scotland	Photo-identification, spatially explicit capture-recapture models	<ul style="list-style-type: none"> - High variation in whale exposure to whalewatching vessels. - Animals whose home range was predominantly in the inner Moray Firth received higher levels of boat exposure. 	Pirota <i>et al.</i> (2015b)
Burrnan dolphins ²	Port Phillip Bay, Victoria, Australia	Scan sampling via whale-watching platform of opportunity	<ul style="list-style-type: none"> - Probability of sighting dolphins decreased across time. - Dolphins were more likely to approach the vessel when the boat made a legal manoeuvre. - More likely to evoke an 'aggressive' response from illegal/prohibited manoeuvres. - Large dolphin groups responded less and resting groups showing more avoidance behaviour. - Over time there was increasing vessel interaction with dolphin groups with calves, which was a cause for concern. - Better compliance with current legislation required. 	Filby <i>et al.</i> (2015a)
Common dolphin ³	Bay of Plenty, New Zealand	Scan sampling, focal group follows, Markov chain analysis, some data gathered via whalewatching platforms of opportunity	<ul style="list-style-type: none"> - Boat interactions with dolphin groups were found to significantly alter dolphin foraging behaviour. 	Meissner <i>et al.</i> (2015)
Northern minke whale ⁴	Faxaflói Bay, Iceland	Photo-identification, spatially explicit capture-recapture models, via whalewatching platform of opportunity	<ul style="list-style-type: none"> - High variation in whale exposure to whalewatching vessels. - Despite some whales being encountered multiple times by whalewatching vessels, the total amount of time in the presence of vessels was low. - Most exposed individual being with whalewatching vessels only 0.2% of its time during the entire feeding season. 	Christiansen <i>et al.</i> (2015)
Northern minke whale ⁴	Faxaflói Bay, Iceland	Two location/method comparison*, bioenergetics modelling, via whalewatching platform of opportunity	<ul style="list-style-type: none"> - From higher observed rate of surfacing and swimming in location with whalewatching vessels, it was estimated that minke whales experienced a 27.6% increase energy expenditure. 	Christiansen <i>et al.</i> (2014)
Northern minke whale ⁴	Faxaflói Bay, Iceland	A model was developed to investigate how behavioural changes resulting from anthropogenic disturbance might influence female reproductive success in whales.	<ul style="list-style-type: none"> - Using data from previous studies on possible behavioural changes and individuals exposure to whalewatching vessels it was estimated that the effect of whalewatching disturbance on foetal growth wasn't any greater than natural variability. 	Christiansen and Lusseau (In press)

¹*Tursiops truncatus*. ²*Tursiops australis*. ³*Delphinus delphis*. ⁴*Balaenoptera acutorostrata*.

*Note: this part of the study methodology was criticised when initially presented to the sub-committee, and therefore the results should be treated with caution (IWC, 2012).

Table 2
Potential sites for MAWI studies.

Country and Area	Shore-based?	WW now	Current WW can be quantified?	Existing pop'n info?	Feasibility of detecting pop'n impact	Capacity for future WW?	Primary species	Habitat use	Feasibility of site for MAWI	Other sources of major impact
USA: Mid-Atlantic/SE US	Possibly	Yes	Probably	Some	Low (mixed stock w/connections)	High (will expand)	<i>Mn</i>	Feeding	Medium	Many
Oman	Yes	Opp	-	Yes	High (small pop'n)	Low-medium	<i>Mn</i>	Feeding/breeding	Low-medium	Many
Chile: NW	Yes	Opp	-	Yes		Low-medium	<i>Mn, Bm, Bb</i>	Feeding	Medium	Shipping
Haiti: SW of PAP	Yes	Opp	Yes	Some	Low	Medium-high	<i>Pm</i>	Unknown	Medium	Unknown
American Samoa: Tutuila	Yes	No	N/A	Some	Low (small part of large range)	Medium	<i>Mn</i> (also odontocetes)	Breeding	Medium	None
Guatemala: Las Lisas/Monterrico/Puerto Quetzal	Probably	Yes/emerging	Yes	Yes	High (small pop'n)	High (will expand)	<i>Mn</i> (also odontocetes)	Breeding/migrating	Medium-high	Shipping, fishing
Cape Verde: Islands of Sal, Boa Vista and Maio (NE-Atl.)	Yes	Yes	Yes	Yes	High	High	<i>Mn</i>	Breeding	Medium	Many
Panama: Chiriqui Gulf/Montijo Gulf/Coiba Island	Probably	Yes	Yes	Yes	High	Medium	<i>Mn</i>	Breeding	High	Shipping

Opp=opportunistic; *Mn*=*Megaptera novaeangliae*; *Bm*=*Balaenoptera musculus*; *Bb*=*Balaenoptera borealis*; *Pm*=*Physeter macrocephalus*.

SC/66a/WW04 briefly discussed an innovative proposal to use drones and underwater remotely operated vehicles to investigate whalewatching impacts. During discussion, it was noted that although drones may have an impact on whale behaviour, it is likely to be substantially less than a research boat collecting data, and thus warrants consideration as a potential method of data collection. However, it was also noted that drones can be a problem; for example, in some areas they are being deployed from whalewatching vessels to find whales. General permitting procedures for drones are being established in the US by the Federal Aviation Administration.

6. REVIEW REPORTS FROM INTERSESSIONAL WORKING GROUPS

6.1 Modelling and Assessment of Whalewatching Impacts (MAWI) steering group

SC/66a/WW03 discussed progress on the Modelling and Assessment of Whalewatching Impacts (MAWI) initiative. In August 2014, a MAWI symposium and workshop were held at the International Marine Conservation Congress in Glasgow, UK. These were aimed at diverse interest groups, such as conservation organisations, whalewatching companies, scientists and policy makers. Discussion topics included a history of and behavioural and physiological responses to whalewatching, modelling techniques for assessing whalewatching's impact, and the role of industry as platforms of opportunity. The symposium was well-received and attracted the attention of the media (Cressey, 2014). A workshop followed the symposium and discussed the research questions and hypotheses that would most benefit scientific understanding of whalewatching impacts on large cetaceans. The goal was to begin building a strong scientific platform from which to assess the potential effects of whalewatching. The workshop discussed the costs and benefits of whalewatching, the role of whalewatching in cumulative impacts facing cetaceans, and data and modelling needs, among other topics. The outputs of the symposium and workshop resulted in a publication, New *et al.* (2015), which concluded that there are six factors to consider when building this scientific platform. These are:

- standardising data collection;
- defining key research questions;

- identifying the role of whalewatching in the broader suite of disturbances and stressors affecting cetaceans to better assess their combined impacts;
- increasing communication between scientists, government, industry and other stakeholders;
- facilitating the uptake of new modelling techniques; and
- improving the implementation and enforcement of regulations for all vessels interacting with cetaceans.

In order to produce this platform, the participation of more than the members of MAWI's intersessional group will be required. The intersessional group proposes a scientific workshop, which would focus on the first three of the six factors. Once these are agreed, it will be easier to initiate communication with other stakeholders because the goals and needs of the scientific community will be better defined. This may also help governments improve the implementation and enforcement of regulations. Facilitating the uptake of new modelling techniques can be done at a later date with additional workshops. Once the key research questions and data standards are defined, it will be necessary to work with stakeholders at existing study sites, or develop new ones, to implement the beginnings of the unified platform. Funding is required to hold workshops and conduct research and an immediate goal of the intersessional group should be to identify potential sources of funding for the MAWI initiative.

As an additional part of MAWI's intersessional work, the intersessional group prepared Table 2, which describes several potential sites where MAWI's initial work could be undertaken.

In discussion, it was noted that the inclusion of only three species of rorquals in Table 2 was not meant to be restrictive, but MAWI will address only large whales (as opposed to small cetaceans) and in the locations identified, these were the large whale species observed. Other locations with other large whale species can be added to the table as they are identified. It was noted that, for some locations, e.g. Haiti, a site might be a good location from a research perspective, but there may be logistical problems in the country that might lessen its feasibility as a MAWI site. Given the interest in establishing a whalewatching industry in Haiti, the sub-committee called for researchers working there to attend SC/66b to provide a summary of Haiti as an emerging whalewatching location.

6.2 Swim-with-whale operations

No information was presented. An intern has been retained and beginning later in 2015 will be contacting swim-with-whale operators identified in previous meetings and sending them the questionnaire discussed at SC/59. Information in returned questionnaires will be compiled and summarised for SC/66b.

6.3 In-water interactions

No information was presented.

6.4 Populating the Handbook

This will be addressed in Item 7.

6.5 Guiding principles for data collection forms from platforms of opportunity

No information was presented, but work will continue and a draft 'guiding principles for data collection forms' document will be prepared by the intersessional group before the end of 2015.

7. REVIEW PROGRESS ON FIVE-YEAR STRATEGIC PLAN FOR WHALEWATCHING

At SC/64, the Commission's Five-Year Strategic Plan on Whalewatching was reviewed by the sub-committee with a view to providing scientific advice. One of the guiding principles of the Plan discourages whalewatching on endangered and critically endangered species. The sub-committee therefore considered it a priority to identify such species and populations where whalewatching occurred. SC/66a/WW09 presented an initial list of endangered and critically endangered cetaceans (under the IUCN system), noting whether they were subject to whalewatching, and if regulations existed. In total, 34 such populations were identified, 18 critically endangered and 16 endangered.

The sub-committee thanked the authors for preparing this list, which was in response to a specific request from the Conservation Committee. It was noted that these species and populations should also have conservation management plans, so the sub-committee **agreed** to ask the Sub-committee on Small Cetaceans if there is any overlap in these species with the list it has compiled for that purpose. It was noted that this list should eventually be included in the Handbook, although at this stage it is still a draft. The sub-committee requested the authors to continue building the list intersessionally and to submit a final version at SC/66b.

At IWC/65, the Commission endorsed a joint meeting of the Scientific Committee's Sub-committee on Whalewatching and the Conservation Committee's Standing Working Group on Whalewatching (Working Group) to discuss implementation of the Five-Year Strategic Plan for Whalewatching (Plan). This joint meeting was held on 20 May 2015, as a pre-meeting to SC/66a. Ryan Wulff, chair of the Working Group, convened the meeting.

The overall goals of the meeting were to discuss the development of a beta version of the Online Handbook for Whalewatching (the process needed to achieve a version by the next Commission meeting in 2016), and how to move forward with the capacity building components of the Plan. As reported at SC/65a, a 'level' approach will generally be followed for each topic or theme: Level 1 (short, simple); Level 2 (for people who wish more detail after reading Level 1); and Level 3 (for specialists who wish to explore the topic thoroughly).

Initial work will be on Level 1 information, focusing on key areas that either: (1) have information ready (e.g. scientific information on current research, status of stocks);

or (2) are components of helping to develop or promote responsible whalewatching practises (e.g. how to run an effective business, pros and cons of certain practises). For the latter, the primary audience would be prospective or current industry members and the beta version will attempt to populate this portal in a way that distinguishes the distinct phases of industry development.

It was decided that in order to develop the beta website efficiently, four team members (preferably two from the sub-committee and two from the Working Group) would spend a week working directly with the Secretariat in Cambridge. Funding for this meeting would be made available through the existing voluntary contributions to the Working Group. The goal would be to have a draft version ready to submit to the Scientific Committee and the Working Group by the end of April 2016. Suggested edits from those groups would be incorporated before SC/66b, where additional comments would be taken and incorporated into the version presented to the Conservation Committee and Commission at IWC/66.

Deadlines/next steps are noted below:

- (1) basic outline of Level 1 items and portals: 4 June 2015;
- (2) material (links, videos, case study/examples) to Secretariat: 1 February 2016;
- (3) small group meeting in Cambridge: TBD (before end of March 2016);
- (4) suggestions/edits to small group on draft version: 30 April 2016; and
- (5) final beta version for IWC/66: 1 September 2016.

Regarding capacity building, there was agreement that the Working Group (along with sub-committee members) would focus initially on what types of capacity building the IWC could offer (to both IWC members and non-members). Then work could be done on setting up best practises and a potential network or database of existing groups or individuals that could do that work.

The sub-committee **agreed** that the collaboration involving the Handbook has been an excellent example of coordination between the Scientific Committee and the Conservation Committee. The sub-committee is at the forefront of working out ways for the two bodies to interact and coordinate projects that further the work of both Committees.

8. REVIEW WHALEWATCHING ON THE PACIFIC COAST OF THE UNITED STATES

Table 3 summarises the number of whalewatching operations along the western coast of the US.

In response to a question about potential problems in the US, it was noted that only a few whalewatching areas have regulations, yet these regulations are often not enforced. Guidelines, which are more widespread in the USA, are of course unenforceable. In addition, more tourism companies are now advertising whalewatching from novel, individual platforms such as paddleboards. Commercial whalewatching vessels are better behaved, but self-policing can also be a problem, as it can lead to confrontations on the water, which can create a hostile environment. Licensing was once again suggested as a way to limit the number of vessels viewing whales; however, licensing can accomplish only so much, as there are more recreational vessels, fishing vessels moonlighting as whalewatchers and so on, watching whales than dedicated commercial whalewatching vessels. It was noted that in the US, where there are differing requirements under different environmental laws, there are minor but important differences between permitting and licensing, which can create difficulties for managers.

Table 3
Whalewatching operations in the western USA.

WW area/ location	No. ops	Platform	Main targeted species	Research?	Regulations/codes of conduct	Other
Alaska						
Glacier Bay	6	Boat, kayak	HW, MW, FW	No	Yes Marine Mammal Protection Act (MMPA, federal legislation); Glacier Bay National Park Regs (stricter than NOAA Alaska Regional Office regs); NOAA Alaska Regional Office Regs MMPA; Glacier Bay National Park Regs; NOAA Alaska Regional Office Regs	Maintain a distance of ¼ n.mile from HW; pursue HW from a distance of ½ n.mile or more; maintain a distance of one n.mile from shore; speed limit of 20kts (13kts when there are high numbers of whales). As above
Juneau	19	Boat	HW, KW	No	Yes	As above
Ketchikan	5	Boat	HW	No	Yes	No approach within 100 yards of a HW; do not place vessel in path of HW causing them to surface within 100 yards; operate at a slow, safe speed. As above
Sitka	10	Boat, kayak	GW, HW, MW, FW	No	Yes	As above
Seward	4	Boat	GW, HW, KW, MW, FW	No	Yes	As above
Valdez	2	Boat	GW, HW, KW, MW	No	Yes	As above
Washington						
Puget Sound	5	Boat	KW	Yes	Yes	Mandatory 200 yard viewing distance; Center for Whale Research
San Juan Islands	12	Boat, kayak, shore-based	KW	Yes	Yes	Mandatory 200 yard viewing distance; Center for Whale Research; San Juan Island Whale and Wildlife Tours Marine Mammal and Wildlife Monitoring; Pacific Whale Watch Association.
Oregon						
Depoe Bay	2	Boat	GW	No	Yes	Oregon Whale (Research EcoExcursions)
Garibaldi	3	Boat, plane	GW	No	Yes	-
Newport	5	Boat	GW	No	Yes	-
Charlles-ton	1	Boat	GW	No	Yes	-
Brookings	1	Boat	GW	No	Yes	-
Astoria	1	Plane	GW	No	Yes	-
Florence	2	Plane	GW	No	Yes	-
Bandon	1	Plane	GW	No	Yes	-
California						
Santa Cruz	3	Boat, kayak	GW, HW, BW	No	Yes	100 yard viewing distance.
Moss Landing,	7	Boat	GW, HW, BW, FW	Yes	Yes	100 yard viewing distance; Monterey Bay Cetacean Project, Cascadia Research Collective.
Monterey	5	Boat	GW, HW, BW	Yes	Yes	Cascadia Research Collective.
Sausalito and Half Moon Bay)	16	Boat, kayak, 'SUP'	GW, HW, BW, FW	No	Yes	-
San Diego (incl. La Jolla and Ocean-side)	8	Boat, kayak, 'SUP'	GW, HW, BW, FW	Yes	Yes	University of Redlands.
Orange County (New- port Beach/Dana Point)	5	Boat, kayak, 'SUP', shore-based	GW, HW, BW, FW	Yes	Yes	Aquarium of the Pacific.
Los Angeles, Long Beach	5	Boat	GW	No	Yes	-
Mendocino County, Humboldt County	6	Boat	GW, HW, BW, FW	Yes	Yes	Channel Islands National Marine Sanctuary.
Santa Barbara, Ventura, Oxnard Morro Bay	3	Boat	GW, HW, BW	No	No	-

GW=Gray whale; HW=Humpback whale; BW=Blue whale; FW=Fin whale; MW=Mink whale; KW=Killer whale

During discussion, two emerging issues of concern were raised. One is recently developed or new technology being used by whalewatching operators or passengers during whalewatching. Another is changes in species distributions in certain areas (e.g. southern California), leading to previously infrequently or never observed species being targeted by established whalewatchers.

In some ways, these two issues make the western US, despite its long-established whalewatching industry, an emerging area of concern. These two emerging issues also have global implications, suggesting the sub-committee's work plan should consider 'emerging whalewatching issues of concern' generally, rather than the more limited 'emerging whalewatching industries of concern'. Such issues may be developing or expanding industries, new technologies, ecological changes due to climate change, or direct human-cetacean interactions, among others.

The sub-committee noted that technology such as drones, selfie sticks, Go-Pros, social media, and smart phone video can result in reckless behaviour by the whalewatchers (which can be dangerous for people and animals), unrealistic expectations in the public with regard to whalewatching, and/or actually promote dangerous or illegal behaviour. For example, a paddle-boarder might use a Go-Pro to film up-close and unusual whale behaviours, post a video to social media (such as YouTube), and then other recreational mariners might try to capture similar footage.

The sub-committee **recommends** that researchers, naturalists, and other relevant individuals using or working on-board platforms of opportunity report back to the sub-committee regarding prevalence of these technologies, potential or observed impacts, and any other relevant information related to the use of these technologies during whalewatching activities (including via National Progress Reports). Once this information is considered by the sub-committee, it may recommend relevant research.

Further, the sub-committee noted that in some established whalewatching areas (in the US and elsewhere), new species are beginning to appear, most probably due to changing prey distribution and other climate change-related habitat changes. This can lead to local whalewatchers traveling into new areas (sometimes outside of established whalewatching areas) and being faced with behaviours different from those of established target species, which would require the operators to have a better understanding of the new species' ecology and natural history. The influx of 'new' species to an established whalewatching area may also lead to increased competition within the industry and emerging markets in areas outside of the established whalewatching region.

The sub-committee **recommends** that relevant authorities conduct operator training programmes that address these new species' ecology, behaviour, and requirements for best-practice whalewatching. Also, there needs to be better outreach to tourists, recreational whalewatchers and others active on the water, offering education about these new species. This should include information regarding sustainable whalewatching practises, including specific guidelines, as well as information regarding setting appropriate expectations within the public for viewer/whale interactions.

In considering this item for SC/66b, the sub-committee **agreed** that an effort to collect information on whalewatching in China and Russia would be useful. Rose volunteered to collate relevant information and present it next year. It was also noted that the South Pacific Regional Environment Programme (SPREP) has designated 2016-17 as 'The Year of the Whale' for the Pacific. Given that SPREP and

the Commission have recently established a cooperative programme, and that whalewatching has great potential for many Pacific nations, the sub-committee **agreed** that SPREP should be invited to submit a report for SC/66b on whalewatching in SPREP member nations, with ideas on ways for this sub-committee and SPREP to collaborate (see Item 13).

9. CONSIDER INFORMATION FROM PLATFORMS OF OPPORTUNITY OF POTENTIAL VALUE TO THE SCIENTIFIC COMMITTEE

Ritter *et al.* (2015) presented data from a long-term cetacean study where, during regular whalewatching trips from La Gomera, Canary Islands, sightings of small cetaceans were documented photographically from 1996 through 2014. When taking images of individual animals from a variety of species, anomalies of different types were detected and analysed. Such anomalies were categorised as: (a) skin lesions (e.g. large scratches) and injuries (fresh or healed); (b) skin anomalies (e.g. distinct blotches, patchy scars, dents, bumps); and (c) emaciated animals. Anomalies were found in the following species: bottlenose dolphin, pilot whale, Atlantic spotted dolphin, rough-toothed dolphin and common dolphin. Emaciated animals were most often bottlenose dolphins, sometimes with several emaciated animals in the same group, indicating wider affliction of this species. Several causes for each category of anomalies were considered, including: (a) ship strikes and entanglement; (b) skin diseases, such as infections and scars from predators/parasites; and (c) food shortage or internal diseases. In most cases, the true reason for the anomaly will remain unknown. However, documenting anomalies, even if conducted in a non-systematic way from platforms of opportunity, can significantly contribute to assessing the health status of small cetacean populations. In multi-species habitats like the Canary Islands, the comparison of levels of affliction can help understand the impact of anthropogenic threats to different cetacean species sharing the same environment.

The sub-committee welcomed this presentation and noted the qualitative value of these data. In response, it was noted that if there are areas with larger numbers of vessels, then such data can cover more of these areas, be systematic and have quantitative value. Some afflicted animals were re-sighted at least once. Veterinarians were consulted when cetaceans with apparently severe illness were seen, but in most cases, there was no follow-up on cetaceans during data collection.

In discussion, one member described a smart phone app called 'Whale mAPP' (<http://www.whalemapp.org/>), which allows the collection of basic data by whalewatchers on platforms of opportunity. The sub-committee asked for a paper to be submitted at SC/66b describing this data collection system. Another member noted that a new whalewatching vessel, with underwater viewing, began operating last year in Península Valdés, Argentina and researchers have started collecting data from the underwater vantage point, to see if the data are useful for scientific studies. The researchers intend to submit a paper regarding data collected from this new vessel at SC/66b.

10. REVIEW WHALEWATCHING GUIDELINES AND REGULATIONS

Papers summarised in SC/66a/WW08 related to compliance with whalewatching regulations and guidelines are presented in Table 4. As above, the sub-committee thanked Parsons for preparing this document.

Table 4

Summary of studies on compliance with whalewatching guidelines described in SC/66a/WW08. It should be noted that inclusion in this table does not suppose endorsement of the findings or recommendations of the various studies by the sub-committee.

Species	Location	Key findings	Reference
Burrnan dolphin, <i>Tursiops australis</i>	Port Phillip Bay, Victoria, Australia	<ul style="list-style-type: none"> - Tourists were supportive and recognised the importance of whalewatching regulations. - Data were collected on compliance levels of the dolphin-swim trip operators with whalewatching regulations – it was found that compliance levels had not improved significantly over the past decade, since previous studies. - Tourist surveys might be a valuable tool to encourage compliance with regulations, i.e. for encouraging operators to increase tourist satisfaction levels by improving compliance with regulations. 	Filby <i>et al.</i> (2015b)
Short-beaked common dolphin, <i>Delphinus delphis</i>	Bay of Plenty, North Island of New Zealand	<ul style="list-style-type: none"> - Non-compliance with the whalewatching regulations for interaction time with dolphins was exceeded in 14.8% of encounters. - The number of vessels in the vicinity of dolphins exceeded the upper limit in 24.1% of encounters. - The speed limit within 300m of dolphins was exceeded in 51.3% of encounters. - On one occasion a swim-with-dolphin encounter with a calf (which is prohibited) was documented. 	Meissner <i>et al.</i> (2015)

The sub-committee acknowledged submission of SC/66a/WW17rev4 but did not discuss the paper, as the authors did not attend the meeting.

SC/66a/WW18 described a new regulation on whalewatching in Ecuador. In 2008, the Constitution of Ecuador guaranteed the Rights of Nature, referring to indigenous traditions, knowledge, and different concepts of nature. In 2014, the Ministries of Environment, Tourism, Public Works, and National Defense signed Inter-ministerial Agreement No. 20140004, for the Regulation of Whalewatching Tourism in Ecuador, to replace the 2002 Whalewatching Regulation. The Agreement covers the coast and Amazon regions.

The sub-committee welcomed this paper and invited additional information on the new Agreement and its effectiveness to be submitted next year.

Reseau d'observation de mammiferes marins (ROMM) (2014) is a mariner's guide to whales in the northwest Atlantic. While primarily targeting large container and cargo ships and offering recommendations for avoiding collisions, some of its advice is relevant to whalewatching vessels, especially larger commercial boats. For example, the guide alerts mariners to the need to be especially vigilant against collisions with whales when there are adverse weather conditions, when the vessel is travelling at higher speed, and when the vessel is in areas of known high occurrence of whales, among other things.

During discussion, while the sub-committee noted the success of regulations in the Atlantic to minimise risk of ship strikes for northern right whales, it acknowledged that the larger problem in the context of whalewatching was smaller vessels. In addition, all vessels that may slow to view whales must be considered when addressing collision risk, not just commercial whalewatching boats. The sub-committee **encouraged** additional research (with presentations to the sub-committee) on collision risk in the context of whalewatching and **agreed** that regulations and guidelines meant to minimise collision risk should apply to all vessels around whales. The sub-committee's attention was drawn to the collision of a dive vessel with a whale in Cabos San Lucas, Mexico earlier in 2015, where a passenger was killed.

Carlson noted that the IWC Compendium of Whalewatching Guidelines and Regulations was not updated last year, but an update will be available this year.

A study to identify best practises in Pacific whalewatching, as reflected in US and Canadian whalewatching guidelines, was conducted from December 2014 to May 2015. The study noted a 60% rate of noncompliance with the ≤ 30 min viewing guideline during the first pursuit of a baleen whale.

After the first pursuit, any subsequent pursuits showed greater rates of compliance with this guideline. It is probable that whalewatching operators wish to ensure customer satisfaction while also minimising fuel costs, which may contribute to longer (noncompliant) viewing time during the first pursuit. The relevance of this viewing time guideline should be further evaluated.

The sub-committee thanked the author for presenting these data. During discussion, it was suggested that looking at dive times would be useful, as guidelines often say ≤ 30 min or '2-3 dives'. In addition, guidelines often say that whalewatching vessels should not depart the area until a whale surfaces from a dive. One member asked if it is considered compliant for a vessel to watch a group of whales for 30 minutes, leave the area, and then return to the initial group sometime later the same day to watch for another 30 minutes. Guidelines are not clear on this point. Additional research, to identify relevance of this guideline considering species-specific dive times and surface intervals, was advised.

11. EMERGING WHALEWATCHING INDUSTRIES OF CONCERN

Mahanty *et al.* (2015) reported the results of a passive acoustic monitoring study undertaken in the southeastern Arabian Sea off the coast of Kerala, India in January to May 2015. The study identified what may be a new humpback whale breeding habitat in the northern Indian Ocean, as detected by one fixed, static array. Song detections were made on 10 occasions within an estimated range of 35km of the array. Detections were made between January and March, with highest frequency of detections in February.

In response to a question, it was noted that prior to this study, the most distant acoustic detection of humpback whales from the Arabian Sea area was Sri Lanka. The presence of singing whales suggest this may be a previously unknown breeding area. While sightings have been made throughout the Arabian Sea, the connectivity of these whale groups is unknown. The catalogue in Oman is being compared to a handful of photos elsewhere, but so far no matches have been made. To date, there are no records of individual whales identified in Omani waters moving out to more distant sightings locations.

In further discussion, it was noted that there is potential for expansion of whalewatching to these other locations within the Arabian Sea, but it is as yet unknown how many whales actually inhabit these areas (beyond Oman). It is possible numbers of whales are insufficient to support an industry. As tourism infrastructure exists in some of these areas and dolphin-watching may already be occurring, at

least opportunistic humpback whalewatching could follow. Researchers in India and other range states would be better qualified to address this question and are invited to submit information to SC/66b.

It was suggested that a regional organisation in the Arabian Sea could be effective in addressing the management concerns that arise with this critically endangered population. In response, it was noted that the region previously proposed such a group, but it may be too early for one to form, given the lack of knowledge about the whales in some areas within the region. There needs to be more education and outreach to Arabian Sea range states, particularly those that are not Commission Members or otherwise aware of this issue. At present there is an informal network of colleagues throughout the region.

Minton *et al.* (2015) reported on a workshop held in Dubai in January 2015, attended by regional researchers with the aim to review information and develop a unified and collaborative research strategy for Arabian Sea humpback whales. Summaries were presented to the workshop from members of each range state that covered known biology, spatial distribution, threats and capacity of active organisations in cetacean research in each country. Knowledge and capacity gaps were identified and recommendations made, including establishing network resourcing and outreach links with additional stakeholders and governments of range states. Large scale GIS mapping exercises and field research to address knowledge gaps and identify industry threats were noted as priorities. Studies have started and group efforts are feeding into a Convention on Migratory Species Ecologically and Biologically Sensitive Areas process. The group now requires basic resources to initiate work plans.

After this report was prepared, a questionnaire was sent to workshop participants to learn about their capacity to address issues raised in the workshop. Developing relevant modelling and data-sharing platforms were identified as important goals. Other regional treaty organisations are looking at the conservation issues in the Arabian Sea and efforts to secure more leverage, including identifying funding sources, to pursue important management initiatives are being undertaken. Ecosystem-based management is also being addressed. The sub-committee **agreed** that every effort to conduct whalewatching management regionally must be made and it **endorsed** the workshop's recommendations (see Executive Summary in Minton *et al.*, 2015). These workshop recommendations did not include using whalewatching vessels as platforms of opportunity, primarily because outside of Oman, the range states do not yet have a sufficient whalewatching industry to support platform of opportunity data collection.

Finally, an overview of research activities and emerging threats in Oman during the 2014-15 season was presented, and the proposed approach for spending funds allocated by the Commission in 2014 to support development of a sustainable whalewatching industry in the Sultanate was described. It was noted that research continues to confirm the importance of two key areas (Hallaniyats Bay and Gulf of Masirah) as important Arabian Sea humpback whale habitat, where threats from shipping, hydrocarbon exploration and extraction, and fishing industries are emerging. The population's status (Minton *et al.*, 2008) is vulnerable due to low genetic diversity (Pomilla *et al.*, 2014) and reports of poxvirus are increasing in prevalence (Van Bresse *et al.*, 2014). In addition, five strandings reported in the last five months emphasised the severity of conservation threats

facing this population. Feedback on cetacean sightings is continuing from tour operators previously engaged in training workshops in 2013/14. The proposed approach for 2014-16 Commission funding is to continue with the same team and condense the work plan into one year, concentrating on training vessel captains to ensure they adhere to guidelines. Government and industry stakeholders will also be consulted to get further comment on regulation and monitoring of the industry.

The sub-committee welcomed this effort. It thanked Willson for preparing this presentation and the Commission for its financial support for this work. It was noted that the positive influence of this work might wain as time passes, so it would be useful to retain someone to continue follow-up with boat operators over the long-term. In addition, it was noted that operators target spinner dolphins in Muscat and Indo-Pacific humpbacked dolphins elsewhere, and therefore the industry has the potential for rapid expansion to humpback whales. The sub-committee **agreed** that there is a need to cap the number of boats until there are effective regulations in place, to ensure the sustainability of the industry, and **recommended** management action to limit the industry's expansion until regulations are developed.

12. PROGRESS ON PREVIOUS RECOMMENDATIONS

At SC/65b, the sub-committee recommended compiling examples where Committee advice on whalewatching has been utilised when successfully developing guidelines or other protective initiatives for whalewatching management. It was suggested that referring to the sub-committee's reports would be a way to identify this information. However, when this effort was undertaken, many more examples beyond the report were discovered. Therefore, a questionnaire has been developed to gather this information from the wider scientific and management communities. A draft of the questionnaire was presented to the sub-committee for review and comment. The sub-committee welcomed the questionnaire and **recommended** that the developers solicit comment from sub-committee members at this meeting and intersessionally, distribute the questionnaire before SC/66b, and report back with any results at that meeting.

Returning to discussion and presentations on Bocas del Toro, Panama, SC/66a/WW14, SC/66a/WW15, and SC/66a/WW16 were presented sequentially. The authors of these three papers thanked Pacific Whale Foundation for providing funding for this work.

At SC/64, the Committee 'strongly recommend[ed] that Panamanian authorities enforce the relevant whalewatching regulation (ADM/ARAP No. 01) and in particular promote adherence to requirements regarding boat number and approach speed and distances' (IWC, 2013, p.61). SC/66a/WW14 outlined the results of boat-based observations of whalewatching operator compliance with these regulations in Bocas del Toro. Almost three-quarters of boat operators were noncompliant with boat distance requirements (requirement=100m; boats approached within 50m of dolphins). When boat operators, at both noncompliant and compliant distances, were further evaluated for their compliance with the regulations on boat manoeuvring (such as switching engines off or putting them in neutral, following dolphins, driving through and circling dolphin groups), boat operators at noncompliant distances (≤ 50 m) were also noncompliant with respect to their manoeuvring 67% of the time, i.e. they were 'double noncompliant'. Boat operators at compliant distances (≥ 100 m) manoeuvred in a noncompliant

manner 58% of the time; therefore, many boat operators compliant for distance were still noncompliant with other regulations. Operators were also often noncompliant with the requirement for limited number of boats: 45% of the time, three or more boats at a time were recorded observing a dolphin group (requirement=two boats at a time observing a dolphin group), and up to 15 boats were seen with a group of dolphins on three occasions. This study took place during the 'low' tourism season and therefore it is likely that the situation is much worse in the 'high' season.

In response to the recommendation made by the sub-committee at SC/65b (IWC, 2014b, p.326), two social surveys were conducted in Bocas del Toro to investigate the human dimensions of dolphin-watching tourism in the region: one of tourists' perspectives on dolphin-watching in Bocas del Toro (SC/66a/WW15) and the other of boat operators' knowledge about local dolphins and their perspectives on dolphin conservation and dolphin tourism in Bocas del Toro (SC/66a/WW16).

SC/66a/WW15 indicated that tourists wanted more educational tours (88% of tourists said this was important) and they wanted a boat operator who was licensed for whalewatching (87%), educated about dolphins (92%), and followed whalewatching regulations (97%). A majority of tourists also said that they did not think the Panamanian Government was effective in protecting the marine environment, while 66% of tourists said there were environmental issues that the government was not addressing. Finally, 93% of tourists believed that the Panamanian Government should provide more environmental protection for Bocas del Toro.

SC/66a/WW16 reported that 47% of boat operators said they have not received any whalewatching training. Only 27% said they were aware of official whalewatching regulations, while 40% said they did not know of any regulations and 33% emphatically stated there were no regulations. Boat operators were not following Panama's whalewatching regulations: 80% of boat operators admitted that they approached dolphins to distances of 50m or less, although the regulations prohibit approaches closer than 100m. All boat operators who stated that they had received whalewatching training admitted that they approached dolphins to ≤ 50 m. Boat operators were also not knowledgeable about the status of the dolphins. However, boat operators stated that dolphin conservation was important to them (93% of boat operators said that marine environmental protection was important, and 93% said that dolphin conservation was 'very important' to them). In addition, 80% of boat operators said they were more likely to vote for a politician that supported dolphin conservation. Finally, 100% of boat operators said they would like to receive dolphin-watching training if it were offered.

So despite a lack of compliance with dolphin-watching regulations in Bocas del Toro, tourists are supportive of regulations for boat operators and better environmental protection in the region, and boat operators agree that protecting the local dolphins is important and they are interested in receiving training in sustainable viewing practises.

SC/66a/WW01 described a community planning effort for Bocas del Toro. Five meetings, taking place in late 2014 through early 2015, were organised with local leaders and representatives of some of the relevant government agencies. The meeting participants noted three urgent issues to be addressed within the next year: (1) restructuring the tours offered to significantly reduce the use of Dolphin Bay

and other threatened ecosystems; (2) building a 'dolphin centre' at the entrance of Dolphin Bay, to serve as a control post for boats entering the bay and as a visitor centre; and (3) implementing a dolphin-watching licensing scheme (and compliance evaluation). These steps will help to reduce boat traffic within Dolphin Bay, an urgent need to reduce pressure on this small dolphin population.

In discussion of this paper, some members were of the opinion that if a dolphin centre is built, it should perhaps be in the town of Bocas del Toro, so it is part of the community. If it is built at the entrance of Dolphin Bay, it will be isolated from stakeholders and less effective.

In the general over-arching discussion on the Dolphin Bay situation that followed these papers, it was noted that training workshops that rely on PowerPoint presentations and printed materials are often ineffective in Bocas del Toro, as many boat operators are functionally illiterate. Operators prefer to speak with people they know and may not feel comfortable asking questions of or admitting they do not know something to non-locals and government officials, who may thus be ignored.

It was suggested that politicians should become constructively involved in the issue and, if they are local, could become trusted liaisons for the community with the federal government. It was also noted that operators are doing what passengers ask them to do; for example, passengers ask the operators to get closer to the dolphins and the operators comply, despite knowing close approaches within 100m are illegal. Therefore, it is important to educate passengers, so they understand that close approaches are harmful.

A discussion ensued about the efficacy of 'top-down' versus 'bottom-up' regulation of whalewatching. Some members feel bottom-up, community level management may be more effective in communities like Bocas del Toro compared to top-down, government-enforced management. The sub-committee **recommended** additional studies on the effectiveness of the two styles of whalewatching management, with results to be presented at future Committee meetings. It was noted that guidelines can work, but only if local boat and tourism operators feel ownership of them. The sub-committee **recommended** that any future workshops in Bocas be designed to maximise the sense of local ownership of the process and outcomes.

The sub-committee **agreed** that tourism representatives should also be included in these workshops wherever appropriate and possible. It was suggested that reaching tourists before they even arrive in the region is important, perhaps via guides (e.g. *Fodor's*, *Lonely Planet*) or leaflets and brochures in travel agents and the like. It was noted that any written material must be structured specifically for the culture being targeted. What may be effective in messaging or design with one culture might be ineffective with another. These initial contacts with tourists must set realistic expectations from the outset; too many tour company brochures feature rare, spectacular occurrences (e.g. bow-riding dolphins) that lead customers to have unrealistic expectations of the tourism experience. The sub-committee **recommended** that researchers and managers working in Bocas del Toro work with those who advertise the area as a tourism destination to set more realistic and conservation-minded expectations, so tourists can recognise that the dolphin-watching situation in the archipelago is unsustainable and can ask operators for a more environmentally-benign experience.

In reviewing the large amount of information presented to the sub-committee in response to previous recommendations on Bocas del Toro, the sub-committee **expressed grave**

Table 5
Intersessional working groups and related information.

Group	Terms of reference	Membership
Modelling and Assessment of Whalewatching Impacts (MAWI) (Steering Group)	Define specific research questions and hypotheses that will benefit understanding of the impact of whalewatching, identify those whalewatching locations that would be most suitable and amenable for targeted studies addressing these questions, and summarise the current modelling tools available to analyse the data that will be collected.	New (Convenor), Carlson, Cook, Kaufman, Leaper, Parsons, Ritter, Robbins, Rose, Simmonds, Weinrich
Swim-with-whale operations	Assess the extent and potential impact of swim-with-whale operations.	Rose (Convenor), Gero, Kaufman, Parsons, Ritter, Sironi, Weinrich
Providing input to the Standing Working Group on Whalewatching	Collate information to assist Commission's Standing Working Group on Whalewatching to populate the Whalewatching Handbook; prepare summaries of areas of concern; other tasks as needed.	Rojas-Bracho (Convenor), Carlson, Iñiguez, Kaufman, Luna, Parsons, Ritter, Weinrich
Guiding principles for data collection forms	Work on finalising a list of standardised elements, with descriptions/explanations, which should be included in a data collection form for use on platforms of opportunity, to be hosted by the Commission website.	Rose (Convenor), Carlson, Kaufman, Ritter, Rodriguez-Fonseca, Robbins, Vinding, Weinrich
Developing a structure for the annual whalewatching digest summary table	Finalise the parameters to be included in the table presenting the information in the annual whalewatching digest.	Parsons (Convenor), Carlson, Kaufman, Rose

concern about the continuing, intransigent situation with dolphin harassment by dolphin-watching operators in Dolphin Bay and noted that the advice it has been offering to the Panamanian Government over a number of years is not being heeded. It **recommended** that dolphin-watching in Panama be a focus of discussion at the Joint Meeting of the Scientific and Conservation Committees at the end of SC/66a and **agreed** that the Joint Meeting should consider:

- (1) how this particular concern and associated advice might be most effectively delivered to the relevant authorities in Panama; and
- (2) more generally, how concerns and advice about whale-watching might be most effectively delivered to the relevant countries/authorities.

The sub-committee reiterated several points made at previous meetings, including that Panamanian authorities are insufficiently invested in or committed to controlling the dolphin-watching situation in Bocas, despite the repeated recommendations of the Committee and others. The sub-committee **recommended** that the relevant authorities make the enforcement of the dolphin-watching regulations a higher priority.

It was suggested that specific authorities for whalewatching or specific operations by general authorities focused on whalewatching might be one solution to the enforcement problem. Others noted that preventing violations in the first place, rather than enforcing violations, was equally, if not more, important. Education of tour operators and tourists is essential, to prevent negative behaviour before it occurs. Experiential learning, with training on the water by trusted peers, may be the most effective educational method for small communities such as Bocas del Toro.

The sub-committee **agreed** that efforts to address the situation in Bocas del Toro must be three-pronged: (1) engage the authorities; (2) educate boat and tourism operators and tourists; and (3) support research. However, after some discussion, the sub-committee **strongly recommended** the formation of a permanent local organisation in Bocas del Toro to manage these three approaches. In the past, many positive impacts from research, education, or capacity building projects were temporary because there was no long-term presence in the town to carry through with these efforts. Tourists, boat operators, and the community all support more protection for the Bocas del Toro dolphins, but without local champions and long-term local ownership of capacity building efforts, the situation is unlikely to improve.

One member described a case study in Argentina that might be considered a model for moving forward with addressing the situation in Panama (Sironi *et al.*, 2009). A local NGO organised a workshop in 2005, in which all stakeholders affected by whalewatching participated. Within two years, the provincial government of Chubut organised monthly meetings with these stakeholders, which went on for one year, to work on the text for a statute that would regulate whalewatching. The text was agreed by everyone at the end of that period. The law allowed for dynamic management, to address any adjustments needed after the law was implemented. Panama could possibly consider this as an example for addressing the situation in Bocas del Toro.

Some members expressed concern about the lack of tangible commitment from governments to responsible whalewatching. In southern Brazil, all relevant elements, including community buy-in and regulations, were present, but the latter were not enforced. A lawsuit eventually suspended whalewatching in a protected area. All the needed ingredients – community involvement, education, regulations, and so on – may be present in a region, but without a government's tangible investment, efforts to ensure responsible whalewatching might still fail.

13. WORK PLAN

The work plan prioritised major items as listed below.

- (1) Assess the impacts of whalewatching on cetaceans (methods and results of changes in behaviour and movement patterns; methods and results of physiological changes to individuals; methods and results of demographic and distributional changes).

In addition, the following items were **agreed** for the next meeting.

- (1) Review reports from Intersessional Working Groups: (i) Modelling and Assessment of Whalewatching Impacts (MAWI) steering group; (ii) swim-with-whale operations; (iii) providing input to the Standing Working Group on Whalewatching; (iv) guiding principles for data collection forms from platforms of opportunity; and (v) developing a structure for the annual whalewatching digest summary table.
- (2) Review whalewatching in the region of the South Pacific.
- (3) Consider information from platforms of opportunity of potential value to the Scientific Committee.

- (4) Review of whalewatching guidelines and regulations (methods and results of compliance with guidelines/regulations; methods and results of efficacy of 'top-down' versus 'bottom-up' management; update development of guidelines or regulations in existing and new jurisdictions).
- (5) Consider emerging issues of concern (e.g. new areas/species, new technologies, in-water interactions).
- (6) Review progress on previous recommendations.

The sub-committee discussed the work plan and set priorities for the next two years as listed. Terms of reference and members of the Intersessional Working Groups as agreed by the sub-committee are listed in Table 5.

14. ADOPTION OF THE REPORT

The report was adopted at 15:07 on 28 May 2015. The sub-committee thanked Urbán and Carlson for their wise guidance during the discussions and Rose for her efficient rapporteuring.

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Appendix 1**AGENDA**

1. Opening remarks
 2. Election of Chair(s) and appointment of rapporteur(s)
 3. Adoption of agenda
 4. Review of available documents
 5. Assess the impacts of whalewatching on cetaceans (methods and results of changes in behaviour and movement patterns; methods and results of physiological changes to individuals; and methods and results of demographic and distributional changes)
 6. Review reports from Intersessional Working Groups
 - 6.1 Modelling and Assessment of Whalewatching Impacts (MAWI) steering group
 - 6.2 Swim-with-whale operations
 - 6.3 In-water interactions
 - 6.4 Populating the Handbook
 - 6.5 Guiding principles for data collection forms from platforms of opportunity
 7. Review progress on Five-Year Strategic Plan for Whalewatching
 8. Review whalewatching of the western United States
 9. Consider information from platforms of opportunity of potential value to the Scientific Committee
 10. Review of whalewatching guidelines and regulations
 11. Emerging whalewatching industries of concern
 12. Progress on previous recommendations
 13. Other issues
 14. Work plan
 15. Adoption of report
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