

Annex to Resolution 11.29 (Rev. COP12)

SPECIES-SPECIFIC GUIDELINES FOR BOAT-BASED WILDLIFE WATCHING

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SPECIES-SPECIFIC GUIDELINES FOR BOAT-BASED WILDLIFE WATCHING

INTRODUCTION

Wildlife watching is simply defined as the organized or incidental viewing of animals in their natural environment (Valentine & Birtles, 2004). In the marine realm, wildlife-watching activities can be conducted by boat and usually target large marine animals such as marine mammals (including cetaceans, pinnipeds and sirenians), sharks and rays, marine turtles (Higham & Lück, 2008) and / or large aggregations of animals (e.g. nesting colonies of sea birds) (Carney & Sydman, 1999).

Marine wildlife watching has some obvious benefits:

- It raises environmental awareness by providing people with information on threats to a species;
- It supports conservation efforts through data collection;
- It supports the local economy by employing people from local communities (Inman *et al.*, 2016).

However, the continued presence of boats targeting and remaining for long periods with an individual or a group of animals, the noise of the engine, and human-wildlife interactions can have immediate and cumulative negative effects on animal behaviour (Green & Giese, 2004). Boat-based wildlife watching can be at the origin of negative effects such as:

- Changes in habitat use and/or displacement (Buckingham *et al.*, 1999);
- Changes in short-term natural behaviour (Magalhañes *et al.*, 2002; Lusseau, 2003);
- Chronic stress induced by long-term exposure to boats (Lusseau & Bieder, 2007; Parsons, 2012);
- Changes in energy expenditure with potential negative consequences on individuals and overall population health (Erbe, 2002);
- Injuries and death as a consequence of collision with boats or other motorized vessels (Quiros, 2007).

Guidelines, codes of conduct and regulations have been the most commonly used method to try and mitigate the negative impacts of wildlife watching (Birtles *et al.*, 2002). Species-specific guidelines for boat-based wildlife watching can provide targeted management measures to reduce disturbance to species within a particular location (Giles, 2014). They can also be designed to consider seasonal species distributions and tourism cycles, making the management strategies more targeted towards the local species behaviour and patterns of habitat use (Inman *et al.*, 2016). For example, the number of boats allowed to conduct wildlife-watching tours can be reduced during particularly delicate seasons (e.g. nesting season for seabirds), or the minimum distance between a boat and an animal or group of animals can be increased during breeding seasons when new-borns are present (Curtin, 2010).

SCOPE AND PURPOSE OF THIS DOCUMENT

The aim of this document is to provide general best practice guidelines to assist CMS Parties interested in adopting appropriate measures to ensure the sustainability of any boat-based wildlife-watching activities in their area of jurisdiction.

The guidelines provided here aim at ensuring that boat-based wildlife-watching activities do not have negative effects on the long-term survival of populations and habitats, and have minimal impact on the behaviour of watched and associated animals.

These guidelines address **boat-based wildlife watching only** and do not include measures to reduce the impact of other activities such as 'swim-with' or 'dive-with' that might occur at the same time. When more activities occur at the same time, specific guidelines and limitations shall be included to ensure the safety of marine wildlife and all participants.

These guidelines do not address case- or nation-specific situations but are meant to provide a general overview of the measures usually adopted to mitigate impacts of boat-based wildlife-watching activities and reduce disturbance of marine wildlife. Local environmental impact assessments shall be conducted to identify the most suitable and practical measures to be included in the guidelines. When environmental impact assessments cannot be conducted, a precautionary approach shall be used.

These guidelines target the following groups of species:

- Sirenians;
- Marine turtles;
- Pinnipeds;
- Elasmobranchs (sharks, skates and rays);
- Seabirds.

CMS in collaboration with the International Whaling Commission (IWC) is developing specific guidance targeting cetacean-watching operations; therefore, this group is not included in this document.

DOCUMENT STRUCTURE

This document consists of two parts:

PART 1: General considerations concerning boat-based wildlife watching

Part 1 addresses broader issues to be taken into account when establishing national guidelines for boat-based wildlife watching.

PART 2: Species-specific considerations for developing guidelines for boat-based wildlife watching

Part 2 includes recommendations for species-specific guidelines based on the draft outline contained in the Annex to UNEP/CMS/COP11/Doc.23.4.5. The guidelines address seven points:

1. General description of species/group of species
2. Risks for wildlife related to boat-based watching activities
3. Indicators of disturbance
4. Factors to consider
5. Additional management considerations
6. Other suggested elements to be included in the guidelines
7. Guidelines and suggested thresholds
 - a. Level of Activity
 - b. Method of approach
 - c. Interactions

Supplementary material provided in UNEP/CMS/COP12/Inf.16 consists of: sample species-specific guidelines for boat operators and examples of stress signs in marine wildlife; a list of

currently in use codes of conducts relevant to the groups of species targeted in this document; a list of peer-reviewed publications on the impacts of wildlife-watching activities on the groups of species targeted in this document.

HOW TO USE THIS DOCUMENT

This document is meant as a guide to facilitate the selection of best practices for boat-based wildlife-watching tours considering most frequent options and local conditions. This document offers some examples of limitations currently in use (e.g. maximum speed, minimum distance, maximum number of vessels that can interact with one individual, etc.). These thresholds are generally based on species-specific or location-specific studies. Nevertheless, disturbance depends on various factors, including animal habituation, local weather and current conditions. Therefore, local environmental impact assessments are always encouraged to identify specific and locally relevant thresholds. When environmental impact assessments cannot be conducted, a precautionary approach shall be adopted and guideline measures shall be based on the best available scientific evidence.

This document does not address other wildlife-related activities that might occur at the same time as boat-based wildlife-watching tours (e.g. 'swim-with', diving, snorkelling, etc.); however, it is important to consider cumulative effects from all possible disturbance sources when establishing guidelines.

The supplementary material (UNEP/CMS/COP12/Inf.16) includes sample guidelines for boat operators, a list of codes of conduct currently in use, and a non-exhaustive list of peer-reviewed publications addressing the impacts of disturbance on marine wildlife.

PART 1: GENERAL CONSIDERATIONS CONCERNING BOAT-BASED WILDLIFE WATCHING

1.1 ENVIRONMENTAL IMPACT ASSESSMENTS

Environmental impact assessments (EIAs) should be conducted prior to the establishment of boat-based wildlife-watching operations to evaluate the ecological, social and economic impacts of such activities.

Where threatened species are targeted, boat-based wildlife-watching activities should only be permitted after the conduct of thorough assessments of the status of the target populations concerned (numbers, distribution and other characteristics of the target population/s in an area) as well as potential impacts of the boat-based wildlife-watching activities on the behaviour and habitats of the target wildlife.

The assessment of ecological impacts of boat-based wildlife-watching activities should include short-, medium- and long-term cumulative effects on the species ecology, well-being and conservation status, as well as on their habitats.

EIAs should identify locally important areas for a species (e.g. nesting grounds, feeding grounds, aggregation sites, etc.) as well as sensitive seasons (e.g. nesting or breeding), temporal and spatial variations of habitat use and migration routes.

Whenever possible, EIAs should be carried out to assess:

- Maximum number of vessels allowed to interact with one animal or a group of animals at the same time;
- Time of the day when interactions can occur and maximum number of hours during which boat-based wildlife-watching activities can be carried out;
- Minimum distance to be kept from an animal and maximum speed allowed in the interaction zone.

When these parameters cannot be evaluated through EIAs, a precautionary approach should be used based on existing studies and codes of conduct.

In areas where boat-based wildlife-watching tours coincide with other wildlife-related activities (e.g. 'swim-with' activities), EIAs should consider the cumulative impacts derived from all interactions and further restrictions should be considered.

1.2 CONSIDERATIONS ABOUT VESSELS

Vessel design should allow for the operator to have sufficient field of vision in order to avoid collision with wildlife.

The size, type and manoeuvrability of the vessels should be taken into consideration when establishing minimum distances and speed limits.

The size, type, and mode of propulsion of a vessel should be suitable for the local conditions.

Personal watercraft such as jet skis should generally be prohibited from conducting wildlife-watching activities due to their reduced steering ability, limited field view in front and the need for a group to use more than one vessel at the same time.

The use of propeller guards should be considered to reduce injuries to and mortality of marine species in case of collision. However, recent studies suggest that the most effective way to reduce risks of injury and mortality is to reduce the vessel speed below 'wake speed' (i.e. five knots) (Work *et al.*, 2010).

1.3 LICENSING/PERMITS FOR BOAT-BASED MARINE WILDLIFE WATCHING

It is advised that when commercial wildlife watching occurs, a licensing/permits system to limit the number of operating vessels is implemented in order to have some control on the maximum number of boats able to interact with wildlife.

Where boat-based wildlife watching occurs in protected areas, areas of special interest for conservation, and ecologically important areas, it is strongly recommended that all boat-based wildlife-watching operators are licensed.

A licensing / permits scheme should include training for boat-based wildlife-watching operators to inform them about:

- The biology and behaviour of the species,
- Effective regulations,
- Management of risks to humans and animals,
- Reduction of disturbance,
- Involvement in scientific research,
- Any known cultural value of the species to local communities,
- Education of their clients,
- Accreditation requirements and procedures, and so forth.

Compliance with conditions for boat-based wildlife watching should be monitored and assessed at appropriate intervals and where non-compliance or the risk of non-compliance is identified appropriate measures should be undertaken, including increasing educational efforts.

Prosecution action should be considered when investigations conducted through due process reveal serious and/or repetitive breaches of conditions.

A 'warning system' should be available for compliance officers to apply under special circumstances. All warning systems should include provision to record any warnings issued.

A 'sighting reporting scheme' should be included in all licensing / permit scheme, enabling boat tour operators to report their wildlife sightings or any other anomalous observation, and alert authorities in case of injured or dead animals.

1.4 OTHER IMPORTANT CONSIDERATIONS

In areas where 'swim-with' activities take place, interaction times and number of vessels and people interacting with one animal should be further reduced. 'Swim-with' activities result in negative impacts on wildlife and special care should be taken in investigating cumulative impacts from all sources of disturbance.

Provisioning is often associated with marine wildlife watching, particularly in the case of elasmobranchs and pelagic seabirds. Provisioning has various well known negative effects on marine wildlife (Orams, 2002; Laroche *et al.*, 2007; Hammerschlag *et al.*, 2012) and therefore should be generally prohibited. When provisioning is allowed, regulations should be in place to limit its negative effects.

Where personal and recreational crafts are used, owners should be encouraged by local administrations to adopt the same codes of conduct used by commercial wildlife-watching operators. Owners of recreational crafts should be invited to attend educational events to better understand the effects of boat-based wildlife-watching operations. Educational material should be displayed in harbours and marinas and distributed to owners of personal and recreational crafts.

Where observed marine wildlife is associated with sensitive habitats, special care should be taken not to damage those habitats (e.g. seagrass meadows and coral reefs) (Allen 1992; Ritter & Schafer, 1998; Uhrin & Holmquist, 2003).

1.5 DEFINITIONS

Caution zone refers to the area where boats can approach wildlife and where the **interaction** can take place. In the caution zone, boats must reduce their speed and eventually the engine must be put in neutral. When boat-based wildlife watching and swim-with activities occur simultaneously, **swim-only** and **boat-only** areas might be created to avoid conflicts between boat users and people in the water and reduce impacts on marine wildlife.

Boat only zone refers to the area within the **caution zone** where boats are allowed to interact with marine wildlife. No swimmers should be allowed in the boat only zone. When swim-with activities are run at the same time as boat-based wildlife-watching tours, swimmers should use a **swim-only zone**.

Disturbance refers to the result of direct or indirect human-wildlife interaction that changes the behaviour of an animal or changes the environment in which the animal lives, which in turn affect its well-being and survival in the short, medium and/or long term (Evans, 1996). Some examples of disturbance are: direct injuries or death, changes in habitat uses, changes in behaviour, changes or damages to habitat, increased physical stress, etc. (SMWWC, 2005).

Harassment refers to disturbance that is repeated in multiple events over time. While **Disturbance** and **harassment** have a subtle difference in meaning, in most literature they are used interchangeably (Kelly *et al.*, 2004).

Human – animal interaction or simply **interaction** refers to all recreational, educational or entertaining activities that involve the observation of wildlife in their natural habitat. This includes for example observing animals at the surface from a vessel, swimming and/or diving with them. An **interaction** starts when a vessel enters the **caution zone** and last for the maximum interaction time allowed in a code of conduct or until the animal leaves, whatever happens first.

No access zone refers to the area around, beneath and above an animal or a group of animals that is strictly off limits to both vessels and people at all times.

Swim only zone refers to the area within the Caution zone where swimmers / divers only are allowed.

Swim-with activity refers to all the activities that involve having people in the water to swim, dive or snorkel with marine wildlife.

Vessel refers to a motorized or non-motorized boat used to transport people for dedicated **interactions** with marine wildlife. Some examples of vessels: ship, sailboat, yacht, zodiac, small boats, kayak.

Waiting zone refers to the area where vessels can wait for their turn to interact with wildlife while the maximum allowed number of vessels is in the caution zone.

Wildlife watching refers to the organized or incidental viewing of free ranging animals in their natural habitats (Valentine & Birtles, 2004).

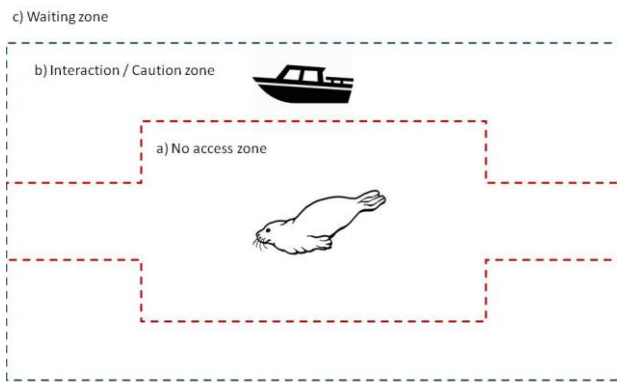


Figure 1. Simplified diagrams of the various zones to consider when conducting a boat-based wildlife-watching tour.

PART 2: SPECIES-SPECIFIC CONSIDERATIONS FOR DEVELOPING GUIDELINES FOR BOAT-BASED WILDLIFE WATCHING

SIRENIANS¹

GENERAL DESCRIPTION OF GROUP OF SPECIES

Sirenians are a small order of marine mammals which currently includes only four living species divided into two families, Dugongidae and Trichechidae. The Family Trichechidae includes three species: the West Indian Manatee (*Trichechus manatus*), the African Manatee (*Trichechus senegalensis*), and the Amazonian Manatee (*Trichechus inunguis*). The Family Dugongidae includes only one species, the Dugong (*Dugong dugon*).

All Sirenians are herbivorous, predominantly feeding on seagrasses, seaweeds and other aquatic vegetation. They are usually found in tropical and sub-tropical, coastal, aquatic habitats, with a preference for shallow waters with abundant submerged vegetation. The Amazonian Manatee is found only in freshwater habitats; the West Indian Manatee and the African Manatee can withstand high variations of salinity and can move between freshwater and marine habitats. Dugongs are primarily marine mammals (Marsh *et al.*, 2011).

RISKS RELATED TO BOAT-BASED WATCHING ACTIVITIES

- Injuries or death due to collision with boats (Beck *et al.*, 1982; Nowacek *et al.*, 2004);
- Changes in distribution and habitat use (Buckingham *et al.*, 1999);
- Changes in behaviour (Hodgson & Marsh, 2007);
- Destruction or modification of feeding habitats destruction (Uhrin & Holmquist, 2003).
-

EARLY INDICATORS OF DISTURBANCE

- Increased swimming speed;
- Change of direction;
- Sudden change of activity;
- Swimming away from disturbance;
- Abrupt dives or swimming actively to deeper areas (King & Heinen, 2004; Nowacek *et al.*, 2004; Hodgson & Marsh, 2007; Miksis-Old *et al.*, 2007)

FACTORS TO CONSIDER

While these recommendations only address boat-based wildlife-watching activities, it is important to consider that sirenians can be observed according to different modalities and in combination with other activities. Wherever this is the case, special attention should be given to the cumulative short- and long-term impacts of wildlife-watching activities.

Sirenians can be observed:

¹ The scope of these recommendations is to assist CMS Parties interested in adopting codes of conduct to reduce the impact of boat-based watching activities on sirenians in their area of jurisdiction. These recommendations are general and do not consider species-specific or location-specific needs. Furthermore, other activities that may occur at the same time (e.g. diving, swimming) are not covered. Sample codes of conduct currently in use for boat-based sirenian-watching are included in the supplementary material.

- Occasionally as part of other wildlife-watching tours (e.g. in combination with marine turtle-watching tours);
- Regularly, during targeted boat tours. In this case, it is likely to assume that there are aggregations of sirenians in feeding and breeding areas.

Observing sirenians can occur:

- From a boat in combination with 'swim-with' activities.
- From a boat, without 'swim-with' activities.

In case of 'swim-with' activities, the implementation of separate swim only and boat only zones should be considered in addition to the caution and no approach zones.

ADDITIONAL MANAGEMENT CONSIDERATIONS

- **Type of vessel:** consider prohibiting the use of motorized vessels like jet skis, parasails, and hovercraft in Sirenians aggregation sites as these vessels are fast, do not allow for good visibility of the water in front of the vessel, and are subject to sudden change of movements.
- **Use of propeller guards:** the use of propeller guards might reduce the risk of accidentally injuring surfacing animals. However, reducing travelling speed is generally recognized as the most effective way to reduce accidents.
- **Shallow bays and confined waterways:** in confined waterways such as bays, estuaries, channels and rivers it may not be possible for vessels to maintain approach distances and/or respect the number of vessels per animal. Where possible, declaring confined waterways as 'swim-only' areas or as no access areas should be considered.

OTHER SUGGESTED ELEMENTS TO BE INCLUDED IN THE GUIDELINES

- Summary of national legislation related to Sirenians;
- Sanctions for boat operators and visitors in case of non-compliance with national legislation;
- Maps of areas of special interest and suggested routes for boat-based wildlife-watching tours;
- Calendar of aggregation occurrence, if seasonality is observed / known.

SUGGESTED REGULATIONS AND EXISTING THRESHOLDS

LEVEL OF ACTIVITY

Regulations	Explanation	Existing thresholds	References
<ul style="list-style-type: none"> The maximum number of vessels allowed in the caution zone and interacting simultaneously with an individual or a group of sirenians should be limited. 	<p>Vessels operators should be mindful of cumulative impacts that multiple vessels can provoke.</p>	<p>1-3</p>	<p>[1 – 2]</p>
<ul style="list-style-type: none"> The maximum duration of interaction for each vessel should be limited. 	<p>The maximum duration and number of interactions for all vessels at one site should be estimated and used to limit the number of vessels per day.</p>	<p>15 – 30 minutes</p>	<p>[1 – 6]</p>
<ul style="list-style-type: none"> Boat-based watching tours targeting sirenians should be conducted only during determined hours. 	<p>The cumulative daily impact of tours in an area should be considered when establishing a maximum time for interaction.</p>	<p>Daytime, up to a maximum of 6 hours per day.</p>	<p>[1]</p>
<ul style="list-style-type: none"> A waiting zone should be set around the caution zone to allow for other vessels to wait for their turn to interact with an individual or a group of sirenians. 		<p>In open waters: 200 to 500 metres</p>	<p>[3-5]</p>
<ul style="list-style-type: none"> When an individual or a group of sirenians are engaged in interaction, other vessels should wait in the waiting zone. 			
<ul style="list-style-type: none"> Where considered necessary, operators should be required to coordinate their activities so that target species are not continuously disturbed throughout the day. 			

METHOD OF APPROACH

<ul style="list-style-type: none"> ▪ The boat operator should reduce speed in areas with high probability of finding sirenians. 	<p>Reducing the speed is the most effective way to reduce injuries and collision with individuals in the water.</p> <p>Consider the type of vessel, sea conditions as well as water visibility when setting maximum speed.</p>	<p>< 5 knots</p>	<p>[1- 7]</p>
<ul style="list-style-type: none"> ▪ A caution zone should be set around an individual or group of sirenians. 	<p>The caution zone represents the minimum distance between an animal and a vessel.</p> <p>The caution zone varies according to the type of vessel, method of propulsion and manoeuvrability.</p>	<p>From 15 or 50 to 100 metres</p>	<p>[1-7]</p>
<ul style="list-style-type: none"> ▪ When in the caution zone, boat operators should approach the animal/s from the side at a low speed. 		<p>< 5 knots</p>	<p>[1-7]</p>
<ul style="list-style-type: none"> ▪ Approaching mothers with calves should always be prohibited. 			
<ul style="list-style-type: none"> ▪ Separating a mother and calf or a group of sirenians should always be prohibited. 			
<ul style="list-style-type: none"> ▪ Trapping an animal or a group of sirenians should be prohibited. Boat operators should position their vessels so as to leave enough space for the animal/s to swim away and/or surfacing. 			
<ul style="list-style-type: none"> ▪ Chasing, pursuing and trying to approach animal/s showing early signs of disturbance or not interested in interacting with the vessel should be forbidden. 			

INTERACTIONS

<ul style="list-style-type: none"> ▪ Disturbing, chasing, harassing or herding animals should be prohibited.

<ul style="list-style-type: none"> Feeding sirenians in the wild should be forbidden. 		
<ul style="list-style-type: none"> Boat operators and tour guides should avoid excess noise or splashing when in proximity to sirenians. 		
<ul style="list-style-type: none"> Touching or attempting to touch sirenians in the wild should be prohibited. 		
<ul style="list-style-type: none"> In the caution zone, the boat operator should maintain constant and predictable direction at low speed. 	< 5 knots	[1–7]
<ul style="list-style-type: none"> At first sign of stress, the boat operator should gently move away from the animal. 		
<ul style="list-style-type: none"> Anchoring on seagrass areas should be prohibited. 		
<ul style="list-style-type: none"> Where possible, boating over seagrass and shallow areas should be prohibited. 		
<ul style="list-style-type: none"> If an animal approaches the boat, the operator should engage in neutral gear and allow the animal to pass. 		
<ul style="list-style-type: none"> On departing, the boat operator should wait until animals are away from the vessel. The boat operator should check bow and stern before engaging the propeller. 	40 m – 300 m	[2-5, 7]
<ul style="list-style-type: none"> While departing the caution zone, the boat operator should keep a slow speed and should not be allowed to accelerate until the waiting zone is reached. 	< 5 knots	[1–7]

[1] Rules and Regulations governing the conduct of marine wildlife tourism interactions in the Philippines. Draft prepared in May 2016

[2] Code of Practice for the Sustainable Management of Dugong and marine turtle tourism in Australia. Published October 2005

[3] Suggested interaction rules for dugong viewing vessels. A Report to the Western Australian Department of Conservation and Land Management. Published in 1997.

[4] Mammal Interaction conditions for dugongs 2 pp. Western Australia Department of Conservation and Land Management: Perth. Published in 1998.

[5] Red Cliff Bay Code of Conduct: Vessels and Marine Mammals in the Red Cliff Bay Region, Shark Bay. Published in 2004

[6] National Marine Fisheries Service (U.S) Southeast region marine mammal and sea turtle viewing guidelines. Accessed May 2017

[7] Best Environmental Practices: Dugong Protection. Great Barrier Reef Marine Park Authority: Townsville. Published in 2004

MARINE TURTLES²

GENERAL DESCRIPTION OF GROUP OF SPECIES

Seven species of marine turtle currently inhabit the oceans: the Green Turtle (*Chelonia mydas*), the Hawksbill Turtle (*Eretmochelys imbricata*), the Loggerhead Turtle (*Caretta caretta*), the Olive Ridley Turtle (*Lepidochelys olivacea*), the Kemps' Ridley Turtle (*Lepidochelys kempii*), the Leatherback Turtle (*Dermochelys coriacea*), and the Flatback Turtle (*Natator depressa*).

Marine turtles are circumglobally distributed and can be found in all oceans (Wallace *et al.*, 2010). They exhibit late sexual maturity, slow growth, low survival rates in the first life stages and are therefore extremely vulnerable to anthropogenic threats such as directed harvest, bycatch, pollution, coastal development and climate change (Mast *et al.*, 2005).

RISKS RELATED TO BOAT-BASED WATCHING ACTIVITIES

- Injuries or death due to collision with boats (Hazel *et al.*, 2007);
- Changes in distribution and habitat use (Schofield *et al.*, 2007);
- Changes in behaviour (Schofield *et al.*, 2006);
- Destruction of feeding and resting habitats (*i.e.* seagrass meadows and coral reefs) (Uhrin & Holmquist, 2003).

EARLY INDICATORS OF DISTURBANCE

- Increased swimming speed;
- Fast diving;
- Change of direction;
- Sudden change of activity;
- Swimming away from disturbance;
- Swimming actively towards deeper areas.

FACTORS TO CONSIDER

While these recommendations only address boat-based wildlife-watching activities, it is important to consider that marine turtles can be observed in accordance with different modalities and in combination with other activities. Wherever this is the case, special attention should be given to the cumulative short- and long-term impacts of wildlife-watching activities.

Marine turtles can be observed:

² The scope of these recommendations is to assist CMS Parties interested in adopting codes of conduct to reduce the impact of boat-based watching activities on marine turtles in their area of jurisdiction. These recommendations are general and do not consider species-specific or location-specific needs. Furthermore, other activities that may occur at the same time (*e.g.* diving, swimming) are not covered. Sample codes of conduct currently in use for boat-based marine turtle-watching are included in the supplementary material.

- Occasionally as part of other wildlife-watching tours (e.g. in combination with Dugong- and manatee-watching tours);
- Regularly, during targeted boat tours. In this case, it is likely to assume that there are aggregations of marine turtles in feeding or nesting areas.

Observing marine turtles can occur:

- From a boat in combination with swim-with activities.
- From a boat, without swim-with activities.

In case of 'swim-with' activities, the implementation of separate swim only and boat only zones should be considered in addition to the caution and no approach zones.

ADDITIONAL MANAGEMENT CONSIDERATIONS

- **Type of vessel:** consider prohibiting the use of motorized vessels such as jet skis and hovercraft in marine turtle aggregation sites as these vessels are fast, do not allow for good visibility of the water in front of the vessel, and are subject to sudden change of movements.
- **Use of propeller guards:** the use of propeller guards might reduce the risk of accidentally injuring surfacing animals. However, decreasing travelling speed is generally recognized as the most effective solution to reduce risks of collision.
- **Shallow bays and confined waterways:** in confined waterways such as bays and lagoons, it may not be possible for vessels to maintain approach distances and/or respect the number of vessels per animal. Where possible, declaring confined waterways as swim-only areas or as no access areas should be considered.

OTHER SUGGESTED ELEMENTS TO BE INCLUDED IN THE GUIDELINES

- Summary of national legislation related to marine turtles;
- Sanctions for boat operators and visitors in case of non-compliance with national legislation;
- Maps of areas of special interest and suggested routes for boat-based wildlife-watching tours;
- Calendar of nesting season and marine turtle aggregation periods.

GUIDELINES AND SUGGESTED THRESHOLDS

LEVEL OF ACTIVITY

Regulations	Explanation	Existing thresholds	References
<ul style="list-style-type: none"> The maximum number of vessels allowed in the caution zone and interacting simultaneously with an individual or a group of marine turtles should be limited. 	Vessels operators should be mindful of cumulative impacts that multiple vessels can provoke.	2	[1]
<ul style="list-style-type: none"> The maximum duration of interaction for each vessel should be limited. 	The maximum duration and number of interactions for all vessels at one site should be estimated and used to limit the number of vessels per day.	30 minutes	[1–4]
<ul style="list-style-type: none"> Boat-based watching tours targeting marine turtles should be conducted only during daytime. 	The cumulative daily impact of tours in an area should be considered when establishing a maximum time for interaction.	Daytime, up to a maximum of 8 hours per day.	[1]
<ul style="list-style-type: none"> No boat-based activity should be allowed in front of a nesting beach during the nesting season. 	Nesting female turtles are known to gather during day in feeding areas close to the nesting grounds. The disturbance in these areas could discourage nesting.		
<ul style="list-style-type: none"> A waiting zone should be set around the caution zone to allow for other vessels to wait for their turn to interact with marine turtles. 		100 to 500 m	[1, 5]
<ul style="list-style-type: none"> When an individual or a group of marine turtles is engaged in interaction, other vessels should wait in the waiting zone. 			
<ul style="list-style-type: none"> Where considered necessary, operators should be required to coordinate their activities so that target species are not continuously disturbed throughout the day. 			

METHOD OF APPROACH

<ul style="list-style-type: none"> The boat operator should reduce speed in areas with high probability of finding marine turtles. 	<p>Reducing the speed is the most effective way to reduce injuries and collision with individuals in the water.</p> <p>Consider the type of vessel, sea conditions as well as water visibility when setting maximum speed.</p>	<p>< 3 - 5 knots</p>	<p>[1, 5]</p>
<ul style="list-style-type: none"> A caution zone should be set around an individual or group of marine turtles. 	<p>The caution zone represents the minimum distance between an animal and a vessel.</p> <p>The caution zone varies according to the type of vessel, method of propulsion and manoeuvrability.</p>	<p>From 20 metres to 100 m</p>	<p>[1–5]</p>
<ul style="list-style-type: none"> When in the caution zone, boat operators should approach the animal/s from the side at a low speed. 		<p>< 5 knots</p>	<p>[5]</p>
<ul style="list-style-type: none"> Trapping an animal or a group of marine turtles should be forbidden. Boat operators should position their vessels so that to leave enough space for the animal/s to swim away and/or surfacing. 			
<ul style="list-style-type: none"> Chasing, pursuing and trying to approach animal/s showing early signs of disturbance or not interested in interacting with the vessel should be forbidden. 			

INTERACTIONS

<ul style="list-style-type: none"> Disturbing, chasing, harassing or herding animals should be prohibited. 			
<ul style="list-style-type: none"> Feeding marine turtles in the wild should be forbidden. 			
<ul style="list-style-type: none"> Touching or attempting to touch or catch marine turtles in the wild should be prohibited. 			

<ul style="list-style-type: none"> ▪ In the caution zone, boat operators should maintain constant and predictable direction at low speed. 	< 5 knots	[5]
<ul style="list-style-type: none"> ▪ At first sign of stress, boat operators should gently move away from the animal. 		
<ul style="list-style-type: none"> ▪ Anchoring on seagrass or coral reef areas should be prohibited. 		
<ul style="list-style-type: none"> ▪ Where possible, boating over seagrass and shallow areas should be prohibited. 		
<ul style="list-style-type: none"> ▪ If an animal approaches the boat, the operator should engage in neutral gear and allow the animal to pass. 		
<ul style="list-style-type: none"> ▪ On departing, the boat operator should wait until animals are away from the vessel. Boat operators should check bow and stern before engaging the propeller. 	min 30m	[5]
<ul style="list-style-type: none"> ▪ While departing the caution zone, boat operators should keep a slow speed and should not be allowed to accelerate until the waiting zone is reached. 	< 5 knots	[5]

[1] Rules and Regulations governing the conduct of marine wildlife tourism interactions in the Philippines. Draft prepared in May 2016

[2] NOAA. Responsibly watching California's marine wildlife: a handbook for ocean users. Accessed May 2017

[3] NOAA. Hawaii viewing guidelines. Accessed May 2017

[4] SERO NMFS. South-east U.S. Marine Mammal and Sea Turtle Viewing Guidelines. Accessed May 2017

[5] Code of Practice for the Sustainable Management of Dugong and Marine Turtle Tourism in Australia. Published in 2005

PINNIPEDS³

GENERAL DESCRIPTION OF GROUP OF SPECIES

Pinnipeds are marine mammals which spend part of their life in the water and part of their life on land. While on land, pinnipeds engage in activities such as mating, molting, resting and parenting (Riedman, 1990). Currently there are 34 species of pinnipeds divided into three families: the Phocidae (or true seals), the Otariidae (eared seals and sea lions) and the Odobenidae (the walrus). Generally, pinnipeds occur in cold waters with high marine productivity. Nevertheless, they can also be found in tropical and temperate regions (Schipper *et al.*, 2008).

In the past, most pinnipeds were heavily harvested which brought many populations to the brink of extinction. Currently main threats to pinnipeds are: fishery bycatch, marine pollution and climate change (Kovacs *et al.*, 2012).

Pinnipeds are particularly suitable for wildlife-watching tourism due to their predictability in location, they are approachable, they can be easily observed in open habitats and they can be relatively tolerant to human presence (Hickstadts *et al.*, 2003; Curtin *et al.*, 2009).

RISKS RELATED TO BOAT-BASED WATCHING ACTIVITIES

It is important to consider that different species of pinnipeds react differently to disturbance, with some studies also showing variability in response within the same species according to sex and age (Birtles *et al.*, 2001; Boren *et al.*, 2002). Generally speaking, however, we can say that main risks for pinnipeds associated with boat-based watching activities are:

- Changes in distribution and habitat use (Kucey & Trites, 2006);
- Changes in behaviour (Boren, 2008);
- Injuries or death due to collision with boats (Greenland & Limpus, 2008).

EARLY INDICATORS OF DISTURBANCE

- Increased vocalization rate;
- Aggressive / warning behaviour;
- Increased swimming speed;
- Displacement from hauling sites;
- Swimming or actively moving away from disturbance.

FACTORS TO CONSIDER

While these recommendations only address boat-based wildlife-watching activities, it is important to consider that pinnipeds can be observed according to different modalities and in combination with other activities. Wherever this is the case, special attention should be given to the cumulative short- and long-term impacts of wildlife-watching activities.

³ The scope of these recommendations is to assist CMS Parties interested in adopting codes of conduct to reduce the impact of boat-based watching activities on pinnipeds in their area of jurisdiction. These recommendations are general and do not consider species-specific or location-specific needs. Furthermore, other activities that may occur at the same time (e.g. diving, swimming) are not covered. Sample codes of conduct currently in use for boat-based pinniped-watching are included in the supplementary material.

Pinnipeds can be observed:

- Occasionally as part of other wildlife-watching tours (e.g. in combination with penguin-watching tours);
- Regularly, during targeted boat tours;
- In the water, while swimming to and from a colony;
- On land, in a colony.

Pinniped-watching can occur:

- From a boat in combination with 'swim-with' activities.
- From a boat with the possibility of landing in proximity of the colony.

In case of 'swim-with' activities, the implementation of separate swim only and boat only zones should be considered in addition to the caution and no approach zones.

In case of boat landing, the implementation of specific guidelines for boat manoeuvring in proximity of the colony and the designation of landing areas should be considered.

ADDITIONAL MANAGEMENT CONSIDERATIONS

- **Breeding sites:** closure of breeding sites during the breeding season should be considered as disturbance at these sites was found to provoke a disruption of maternal behaviour, resulting in shorter lactation periods and reduced growth of pups (Lidgard, 1996).
- **Hauling and breeding sites:** it is important that human presence (on boats, in the water or on land) is not 'sudden'. Panic attacks in colonies of pinnipeds can generate stampedes and can result in the death of younger animals (Shaughnessy, 1999). Any simulation of predatory behaviour should be strictly prohibited.

OTHER SUGGESTED ELEMENTS TO BE INCLUDED IN THE GUIDELINES

- Summary of national legislation related to pinnipeds;
- Sanctions for boat operators and visitors in case of non-compliance with national legislation;
- Maps of areas of special interest and suggested routes for boat-based wildlife-watching tours;
- Calendar with breeding seasons.

GUIDELINES AND SUGGESTED THRESHOLDS

LEVEL OF ACTIVITY

Regulations	Explanation	Existing thresholds	References
<ul style="list-style-type: none"> The maximum number of vessels allowed in the caution zone and interacting simultaneously with an individual or a group of pinnipeds should be limited. 	<p>Vessels operators should be mindful of cumulative impacts that multiple vessels can provoke.</p> <p>The maximum number of vessels allowed at the same time on the same site shall be established based on the size of the site and the size of the colony to be observed.</p>	2	[1]
<ul style="list-style-type: none"> The maximum duration of interaction for each vessel should be limited. 	<p>The maximum duration and number of interactions for all vessels at one site should be estimated and used to limit the number of vessels per day.</p>	10 - 30 minutes	[1-3]
<ul style="list-style-type: none"> Boat-based watching tours targeting pinnipeds should be conducted only during daytime to avoid disrupting resting behaviour. 	<p>The cumulative daily impact of tours in an area should be considered when establishing a maximum time for interaction.</p>	Daytime.	[1-2, 4]
<ul style="list-style-type: none"> Where considered necessary, operators should be required to coordinate their activities so that target species are not continuously disturbed throughout the day. 			

METHOD OF APPROACH

<ul style="list-style-type: none"> The boat operator should reduce the speed when approaching areas with high probability of finding pinnipeds in the water and on land. 	<p>Reducing the speed is the most effective way to reduce injuries and collision with individuals in the water.</p> <p>Consider the type of vessel, sea conditions as well as water visibility when setting maximum speed.</p>	< 5knots	[2]
<ul style="list-style-type: none"> A caution zone should be set for motorized and non-motorized vessels approaching haul-out sites and pinnipeds colonies on land. 	<p>The caution zone represents the minimum distance between an animal and a vessel.</p> <p>The caution zone varies according to the type of</p>	30 – 100 m	[1–5]

	vessel, method of propulsion and manoeuvrability.		
<ul style="list-style-type: none"> When pinnipeds are observed swimming, a caution zone around the animal or pod should be set. 	<p>The caution zone represents the minimum distance between an animal and a vessel.</p> <p>The caution zone varies according to the type of vessel, method of propulsion and manoeuvrability.</p>	30 – 50 m	[1, 5-6]
<ul style="list-style-type: none"> When an animal or a pod is observed in the water, the boat operator should reduce the speed. 		< 5 knots	[1]
<ul style="list-style-type: none"> When in the caution zone, the boat operator should approach the animal/s from the side at a low speed. 		< 5 knots	[1]
<ul style="list-style-type: none"> Approaching and/or separating a mother and pup should always be forbidden. 			
<ul style="list-style-type: none"> Trapping an animal or a pod should be forbidden. Boat operators should position their vessels so that to leave enough space for the animal/s to swim away. 			
<ul style="list-style-type: none"> Chasing, pursuing and trying to approach animal/s showing early signs of disturbance or not interested in interacting with the vessel should be forbidden. 			

INTERACTIONS

<ul style="list-style-type: none"> Disturbing, chasing, harassing or herding animals should be prohibited. 			
<ul style="list-style-type: none"> Boat operators and tour guides should avoid sudden, loud noises in proximity of a colony. Special care should be taken during the breeding season. 			
<ul style="list-style-type: none"> Feeding pinnipeds in the wild should be forbidden. 			
<ul style="list-style-type: none"> Touching or attempting to touch pinnipeds in the wild should be prohibited. 			

<ul style="list-style-type: none"> ▪ In the caution zone, boat operators should maintain constant and predictable direction at low speed. 	<p>< 5 knots</p>	<p>[1]</p>
<ul style="list-style-type: none"> ▪ At first sign of stress, the boat operator should gently move away from the animal. 		
<ul style="list-style-type: none"> ▪ If an animal approaches the boat, the operator should engage in neutral gear and allow the animal to pass. 		
<ul style="list-style-type: none"> ▪ On departing, the boat operator should wait until animals are away from the vessel. The boat operator should check bow and stern before engaging the propeller. 		
<ul style="list-style-type: none"> ▪ While departing the caution zone, boat operators should keep a slow speed and should not be allowed to accelerate until the waiting zone is reached. 	<p>< 5 knots</p>	<p>[1]</p>

[1] The Solent Seals Code of Conduct. Accessed May 2017

[2] Pembrokeshire Code of Conduct for Seals. Accessed May 2017

[3] NMFS South-east Region Marine mammal and sea turtle viewing guidelines. Accessed May 2017

[4] Scottish Marine Wildlife Watching Code for Seals. Accessed May 2017

[5] International Association of Antarctica Tour Operators – Seal Watching guidelines. Accessed May 2017

[6] NOAA California Seals and Sea Lions viewing guidelines. Accessed May 2017

ELASMOBRANCHS⁴

GENERAL DESCRIPTION OF GROUP OF SPECIES

Elasmobranchs are a subclass of cartilaginous fish and include all sharks, skates and rays. Although they are a very diverse group, most elasmobranch species are characterized by slow growth, late sexual maturity and low reproductive rate, which make them extremely vulnerable to overexploitation (Camhi, 1998).

Boat-based tours with elasmobranchs mainly target large filter-feeding species such as the Basking Shark (*Cetorhinus maximus*), Whale Shark (*Rhincodon typus*) and mobulid rays (Manta and Devil Rays). These species have some common characteristics: they can spend a relatively long time at the surface, they aggregate in large numbers in feeding hot spots at known seasons (therefore their location is predictable) and they can be observed from a relatively long distance.

RISKS RELATED TO BOAT-BASED WATCHING ACTIVITIES

- Injuries or death due to collision with boats (Dobson, 2008);
- Changes in distribution and habitat use (Graham, 2004);
- Changes in behaviour (Quiros, 2007);
- Habitat destruction (Davenport & Davenport, 2006).

EARLY INDICATORS OF DISTURBANCE

- Sudden change of direction;
- Sudden dive;
- Frequent dives;
- Increased swimming speed;
- Actively swimming away from disturbance / avoidance of boats and people.

FACTORS TO CONSIDER

While these recommendations only address boat-based wildlife-watching activities, it is important to consider that elasmobranchs can be observed according to different modalities and in combination with other activities. Wherever this is the case, special attention should be given to the cumulative short- and long-term impacts of wildlife-watching activities.

Elasmobranchs can be observed:

- Occasionally as part of other wildlife-watching tours (e.g. in combination with cetacean tours);
- Regularly, during targeted boat tours. In this case, it is likely to assume that there are aggregations of elasmobranchs in feeding and breeding areas.

Elasmobranchs can be observed:

- From a boat in combination with 'swim-with' activities.

⁴ The scope of these recommendations is to assist CMS Parties interested in adopting codes of conduct to reduce the impact of boat-based watching activities on elasmobranchs in their area of jurisdiction. These recommendations are general and do not consider species-specific or location-specific needs. Furthermore, other activities that may occur at the same time (e.g. diving, swimming) are not covered. Sample codes of conduct currently in use for boat-based elasmobranch-watching are included in the supplementary material.

- From a boat, without 'swim-with' activities.

In case of 'swim-with' activities, the implementation of separate swim only and boat only zones should be considered in addition to the caution and no approach zones.

ADDITIONAL MANAGEMENT CONSIDERATIONS

- **Type of vessel:** consider forbidding the use of motorized vessels such as jet skis and hovercraft in elasmobranch aggregation sites as these vessels are fast, do not allow for good visibility of the water in front of the vessel, and are capable of sudden changes in movements.
- **Use of propeller guards:** the use of propeller guards might reduce the risk of accidentally injuring surfacing animals. However, decreasing travelling speed is the most effective solution to reduce risks of collision.
- **Seasonal feeding and mating aggregations:** when groups of elasmobranchs are observed in large numbers at feeding and mating sites, consider limiting the number of hours per day during which wildlife-watching activities are run. Cumulative disturbance at these sites might have long term repercussions on the population health and survival (Quiros, 2007).
- **Provisioning / Feeding wild animals:** generally feeding of wild animals should be prohibited. Rules should exist for boat operators that use lights at night to attract filter feeder species of elasmobranchs.

OTHER SUGGESTED ELEMENTS TO BE INCLUDED IN THE GUIDELINES

- Summary of national legislation related to elasmobranchs;
- Sanctions for boat operators and visitors in case of non-compliance with national legislation;
- Maps of areas of special interest and suggested routes for boat-based wildlife watching tours;
- Calendar of feeding and mating aggregation season.

GUIDELINES AND SUGGESTED THRESHOLDS

LEVEL OF ACTIVITY

Regulations	Explanation	Existing thresholds	References
<ul style="list-style-type: none"> The maximum number of vessels allowed in the caution zone and interacting simultaneously with an individual or a group of elasmobranchs should be limited. 	<p>Vessel operators should be mindful of cumulative impacts that multiple vessels can provoke.</p> <p>The maximum number of vessels allowed at the same time on the same site shall be established based on the size of the site and the size of the colony to be observed.</p>	1 – 2	[1–4]
<ul style="list-style-type: none"> The maximum duration of interaction for each vessel should be limited. 	<p>The maximum duration and number of interactions for all vessels at one site should be estimated and used to limit the number of vessels per day.</p>	30 – 90 minutes	[1–4]
<ul style="list-style-type: none"> Boat-based watching tours targeting elasmobranchs should be conducted only during daytime, for a limited number of hours per day. 	<p>The cumulative daily impact of tours in an area should be considered when establishing a maximum time for interaction.</p> <p>The maximum cumulative interaction time should be kept to a minimum when tours occur in feeding and mating areas.</p>	Daytime, up to a maximum of 8 hours per day	[4]
<ul style="list-style-type: none"> A waiting zone should be set around the caution zone to allow for other vessels to wait for their turn to interact with an individual or a group of elasmobranchs. 		250 – 500 m	[1, 3, 6]
<ul style="list-style-type: none"> When an individual or a group of elasmobranchs are engaged in interaction with the maximum allowed number of vessels, other vessels should wait in the waiting zone. 			
<ul style="list-style-type: none"> Where considered necessary, operators should be required to coordinate their activities so that target species are not continuously disturbed throughout the day. 			

METHOD OF APPROACH

<ul style="list-style-type: none"> The boat operator should reduce the speed when approaching areas with high probability of finding elasmobranchs in the water. 	<p>Reducing the speed is the most effective way to reduce injuries and collision with individuals in the water.</p> <p>Consider the type of vessel, sea conditions as well as water visibility when setting maximum speed.</p>	<p>< 5 – 8 knots [1–2, 5]</p>
<ul style="list-style-type: none"> A caution zone should be set around an individual or a group of elasmobranchs. 	<p>The caution zone represents the minimum distance between an animal and a vessel.</p> <p>The caution zone varies according to the type of vessel, method of propulsion and manoeuvrability.</p>	<p>20 – 300 m [1–6]</p>
<ul style="list-style-type: none"> In the caution zone, the boat operator should reduce the speed. 		<p>< 3 – 8 knots [1–6]</p>
<ul style="list-style-type: none"> When in the caution zone, the boat operator should approach the animal/s from the side at a low speed. 		
<ul style="list-style-type: none"> Trapping or cornering an animal or a group of elasmobranchs should be forbidden. Boat operators should position their vessels in a way that allow elasmobranchs to swim away. 		
<ul style="list-style-type: none"> Chasing, pursuing and trying to approach animal/s showing early signs of disturbance or not interested in interacting with the vessel should be forbidden. 		

INTERACTIONS

<ul style="list-style-type: none"> Disturbing, chasing, or harassing animals should be prohibited. 	
<ul style="list-style-type: none"> Feeding elasmobranchs in the wild should be forbidden, unless stated otherwise. 	
<ul style="list-style-type: none"> Touching or attempting to touch elasmobranchs in the wild should be prohibited. 	

-
- In the caution zone, boat operators should maintain constant and predictable direction at low speed. < 3 – 8 knots [1–6]
 - At first sign of stress, boat operators should gently move away from the animal.
 - If an animal approaches the boat, the operator should engage in neutral gear and allow the animal to pass.
 - On departing, the boat operator should wait until animals are away from the vessel. Boat operators should check bow and stern before engaging the propeller.
 - While departing the caution zone, boat operators should keep a slow speed and should not be allowed to accelerate until the waiting zone is reached. < 5 – 8 knots [1–3]
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[1] Ningaloo Reef Code of Conduct for Whale Shark watching. Accessed May 2017

[2] Fisheries and Oceans Canada – Code of Conduct: Basking sharks. Accessed May 2017

[3] A guide for responsible shark and ray tourism. Published in 2017

[4] Rules and Regulations governing the conduct of marine wildlife tourism interactions in the Philippines. Draft prepared in May 2016

[5] Scottish Marine Wildlife Watching Code. Published in 2005

[6] The Shark Trust Basking Shark Code of Conduct. Accessed May 2017

SEABIRDS⁵

GENERAL DESCRIPTION OF GROUP OF SPECIES

Seabirds are generally defined as birds that spend most of their life at sea and therefore have developed special adaptations to survive in the marine environment. Broadly, there are approximately 365 species of seabird, divided into 17 families (Birdlife International, 2017a). However, boat-based wildlife-watching activities mainly target the following:

- Diomedidae (Albatrosses)
- Fregatidae (Frigatebirds)
- Hydrobatidae (Northern Storm Petrels)
- Laridae (Gulls, Terns, Skimmers)
- Oceanitidae (Southern Storm Petrels)
- Pelecanidae (Pelicans)
- Phaethontidae (Tropicbirds)
- Phalacrocoracidae (Cormorants)
- Procellariidae (Petrels, Shearwaters)
- Spheniscidae (Penguins)
- Stercorariidae (Skuas)
- Sulidae (Gannets, Boobies)

Generally speaking, seabirds have a circumglobal distribution and present two life-styles: they either spend most of their life at sea coming onshore to nest, or they occupy near-shore and coastal habitats all year round (BirdLife International, 2017b). Seabirds usually show slow growth, long life spans, and low number of chicks per year (usually one or two), which make them vulnerable to any kind of exploitation (Hamer *et al.*, 2001).

Seabird boat-based tours can target nesting and breeding colonies as well as feeding aggregations of pelagic birds as these offer large groups of animals that are visible even from a relatively large distance, they are predictable in space and time (breeding season) and usually occupy areas of outstanding beauty (Yorio *et al.*, 2001).

RISKS RELATED TO BOAT-BASED WATCHING ACTIVITIES

- Higher mortality in juveniles due to changes in parental behaviour (Velando & Munilla, 2011);
- Reduced time spent foraging (Ronconi & St. Clair, 2002);
- Changes in distribution and habitat use (Seddon & Ellenberg, 2008);
- Modification or destruction of feeding and nesting habitats (Davenport & Davenport, 2006).
- Use of 'chum' to attract seabirds to vessels encourages birds to attend boats and can lead birds to associate boats with food. Birds habituated to attending vessels may also attend fishing vessels where they may be exposed to lethal fishing techniques.

⁵ The scope of these recommendations is to assist CMS Parties interested in adopting codes of conduct to reduce the impact of boat-based watching activities on seabirds in their area of jurisdiction. These recommendations are general and do not consider species-specific or location-specific needs. Furthermore, other activities that may occur at the same time (e.g. diving, swimming) are not covered. Sample codes of conduct currently in use for boat-based seabird-watching are included in the supplementary material.

EARLY INDICATORS OF DISTURBANCE

- Increased paddling speed if in water;
- Flight or dive if in water.

FACTORS TO CONSIDER

While these recommendations only address boat-based wildlife-watching activities, it is important to consider that seabird watching can occur according to different modalities and in combination with other activities. Wherever this is the case, special attention should be given to the effects of cumulative short- and long-term impacts of wildlife-watching activities.

Seabirds can be observed:

- Occasionally as part of other wildlife-watching tours (e.g. in combination with marine mammal tours);
- Regularly, during targeted boat tours. In this case, it is likely to assume that there are aggregations of seabirds in feeding areas.

The observation can occur:

- From a boat only.
- From a boat with possibility to land in proximity of the colony.

ADDITIONAL MANAGEMENT CONSIDERATIONS

- **Foraging grounds:** disturbance at foraging sites can seriously reduce the reproduction and survival of adult seabirds and their offspring.
- **Breeding sites:** disturbance at breeding sites can seriously affect the survival of offspring as a consequence of nest abandonment by adults. Even keeping birds away from eggs or young chicks for a short period risks predation from other birds (skuas, gulls) or death of eggs and chicks through exposure. Seabird-watching activities at breeding sites should be strictly managed and restricted to only a small section of a colony.
- **Species' reaction to boats and human presence:** different species of seabird show different reactions to boats and human presence. Some birds can become habituated to human presence, while others will always tend to fly away if boats or people are too close. The reaction of the targeted bird species should be assessed before establishing guidelines.

OTHER SUGGESTED ELEMENTS TO BE INCLUDED IN THE GUIDELINES

- Summary of national legislation related to seabirds;
- Sanctions for boat operators and visitors in case of non-compliance with national legislation;
- Maps of areas of special interest for seabirds (including at-sea foraging grounds) and suggested routes for boat-based wildlife-watching tours;
- Calendar of breeding season.

GUIDELINES AND SUGGESTED THRESHOLDS

LEVEL OF ACTIVITY

Regulations	Explanation	Existing thresholds	References
<ul style="list-style-type: none"> Wherever necessary, a maximum number of vessels allowed in the caution zone and interacting simultaneously with an aggregation of seabirds should be set. 	<p>Vessel operators should be mindful of cumulative impacts that multiple vessels can provoke.</p>		
<ul style="list-style-type: none"> Wherever possible, the maximum duration of interaction for each vessel should be limited. 	<p>The maximum duration and number of interactions for all vessels at one site should be estimated and used to limit the number of vessels per day.</p>		
<ul style="list-style-type: none"> Boat-based watching tours targeting seabirds should be conducted only during day time, for a limited number of hours per day to avoid disrupting resting behaviour. 	<p>The cumulative daily impact of tours in an area should be considered when establishing a maximum time for interaction.</p> <p>The maximum cumulative interaction time should be kept to a minimum when tours occur in feeding and mating areas.</p>		
<ul style="list-style-type: none"> Where considered necessary, operators should be required to coordinate their activities so that target species are not continuously disturbed throughout the day. 			

METHOD OF APPROACH

<ul style="list-style-type: none"> The boat operator should reduce speed in areas with high probability of finding seabirds. 	<p>Reducing the speed is the most effective way to reduce injuries and collision with individuals in the water.</p> <p>Consider the type of vessel, sea conditions as well as water visibility when setting maximum speed.</p>	< 6 knots	[1]
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<ul style="list-style-type: none"> When seabirds on land are observed, a caution zone should be set around the bird aggregation. 	<p>The caution zone represents the minimum distance between an animal and a vessel.</p>	<p>30 – 100 metres according to vessel size</p>	<p>[1-3]</p>
	<p>The caution zone varies according to the type of vessel, method of propulsion and manoeuvrability.</p>		
<ul style="list-style-type: none"> When seabirds are observed in the water, a caution zone should be set around the bird aggregation. 	<p>The caution zone represents the minimum distance between an animal and a vessel.</p>	<p>30 – 100 metres according to vessel size</p>	<p>[2-3]</p>
	<p>The caution zone varies according to the type of vessel, method of propulsion and manoeuvrability.</p>		
<ul style="list-style-type: none"> When in the caution zone, boat operators should keep a low speed. 		<p>< 6 knots</p>	<p>[1, 4]</p>
<ul style="list-style-type: none"> Chasing, pursuing and trying to approach animal/s showing early signs of disturbance or not interested in interacting with the vessel should be prohibited. 			

INTERACTIONS

<ul style="list-style-type: none"> Disturbing, chasing, or harassing animals should be prohibited. 			
<ul style="list-style-type: none"> Boat operators and tour guides should avoid excessive noise in proximity of seabirds. 			
<ul style="list-style-type: none"> Feeding seabirds in the wild should always be prohibited, unless studies have shown that no negative effect results from this activity. 		<p>Under no circumstances should 'chumming' occur to attract birds south of 60°</p>	<p>[3]</p>
<ul style="list-style-type: none"> Touching or attempting to touch seabirds in the wild should be prohibited. 			

<ul style="list-style-type: none"> ▪ In the caution zone, boat operators should maintain constant and predictable direction at low speed. 	<p>< 6 knots</p>	<p>[1]</p>
<ul style="list-style-type: none"> ▪ At first sign of stress, boat operators should gently move away from the animal. 		
<ul style="list-style-type: none"> ▪ If an animal approaches the boat, the operator should engage in neutral gear and allow the animal to pass. 		
<ul style="list-style-type: none"> ▪ On departing, the boat operator should wait until animals are away from the vessel. Boat operators should check bow and stern before engaging the propeller. 		
<ul style="list-style-type: none"> ▪ While departing the caution zone, boat operators should keep a slow speed and should not be allowed to accelerate until the waiting zone is reached. 	<p>< 6 knots</p>	<p>[1]</p>

[1] Scottish Marine Wildlife Watching Code. Accessed May 2017

[2] Gobierno de Chile. D.S. N° 38-2011 Reglamento General de Observación de Mamíferos, Reptiles y Aves Hidrobiológicas y del Registro de Avistamiento de Cetáceos. Accessed May 2017

[3] IAATO Marine Wildlife Watching Guidelines for vessel and zodiac operations. Accessed May 2017

[4] Guidelines for Managing Visitation to Seabird Breeding Islands in Australia. Accessed May 2017

REFERENCES

- Allen W/ H., 1992. Increased dangers to Caribbean marine ecosystems. *Bioscience*; 42(5):330–5.
- Beck, C.A., Bonde, R.K. and Rathbun, G.B., 1982. Analyses of propeller wounds on manatees in Florida. *The Journal of Wildlife Management*, 46(2), pp.531-535.
- BirdLife International. 2017a. The BirdLife checklist of the birds of the world, with conservation status and taxonomic sources. Version 9. Available from <http://datazone.birdlife.org/species/taxonomy>. Accessed on 6 April 2017
- Birdlife International. 2017b. Seabirds – The biology. Available from <http://www.birdlife.org/europe-and-central-asia/seabirds-and-marine-science-seabirds>. Accessed on 6 April 2017
- Birtles, A., Valentine, P. and Curnock, M., 2001. *Tourism Based on Free-Ranging Marine Wildlife*. Wildlife Tourism Research Report No. 11. Status Assessment of Wildlife Tourism in Australian Series. STCRC, Gold Coast, Queensland.
- Birtles, R. A., P. W. Arnold, and A. Dunstan. 2002. Commercial swim programs with dwarf minke whales on the northern Great Barrier Reef, Australia: Some characteristics of the encounters with management implications. *Australian Mammalogy* 24:23–38
- Boren, L. 2001. Assessing the impact of tourism on New Zealand fur seals (*Arctocephalus forsteri*). Masters thesis, University of Canterbury, Canterbury, New Zealand.
- Boren, L., Gemmell, N.J. and Barton, K.J. 2002. Tourism disturbance on New Zealand fur seals *Arctocephalus forsteri*. *Australian Mammalogy* 24, 85–95.
- Buckingham, C. A., L. W. Lefebvre, J. M. Schaefer, and H. I. Kochman. 1999. Manatee response to boating activity in a thermal refuge. *Wildlife Society Bulletin* 27(2):514–522
- Camhi, M., 1998. *Sharks and their relatives: ecology and conservation* (No. 20). IUCN.
- Carney, K.M. and Sydeman, W.J., 1999. A review of human disturbance effects on nesting colonial waterbirds. *Waterbirds*, pp.68-79
- Curtin, S., 2010. Managing the wildlife tourism experience: The importance of tour leaders. *International Journal of Tourism Research*, 12(3), pp.219-236.
- Curtin, S., Richards, S. and Westcott, S., 2009. Tourism and grey seals in south Devon: management strategies, voluntary controls and tourists' perceptions of disturbance. *Current Issues in Tourism*, 12(1), pp.59-81.
- Davenport, J. and Davenport, J.L., 2006. The impact of tourism and personal leisure transport on coastal environments: a review. *Estuarine, Coastal and Shelf Science*, 67(1), pp.280-292.
- Dearden, P., Topelko, K. and Ziegler, J., 2008. Tourist interactions with sharks. *Marine wildlife and tourism management: Insights from the natural and social sciences*, pp.66-90.
- Dobson, J., 2008. Shark! A new frontier in tourist demand for marine wildlife. *Marine wildlife and tourism management: Insights from the natural and social sciences*, pp.49-65.
- Erbe, C., 2002. Underwater noise of whale-watching boats and potential effects on killer whales (*Orcinus orca*), based on an acoustic impact model. *Mar. Mammal Sci.* 18 (2), 394e418. <http://dx.doi.org/10.1111/j.1748-7692.2002.tb01045.x>.
- Evans, P.G., 1996. Human disturbance of cetaceans. In *The Exploitation of Mammal Populations* (pp. 376-394). Springer Netherlands.
- Giles, D.A., 2014. Southern Resident Killer Whales (*Orcinus orca*): the Evolution of Adaptive Management Practices for Vessel-based Killer Whale Watching in the Salish Sea, a Novel Non-invasive Method to Study Southern Resident Killer Whales (*Orcinus orca*) and Vessel Compliance with Regulations, and the Effect of Vessels on Group Cohesion and Behavior of Southern Resident Killer Whales (*Orcinus orca*). MA thesis. University of California, Davis.
- Graham, R.T., 2004. Global whale shark tourism: a “golden goose” of sustainable and lucrative income. *Shark News*, 16, pp.8-9.
- Green, R., Giese, M., 2004. Negative effects of wildlife tourism on wildlife. In: Higginbottom, K. (Ed.), (2004). *Wildlife Tourism*. Common Ground, Altona. Ch. 5.
- Greenland, J.A. and Limpus, C.J., 2008. Marine wildlife stranding and mortality database annual report 2007. II. Cetacean and Pinniped.

- Hamer, K.C., Schreiber, E.A. and Burger, J., 2001. Breeding biology, life histories, and life history-environment interactions in seabirds. *Biology of marine birds*, pp.217-261.
- Hammerschlag, N., Gallagher, A. J., Wester, J., Luo, J., & Ault, J.S. 2012. Don't bite the hand that feeds: assessing ecological impacts of provisioning ecotourism on an apex marine predator. *Functional Ecology*, 26(3), 567-576.
- Hazel, J., Lawler, I.R., Marsh, H. and Robson, S., 2007. Vessel speed increases collision risk for the green turtle *Chelonia mydas*. *Endangered Species Research*, 3, pp.105-113.
- Higham, J.E.S., Lück, M., 2008. Marine Wildlife and Tourism Management: Insights from the Natural and Social Sciences. CABI Publishing, Wallingford.
- Hiickstadt, G.H., Oosthuizen, H. and Adrian Schiavini, C.C., 2003. Pinniped-focused tourism in the southern hemisphere: a review of the industry. *Marine Mammals: Fisheries, Tourism and Management Issues: Fisheries, Tourism and Management Issues*, p.257.
- Hodgson, A.J. and Marsh, H., 2007. Response of dugongs to boat traffic: the risk of disturbance and displacement. *Journal of Experimental Marine Biology and Ecology*, 340(1), pp.50-61.
- Inman, A., Brooker, E., Dolman, S., McCann, R. and Wilson, A.M.W., 2016. The use of marine wildlife-watching codes and their role in managing activities within marine protected areas in Scotland. *Ocean & Coastal Management*, 132, pp.132-142
- Kelly, C., Glegg, G.A. and Speedie, C.D., 2004. Management of marine wildlife disturbance. *Ocean & coastal management*, 47(1), pp.1-19.
- King, J.M. and Heinen, J.T., 2004. An assessment of the behaviors of overwintering manatees as influenced by interactions with tourists at two sites in central Florida. *Biological Conservation*, 117(3), pp.227-234.
- Kovacs, K.M., Aguilar, A., Aurioles, D., Burkanov, V., Campagna, C., Gales, N., Gelatt, T., Goldsworthy, S.D., Goodman, S.J., Hofmeyr, G.J. and Härkönen, T., 2012. Global threats to pinnipeds. *Marine Mammal Science*, 28(2), pp.414-436.
- Kucey, L. and Trites, A.W. (2006) A review of the potential effects of disturbance on sea lions: assessing response and recovery. In: Trites, A.W., Atkinson, S.K., DeMaster, D.P., Fritz, L.W., Gelatt, T.S., Rea, L.D. and Wynne, K.M. (eds) *Sea Lions of the World*. Lowell Wakefield Fisheries Symposium, USA, pp. 325–352.
- Laroche, R. K., Kock, A. A., Dill, L. M., & Oosthuizen, W.H. 2007. Effects of provisioning ecotourism activity on the behaviour of white sharks *Carcharodon carcharias*. *Marine Ecology Progress Series*, 338, 199-209.
- Lidgard, D.C. 1996. The effects of human disturbance on the maternal behaviour and performance of grey seals (*Halichoerus grypus*) at Donna Brook, Lincolnshire, England. Preliminary Report to the British Ecological Society, UK.
- Lusseau, D. 2003. Effects of tour boats on the behavior of bottle-nose dolphins: Using Markov chains to model anthropogenic impacts. *Conservation Biology* 17:1785–1793.
- Lusseau, D., Bejder, L., 2007. The long-term consequences of short-term responses to disturbance experiences from whalewatching impact assessment. *Int. J. Comp. Psychol.* 20 (2), 228e236.
- Magalhães, S., R.Prieto, M. A. Silva, J. Goncalves, M. Afonso-Dias, and R. S. Santos. 2002. Short-term reactions of sperm whales (*Physeter macrocephalus*) to whale-watching vessels in the Azores. *Aquatic Mammals* 28:267–274.
- Marsh, H., O'Shea, T.J. and Reynolds III, J.E., 2011. *Ecology and conservation of the Sirenia: dugongs and manatees* (No. 18). Cambridge University Press.
- Mast, R.B., Hutchinson, B.J., Howgate, E., Pilcher, N.J. 2005. MTSG update: IUCN/SSC Marine Turtle Specialist Group hosts the second Burning Issues Assessment Workshop. *Marine Turtle Newsletter* 110: 13–15.
- Miksis-Olds, J.L., Donaghay, P.L., Miller, J.H., Tyack, P.L. and Reynolds, J.E., 2007. Simulated vessel approaches elicit differential responses from manatees. *Marine Mammal Science*, 23(3), pp.629-649.
- Nowacek, S.M., Wells, R.S., Owen, E.C., Speakman, T.R., Flamm, R.O. and Nowacek, D.P., 2004. Florida manatees, *Trichechus manatus latirostris*, respond to approaching vessels. *Biological Conservation*, 119(4), pp.517-523.

- Orams, M. B. 2002. Feeding wildlife as a tourism attraction: a review of issues and impacts. *Tourism management*, 23(3), 281-293.
- Parsons, E.C.M., 2012. The negative impacts of whale-watching. *J. Mar. Biol.* <http://dx.doi.org/10.1155/2012/807294>
- Quiros, A.L., 2007. Tourist compliance to a Code of Conduct and the resulting effects on whale shark (*Rhincodon typus*) behavior in Donsol, Philippines. *Fisheries Research*, 84(1), pp.102-108.
- Riedman, M., 1990. *The pinnipeds: seals, sea lions, and walruses* (No. 12). Univ of California Press.
- Ritter W, Schafer C. 1998. Cruise-tourism: a chance of sustainability. *Tourism Recreation Research*, 23(1):65–71
- Ronconi, R.A. and Clair, C.C.S., 2002. Management options to reduce boat disturbance on foraging black guillemots (*Cephus grylle*) in the Bay of Fundy. *Biological conservation*, 108(3), pp.265-271.
- Schipper, J., J. Chanson, F. Chiozza, *et al.* 2008. The biogeography of diversity, threat, and knowledge in the world's terrestrial and aquatic mammals. *Science* 322:225–230.
- Schofield, G., Bishop, C.M., MacLean, G., Brown, P., Baker, M., Katselidis, K.A., Dimopoulos, P., Pantis, J.D. and Hays, G.C., 2007. Novel GPS tracking of sea turtles as a tool for conservation management. *Journal of Experimental Marine Biology and Ecology*, 347(1), pp.58-68.
- Schofield, G., Katselidis, K.A., Dimopoulos, P., Pantis, J.D. and Hays, G.C., 2006. Behaviour analysis of the loggerhead sea turtle *Caretta caretta* from direct in-water observation. *Endangered Species Research*, 2, pp.71-79.
- Seddon, P.J. and Ellenberg, U., 2008. Effects of human disturbance on penguins: the need for site and species specific visitor management guidelines. *Marine wildlife and tourism management: Insights from the natural and social sciences*, pp.163-181.
- Shaughnessy, P. D. 1999. The action plan for Australian seals. Environment Australia, Canberra, Australia.
- SMWWC (2005) A guide to best practice for watching marine wildlife. Scottish Natural Heritage, Inverness, UK
- Uhrin, A.V. and Holmquist, J.G., 2003. Effects of propeller scarring on macrofaunal use of the seagrass *Thalassia testudinum*. *Marine Ecology Progress Series*, 250, pp.61-70.
- Valentine, P. and Birtles, A. 2004. Wildlife watching. In K. Higginbottom (Ed.) *Wildlife tourism: Impacts, management and planning* (p. 15 – 34). Gold Coast: Common Ground Publishing, CRC for Sustainable Tourism.
- Velando, A. and Munilla, I., 2011. Disturbance to a foraging seabird by sea-based tourism: Implications for reserve management in marine protected areas. *Biological Conservation*, 144(3), pp.1167-1174.
- Wallace, B.P., Di Matteo, A.D., Hurley, B.J., Finkbeiner, E.M., Bolten, A.B., *et al.* 2010. Regional Management Units for marine turtles: A novel framework for prioritizing conservation and research across multiple scales. *PLoS ONE* 5(12): e15465. doi:10.1371/journal.pone.0015465.
- Work, P.A., Sapp, A.L., Scott, D.W. and Dodd, M.G., 2010. Influence of small vessel operation and propulsion system on loggerhead sea turtle injuries. *Journal of Experimental Marine Biology and Ecology*, 393(1), pp.168-175.
- Yorio, P., Frere, E., Gandini, P. and Schiavini, A., 2001. Tourism and recreation at seabird breeding sites in Patagonia, Argentina: current concerns and future prospects. *Bird Conservation International*, 11(04), pp.231-245.