

# GUIDELINES FOR RECREATIONAL IN-WATER INTERACTIONS WITH MARINE WILDLIFE

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## INTRODUCTION

For the purpose of this document, in-water recreational interactions with marine megafauna are defined as activities in which the human participant is fully or partially immersed in the water in proximity to marine mammals, turtles, fish and seabird species in their natural environment. These include standing in the water, surface swimming, free diving, snorkelling and scuba diving as part of commercial tourism operations or undertaken by individuals for leisure purposes.

Like other forms of wildlife watching, in-water interactions may provide an economic incentive for the protection of species, an exhilarating and potentially educational experience for participants, and a source of livelihood for local communities and other actors. Over the past few decades, such operations have rapidly increased in occurrence and popularity worldwide, generating a pressing need to understand and manage any detrimental effects on the behaviour, welfare and biology of the target species, and the consequent indirect effects on local environments and human communities.

The evidence for the short-term disturbances of in-water activities on marine species is widespread and ubiquitous (e.g., Healy et al. 2020; Gallagher et al. 2015; Senigaglia et al. 2016), with responses varying greatly between species, locations and types of activity (Gallagher et al. 2015; Orams 2004). A study focused on an Indo-Pacific bottlenose dolphin population off the south coast of Mozambique reported significant changes in behaviour, where dolphins were more likely to travel and less likely to socialize, rest or forage after tourist swims (Rocha et al. 2023). However, the long-term biological and ecological consequences on marine wildlife remain difficult to investigate, quantify and assess. While recommending new and increased research attention to advance the understanding of this complex phenomenon, scholars are urging the adoption of precautionary approaches in the management of these activities and a shift to a sustainability paradigm based on integrated and adaptive, as well as inclusive and multi-stakeholder, schemes with protection of wildlife as the primary objective (e.g., Meyer et al. 2021a; Higham et al. 2014, 2016).

Nowadays, it is widely acknowledged that the potential for detrimental consequences of marine mammal-oriented tourism is substantial (Orams 2004). There is solid evidence that a large number of aquatic mammal species are sensitive to the disturbances caused by in-water interactions. Aquatic mammals can suffer direct physical impacts (e.g., collisions) and injuries (Samuels et al. 2003), with odontocetes exhibiting the highest degree of contact with humans generally at the greatest risk of injury, illness and death (Frohoff 2000). Food provisioning has also been found to be harmful to dolphins (Mann and Kemps 2003; Samuels et al. 2003; Samuels and Bejder 2004; Christiansen et al. 2016). The literature detailing the responses of unhabituated aquatic mammals exposed to 'swim-with' activities has largely focused on behaviour patterns and displays. Most species are sensitive to disturbance caused by close approaches, and their recorded responses included changes in breathing patterns, inter-individual distance, level of activity, vocalization and range of movements, among others (Kyngdon et al. 2003; King and Heinen 2004; Martinez et al. 2011; Stafford-Bell et al. 2012; Lundquist et al. 2013; Cowling et al. 2014; see also reviews by Bejder and Samuels 2003; Curtin and Garrod 2008). In addition to the concerns about the effects of disturbance on the behaviour and health of marine wildlife, is the issue of zoonotic disease. There is increasing concern about the transference of disease from wild animals to people, and vice versa, and arguably this concern is most marked for marine species that are not commonly in contact with people. These concerns have recently been increased by new research that shows that cetaceans are potentially highly vulnerable to the SARS-CoV-2 virus that drove the recent COVID-19 pandemic (e.g., Damas et al., 2020), reports of the transmission of Avian Influenza

from birds to mammals with associated mortalities,<sup>1</sup> and the presence of the virus in seals in the UK.<sup>2</sup> While significant research is still under way that will help to inform risk assessments, the threat to animals and to those entering into close contact with them is another strong argument for watching from a distance to minimize the risk of transmission.

Furthermore, although this aspect is often neglected and overlooked (Spradlin et al. 2001b), swimming with aquatic mammals causes real concerns over the safety of human swimmers and divers. Concerns arise because marine mammals are large, powerful and wild creatures whose movement and behaviour can harm, injure or kill human participants of in-water interactions (Webb 1978; Shane et al. 1993; Wilson 1994; Orams et al. 1996; Santos 1997; Seideman 1997; Christie 1998; Samuels et al. 2003). Disease transmission is also a possibility, as whales and dolphins carry parasites and certain diseases that can be transmitted to humans and vice versa (Waltzek et al. 2012). Furthermore, such activity poses the intrinsic dangers of any in-water activity, which are further exacerbated when operations are carried out in open waters, involve large crowds, are undertaken by inexperienced participants and swimmers, and/or led by uncertified or unspecialized guides. Close approaches also increase the likelihood of vessel strike, particularly an issue for swim tour boats that drop people in the water close to targeted cetaceans and other aquatic mammals (Lammers et al. 2013).

Based on the current expert perspectives, and the belief that wildlife should always be afforded the highest level of protection from human interactions, Parties are urged to adopt a combination of preventive and precautionary strategies aimed at minimizing both known and potential effects of in-water interactions.

**Overall, it is recommended that no recreational in-water interactions with marine wildlife take place**, unless their lack of detrimental effects and their net conservation benefits has been carefully considered, noting that long-term research on the impacts of in-water interactions is required to make an evidence-based decision. Specifically, Parties are urged to:

1. Carefully evaluate and assess the suitability, feasibility and sustainability of current, emerging or prospective in-water interactions before **decisions on their establishment or continuation** and management are made. Where other sustainable alternatives exist, the least intrusive should be preferred (e.g., sustainable boat- and land-based watching, virtual reality experiences).
2. In existing, emerging and prospective situations in which in-water interactions are allowed to occur, strictly regulate them with dedicated evidence-based and adaptive measures **to reduce the risk of disturbance and other detrimental impacts on the wildlife**. In practical terms, it is strongly recommended to:
  - a) cease immediately all physically intrusive in-water recreational interactions that include intentional touching, handling and direct feeding of the target species;
  - b) avoid the use of attractants to prompt animals;
  - c) conduct dedicated research and monitoring to underpin the formulation of more appropriate interventions;
  - d) implement and enforce regulations in line with the guidelines for best practices provided in this document.

Applying these principles has, in some cases, resulted in a ban on in-water interactions (e.g., in Chubut, Argentina, based on the 'Ley de Protección de la Fauna Marina' (Inman et al. 2016))

<sup>1</sup> [Peru reports hundreds of sea lion deaths due to bird flu](#)

<sup>2</sup> [Confirmed findings of influenza of avian origin in non-avian wildlife](#)

and, in others, in the formulation of guidelines that allow in-water interactions under certain conditions (e.g., permit system for commercial operations, New Zealand).

Following CMS COP endorsement of *Guidelines on Sustainable Boat-Based Marine Wildlife Watching* (Annex to [UNEP/CMS/Resolution 11.29 \(Rev.COP12\)](#)) in 2017, similar species-specific guidance was requested for in-water interactions with marine megafauna species. This present document, which draws from the information in Annex 2 to [UNEP/CMS/COP13/Doc.26.2.5](#) and recent updates, seeks to provide this guidance. In order to serve the conservation objectives of the Convention, and regardless of their format and characteristics, such guidelines are inspired by a **precautionary approach** and are aimed at **eliminating** or, at the very least, **minimizing disturbance and adverse effects on wildlife**.

## SCOPE AND PURPOSE

This document presents considerations and guidelines to assist the Parties in adopting appropriate measures to regulate in-water recreational interactions with marine mammals, marine turtles, large fish and seabirds in their area of jurisdiction.

These guidelines have the scope to avoid and mitigate disturbance and adverse effects from in-water interactions on the target species and associated habitats, including both long-term detrimental effects on population demographics (e.g., survival, reproduction) and shorter-term impacts on individual behaviour and welfare.

The guidance provided is specific to in-water recreational interactions in wild settings (i.e., natural environments) via standing, swimming, snorkelling, free diving and scuba diving. Interactions carried out in captive and semi-captive facilities are not addressed in this document.

## STRUCTURE

The document is organized in two sections.

**Part 1 – General guidelines for recreational in-water interactions** outlining the existing types of interactions, risks, management strategies and tools, followed by a list of General Guiding Principles and General Guidelines applicable as a minimum standard to marine wildlife in all contexts.

**Part 2 – Species-specific guidelines for recreational in-water interactions** providing species-specific guidance and resources on marine mammals, marine turtles, fish and seabirds to complement the General Guidelines.

The **Supplementary Material** at the end of this document includes non-exhaustive lists of useful resources and codes of conduct currently in use that are relevant to the groups of species targeted in this document.

## HOW TO USE THIS DOCUMENT

This document provides examples, considerations and suggestions to develop, adjust or validate decisions and regulations governing recreational in-water interactions.

It should be emphasized that the guidelines presented do not systematically address all case- or nation-specific situations but provide a general overview of measures that have been

adopted or are recommended. Taking note of these guidelines, CMS Parties are encouraged to undertake relevant impact assessments and expert consultations to identify the most appropriate and effective way to adopt and adapt these guidelines to the specific local contexts.

As interactions are mostly undertaken for tourism purposes and most often rely on powered vessels, this document should be used in combination with the [Guidelines on Sustainable Boat-Based Marine Wildlife Watching](#) endorsed in CMS Resolution 11.29 (Rev.COP12), bearing in mind also the principles contained in CMS Resolution 12.16 [Recreational In-Water Interaction with Aquatic Mammals](#) and CMS Resolution 12.23 [Sustainable Tourism and Migratory Species](#), to coherently and comprehensively address aspects of various activities. Guidelines for the management of other aspects and activities that precede, accompany or follow the interaction presented in other CMS Resolutions and associated documents can also be integrated to complete those presented here, for the benefit of all participants (e.g., anthropogenic noise, community participation, communication information and outreach plans, collection of aquatic wild meat).

Finally, it is important to note that the general health and safety of human participants is beyond the scope of this document. It is recommended that provisions found in recommendations and certifications on open-water swimming, snorkelling and scuba diving issued by relevant authorities and organizations are considered alongside the guidelines and, where necessary, integrated in a way that ensures the highest standards of protection for wildlife.

## DEFINITIONS

**Accreditation.** A voluntary label or certification issued by a responsible organization to a tourism operation recognized as having complied with the standard of operations.

**Active interaction.** The interaction is pursued by the human participants, who follow, chase or are placed in the path of the wildlife.

**Aggressive behaviour or display.** Any behaviour or display directed towards an opponent, predator or competitor (conspecific or otherwise) to injure, inflict pain or give a reliable warning of such impending consequences if it takes no evasive action.

**Agonistic behaviour or display.** Any behaviour or display to warn off an opponent, predator or competitor (conspecific or otherwise).

**Boat-based in-water interaction.** A type of in-water interaction in which participants are carried to the interaction zone aboard a vessel or a powered platform to which they return at the end of the interaction.

**Cleaning station.** A section of a coral reef where cleaner fish, such as wrasses or gobies, remove parasites from large fish, sharks or rays.

**Dedicated interaction.** An interaction resulting from the specific intent and desire to encounter the wildlife at the location.

**Distress.** A change in behaviour that is a clear response to an in-water interaction. This may include attempts to leave the area or move away from the vessel quickly or slowly; regular changes in direction or speed of swimming; hasty dives; changes in breathing patterns; increased time spent diving compared to time spent on the surface; changes in acoustic

behaviour; aggressive behaviours such as tail slashes; trumpet blows, or any sign of separation of a whale mother from its calf, for example.

**Disturbance.** 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 affects its well-being and survival in the short, medium and/or long term (Evans 1996). Some examples of disturbance are: direct and indirect injuries or death, changes in habitat uses, changes in behaviour, changes or damages to habitat, increased physical stress, etc. (SMWWC 2005). Disturbances generally have a negative connotation and they affect the wildlife in a negative manner.

**Free diver.** A person who is entering or in the water and potentially using a mask, snorkel, fins, a weight-belt, but without a floatation device and breathing apparatus.

**Harm.** Any act that actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioural patterns.

**Harassment.** Any act that demonstrates a disregard for the well-being of wildlife or which creates the likelihood of injury to or disrupts normal behaviour patterns of wildlife. Such acts include, but are not limited to, chasing, pursuing, herding or attempting to take wildlife.

**Interaction Zone.** The area or location where in-water interactions through scuba diving, snorkelling, free diving or swimming occur, ranging from the minimum interaction distance to 50m (100m for whales).

**Land-based in-water interaction.** A type of in-water interaction in which participants enter the water from the shore and return to it at the end of the interaction.

**Licence system.** See 'Permit system'.

**Marine megafauna.** An umbrella term encompassing large marine taxa, including marine mammals, marine and estuarine reptiles, large fish and seabirds.

**Minimum Interaction Distance.** The minimum distance allowed between a participant and the wildlife. Different minimum distances apply to each taxa – for example, 3m for turtles but 30m for cetaceans.

**Opportunistic interaction.** An interaction not specifically sought after and resulting from being at the location for an unrelated activity (including dedicated interaction with other species).

**Passive interaction.** The interaction is initiated by the wildlife of their own accord. Furthermore, the wildlife is granted a degree of 'control' over the duration, location and proximity of the interaction.

**Permit system.** A legal and management tool based on permits or licences to conduct in-water recreational interactions issued by a relevant authority to providers and operators. The conditions to obtain and maintain a permit vary and may include the attendance of specific training sessions (e.g., elements of biology and ecology of the species, existing regulations, management of interactions, customer education and interpretation), adherence and compliance to regulations and permit conditions, and participation in research efforts. The system allows authorities to control the number of operators able to engage in interactions, and to specify the activities they are permitted to undertake.

**Precautionary Principle.** A broad approach dictating that precautionary measures should be taken (in this case, in favour of protecting the welfare of wild animals and the integrity of their habitat) when scientific understanding of some cause-and-effect relationships is not conclusive.

**Provisioning.** The use of methods to attract and maintain wildlife in close proximity, done through feeding, attracting and modifying the habitats of the wildlife (see Meyer et al. 2021b for the most recent reclassification of provisioning-associated terminology).

**Surface rope or line.** Ropes deployed in the water as an aid or tether for swimmers and snorkellers, also known as Mermaid lines.

**Scuba diver.** A person who is entering or in the water, moving in the water column at different depths, using a mask, snorkel, fins a weight-belt and a breathing apparatus.

**Shore-based in-water interaction.** See Land-based in-water interaction.

**Snorkeller.** A person who is entering or in the water, staying at the surface, and using a mask, snorkel, fins and without a breathing apparatus.

**Swimmer.** A person who is entering or in the water, staying at the surface, and without snorkelling, free diving or scuba diving equipment.

**Sustainable interaction.** Any practice creating and maintaining the conditions to sustain the used resource (i.e., in this case, wildlife), with human and wildlife coexisting harmoniously. Central to sustainability is an ecocentric imperative to have the least possible impacts on nature and its biota (Notarbartolo di Sciara and Würsig 2022; Campagna and Guevara 2022; Higham et al. 2014) and to grant the wildlife space and freedom from interactions (see *Sustainability Paradigm* in Higham et al. 2014).

**Take.** To “take” means taking, hunting, fishing, capturing, harassing, deliberate killing or attempting to engage in any such conduct (CMS 1979, Article I (1i) of the Convention).

**Tonic immobility.** A [reversible] natural state of unresponsiveness, paralysis or immobility, which some elasmobranch species enter when physically inverted or handled in specific ways. It can cause excessive stress to the animal (Lawrence et al. 2016).

## PART 1 - General guidelines for recreational in-water interactions

### 1.1 AN OVERVIEW ON RECREATIONAL IN-WATER INTERACTIONS

In-water interactions with marine wildlife for tourism and recreational purposes have experienced extensive growth since the 1990s, and their actual extent is likely underestimated (e.g., Healy et al. 2020; Gero et al. 2016; Hendrix and Rose 2014). The phenomenon has global reach and is manifested in a variety of activities shaped by both the natural and anthropic characteristics of each interaction: they can occur in shallow or deep waters, inshore or offshore, at the surface or at depth, year-round or seasonally, be shore- or platform-based, opportunistic or dedicated, prompted (e.g., with food, lures, attractants) or not, with restricted (e.g., use of surface lines as tethers) or free movements of the human participant.

Like other forms of wildlife watching, in-water interactions may provide potential benefits to the target wildlife by encouraging or increasing awareness, stewardship and ownership, economic benefits, an alternative to lethal consumptive uses (e.g., poaching, fishing, whaling), and research opportunities (e.g., Hoyt 2018; Topelko and Dearden 2005). However, there is increasing concern regarding the bio- and anthropocentric risks of the activity on:

- **Conservation** (population level), or the endangering of populations caused by the detrimental effects of disturbances on behaviours of survival or reproductive importance, namely mating, nursing, feeding and defence. Indicators for the assessment of the conservation status of a population are survival rate, reproductive rate and population size, and their trends over time (e.g., Bejder et al. 2006; Filby et al. 2014).
- **Wider ecological processes**, or the direct and indirect cascading effects that interactions with the target individuals and populations have on non-target species, habitat, processes, ecosystems and communities (e.g., Meyer et al. 2020; Milazzo et al. 2005).
- **Animal welfare** means the physical and mental state of an animal in relation to the conditions in which it lives and dies (WOAH 2022). Indicators that animals are affected by disturbances include both short- and long-term responses at the behavioural, histological, biochemical, physiological and/or ecological levels.
- **Human safety**, or the risk of injury and harm to human participants in the interactions, which could be caused by the target wildlife (e.g., biting, zoonoses), exposure to wild conditions, logistics of the operations or other human participants (e.g., Cisneros-Montemayor et al. 2020; Sprogis et al. 2020).

Currently, the following are considered among the main challenges to effective management of in-water interactions:

- **Missing or poor management frameworks.** Unregulated, poorly or unmanaged in-water interactions are more likely to lead to invasive, uninformed and unmonitored approaches to the animals, meaning that they are more likely to cause welfare and conservation harms rather than benefiting from any potential conservation benefits of the activity.
- **Lack of regulatory enforcement and implementation of best practices.** In-water recreational interactions generally show scarce compliance to regulations, whether deliberate or accidental (e.g., Schofield et al. 2015; Scarpaci et al. 2003). Ambiguous

stipulations (e.g., harassment, Tyne et al. 2014; Sorice et al. 2003) as well as challenges in ensuring patrolling, monitoring and enforcement of regulations and sanctions (e.g., Gallagher et al. 2015; Mustika et al. 2012) are among the causes of the limited uptake.

- **Knowledge gaps.** The complex life histories of marine wildlife species, the confounding effects of co-occurring anthropogenic activities and the scarcity of dedicated, historical data sets have so far hampered efforts to conclusively assess the long-term biological and ecological significance of in-water interactions on the target wildlife. Moreover, research efforts have mostly focused on the biological and ecological dimensions of the activity, and less so on the social ones, the only exception being the shark tourism phenomenon, which has attracted equal interest from both domains (Gallagher et al. 2015). The use of integrated frameworks for management is often recommended but, despite advances in their theoretical specifications, empirical application and validation are still scarce (e.g., Bejder et al. 2022; Meyer et al. 2021; Catlin and Jones 2010, 2011; Reynolds and Braithwaite 2001; Duffus and Dearden 1990, 1993).

Moving forward, it is strongly recommended that Parties take action to address the above-described challenges by:

- Adopting a precautionary approach and carefully investigating the feasibility and impacts of emerging or prospective in-water interactions before decisions on their establishment and management are made (e.g., [Management program for humpback whale interactions along the Ningaloo Coast, 2020, Australia](#)). Ideally, this would also include reflections on ethical implications and moral responsibilities (e.g., considerations in Bertella and Acquarone 2017).
- Implementing new regulations or adjusting existing ones to effectively avoid and mitigate disturbances from the activity where it is currently not or poorly managed, and where it has proven detrimental for the wildlife. If it is not possible to implement new or adjust existing regulations to address current management issues, consider phasing out the activity. France, for example, has a regulation in force since 2021 prohibiting the deliberate approach of marine mammals by a vessel to a distance of less than 100m in French internal waters and territorial sea in the Mediterranean.
- Promoting ownership, stewardship and best behaviour through the engagement of invested stakeholders (e.g., consultation of traditional indigenous owners; co-development of regulations with commercial operators; tourist education and interpretation) as a complementary or alternative strategy to the enforcement of regulations and sanctions (e.g., Filby et al. 2015; Scarpaci et al. 2003).
- Investing efforts on expanding relevant data sets with long-term regular and sustained data-collection, research focusing on long-term population-level consequences of disturbance that employ robust modelling techniques (e.g., Pirodda et al. 2018, 2022; Booth et al. 2020; Bejder and Samuels 2003), modern technologies (e.g., Papafitsoros et al. 2021; Nowacek et al. 2016) and integrated interdisciplinary frameworks (e.g., Meyer et al. 2021a; Heenehan et al. 2015; Catlin and Jones 2010; Higham et al. 2009; (Bejder et al. 2022)).
- Implement an adaptive management approach whereby new information is used to update and amend regulations, codes and/or practices as needed.

These guidelines avoid listing specific distances other than “body length of the animal or 3 metres or 30 metres for cetaceans”, as distances are difficult to assess and implement in the field because of the human inability to accurately measure in the water, but also because of the movement of the wildlife and the fact that they spend a fraction of time on the surface (if any).

Interactions can be very dynamic, and, in the water, the animals are more agile than humans. Except for stationary animals or those otherwise restricted in their movement, the animals would be in control of the distance between them and people. The minimum interaction distances we suggest (body length/3m or 30m for cetaceans) are meant mostly for the safety of the human participants. In case of interactions with more stationary animals, they can be more easily applied and are also more important for the protection of the wildlife.

For various reasons, asking people in the water to assess and maintain a distance is not reasonable, regardless of their level of expertise. Likewise, asking a guide to be responsible for ensuring a specific minimum distance might not be doable.

This document moves away from metric distance provisions:

- For people in the water, it shifts from metres to using the “animal body length or 3m, whichever is greater” as a minimum distance as a more easily applicable unit of measurement.
- It places emphasis on more effective solutions, such as designating clear no-interaction situations, time-area closures, passive interactions with dedicated devices for floatation and/or control of participants’ movements and distance from the wildlife, and attention to changes in wildlife behaviour.
- It introduces the general principles and considerations to ensure safe, low disturbance and sustainable interactions, leaving it to the Parties to assess the type of interactions they have and to develop specific parameters and criteria in line with the principles and inspired by examples cited.
- It presents some evidence-based species-specific guidelines (Part 2).

A similar ‘qualitative’ approach is found in the updated International Whaling Commission General Principles for Whale Watching as well as in various dugong and turtle tourism projects consulted.

## 1.2 GENERAL CONSIDERATIONS FOR DEVELOPING GUIDELINES

Considerations presented in this section align with the recommendation of the Aquatic Mammal Working Group of the CMS Scientific Council ([UNEP/CMS/COP12/Inf.13](#)) that each of the Parties **carefully evaluate the decision as to whether in-water interactions should be established or continued** and, where they are allowed to occur, adopt measures to **avoid or mitigate disturbance and adverse effects on the wildlife**.

The following **General Guiding Principles** and **General Guidelines** (Section 1.3) apply to all in-water interactions in all areas and can be used as the basis for decisions on the activity.

It must be emphasized that the specific way in which principles and guidelines are formulated, adopted and enforced, is the responsibility of the Parties.

## General Guiding Principles

### 1. Protect most sensitive wildlife

Clearly define situations and locations in which the activity is not allowed to occur at all, or is subject to more restrictive regulations. This might include banning or restricting interactions with selected species or populations (e.g., classified as endangered, vulnerable in the IUCN Red List) and population segments (e.g., based on age, sex and residency patterns) that are disproportionately targeted, already exposed to high cumulative or chronic anthropogenic pressures, or particularly averse to interactions and susceptible to be negatively affected by them (e.g., resident individuals, Constantine 2001; mother-calf pairs, Lundquist et al. 2013; King and Heinen 2004). To this aim, spatial and temporal closures are an important tool to protect critical resting, breeding, nursing, feeding areas and times (Higham et al. 2014; Tyne et al. 2014; Landry and Taggart 2010; Higham and Lusseau 2007), provided that they are part of adaptive and non-static management schemes (e.g., Dwyer et al. 2020; Hartel et al. 2014). Regulations should also define conditions in which interactions should cease (e.g., signs of disturbance or aggression from the wildlife, violation of regulations) and instructions on ensuing procedures.

#### *Examples:*

- *Ban on commercial interactions with a declining population of bottlenose dolphins in the [Bay of Islands \(New Zealand\)](#)*
- *Legal ban on interactions with juvenile dolphins or pods including those in [New Zealand](#)*
- *Combination of spatial and temporal closures to ban early morning interactions and protect core resting habitat of spinner dolphins at [Samadai Reef, Egypt](#)*
- *Interruption of in-water access at temperatures below 62.2 degrees Fahrenheit in the manatee refuge at [Three Sisters Springs, US](#)*

### 2. Reduce intrusiveness

Prohibit all physically and ecologically intrusive activities, defined as the deliberate touching, provisioning (feeding) and handling, and alteration of natural history and behavioural ecology of the species (Parsons et al. 2006). Such practices are not only detrimental for wildlife and high risk for the human participants (e.g., Sprogis et al. 2020), but can also be in breach of existing national or regional regulations and laws governing wildlife protection in most countries.

Parties are invited to place particular attention on regulating activities involving **provisioning** (attracting, feeding and modifying habitat) (as defined in Meyer et al. 2021b) to increase the likelihood of viewing elusive wildlife up close and in favourable settings. Based on the evidence of alterations of biology and ecology of the target wildlife (e.g., Senigaglia et al. 2019, 2022; Stewart et al. 2016; Brunnschweiler et al. 2014; Schleimer et al. 2013; Semeniuk et al. 2009; Orams 2002) and poorly understood effects on non-target species and wider ecosystem and communities (Meyer et al. 2021b), it is strongly recommended against the establishment, continuation and expansion of activities employing direct feeding, or the deliberate use of food directly ingested by the target species (as defined in Meyer et al. 2021) and urges extreme caution in regulating **indirect feeding, intentional attracting and intentional habitat modification**.<sup>3</sup> In general, tourism-based feeding is most associated with negative health outcomes (Murray et al. 2016) and supplemental feeding of marine species is often not benign (Burgin and Hardiman 2021). Where the practice takes place, it is recommended that food is provided at very low densities and for short periods of time at unpredictable times and

<sup>3</sup> As defined in Meyer et al.2021: **Indirect feeding**: prey species are attracted through the wildlife tourism activity and are consumed by the target species. **Intentional attracting**: facilitating interactions with target species with the use of non-consumable stimuli that either exploits wildlife appetite or socialisation. **Intentional habitat modification**: a modified structure or environmental alteration incorporated specifically for wildlife tourism

locations to prevent aggregation and habituation, and is suspended during times of migration and epidemics (Murray et al. 2016).

The use of dedicated devices is essential for the safety of participants, can improve the quality of the interaction, and protect the wildlife and the local ecosystem. Devices include gear to support and control participants' floatation (e.g., lifejackets, wetsuits, platforms), predictability of movement (tethers, surface or weighted ropes, boom nets, submerged or semi-submerged platforms) and distance from the wildlife (e.g., artificial or natural markers or barriers). Decisions on the use of such devices is underpinned by the characteristics of the species and the site, and must not pose additional risks to the wildlife or the participants (e.g., entanglement; see considerations in Scarpaci et al. 2005, p.93).

Finally, it is recommended that, where multiple sustainable wildlife watching options are available (e.g., in-water interactions, boat- or land-based watching, underwater viewing chambers), the least intrusive is preferred. In particular, the potential of virtual and augmented reality to provide a valid alternative to real visitation (Guttentag 2010) while still ensuring some of its benefit (e.g., conservation behaviour; Hofman et al. 2022) should be further explored (Bejder et al. 2022).

*Examples:*

- *Use of surface ropes in interactions with Dwarf Minke Whales in [Great Barrier Reef, Australia](#)*
- *Prohibition of the deliberate and intentional feeding of cetaceans, and discouragement of establishment or expansion of authorized certified feeding programmes in [Australia's National Whale and Dolphin Watching Guidelines](#)*
- *Legal definition of the areas and manners in which certified operators can undertake chumming in [white shark cage diving, South Africa](#)*
- *Creation of a "Do not cross" rubble line at the diving and snorkelling cleaning station of [Manta Sandy Ranger Station](#) (Raja Ampat, Indonesia) to limit intrusiveness and reduce benthic damages*
- *Use of weighted ropes for scuba diving with sharks in the Azores, Portugal (Bentz et al. 2014)*

### **3. Regulate access to the activity**

Define whom, where, when and under which conditions operators are authorized to organize, guide and participate in in-water recreational interactions. This includes strictly monitoring and regulating the expansion of the activity, clearly identifying the areas and times in which it is permitted and prohibited, and identifying criteria and requirements for participation in the activity. It is recommended that the responsibility of overseeing the development of the activity is entrusted to a specific and respected organization or agency, either new or existing, that has the relevant authority and can incorporate the expertise and perspectives of key stakeholders.

A dedicated permit scheme is an effective and recommended way to regulate the extent and operation standards of commercial in-water interactions (e.g., Catlin et al. 2012), recognizing that there may need to be adjustments made to suit particular circumstances, for example where operators cross domestic jurisdictional boundaries. Its core elements include (see also Hoyt 2007, 2012; ACCOBAMS 2004, 2007):

- Specific authorization from a relevant authority, in addition to possessing operating licences and in conformity with national and international regulations related to the qualification and security of the activity undertaken;
- Comprehensive risk assessment and risk management plan;

- Ensuring relevant training is provided to captains and guides, including extended knowledge of the site and the species, language and interpretive-guiding skills (e.g., Pagel 2021; Weiler and Ham 2002) and good understanding of regulations, risks and implications of interactions for both wildlife and participants;
- Record of interactions by participant operators (logbook of encounters, images and photographs), sharing information and/or other support (e.g., financial contribution, platform available to researchers) to ongoing research programmes on the wildlife responses to interactions;
- Regular monitoring of compliance and impacts on wildlife to underpin adaptive management.

In the case of private individuals (e.g., boaters, fishers, kayakers, swimmers) existing regulations and codes of conduct could be included as part of other licences they need to acquire (e.g., fishing, boating), contracts for the rental of equipment and gears (e.g., scuba diving, stand up paddle boards), and information displays in prominent locations along the shore and at boat launching points.

*Examples:*

- *Management programme for humpback whale interactions along the [Ningaloo Coast 2020 \(Australia\)](#)*
- *Prohibition of motorized vessels inside the manatee refuge at [Three Sisters Springs, US](#)*
- *Marine Mammal Protection Regulations and permit scheme to regulate expansion and ensure standard of commercial interactions in [New Zealand](#)*
- *In-water interactions with cetaceans allowed only through locally certified operators in [Tonga](#)*
- *Ticketing system to cap the daily number of visitors interacting with spinner dolphins at [Samadai Reef, Egypt](#)*

#### **4. Work with the community**

Involve and engage stakeholders in the management of in-water interactions. Collaborations in the development of regulations, implementation and monitoring of compliance, research and data-collection, education and interpretation can not only increase adherence to regulations, but also the sense of ownership and stewardship over the local wildlife (e.g., Pagel 2021; Bach and Burton 2015; Sorice et al. 2006; Parsons and Woods-Ballard 2003).

Opting for participative processes means, first and foremost, better understanding the social, political, economic, demographic and cultural characteristics of the human communities involved (e.g., Ziegler et al. 2021; Patroni et al. 2018; Wiener 2015; Filby et al. 2015; Lewis and Newsome 2003) and analysing them within interdisciplinary frameworks (e.g., Meyer et al. 2021a; Higham et al. 2009; Duffus and Dearden 1990) to identify monitoring and management schemes and processes best suited to the specific context.

For management to remain timely and evidence-based, it is necessary that these co-creative processes are based on shared priorities and objectives, and rely on adequate regulatory frameworks (Fumagalli et al. 2021).

*Examples:*

- *[Minke Whale Project](#) at Great Barrier Reef*
- *[WiSe scheme](#), UK national training scheme for minimizing disturbance to marine wildlife; training and accreditation of operators and private practitioners of water activities*

- Entry fee at the [Baa Atoll Hanifaru MPA](#) to the Baa Atoll Conservation Fund of invested stakeholders (Maldives)
- Citizen science programme, [Big Fish Network](#), for whale sharks in the Maldives
- Voluntary [High Quality Whale Watching Certificate](#) by ACCOBAMS, the Pelagos Sanctuary, several non-governmental organizations and whale-watching operators

## **5. Enforce regulations**

Ensure regular patrolling, monitoring and compliance with permitted conditions. A necessary prerequisite is that regulations and permitting requirements are formulated in a clear, unequivocal fashion, accessible to all interested stakeholders and are applicable in the field. In particular, it is recommended that:

- Behaviours that constitute harm, distress and harassment, and that are legal/accepted or illegal/unaccepted, are well defined and detailed (Tyne et al. 2014; Sorice et al. 2003).
- Where possible, regulations are quantified using units that can be easily understood and applied on site (e.g., duration of interactions, maximum number of people allowed). Metric distances (e.g., metres, yards) are extremely common in guidelines and codes of conduct, but can be hard to assess and to comply with in open waters (Button et al. 2016; Baird and Burkhart 2000). Unless accompanied by a requirement for using enabling tools, such as automatic distance detectors and laser range finders (Baird and Burkhart 2000), other units (e.g., animal body lengths) or solutions (e.g., demarcated zone, physical tethers) should be preferred.
- Compliance to and efficacy of regulations are regularly evaluated, and management adapted accordingly, where required (Wiley et al. 2008).

Patrolling and monitoring should be entrusted to authorized local actors that hold the respect of stakeholders, are able to work fairly and consistently at the site, and are trained to recognize wildlife disturbances and non-compliance to existing regulations. Where these conditions cannot be met, for instance because the costs or the logistics of monitoring and patrolling are prohibitive, viable alternatives include the use of remote technologies (e.g., nautical video vigilance cameras, Becerril-García et al. 2020) or community/peer observation and reporting.

To encourage compliance, it is essential that infringement offences are monitored, recognized and reported to the relevant authorities, with sanctions and penalties (e.g., substantial fines, suspension of commercial licence) to operate as a deterrent.

### *Examples:*

- Trained gamekeepers for monitoring and enforcement of no-take regulations at [Shark Reef Marine Reserve, Fiji](#)
- Commercial licence revoked, cancelled or suspended in case of contravention or failure to adhere to permit conditions for [white shark cage diving, South Africa](#)
- Official-looking volunteers as an alternative to on-site enforcement personnel to increase voluntary compliance to regulations in New Zealand (Acevedo-Gutiérrez et al. 2011)
- [Hotline of the Florida Fish and Wildlife Conservation Commission](#) to report injuries or harassment of manatees, USA
- Coordinated monitoring and enforcement with the Spatial Monitoring and Reporting Tool ([SMART](#)) approach, a set of free software and analysis tools designed to help conservationists manage and protect wildlife and wild places

## **6. Monitor the system**

Keep track of the characteristics, role and implications of the activity within social and ecological settings at local, national and global levels (Higham et al. 2009, 2014). As the social and ecological features of interaction sites change over time, systems to ensure that current arrangements meet the agreed ecological and socioeconomic targets or provide information for its adjustment are required. Research investigating **wildlife biology and ecology** (e.g., occurrence and habitat use, short-term responses to interactions, long-term consequences of interactions, population size, health and stress monitoring, population-level consequences) and **social aspects of the activity** (e.g., number and locations of commercial operators, changes to numbers of visitors over time, economic dimension, compliance, injuries deriving from interactions, ethics and moral responsibility) underpins the identification of baseline and trend key indicators, as well as of risk thresholds, for the management of the activity at all stages of development (e.g., Bejder et al. 2022; ACCOBAMS 2020; Higham et al. 2009; Duffus and Dearden 1990). Ideally, research practices should ensure that the required information is collected with no or minimal additional disturbance to the wildlife (e.g., using platforms of opportunity, Santana-Morales et al. 2021b; logbook reporting, Nazimi et al. 2018; passive acoustic monitoring, Bradley et al. 2017; social media, Barra et al. 2020; citizen science and artificial intelligence, [Wildbook](#)).

### *Examples:*

- Programme for the transition to and management of commercial interactions with humpback whales along the [Ningaloo Coast 2020 \(Australia\)](#)
- Certified guides required to fill logbooks collecting sighting information at [the Whale Shark Biosphere Reserve and the Yum Balam Flora and Fauna Protection Area, Mexico](#)
- Research studies employing control-impact (Meyer et al. 2019; Fumagalli et al. 2018), before-during-after (Stack et al. 2021b) and longitudinal (Filby et al. 2014) study designs
- Adaptive management with progressive community-driven expansion of the [Shark Reef Marine Reserve, Fiji](#)
- Carrying capacity simulation studies at Guadalupe Island Biosphere Reserve, Mexico (Santana-Morales et al. 2021a)

## 1.3 GENERAL GUIDELINES

The following *General Guidelines* aim to offer a viable and readily available resource for those tasked with developing plans and regulations for any new or previously unmonitored in-water interaction operation with any marine megafauna species. They provide an applicable set of guidelines that can form the basis of regulations in all areas, and inspire first and necessary intervention where the management of interactions lags behind their expansion, or where scientific data are scant.

Moreover, at those many locations where in-water interactions target different species or groups of species in the same or adjacent sites, an overarching system of Marine Wildlife Interaction Guidelines applicable to all species would ensure a common, coherent and consistent regulatory approach. This might facilitate uptake, understanding of and compliance with regulations. The *Marine Wildlife Tourism Guidelines* in the [Philippines](#) and the Level 1-2 regulations in the [Code of Conduct in the Dugong and Turtle tourism Program](#) (Birtles et al. 2005) are examples of such an approach.

## Proposed General Guidelines for in-water interactions with marine wildlife

1. Interactions are allowed only with the specifically designated species, populations and individuals, and in the designated areas and times. In all other cases, areas and times, they are not allowed to begin or continue.
2. Interactions are never allowed to begin or to continue when:
  - a) The wildlife is undertaking critical/biologically important behaviour
  - b) The wildlife avoids the interaction by increasing swim speed, swiftly changing direction of movement, and/or diving for longer (air breathing taxa)
  - c) The wildlife responds to the interaction by interrupting a critical activity or behaviour (i.e., resting, feeding, mating, nursing and cleaning)
  - d) The wildlife becomes agitated, boisterous or aggressive (e.g., threatening displays, biting, tail slashes. See Part 2) towards the human participants
  - e) The wildlife is injured or entangled in ropes, nets, buoys or other materials that hamper their free movement. In this case, alert the relevant authorities
  - f) The existing regulations are violated

While all participants are to be made aware of these situations, in commercial interactions guides are responsible to assess the situation before and during an interaction, set the course of action in respect of regulations, and instruct participants accordingly.

3. Commercial in-water interactions can be offered, organized and delivered only by operators in possession of a dedicated licence, certification or permit to conduct the activity.
4. **Direct feeding** of all wildlife is not encouraged. All forms of intentional attracting<sup>4</sup> and habitat modification with the purpose of attracting marine mammals and turtles are prohibited unless occurring under a regulated management plan that recognizes the potential detrimental impacts and has appropriate measures in place to mitigate these impacts. They are strictly regulated in commercial interactions with elasmobranchs, and prohibited in private interactions with this taxon.<sup>5</sup>
5. It is prohibited to **physically interact** with, or take, touch, handle, ride, step on, hold on to, hold, move or take the animals.
6. Participants engage in **passive interactions**, swimming calmly and in a predictable manner, without chasing, cornering and pursuing the target wildlife, and avoiding unnecessary noise and sonic signalling.
7. In the case of aquatic mammals and turtles, as soon as the wildlife is sighted, participants **approach from and stay on the side**, and avoid the space directly above and below, as well as in front of and behind the wildlife. They do not block, box in or cross the path of the wildlife.
8. Participants **do not get between**, or attempt to separate individuals and groups, in particular mother-calf pairs and mating partners.

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<sup>4</sup> Including the use of sound to attract or disturb animals to prompt them to interact (e.g., loud sounds to scare sea lions into the water).

<sup>5</sup> Further information in Niella et al. 2023 and the [South Australian White Shark Tour Licensing Policy](#).

9. In-water interactions occur at a **minimum distance** that is different for every taxon or taxonomic group. As a rule of thumb, absolute minimum distance should be body length of the animal or 3 metres, whichever is greater.
10. Participants make use of the **dedicated** and **safety devices** provided, including but not limited to tethering ropes, holding structures and/or buoyant equipment.
11. To **minimize acoustic disturbance** and intrusiveness, the use of personal underwater motorized propulsion vehicles, horns and noise generating equipment is allowed only in case of emergency.
12. For each private individual or commercial group, the maximum **duration** of interaction is 30 minutes per trip, however, this should take into consideration the size of the industry/population/species, for example impacts on small groups or on an individual. Time would begin with the entry in the water of the first participant(s). After the designated maximum duration, all participants should leave the water.
13. A private or commercial party is allowed a maximum of two consecutive in-water interaction attempts, always considering the size of the industry/population/species. The minimum rest between successive attempts is 30 minutes.
14. To reduce disturbances, interactions are allowed to occur only at specific times of the day, varying according to the species and circumstances (to be defined to best suit the ecological needs of the wildlife). At least one-third of each day and one-third of the area is reserved for animals to be left alone, to protect natural behaviour patterns (Hoyt 2018).
15. To reduce overcrowding, the **number of people** in the water at any given time should be restricted and specific to the situation and species. For example, a maximum of 10 participants (including guides) allowed simultaneously at the minimum distance. In the case of turtles, sirenians and sharks, a maximum of five participants. In commercial operations, a low participant/guide ratio is recommended (e.g., 5:1).
16. In-water interactions launched from a GPS-fitted support **vessel** must follow the [CMS Guidelines on Boat-Based Marine Wildlife Watching](#). In particular,
  - a) the deployment and collection of people should be done with slow and predictable approaches that do not obstruct the animal's path or disturb the animals. Practices such as leapfrogging and towing are therefore strongly discouraged;
  - b) during the interactions, vessels are to maintain safe distance from people and moor at designated stations or drift with the engine off or idling, as instructed by the local authorities. The repositioning of the vessel is allowed exclusively to ensure the safety of participants and in case of emergency.
17. **Violations** of regulations by private and commercial participants are enforced with offence-specific sanctions.
18. Where available, **site- and species-specific guidelines** take precedence over the General Guidelines.
19. General and Species-specific Guidelines are **reviewed and assessed** by a relevant Committee or Authority on a regular basis, and no later than every five years.

## Notes on implementing guidelines

It is recommended that guidelines are visible, accessible, clear and consistently presented to all stakeholders and interested groups (e.g., private boaters, local residents, tourists, permit owners). Participants and organizers are aware and educated about the existing regulations and the sanctions in case of infringements.

### *Examples:*

- [sign for private boat owners in New Zealand](#)
- *graphics produced by [Marine Wildlife Watch of the Philippines](#)*
- [Videos explaining swimming code of conduct at Three Springs Sanctuary, US](#)
- [Commercial Operator Handbook for permit holders in Western Australia](#)
- *Regulations and codes of conduct including an explanation of the possible consequences of noncompliance to improve their uptake (Granquist and Nilsson, 2016; Curtin et al. 2009)*

Parties are responsible for choosing the tools and strategies most likely to be effective at the specific site and jurisdiction. As mentioned in the General Guidelines, the adoption of Species- and Site-specific Guidelines to complement and enhance the general principles provided by the General Guidelines is recommended.

Parties are encouraged to collaborate with relevant international and national organizations (e.g., governmental agencies, relevant commissions and committees, research community, industry associations, NGOs) to gather insights on the variables that shape the interaction locally, including but not limited to:

- **Wildlife:** species or group of species (see Part 2 of this document), distribution, occurrence, behaviour at interaction site, sensitivity, conservation status, effects on non-targeted species and communities;
- **Environment:** sea conditions, currents, depth, habitat, water temperature, underwater visibility, other human activities;
- **Participants:** permit or licence required, water competency, expectations, attitudes, specialization, ethical and moral positioning;
- **Activity:** use of equipment and supporting devices and platforms, nature of interaction (private or commercial), timing, duration and frequency of interactions, use of attractants, general safety, community involvement, tourism market, financial sustainability, injuries and incidents during interactions;
- **Regulatory framework:** policies, governance, legislative framework, management tools, relevant authorities, conflicting interests.

## PART 2 - Species-specific guidelines for recreational in-water interactions

Having noted that in-water interactions should comply with the General Guidelines described above, in the case in which such interactions might be allowed to go ahead, this section presents additional guidance to complement the regulatory framework with species-specific regulations. Where available, special provisions for CMS-listed marine wildlife species are emphasized.

It should be noted that this section includes some references to the literature on the effects of in-water interactions on the wildlife and how to manage these, but it is not meant to be an exhaustive literature review on these topics. Additional resources and codes of conduct can be found in the Supplementary Material.

### 2.1 MARINE MAMMALS

Cetaceans, sirenians and pinnipeds differ not only in their ecology and biology, but also in the extent of literature available on the effects of in-water interactions and on their popularity as target species for interaction – with cetaceans (mainly delphinids) being the most sought after and studied.

Additional information on the extent, characteristics and occurrence of in-water interactions with aquatic mammals can be found in the dedicated report submitted by the Aquatic Mammals Working Group of the CMS Scientific Council to the Parties in 2017 ([UNEP/CMS/COP12/Inf.13](#)).<sup>6</sup>

#### *Cetaceans*

In-water interactions currently involve at least 28 species of cetaceans, 22 of which are listed in the CMS Appendices (recent reviews in Stack and Serra 2021a; Hendrix and Rose 2014; [UNEP/CMS/COP12/Inf.13](#)). Interactions target mainly delphinid species (e.g., spinner, bottlenose and dusky dolphins) but interactions with mysticete species are also on the rise (Stack and Serra 2021a), particularly with the dwarf minke and humpback whale, and to a lesser extent the minke, fin, Bryde's, blue and southern right whale (Gero et al. 2016). Studies show that common, observable responses to interactions include avoidance behaviours and the interruption of critical activities (reviews in Samuels et al. 2003; Machernis et al. 2018), such as the separation of cow-calf pairs, which increases the vulnerability of the calf to distress and predation; with responses dependent on the characteristics of the wildlife (species, age, sex, history of exposure; e.g., Fiori et al. 2019; Constantine 2001) and the activity (approach type, distance, number of swimmers, duration of interaction; e.g., Kessler et al. 2013; Martinez et al. 2011; Bejder et al. 1999). Although the evidence available on the impacts on whales is limited, it appears that commercial in-water activities may generate as much or more disturbance than boat-based whale watching, possibly due to closer vessel approaches and encounters (Stack et al. 2021; Fiori et al. 2019; Parsons 2012; Vermeulen et al. 2012). It is important to acknowledge that in-water interactions can have double the effect, because it is not only the vessel but also the swimmers that target the animals.

Additional advice and guidance on understanding and managing in-water activities involving cetaceans can be found in Ludewig and Williams-Grey (2019) and in the [Whale Watching Handbook](#), an online, open access and evolving repository of international best practices,

<sup>6</sup> While swimming with giant otters has not been identified as an issue, people approaching them by boat can be an issue. This includes ecotourism trips and incidental sightings: people out in the river fishing who see the otters, and chase them either to get a picture or to get them away from the chosen fishing spots.

educational resources and scientific information on cetacean-based tourism practices curated by the International Whaling Commission and CMS. Furthermore, Carlson (2012) and Garrod and Fennell (2004) offer reviews and analysis of global whale-watching guidelines. There should be different requirements for different whale species during critical periods of behaviour – for example, swimming with breeding southern right whales should be avoided, and swimming with humpback whales on a migratory path also presents specific issues that require effective management to ensure swimmers are not injured. The regulations and [Code of Practice](#) for dwarf minke whale swim-with interactions in the Great Barrier Reef World Heritage Area (Birtles et al. 2008) provide an example of a well monitored, regulated and managed industry that can inspire similar approaches with other species in other sites. Finally, the International Whaling Commission (IWC) will devote increased attention to the subject of in-water interactions and the IWC General Principles for Whale Watching were updated in 2022. Those principles include a provision to “avoid the development of operations that include direct interactions between humans and cetaceans, such as swimming with or provisioning (feeding) the target species” and “where such operations are currently in existence, they should be strictly regulated, monitored and evaluated, to minimize the potential impacts on both humans and cetaceans”.<sup>7</sup>

**Feeding** is not a widespread practice, but is reported in both private (boaters and fishers in USA and Australia, Christiansen et al. 2016; Powell et al. 2011; Samuels et al. 2000) and commercial recreational settings (interactions with the endangered Amazon river dolphin, Alves et al. 2013; Indo-Pacific bottlenose dolphins in Australia). In Australia, feeding is part of regulated, licenced provisioning programmes at four locations. Among those, the case of Monkey Mia has received extensive attention and is currently the most strictly regulated, with adaptive management responsive to the latest research evidence on the impacts of the practice (e.g., Mann et al. 2018, 1998; Foroughirad and Mann 2013). Recent findings on the negative implications of feeding for female reproductive success and calf survival, analysed in the light of the known population decline and the less stringent regulations in place at the site, raise concern for the dolphins targeted in Bunbury (Senigaglia et al. 2019, 2022). It should be noted that feeding cetaceans is prohibited under Commonwealth law in Australia and the current [Australian National Whale and Dolphin Watching Guidelines](#) recommend “no further establishment or expansion of feeding programs”.

In the specific case of **sociable solitary dolphins** (which are individual animals that actively seek human contact), it is recommended that plans to protect them and minimize risks to people entering the water with them are formulated on a case-by-case basis. There is considerable evidence that sociable behaviour by solitary dolphins is caused by people deliberately associating with lone and often young animals and that once they have become ‘habituated’ to people, they become very vulnerable to being killed as a result of accidental or sometimes intentional human actions (Nunny and Simmonds, 2019; Simmonds and Nunny, 2022).

Wilke et al. (2005) and Nunny and Simmonds (2019), recommend in all cases to develop a management plan that creates off-limit areas, discourages interactions, restricts the number of people interacting with the dolphin, prohibits touching and feeding, clearly defines what behaviours constitute harassment and disturbance, and includes specific measures based on the dolphin’s sex, age, personality, home range and stage of sociability. The implementation and uptake of such plans requires diplomacy and good communication skills, as well as the strengthening of community engagement, to promote education and best practice behaviours, and to mitigate conflicts (Wilke et al. 2005).

A complete ban on in-water interactions involving solitary dolphins, including intentional feeding, is strongly recommended.

<sup>7</sup> [https://iwc.int/document\\_3744.download](https://iwc.int/document_3744.download)

## Observable indicators of disturbance

- **Avoidance tactics:** change in heading or swim pattern to move away from the source of disturbance, hasty dives, change in diving and breathing intervals
- **Change in surface activity:** tail slaps, head slapping, aggressive and agonistic behaviour (e.g., reviewed in Scheer 2010), pectoral slapping
- **Change in behavioural state:** such as interruption of feeding, resting and nursing, separation of mother-calf pairs, change in acoustic behaviour

## Guidelines applicable to all cetacean species

1. Prohibit interactions with:
  - a) surface-active groups of whales, or groups engaged in energetic behaviours or displays at the surface for communication or agonistic purposes, which may make interaction unlikely (Gero et al. 2016) and pose a threat to human participants (Sprogis et al. 2020);
  - b) mother and calf pairs and groups including them, and especially when i) calves are newborn, ii) animals are resting, or/and iii) display an evasive behaviour when people or boats approach (Barra et al. 2020, Avila et al. (2021);
  - c) solitary dolphins;
  - d) individuals displaying aggressive or agonistic behaviour, including fluke thrashes, breaching, jaw claps, S-shaped postures;
  - e) special interest cetaceans (e.g. white humpbacks) or injured, entangled cetaceans at any time.
2. Maintain a minimum distance of half the animal's body length or 3m, whichever is greater, or 30m for cetaceans.
3. Participants swim or snorkel calmly at the surface and do not free dive on the wildlife. Scuba diving is not allowed.
4. Use surface ropes, platforms and/or buoyant devices to control the movement of participants and for their safety. The choice of device and its arrangement is based on a dedicated assessment of the local conditions to minimize entanglement and safety risks for both the wildlife and human participants.
5. If launching from a boat, place swimmers/snorkellers at least 100m away from a whale and 50m from a dolphin.
6. If launching from a boat, place participants parallel to the path of the moving cetaceans, entering the water calmly and with minimal noise. Swimmers must not block the path of any cetacean.
7. The use of jet skis or motorized swimming aids (e.g., underwater scooters) is not permitted.

## Species-specific considerations and guidelines for CMS-listed species

**Humpback whales** (*Megaptera novaeangliae*) are currently targeted by commercial in-water interactions off Australia, Tonga and Reunion Island. Research indicates that whales respond to approaches and interactions with both horizontal avoidance (i.e., increased swim speeds, erratic movements, heading away from the vessel) (Stack et al. 2021; Sprogis et al., 2020) and vertical avoidance (i.e., altered dive patterns seen especially in mother-calf pairs) (Sprogis et al. 2020; Fiori et al. 2019), as well as by curtailing their surface resting (Hoarau et al. 2020;

Stack et al. 2021), travelling and nurturing (Fiori et al. 2020). Intrusive or non-compliant behaviour (Hoarau et al. 2020), loud and splashing swimmers, (Kessler et al. 2013), supporting vessels approaching to a distance of less than 100m (Sprogis et al. 2020) and the presence of in-water participants as opposed to only vessels (Stack et al. 2021) were found to exacerbate responses. Surface-active groups (i.e., predominantly breaching, travelling or in competitive groups) are not only difficult and unlikely to be approached up close (Gero et al. 2016), but also pose a risk to the safety of participants, as agonistic behaviours displayed by adults and calves (e.g., as fluke thrashes, peduncle throws and pectoral fin slaps) have caused injuries to swimmers (Barra et al. 2020; Sprogis et al. 2020; Hoarau et al. 2020).

While recommending against the establishment and growth of in-water interactions with the species, Parties are urged to draw guidance from the monitoring and management programmes established on the [Ningaloo Coast](#) (Australia), as well as the existing permit schemes and codes of conduct for vessels and swimmers (e.g., [Australian National Guidelines](#), [Ministry of Tourism Tonga website](#)).

Lundquist et al. (2013) showed that **southern right whales** (*Eubalaena australis*) exposed to in-water interactions in Argentina reduced resting, socializing and surface-active behaviour, increased travelling, and displayed horizontal avoidance (i.e., increase in swim speed and frequency of reorientation). Alteration to travelling, resting and socializing were reported also in controlled vessel-based swimming interactions described in Vermeulen et al. (2012). Mothers and calves were found to be most sensitive to the presence of swimmers (Lundquist et al. 2013). Lundquist et al. (2013) concluded that the activity should not be legalized until further investigation on its effects is conducted or are available. The Australian Whale and Dolphin Watching Guidelines 2017 assess the species as not suitable for in-water interactions (i.e. disturbed, injured or entangled cetaceans, special interest animals and mother-calf pairs).

The chronic exposure of some populations to in-water interactions, and the fact that critical behaviours are temporally and spatially constrained for the **dusky** (*Lagenorhynchus obscurus*) and **spinner dolphin** (*Stenella longirostris*) have important implications for the management of in-water activity for these species (e.g., Tyne et al. 2017). In particular, it is imperative that core resting times and areas are identified and protected from interactions.

In Kaikoura (New Zealand), in-water interactions with **dusky dolphins** are long-established and strictly regulated through a permit scheme for commercial operations, formal Marine Mammal Protection Regulations, and a voluntary code of conduct (Markovitz et al. 2010). As the species displays a consolidated, core resting phase at midday, a voluntary 2-hour 'rest period' (11:30 to 13:30) with no interactions during the peak summer tour season (December–March) has been established. Studies show that dusky dolphins do respond to interactions with short-term behavioural changes (review in Fumagalli et al. 2021; Markovitz et al. 2010) but the population was assessed as relatively resilient to tourism (Lundquist and Markovitz 2009). However, “*minimal effects*’ do not necessarily mean ‘no effects’” and continued monitoring is necessary, as cautioned by Markovitz et al. (2010).

Coastal and island-associated populations of **spinner dolphins** display a predictable and consolidated resting phase during the morning hours in preferred sheltered bays, and feeding occurs only at night in open waters. The high predictability and frequency of occurrence in preferred coastal bays during the daylight hours makes this species particularly sought after for in-water interactions, leading to chronic exposure to disturbance (Fumagalli et al. 2019; Tyne et al. 2018). Reported core resting times are 10:00-14:00 in Hawaii (Tyne et al. 2015, 2017), and sunrise to midday in Egypt (Fumagalli et al. 2018; Notarbartolo di Sciara et al. 2009). At Fernando de Noronha archipelago, specific regulations ban tourism operations for the spinner dolphins.

The **Burrnan dolphin** (*Tursiops australis*) population in Port Phillip Bay, Victoria, Australia, is at risk due to a combination of anthropogenic pressures and natural features. The reliance on spatial zoning as the sole management measure and the lack of compliance to regulations warranted an effort to strengthen enforcement (Howes et al. 2012). The observed increase in effect responses to in-water interactions makes this population not suited for commercial in-water interactions (Filby et al. 2014, 2017).

In Brazil, direct feeding, touching and in-water interactions with the **Amazon river dolphin** (*Inia geoffrensis*) for commercial purposes affect the behaviour of the species and pose a potential danger to humans (Scheer et al. 2014; Alves et al. 2011, 2013). These practices are illegal, but are regulated and licenced at Novo Airão in the Anavilhanas National Park (Alves et al. 2013). There is an urgent need to establish regulations, including restricting and regulating feeding, and prohibiting touching. Also, carrying capacity studies, better infrastructure, a code of conduct, effective enforcement and education and human behaviour change focused programmes for local communities, operators and tourists were recommended (D’Cruze et al. 2017; Alves et al. 2011, 2013).

Viewing and swimming with **common dolphins** (*Delphinus* sp.) significantly affect the species behaviour in New Zealand (Meissner et al. 2015; Stockin et al. 2008; Neumann and Orams 2006), and efforts at ensuring coordinated regional management schemes were recommended to protect the species at the locations where it occurs.

### *Sirenians*

All sirenian species are currently CMS-listed and ‘Vulnerable’ in the IUCN Red List, with two subspecies of the American manatee listed as ‘Endangered’ (*Trichechus manatus* ssp. *manatus* and *latirostris*, respectively **Caribbean/Antillean** and **Florida manatee**).

Their slow and docile behaviour and herbivorous ecology, coupled with the predisposition to approach and interact with humans reported in some instances (Sorice et al. 2003), makes these species particularly susceptible to boat-related injuries and in-water harassment, in the form of touching, poking, prodding and standing on them (Allen et al. 2014). To date, the majority of studies available are on manatees (especially the Florida ssp.), which is also the target of long-established and intense interactions and conservation concerns (e.g., O’Shea 1995; Shackley 1992). More research on the effects of interactions on all sirenian species is strongly recommended to fill the significant existing gaps (Ponnampalam et al. 2022), but in the meanwhile, in-water interactions with sirenians should be specifically discouraged.

Manatees are sensitive to interactions, especially when these are launched from a powered platform (e.g., Buckingham et al. 1999) and in situations with high densities of tourists (King and Heinen 2004). In the presence of swimmers, manatees became hyper-stimulated (Abernathy 1995a), curtail bottom-resting, nursing and feeding, and increase the time spent milling and swimming (King and Heinen 2004; Abernathy 1995b). A combination of no-entry zones (Buckingham et al. 1999), no-interaction days, capped number of participants, improved implementation and enforcement, as well as carrying capacity and environmental impact studies were recommended for the effective management of interactions with manatees (Allen et al. 2014; King and Heinen 2004). Sorice et al. (2003) note that harassment of manatees is an issue of social value, and one that should be addressed with advances in the understanding of stakeholder perspectives.

A [Code of Practice for the Sustainable Management of Dugong](#) tourism, including guidance on environmental assessment, management and code of conduct, is provided in Birtles et al. (2005).

## Observable indicators of disturbance

- Avoidance tactics: displacement from the source of disturbance, changes in heading or swim pattern, swimming at maximum speed
- Change in surface activity: shorter surface intervals, dive with violent fluke slaps
- Change in behavioural state: interruption of resting, feeding and nursing

## Guidelines applicable to all sirenian species

1. Ensure that the minimum distance is respected to avoid any physical contact (touching, poking, prodding and standing on wildlife). Body length of the animal or 3m, whichever is greater, and at least 5m for a mother-calf pair.
2. To minimize disturbance to feeding animals, allow interactions only on the surface. Participants must only swim or snorkel calmly at the surface and not free dive on the wildlife. Scuba diving is not allowed.
3. Do not swim towards the animal when you see one, stay where you are and let them come to you if they want to. If they approach you, stay at least 2m away from the tail.
4. To avoid overcrowding, the number of people allowed to interact with the wildlife at any given time is restricted to five. In commercial settings, a 5:1 participant/guide ratio is recommended. There should be no more than five people within 10m of a dugong.
5. Do not corner, surround or restrict the animal as they breathe at the surface.
6. As manatees are highly tactile, and chew and manipulate lines (Ponnampalam et al. 2022), the use of surface ropes and other deployed devices with lines is not recommended.

## Species-specific considerations and guidelines for CMS-listed species

Florida's warm springs represent a critical habitat for the **Florida manatee** (*Trichechus manatus latirostris*), which would not otherwise be able to tolerate winter temperatures in the area. Interactions could potentially lead to displacement from these important habitats, or to additional energy expenditure to remain in the area, putting the population at risk. More sanctuaries, further restrictions on access (e.g., allow in-water only on alternate days) and strengthened enforcement of regulations are necessary interventions (King and Heinen 2004).

In-water interactions with the **Dugong** (*Dugong dugon*) are reported in Egypt, Vanuatu and Philippines, among others. The effects of in-water interactions on the wildlife are still poorly investigated and understood, but it is cautioned that tourism and recreation would increase boat-related risks (particularly collisions), mother-calf pair separation, and negatively affect seagrass beds. Birtles et al. (2005) recommend that no in-water interactions with the species are allowed until their implications for wildlife are better understood.

### *Pinnipeds*

In-water interactions are reported on nine species of pinnipeds, two of which are CMS-listed ([UNEP/CMS/COP12/Inf.13](#)). Reviews of the literature on pinniped-human recreational interactions reveal that tourism interest in this taxon is increasing and that interactions are predominantly vessel- and land-based (Curtin and Garrod 2008; Newsome and Rodger 2004; Kirkwood et al. 2003). The effects of in-water interactions on pinnipeds are poorly understood, and in addition, guidelines and regulations seldom deal with this issue (Öqvist et al. 2018).

Cowling et al. (2014) describe the effects of interactions on the behaviour of **New Zealand fur seals** (*Arctocephalus forsteri*). The animals, and especially juveniles, are initially attracted towards swimmers, but their curiosity subsides as the interaction continues and also in the long-term, with habituation-type responses. The number of swimmers did not affect responses (Cowling et al. 2014), but the presence of a guide did: guided commercial interactions, as opposed to non-guided independent ones, led to less 'avoidance and aggression' behaviour in seal interactions (Boren et al. 2008). Because of compliance to Marine Mammal Protection Regulations and the low volume of tourism, Cowling et al. (2014) concluded that impacts on this population were successfully minimized.

In commercial and unguided activities targeting the **Australian fur seal** (*Arctocephalus pusillus doriferus*), the presence of swimmers in close proximity to fur seals caused an initial increase of haul-out events and aggressive behaviour (Stafford-Bell et al. 2012).

Findings in Heide (2020) on **Cape fur seals** (*Arctocephalus pusillus pusillus*) suggest that a restriction in the number of snorkellers, the creation of dedicated interaction and no-interaction areas, and the presence of a guide in the water together with the tourists would minimize exposure to disturbances and harassment. Interestingly, the combination of surface and underwater observations used in the study allowed researchers to establish that, while avoidance was recorded very rarely from the surface, seal numbers, position in the water column (increased diving) and increased activity actually changed in response to the presence of swimmers.

Of particular concern are situations in which pinnipeds are exposed to cumulative and persistent disturbances from combined vessel and swimmer, or land- and water-based activities, not only because of their detrimental effects on wildlife behaviour and ecology (Curtin and Garrod 2008), but also of their higher likelihood to trigger aggressive responses by the animals (Constantine 1999).

It has to be emphasized that in-water interactions with pinnipeds can pose significant threats to the safety of human participants. Pinniped inquisitive behaviour may result in chasing, ducking, pulling and biting as well as sexual and threatening behaviours (e.g., Scheer 2020; Dans et al. 2017; Muir et al. 2006; Kirkwood et al., 2003; Constantine 1999; Flanagan, 1996), and increase risk of shark attacks (Kirkwood et al., 2003). Bites and contact abrasions in professionals and recreationists (e.g., researchers, Reisinger et al. 2020; open-water swimmers, Kornblith et al. 2019; Nuckton et al. 2015) can be frequent. They do require immediate medical attention, as they cause a variety of zoonotic diseases (e.g., seal finger, Markham and Polk 1979) and serious health consequences in humans (e.g., Deepak et al. 2019).

### Observable indicators of disturbance

- Avoidance tactics: swimming away, keeping away, hauling out of the water, longer dive intervals, increased diving, rapid submerging
- Change in surface activity: head up-stare
- Change in behavioural state: close approach, increased active, inquisitive or aggressive behaviour (e.g. contact, foreflipper scratch, foreflipper hug, mouth grab, biting) and threatening displays (e.g. non-vocal open mouth, bubble threat display)

### Guidelines applicable to all pinniped species

1. Maximum 5 people at the minimum distance, at least 3m.

2. Do not allow interactions during mating periods and in mating areas as the wildlife is more likely to display territorial aggressive behaviours.
3. Discourage non-guided independent swims, as they are more likely to elicit avoidance behaviours and aggression.
4. Minimize loud and disturbing noises, especially near breeding colonies, to avoid stampedes and disturbances to sensitive individuals.
5. Disengage from any physical contact initiated by wildlife by slowly moving away from them.

### Species-specific considerations and guidelines for CMS-listed species

**South American sea lions** (*Otaria flavescens*) frequently display biting behaviour in the presence of swimmers, and are more likely than most species to bite a swimmer following physical contact (Dans et al. 2017). Aside from ensuring that a minimum distance is respected, it is paramount that emphasis is placed on avoiding physical contact with the wildlife. For the safety of both wildlife and humans, it is recommended that interactions with this species be prohibited altogether.

**Grey seals** (*Halichoerus grypus*) have displayed 'risky' behaviours and displays of aggressive or concerning behaviour directed towards swimmers (Scheer 2020). The most ubiquitous threat display is the non-vocal open mouth threat (Twiss et al. 2022), but risky behaviours included physical contacts initiated by the seal (e.g., mouth grab, foreflipper scratch). This poses serious risks of injury to the participants, reiterating the need for participants to not only maintain a distance from the wildlife but also know when and how to disengage from physical contact.

## 2.2 MARINE TURTLES

While interactions with marine turtles most often occur on land, both opportunistic and dedicated in-water interactions are also widespread. All Cheloniidae species are CMS-listed and classed as 'Vulnerable' to 'Critically Endangered' in the IUCN Red List. Even though tourism is not among the major conservation threats to these species, its mitigation would nonetheless contribute to the conservation of species within this taxon by decreasing the cumulative anthropogenic impacts on them.

Similar to sirenians, the behaviour and ecology of marine turtles make them particularly vulnerable to harassment and collisions with vessels in their critical feeding and resting areas (e.g., Horrocks et al. 2007). The presence of snorkellers and divers was shown to affect feeding, investigating and breathing behaviours of **Hawksbill sea turtle** (*Eretmochelys imbricata*) (Hayes et al. 2016). It was cautioned that disturbances to feeding could not only negatively impact their behaviour and physiology (Taquet et al. 2006; Meadows 2004), but also lead to changes in diurnal patterns of foraging and habitat use of **green turtles** (*Chelonia mydas*) (Landry and Taggart 2010; Taquet et al. 2006). Landry and Taggart (2010) and Griffin et al. (2017) both recommend that core feeding areas and most sensitive time of day be closed to interactions.

In-water interactions involving direct feeding of green turtles in Barbados were linked to alterations in behaviour and increased risks of injury (Horrocks et al. 2007), as well as effects on biochemical indicators (Stewart et al. 2016).

Temporal and spatial stratification to create no-interaction sites (e.g., core feeding areas) and times (e.g., midday, when green turtles vacate feeding grounds for thermal regulation), restrictions in the number of visitors, the establishment of a code of conduct and the strict management of feeding (e.g., creating stations, natural food) are recommended interventions (Griffin et al. 2017; Stewart et al. 2016; Landry and Taggart 2010; Horrocks et al. 2007).

Furthermore, there is a risk that resident individuals can become disproportionately targeted by interactions, leading to repeated, chronic disturbances and increased risks on this specific segment of the wider population (e.g., Papafitsoros et al. 2021; Schofield et al. 2015; Horrocks et al. 2007). Management of interactions with turtles should consider fluctuations in animals available for viewing (Schofield et al. 2015) and randomize location and time in which in-water interactions are allowed (Landry and Taggart 2010).

Parties interested in directing and evaluating Environmental Impact Assessments of developments impacting on sea turtles and turtle habitat can find guidance in [CMS/IOSEA/MOS8/Doc.7.5](#) of the Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and Southeast Asia. A [Code of Practice for the Sustainable Management of Turtle tourism](#), including guidance on environmental assessment, management and code of conduct, is provided in Birtles et al. (2005).

### **Observable indicators of disturbance**

- Avoidance tactics: swimming away, keeping away, surfacing
- Change in surface activity: shorter breathing intervals
- Change in behavioural state: interruption of feeding, resting and breathing

### **Guidelines applicable to all turtle species**

1. Maximum 5 people at the minimum distance, body length of the animal or 3m, whichever is greater.
2. Create no-interaction zones off nesting beaches during the nesting season to prevent disturbance of turtles approaching or leaving the beach.
3. Snorkellers and divers to approach from one side and avoid 'enclosing' the turtle from above as it inhibits the turtle's ability to surface and breath.
4. Do not obstruct the turtle path to, and permanence at, the surface.
5. Prohibit physical interaction, including to take, touch, handle, ride, step on, hold on to, hold or move the turtles.
6. Prohibit scuba diving interactions in core feeding and resting areas to minimize disturbances to animals in these sensitive states.
7. To avoid confusion and possible return to the beach, do not illuminate hatchlings in the water.

## 2.3 FISH

Recreational in-water interactions with sharks and rays are found worldwide and are carried out in a great variety of formats, as the ecology and natural behaviour of elasmobranch species differ significantly. Healy et al. (2020) reviewed 151 unique elasmobranch tourism operations in 42 countries targeting 49 species, of which 17 are CMS-listed. In-water interactions can involve scuba diving or snorkelling at the surface, both with or without a cage, or standing in shallow waters. Commercial activities targeting elasmobranchs can employ practices usually referred to as *provisioning* that include attracting, feeding and modifying habitat in order to increase the likelihood of an interaction (Meyer et al. 2021b).

Calls for mitigation in the development of in-water interaction tourism have been voiced since the late 1990s (e.g., Bessa et al. 2017; Burgess 1998), yet management is missing altogether in about a third of operations (Healy et al. 2020). In particular, provisioning is a collection of complex and multifaceted (Meyer et al. 2021b), contentious (Patroni et al. 2018; Newsome and Rogers 2008; Orams 2002) and risky (Healy et al. 2020, Brena et al. 2015) practices requiring strict regulation (see Murray et al. 2016 for a review of studies and management recommendations pertaining to provisioning supplemental feeding). Where management is in place it is often secondary in nature (i.e., not explicitly designed or implemented to manage elasmobranch tourism) and based on self-management and voluntary codes of conduct (Healy et al. 2020), but examples of well-regulated, comprehensive, sustainable and closely monitored schemes do exist (e.g., cage diving, Healy et al. 2020; Bradley et al. 2017; Smith et al. 2014; case studies in Lawrence et al. 2016).

Case studies in Dobson (2006) illustrate issues and considerations in integrating stakeholder involvement, enforcement, and the balancing of anthropocentric and biocentric concerns in the management of shark tourism. A useful matrix to reflect on the hazards to the target species (e.g. physiology, behaviour), associated ecosystems (e.g. ecological) and humans (e.g. safety, social) as a result of managed versus unmanaged snorkelling, diving, cage diving and provisioning elasmobranchs can be found in Healy et al. (2020). Meyer et al (2021a) offer a comprehensive and collaborative framework organized around five discrete categories – tractability, socioeconomic values, conservation outcomes, animal welfare, and ecosystem impacts – as a model applicable universally to comprehensively assess the sustainability of interactions.

Additional species-specific guidance on establishing regulations for interactions with elasmobranchs can be found in Lawrence et al. (2016).

### *Sharks*

In-water interactions occur both in pelagic and coastal habitats and mostly involve scuba diving. Commercial operations target whale, white and hammerhead sharks, among others. Documented impacts from tourism and recreational activities on sharks include changes in physiology (e.g., Barnett et al. 2016), abundance, residency or seasonality (e.g., Araujo et al. 2014; Meyer et al. 2009), space use (e.g., Huveneers et al. 2013), and physical effects (e.g., Smith et al. 2010).

The way in which animals respond to interactions was found to vary greatly between species, locations, and type of interactions (e.g., Gallagher et al. 2015; Bradley et al. 2017; Bruce and Bradford 2013; Cubero-Pardo et al. 2011) and in many ways is still poorly understood (Vianna et al. 2012), especially their long-term biological implications (Bradley et al. 2017).

Feeding and attracting, ranging from chumming to hand-feeding, are a common feature in many commercial operations and can lead to changes in behavioural budgets, metabolic

rates, space use and local abundance (e.g., Heinrich et al. 2022; Araujo et al. 2014, 2020; Abrantes et al. 2018; Brunnschweiler and Barnett 2013; Hammerschlag et al. 2012, 2017; Brunnschweiler and Baensch 2011; Clarke et al. 2011, 2013; Maljkovi and Côté 2011. See the Responsible Provisioning Toolbox in Lawrence et al. 2016 for additional references).

Scuba diving without feeding can also alter activity budgets and cause temporary displacement (Cubero-Pardo et al. 2011; Smith et al. 2010; Quiros 2007). Moreover, rapid, direct diver approaches in the absence of escape routes are more likely to trigger offensive and defensive displays (Martin 2007). In-water interactions with sharks at certain locations or times pose high risks for human safety that must be carefully assessed and addressed (e.g., use of weighted ropes as tethers in pelagic diving against currents, Bentz et al. 2014; swim/snorkel with sharks restricted to daylight hours).

Shark-based recreational activities have a large potential for growth and are widely proposed as a viable and preferable alternative to fishing (e.g., González-Mantilla et al. 2021; Cisneros-Montemayor et al. 2020; Dearden et al. 2008). There is evidence that well-regulated activities avoid and minimize effects and persistent impacts (e.g., Laroche et al. 2007; Bradley et al. 2017). For instance, in Australia, a management solution employing both legally enforceable licensing and non-binding codes of conduct, was considered appropriate for shark-based ecotourism (Techera and Klein 2013).

However, the implementation and enforcement of any regulations governing interactions with sharks at depth and remote locations faces significant challenges (Gallagher et al. 2015). Despite their limitations (Quiros 2007), codes of conduct are the most realistic approach for the management of commercial interactions (see examples in Lawrence et al. 2016) and, combined with a basic rating system of operators (Gallagher et al. 2015), patrolling by covert operations involving undercover officers (Techera and Klein 2013) and responsible provisioning programmes (see guidance in Lawrence et al. 2016), among others, can help promote responsible providers and interactions.

Based on an International Charter for Responsible Shark Ecotourism and interviews with whale shark tour operators in Nosy Be, Madagascar, the IUCN Sharks Specialist Group suggests the guidelines below as applicable to all shark species (Ziegler et al. 2021).

### **Observable indicators of disturbance**

- Avoidance tactics: changes in direction of movement, increased swim speed, altered diving patterns
- Change in activity: altered patterns of habitat use
- Change in behavioural state: interruption of current behaviour, agonistic behaviour, threatening displays

### **Additional guidelines applicable to all shark species**

1. Favour static, still diving that avoids large and/or sudden movements and sounds.<sup>8</sup>
2. Do not turn sharks on their back or stimulate sensory pores to induce tonic immobility.
3. Do not block the path, escape routes or entrance to caves where sharks rest.
4. Do not swim, surf or dive alone to reduce the chance of inquisitive approaches from wildlife and for safety.

<sup>8</sup> This does not apply to interactions with whale sharks, where participants are typically required to swim or snorkel.

5. Promote the use of tethers, benthic or pelagic holding structures at cleaning stations to reduce disturbance caused by the presence and movements of participants.
6. To avoid unintentionally attracting animals, do not carry speared fish or collected marine animals.
7. For precaution, ensure that no other activity (fishing, spearfishing, swimming, etc.) is practised on the site, especially at locations and times when shark attracting occurs.
8. It is recommended that individuals refrain from wearing reflective objects, such as jewellery or shiny equipment, while participating in shark diving activities. Such objects may be confused with prey fish by predatory sharks, potentially leading to dangerous situations.
9. Ban swimming, surfing or diving in the vicinity of pinniped haul-outs or rookeries, as they are prey of large sharks.
10. Divers should have an adequate diving qualification (e.g. N2, Advance Open Water Diver) with a significant number of dives (>50).
11. Provisioning of any kind is discouraged in line with the precautionary principle. Natural encounters are to be favoured over those using an attractant source. Where attracting occurs:
  - a) it can only be carried out by a professional in possession of a dedicated licence;
  - b) minimize and regulate the amount of chum and bait used;
  - c) avoid shark consumption of baits;
  - d) use only natural and local prey of the species targeted;
  - e) minimize the use of chum and bait once sharks have been attracted;
  - f) ensure there are periods when animals are not attracted by food to avoid altering the target species' distribution, occurrence and behaviour through association and learning.
12. The use of decoys (i.e. artificial models mimicking prey) in neoprene or plastic material is prohibited.
13. The number of co-occurring participants to in-water interactions is limited depending on the site, target species, and guide-tourist ratio.
14. Dives should be performed in the daytime and in waters clear enough for a line-of-sight distance of at least 10m.
15. For the safety of the human participants and to avoid disturbing shark hunting activities, dives and swimming on sites with sharks in darkness or twilight hours, should be forbidden.
16. Tourists should be guided out of the water when one or several sharks are too inquisitive. In case of an imminent close encounter, the shark should be firmly pushed back with a billy stick, but without violence (relevant only to inquisitive sharks). It is forbidden to hit the sharks with fins or with throws of bubbles fusing from the octopus regulators.
17. Photographers should not use flashlights (flashes are likely to provoke escape or defiance reactions).

## Species-specific considerations and guidelines for CMS-listed species

Interactions with the **whale shark** (*Rhincodon typus*) are less likely to elicit an avoidance response if tourists respect the distance limit, swim on one side and stay behind the gills, where they cannot be seen by the sharks. Provisioning activities doubled the residency times of whale sharks, increased the probability of re-sighting over time (Araujo et al. 2014) and affected the depth and temperature use in resident individuals (Araujo et al. 2020). A lack of an obvious pattern of responses in the population surveyed in Mozambique, led Haskell et al. (2015) to postulate that the non-breeding status and transient behaviour of whale sharks at this site might protect them from potential tourism effects. Pierce et al. (2010) emphasize the importance of establishing and enforcing minimum distances between the animals and the in-water participants and proposed a swimmer discharge distance of 20m for boat-based operations. A dedicated study at Ningaloo Reef (Australia), where interactions are regulated by a permit scheme and code of conduct, found that repeated interactions over a five-year period led to habituation of sharks to tourism disturbances, with no disruption of visit or re-encounter patterns at the site (DPAW 2013; Sanzogni et al. 2015). Improved interpretation and education systems to bring to higher compliance, and restrictions on the number of boats allowed were recommended for tourism operating off Isla Holbox (Mexico) (Ziegler et al. 2015).

Provisioning is being employed at emerging locations, raising significant concerns (Ziegler et al. 2018) and urging the formulation of specific legislation and regulation to limit the impacts of provisioning on this mobile and endangered species (Araujo et al. 2020).

The Concerted Action for the Whale Shark ([UNEP/CMS/CA12.7 \(Rev.COP13\)](#)) adopted in 2020 aims to produce unified basic tourism guidelines to limit negative impacts from tourism interactions with the species. An example Code of Conduct can be found in Lawrence et al. (2016, p.61).

The effects of in-water interactions on the **basking shark** (*Cetorhinus maximus*) are unknown. [Guidelines produced by Shark Trust](#) recommend fewer participants (four) and an Interaction Zone of 100m. An example Code of Conduct can be found in Lawrence et al. 2016 (p.63).

The **white shark** (*Carcharodon carcharias*) is the main target of cage-diving operations and among the most studied elasmobranch species in the context of tourism impacts. Intentional attracting was found to affect the residency, fine-scale movement patterns, and activity of white sharks (e.g., Bruce and Bradford 2013; Huveneers et al. 2011; Laroche et al. 2007; Bruce 2005). The diet and nutritional condition of white sharks did not appear to be affected by the small number of baits consumed during cage-diving activities (Meyer et al. 2019). A regulated provisioning programme for cage diving ensures that indirect feeding is avoided or at least minimized, and that the attracting source is chosen carefully to protect the sharks and to promote human and shark safety (Araujo et al. 2020). Gallagher and Huveneers (2018) offer a reflection on current research and management challenges in white shark tourism, which they identify mostly in the areas of animal welfare, ecological interactions, fitness and bioenergetics, and public safety. The white shark cage diving in South Australia scored highly positive when analysed in a newly developed multidisciplinary framework for the sustainability and acceptability of wildlife tourism operations (Meyer et al. 2021a). An example Code of Conduct for shark cage diving can be found in Lawrence et al. (2016, p.65).

The **blue shark** (*Prionace glauca*) is one of the most widely distributed species of shark globally (Nakano and Stevens, 2008). Tourism with blue sharks, both snorkel and scuba based, are common in South Africa, the United States, Mexico, the United Kingdom, Spain and the Azores (Portugal). The [Azores developed a Code of Conduct](#) in 2012 designed for diver safety, animal welfare and general best practices. Similarly, in 2022, blue shark operators in the UK, in collaboration with [MARECO](#), developed the first Code of Conduct for snorkel-based operations with the same objective of establishing the safety of swimmers while

ensuring animal welfare by minimizing disturbance. Namely, limiting the number of people in the water at any one time (max. 6), creating a physical barrier between swimmers and the bait box, prohibiting the presence of swimmers down current from the bait box, strict enforcement of no bright colours or shiny objects/markings on swimmers, and prohibiting direct feeding of sharks.

### *Mobulid rays*

All *mobulid* rays (e.g., manta rays, devil rays) that are the target of scuba diving and snorkelling tourism are CMS-listed. Despite their popularity as tourism attractions (O'Malley et al. 2013), the taxon is severely understudied (see Stewart et al. 2018 for a review of existing knowledge and recommended avenues for research). The conservation concerns for mobulid rays are so serious that precautionary regulations have been already introduced in some regions (e.g., Maldives, Ecuador. Ward-Paige et al. 2013).

Very little is known on the impacts of in-water interactions on the biology, ecology and behaviour of mobulid rays, with studies focusing on manta rays. In Australia, **manta rays** (*Mobula alfredi*<sup>9</sup>) responded to interactions by terminating feeding or cleaning behaviour (Venables et al. 2016). Human predictors of behavioural responses included the amount of surface splashes, the approach strategy, the duration of a single interaction, and the number of repeated interactions (Venables 2013). Interactions with the species are currently unregulated at Nusa Penida MPA (Indonesia), an important area for foraging, cleaning and reproductive behaviours (Germanov et al. 2019) and a popular tourism destination (O'Malley et al. 2013). Science-based carrying capacity assessments to estimate the acceptable number of diver interactions for the area, mandatory codes of conduct, a licensing system for commercial operators, and area-time closures were proposed as management options for the site (Germanov et al. 2019).

Manta rays are potentially at risk from the high number of tourists in the Maldives, urging Anderson et al. (2011) to recommend research on the short- and long-term effects of interactions and a strengthening in education interpretation for all stakeholders.

In a global perspective, the identification of areas and regions characterized by strong conflicts between tourism and exploitation could help prioritize conservation efforts (Mazzoldi et al. 2019; Ward-Paige et al. 2013).

An example Code of Conduct for interactions with manta and eagle rays can be found in Lawrence et al. (2016, p.71).

### **Observable indicators of disturbance**

- Avoidance tactics: changes in swimming speed and direction, abrupt movements
- Change in activity: departure from area (e.g., cleaning station)
- Change in behavioural state: interruption of current behaviour (e.g., feeding)

### **Guidelines applicable to all mobulid ray species**

1. Enter the water calmly and approach the animals slowly, avoiding noises and splashing with fins.

<sup>9</sup> As of January 2023, still listed as *Manta alfredi* in CMS Appendices. In accordance with the CMS standard reference for fish, all species of the family Mobulidae have been included in the genus *Mobula*. (See Eschmeyer, W.N., Fricke, R. and Van der Laan, R. (eds). 2017. Catalog of Fishes: genera, species, references. Accessed on 22 January 2023 at: <https://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>)

2. Approach from the side, leaving the ray a clear path ahead.
3. Do not station directly above or below the animals in order to leave the open water column unobstructed for manoeuvring.
4. Do not swim over cleaning stations, and promote the use of tethers, benthic or pelagic holding structures at cleaning stations to reduce disturbance caused by the presence and movements of participants.
5. Divers keep still, to the side, possibly on or near the bottom, and at distance to avoid disturbing the animals or altering the feeding conditions.
6. Interactions with mating chains (one female followed by two or more males) should be treated with extra caution: fewer than five participants, shorter duration and at least 10m distance.
7. For interactions occurring in darkness, the 'campfire method' whereby human participants (divers, snorkellers, or both) coordinate their lighting to create a central lighted area (campfire) of the water column, is recommended for the safety of both manta ray and participants.

### Species-specific considerations and guidelines for CMS-listed species

Healy et al. (2020) report on the existence of interactions with the IUCN Critically Endangered **smalltooth sawfish** (*Pristis pectinata*) in the Bahamas, an important habitat for the species (Guttridge et al. 2015). No data are currently available on the effects of interactions on the species. A dedicated assessment using the Vulnerability Assessment Matrix places *Pristidae* at low risk from existing or potential marine recreational activities at the [Great Barrier Reef, Australia](#). Although in-water interactions are not a main threat for the species, their prohibition would contribute to the conservation of the species by decreasing the cumulative anthropogenic disturbance to which it is exposed.

#### *Other rays*

**Dasyatidae** and other ray species are a main focus of in-water interactions, which often involve unsuitable and illegal practices such as touching and provisioning (Healy et al. 2020). It is unclear how the animals respond to such interactions, but there are indications that rays exhibit behavioural changes where feeding and attracting are used. The **Southern stingray** (*Hypanus americana*) has been a main focus of commercial and recreational (the most renowned being Stingray City Sandbar, Cayman Islands), as well as of research interest to date (e.g., Hoopes et al. 2020; Vaudo et al. 2017; Shackley 1998). Interactions involving supplemental feeding were associated with changes in rates of intraspecific competition, diurnal patterns of activity (with differences between sexes), residency and spatial distribution (e.g., Corcoran et al. 2013; Gaspar et al. 2008; Newsome et al. 2004; Lewis and Newsome 2003). There is also evidence that feeding stingrays has significant, detrimental effects on the animals' feeding ecology (Hoopes et al. 2020), physiological and body condition, parasite load and risk of injury (e.g., Semeniuk and Rothley 2008; Semeniuk et al. 2007, 2009). Furthermore, ray feeding was associated with effects on the wider community, with changes in density and size distribution of other fish species (e.g., dusky grouper. Milazzo et al. 2005) and habitat features (e.g., excretions from rays, Milazzo et al. 2005; increased organic matter in the water).

An integrated systems dynamic model developed by Semeniuk et al. (2010) for Stingray City Sandbar predicted that strategies, including reduction in visitor density, restricted stingray interactions, and an imposition of a small fee would facilitate a best outcome scenario for

wildlife and humans over a 25-year timespan. Regulations implemented at the site to reduce effects on stingrays include established limits on the number of tourists and vessels allowed, times of commercial activity, ways in which rays could be handled, and amount and types of food that can be provisioned (reported in Vaudo et al. 2017).

Situations in which interactions are unmanaged (e.g., *Dasyatis* species at Hamelin Bay, Australia) are of particular concern not only for the effects on the wildlife, but also for the safety of visitors (e.g., risky behaviours, offal attracting sharks) (Newsome et al. 2004). A decisive effort at enhancing interpretation and education on site, enforcing regulations, and developing site (e.g., zoning, location of feeding position) and visitor management practices (e.g., numbers, group size and length of stay, entry fee) are recommended for this population (Newsome et al. 2004; Lewis and Newsome 2003). Moreover, the adoption of licensing arrangements for commercial operations and a managed feeding programme regulating the amount, type and frequency of feeding is suggested (DeLorenzo and Techera 2018).

Overall, the impacts of ray tourism and recreation are understudied and research available is so limited that one first, crucial, recommended step is to initiate and sustain monitoring programmes on the population targeted (Healy et al. 2020; DeLorenzo and Techera 2018; Vaudo et al. 2017). See the Responsible Provisioning Toolbox in Lawrence et al. (2016) for additional references. An example Code of Conduct for interactions with stingrays can be found in Lawrence et al. (2016, p.69).

### **Observable indicators of disturbance**

- Change in activity: attraction to humans and/or vessels, aggressive competition, altered diel patterns and patterns of habitat use
- Change in behavioural state: interruption of feeding behaviour, agonistic behaviour towards conspecifics and humans

### **Guidelines applicable to all ray species**

1. Do not touch, handle or lift out of the water.
2. Do not turn rays to induce tonic immobility.
3. Do not stand on the rays.
4. Do not block escape routes.
5. Do not swim over cleaning stations, and promote the use of tethers, benthic or pelagic holding structures at cleaning stations to reduce disturbance caused by the presence and movements of participants.
6. Prohibit the direct feeding, and allow other forms of attracting, such as olfactory attractants, and provisioning only if part of a monitored programme and carried out by professionals in possession of relevant licences.
7. Minimize the use and, in all cases, strictly regulate the consumption of baits in provisioning operations: use only local and natural food, minimize the use once the rays have been attracted, and ensure non-provisioning times to prevent insurgence of conditioning.

## Other fish

While a number of bony fish are subject to tourism, two groups are particularly relevant here. Sunfishes (Molidae) are among the species most often targeted by dedicated in-water interaction, but very little is known about the potential impacts of tourism (see a review in Nyegaard et al. 2020). For instance, scuba divers can observe the **short mola** (*Mola ramsayi*) at cleaning stations in Nusa Penida and Nusa Lembongan (Bali, Indonesia). At the former, the cooperation between local organizations has created a dedicated [code of conduct](#) for divers and operators which is adopted in the [Nusa Penida Marine Protected Area](#). However, given the increased diving tourism pressures, further research on the behaviour of the species is required to design most effective management strategies (Thys et al. 2016).

Interactions are reported also on the **striped marlin** (*Kajikia audax*) feeding on bait balls in [Baja California Sur, Mexico](#). A community-based initiative involving local tour operators, tourism providers, and non-profit organizations was launched in 2019, and led to the creation of a [Proposal for Code of Conduct and Conservation Program and Management](#) for in-water interactions with the species.

## 2.4 SEABIRDS

This is a group of species where in-water interactions are scarce. While some species might be opportunistically observed underwater while diving or snorkelling (e.g., shearwaters, auks, penguins such as **African penguin** (*Spheniscus demersus*) and **Cape cormorant** (*Phalacrocorax capensis*) while scuba diving during the KwaZulu-Natal sardine run on the Wild Coast of South Africa), dedicated in-water interactions are rare, and mainly come from filmmakers attempting to film birds diving after fish. In those circumstances, foraging activities may be disrupted and birds at the surface forced to flee. Those actions may cause loss of feeding opportunities or elicit birds to swallow fish that they would otherwise feed to their chick(s).

Current in-water operations target the **African penguin** (*Spheniscus demersus*) in South Africa and the **Galapagos penguin** (*Spheniscus mendiculus*) – both species in most critical need of conservation action (Boersma et al. 2020) – and the **gentoo penguin** (*Pygoscelis papua*) in the Falkland Islands (Islas Malvinas). While research attention has focused mostly on the effects of land-based watching (e.g., Scheun et al. 2021; Lynch et al. 2019; Walker et al. 2005) and recommended the development of land-based tourism planning as a high priority action to reduce detrimental impacts on the species (Boersma et al. 2020), no studies have addressed potential disturbances from in-water interactions undertaken for tourism or recreation (Steven et al. 2011).

### Observable indicators of disturbance

- Change in activity: distraction, focus on approaching stimulus, aggression, head tilting, avoidance of foraging, roosting or breeding habitat
- Avoidance tactics: changes in swimming speed and direction, abrupt movements

### Guidelines applicable to all penguin species

1. Do not approach closer than the minimum distance, body length of the animal or 3m, whichever is greater.
2. Do not intercept direction of travel.

3. Do not taunt or tease birds.

### **Species-specific considerations and guidelines for CMS-listed species**

The **Humboldt penguin** (*Spheniscus humboldtii*) is particularly sensitive to disturbance, which has been associated with lower breeding success (e.g. Ellenberg et al. 2006). Applying a precautionary principle, in-water interactions with the species should be prohibited.

The **African penguin** (*Spheniscus demersus*) is currently exposed to intense land-based watching tourism at two mainland colonies in South Africa, Boulders Beach in the Table Mountain National Park and Stony Point. No guided swimming opportunities exist but tourists at Boulders Beach can access a beach frequented by penguins and this is largely unmonitored. With limited information on the effects of visitation and, given the IUCN 'Endangered' status of the species, a decisive restriction of public disturbance is strongly recommended, and better monitoring and control of tourist activities required.

## Supplementary material

### SELECTED RESOURCES AND CODES OF CONDUCT

*This is not an exhaustive list, nor a list of the “best codes”. It is a collection of examples from different case studies, limited by both language and online accessibility of such codes.*

#### Marine wildlife

Rules and regulations governing the conduct of marine wildlife tourism interactions in the Philippines (2020): <https://law.upd.edu.ph/wp-content/uploads/2021/04/DOT-DA-DILG-DENR-Joint-Memorandum-Circular-No-01-Series-of-2020.pdf>

Code of conduct for marine wildlife interaction (Marine Wildlife Watch of the Philippines): <https://drive.google.com/file/d/1Nf4bYUXQJgkwp4RtJivYOUQhpC9RPzIE/view>

Marine and coastal wildlife code: advice for visitors (Department for Environment, Food & Rural Affairs, UK, 2023): <https://www.gov.uk/government/publications/marine-and-coastal-wildlife-code/marine-and-coastal-wildlife-code-advice-for-visitors>

Code of Conduct promoting best practice for encountering marine life in Cornwall (UK) from The Cornwall Wildlife Trust: <https://www.cornwallwildlifetrust.org.uk/sites/default/files/2019-03/Cornwall%20Marine%20and%20Coastal%20Code%20Guidelines.pdf>

#### Marine mammals

Species / Group of species	Location	Resource and source
Australian Sea Lion <i>Neophoca cinerea</i>	Australia	Recommendations in <a href="https://annamartinez.info/download/Swimming_With_Sealions_Summary.pdf">https://annamartinez.info/download/Swimming_With_Sealions_Summary.pdf</a>
Cetaceans	Australia	Australian National Whale and Dolphin Watching Guidelines 2017 <a href="https://www.awe.gov.au/environment/marine/publications/australian-national-guidelines-whale-and-dolphin-watching-2017">https://www.awe.gov.au/environment/marine/publications/australian-national-guidelines-whale-and-dolphin-watching-2017</a> Great Barrier Reef Marine Park Authority <a href="https://www.gbrmpa.gov.au/about-us/legislation-regulations-and-policies/whale-and-dolphin-watching-regulations">https://www.gbrmpa.gov.au/about-us/legislation-regulations-and-policies/whale-and-dolphin-watching-regulations</a>
Cetaceans	Azores	Reported in Cecchetti et al. 2019
Cetaceans	Colombia	Guía de avistamiento responsable de mamíferos acuáticos en Colombia <a href="https://www.minambiente.gov.co/documento-entidad/guia-de-avistamiento-responsable-de-mamiferos-acuaticos-en-colombia/">https://www.minambiente.gov.co/documento-entidad/guia-de-avistamiento-responsable-de-mamiferos-acuaticos-en-colombia/</a>
Cetaceans	Colombia	Tourist Guide to Whale Watching in Colombia. Ministry of Industry, Commerce and Tourism, Vice Ministry of Tourism, Directorate of Quality and Sustainable Development of Tourism of Colombia. <a href="https://www.academia.edu/26920595/Guia_de_avistamiento_de_ballenas_en_Colombia_Tourist_Guide_of_Whalewatching_in_Colombia">https://www.academia.edu/26920595/Guia_de_avistamiento_de_ballenas_en_Colombia_Tourist_Guide_of_Whalewatching_in_Colombia</a>

Species / Group of species	Location	Resource and source
Cetaceans	Global	International Whaling Commission: General Principles for Whale Watching <a href="https://iwc.int/document_3744.download">https://iwc.int/document_3744.download</a> International Whaling Commission and CMS: Whale Watching Handbook <a href="https://wwhandbook.iwc.int/en">https://wwhandbook.iwc.int/en</a>
Cetaceans	Global	Carlson 2012. A review of whale-watching guidelines and regulations <a href="https://s3-eu-west-1.amazonaws.com/wwhandbook/guideline-documents/IWC-2012-Compendium-of-whale-watching-Regulations-English.pdf">https://s3-eu-west-1.amazonaws.com/wwhandbook/guideline-documents/IWC-2012-Compendium-of-whale-watching-Regulations-English.pdf</a>
Cetaceans	ACCOBAMS area (Black Sea, Mediterranean Sea and Contiguous Atlantic Area)	Overview <a href="https://accobams.org/conservations-action/cetacean-watching/">https://accobams.org/conservations-action/cetacean-watching/</a> Guidelines for the management of cetacean-watching activities in the ACCOBAMS Area (Annex to ACCOBAMS Resolution 8.19) <a href="https://accobams.org/wp-content/uploads/2023/01/MOP8.Doc31_Annex13_Res8.19.pdf">https://accobams.org/wp-content/uploads/2023/01/MOP8.Doc31_Annex13_Res8.19.pdf</a> Guidelines for commercial cetacean-watching in the Black Sea, the Mediterranean Sea and Contiguous Atlantic Area. <a href="https://www.accobams.org/wp-content/uploads/2018/09/GL_commercial_cetacean-watching.pdf">https://www.accobams.org/wp-content/uploads/2018/09/GL_commercial_cetacean-watching.pdf</a> Guidelines for implementing a Pelagos/ACCOBAMS label for commercial whale-watching activities. <a href="https://www.accobams.org/wp-content/uploads/2018/09/GL_PelagosACCOBAMS_label.pdf">https://www.accobams.org/wp-content/uploads/2018/09/GL_PelagosACCOBAMS_label.pdf</a> High Quality Whale Watching certification <a href="http://www.whale-watching-label.com/label">http://www.whale-watching-label.com/label</a>
Cetaceans	US	Dolphin SMART <a href="https://sanctuaries.noaa.gov/dolphinmart/">https://sanctuaries.noaa.gov/dolphinmart/</a> ; <a href="https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/archive/dolphinmart/pdfs/turtle_guide.pdf">https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/archive/dolphinmart/pdfs/turtle_guide.pdf</a>
Cetaceans	Global	World Cetacean Alliance and ClubMed <a href="https://whaleheritagesites.org/wp-content/uploads/2021/12/WCA-Global-Best-Practice-Guidance-for-responsible-whale-and-dolphin-watching-ENGLISH.pdf">https://whaleheritagesites.org/wp-content/uploads/2021/12/WCA-Global-Best-Practice-Guidance-for-responsible-whale-and-dolphin-watching-ENGLISH.pdf</a>
Cetaceans	Global	Whale and Dolphin Conservation <a href="https://whales.org/wp-content/uploads/sites/6/2019/05/wdc-responsible-whale-watching-guide-2019.pdf">https://whales.org/wp-content/uploads/sites/6/2019/05/wdc-responsible-whale-watching-guide-2019.pdf</a> (Ludewig and Williams-Grey 2019)
Cetaceans	Pacific islands	IFAW, SPREP, Operation Cetaces. <a href="https://www.sprep.org/att/publication/000647_whale_watch_guidelines_en.pdf">https://www.sprep.org/att/publication/000647_whale_watch_guidelines_en.pdf</a>
Cetaceans	Bimini, Bahamas	Dolphin Communication Project. <a href="https://www.wildquest.com/wp-content/uploads/CodeOfConduct.pdf">https://www.wildquest.com/wp-content/uploads/CodeOfConduct.pdf</a>
Cetaceans, Dugong <i>Dugong dugon</i>	Australia	Ningaloo Marine Park <a href="https://parksaustralia.gov.au/marine/pub/scientific-publications/archive/ningaloo-visitors-info.pdf">https://parksaustralia.gov.au/marine/pub/scientific-publications/archive/ningaloo-visitors-info.pdf</a>
Dugong <i>Dugong dugon</i>	Vanuatu	Vanuatu Environmental Science Society <a href="https://www.vanuatuconservation.org/wp-content/uploads/2018/09/Poster-Dugong-GLines-Swimming-Diving-WEB.pdf">https://www.vanuatuconservation.org/wp-content/uploads/2018/09/Poster-Dugong-GLines-Swimming-Diving-WEB.pdf</a> <a href="https://www.vanuatuconservation.org/wp-content/uploads/2018/09/Tourists-Guide-for-Interacting-with-Dugongs-WEB.pdf">https://www.vanuatuconservation.org/wp-content/uploads/2018/09/Tourists-Guide-for-Interacting-with-Dugongs-WEB.pdf</a>

Species / Group of species	Location	Resource and source
Dugong <i>Dugong dugon</i>	Australia	Dugong and Turtle Tourism Project <a href="http://dugongturtletourism.org/docs/CodeOfPractice_www.pdf">http://dugongturtletourism.org/docs/CodeOfPractice_www.pdf</a>
Dugong <i>Dugong dugon</i>	Australia	GBRMPA <a href="https://www.gbrmpa.gov.au/about-us/legislation-regulations-and-policies/policies-and-position-statements/guidelines-for-commercial-dugong-watching">https://www.gbrmpa.gov.au/about-us/legislation-regulations-and-policies/policies-and-position-statements/guidelines-for-commercial-dugong-watching</a>
Florida Manatee <i>Trichechus manatus latirostris</i>	US	US Fish and Wildlife Service <a href="https://www.fws.gov/refuge/Crystal_River/Three_Sisters_Springs_Manatee_Information.html">https://www.fws.gov/refuge/Crystal_River/Three_Sisters_Springs_Manatee_Information.html</a> ; <a href="https://www.youtube.com/playlist?list=PLZb5DyVcCk94Z-FNzg6vR1sPr6N4yGizB">https://www.youtube.com/playlist?list=PLZb5DyVcCk94Z-FNzg6vR1sPr6N4yGizB</a> ; <a href="https://www.fws.gov/southeast/pdf/tearsheet/crystal-river-national-wildlife-refuge.pdf">https://www.fws.gov/southeast/pdf/tearsheet/crystal-river-national-wildlife-refuge.pdf</a>
Humpback Whale <i>Megaptera novaeangliae</i>	Australia	Management program for humpback whale interactions along the Ningaloo Coast (Western Australia) <a href="https://www.dpaw.wa.gov.au/management/marine/marine-wildlife/552-swimming-with-humpback-whales">https://www.dpaw.wa.gov.au/management/marine/marine-wildlife/552-swimming-with-humpback-whales</a> Queensland, reported in Stack et al. 2021.
Humpback Whale <i>Megaptera novaeangliae</i>	Tonga	Tonga regulations <a href="http://www.tourismtonga.gov.to/wp-content/uploads/2015/08/WhaleWatchingandSwimmingRegulations2013English-2.pdf">http://www.tourismtonga.gov.to/wp-content/uploads/2015/08/WhaleWatchingandSwimmingRegulations2013English-2.pdf</a>
Marine Mammals	New Zealand	Marine Mammal Protection Regulations <a href="https://www.legislation.govt.nz/regulation/public/1992/0322/latest/whole.html?search=ts_act%40bill%40regulation%40deemedreg_marine+mammals_resel_25_a&amp;p=1#DLM168286">https://www.legislation.govt.nz/regulation/public/1992/0322/latest/whole.html?search=ts_act%40bill%40regulation%40deemedreg_marine+mammals_resel_25_a&amp;p=1#DLM168286</a>
Minke Whale <i>Balaenoptera acutorostrata</i>	Australia	Great Barrier Reef Marine Park. <a href="http://minkewhaleproject.org/wp-content/uploads/2018/08/code-of-practice.pdf">http://minkewhaleproject.org/wp-content/uploads/2018/08/code-of-practice.pdf</a> ; <a href="http://minkewhaleproject.org/management/code-of-practice-sww-endorsed-operators/">http://minkewhaleproject.org/management/code-of-practice-sww-endorsed-operators/</a>
Orca <i>Orcinus orca</i>	Norway	Recommended Code of Conduct <a href="https://www.visittromso.no/seasons/winter/in-water-activities-with-whale#overlay-context=no/node/1223">https://www.visittromso.no/seasons/winter/in-water-activities-with-whale#overlay-context=no/node/1223</a> (Bertella and Acquarone 2017)
Spinner Dolphin <i>Stenella longirostris</i>	Egypt	Regulations at Samadai Reef. <a href="https://hepca.org/projects/project/86">https://hepca.org/projects/project/86</a> (Notarbartolo di Sciara et al. 2009)

## Marine turtles

Species / Group of species	Location	Code and Source
Green Turtle <i>Chelonia mydas</i> , Hawksbill Turtle <i>Eretmochelys imbricata</i> ,	Mexico	CONANP. <a href="https://www.gob.mx/conanp/prensa/se-reanuda-nado-con-tortugas-en-akumal">https://www.gob.mx/conanp/prensa/se-reanuda-nado-con-tortugas-en-akumal</a>

Species / Group of species	Location	Code and Source
Loggerhead Turtle <i>Caretta caretta</i>		
	Australia	Dugong and Turtle Tourism Project. <a href="http://dugongturtletourism.org/docs/CodeOfPractice_www.pdf">http://dugongturtletourism.org/docs/CodeOfPractice_www.pdf</a>
	US	NOAA <a href="https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/archive/dolphinmart/pdfs/turtle_guide.pdf">https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/archive/dolphinmart/pdfs/turtle_guide.pdf</a>
	Maldives	Olive Ridley Project. <a href="https://oliveridleyproject.org/wp-content/uploads/2019/07/Code-of-Conduct-Sea-Turtles-Olive-Ridley-Project.pdf">https://oliveridleyproject.org/wp-content/uploads/2019/07/Code-of-Conduct-Sea-Turtles-Olive-Ridley-Project.pdf</a>
	Philippines	Marine Wildlife Watch of the Philippines. <a href="https://drive.google.com/file/d/1Nf4bYUXQJgkwp4RtJivYOUQhpC9RPzIE/view">https://drive.google.com/file/d/1Nf4bYUXQJgkwp4RtJivYOUQhpC9RPzIE/view</a>
	Colombia	<a href="#">Guía de conservación y observación de tortugas marinas en los Parques Nacionales Naturales de Colombia</a> . Ministerio de Ambiente y Desarrollo Sostenible y WWF-Colombia, 3a ed. Cali.

## Fish

Species / Group of species	Location	Code and Source
Basking Shark <i>Cetorhinus maximus</i>		Shark Trust. Code of Conduct <a href="https://www.sharktrust.org/basking-shark-project">https://www.sharktrust.org/basking-shark-project</a>
Great White Shark <i>Carcharodon carcharias</i> , cage diving	South Africa	South African Government. <a href="https://www.environment.gov.za/sites/default/files/legislations/mlra_whitesharkcage_g31211rg8919gon724_0.pdf">https://www.environment.gov.za/sites/default/files/legislations/mlra_whitesharkcage_g31211rg8919gon724_0.pdf</a>
Great White Shark <i>Carcharodon carcharias</i> , cage diving	Guadalupe Island	Code of Conduct <a href="https://horizoncharters.com/code-conduct-great-white-shark-cage-diving-guadalupe-island/">https://horizoncharters.com/code-conduct-great-white-shark-cage-diving-guadalupe-island/</a>
Great White Shark <i>Carcharodon carcharias</i> , cage diving	Guadalupe Island	Code of Conduct <a href="https://horizoncharters.com/code-conduct-great-white-shark-cage-diving-guadalupe-island/">https://horizoncharters.com/code-conduct-great-white-shark-cage-diving-guadalupe-island/</a>
Mobulid rays		Manta Pacific <a href="https://www.mantapacific.org/manta-tour-participant-guidelines">https://www.mantapacific.org/manta-tour-participant-guidelines</a> ; <a href="https://www.mantapacific.org/manta-tour-operator-standards">https://www.mantapacific.org/manta-tour-operator-standards</a>
Mobulid rays		Manta Trust. <a href="https://swimwithmantas.org/">https://swimwithmantas.org/</a>
Mobulid rays	Raja Ampat, Indonesia	Code of Conduct for snorkellers <a href="https://rajaampat-seacentre.org/wp-content/uploads/2019/12/COC-Snorkellers-2.jpg">https://rajaampat-seacentre.org/wp-content/uploads/2019/12/COC-Snorkellers-2.jpg</a> and divers <a href="https://rajaampat-seacentre.org/wp-content/uploads/2019/12/COC-Divers.jpg">https://rajaampat-seacentre.org/wp-content/uploads/2019/12/COC-Divers.jpg</a>

Species / Group of species	Location	Code and Source
Mobulid rays	Bali	Code of Conduct <a href="https://bali.com/code-of-conduct-scuba-diving/">https://bali.com/code-of-conduct-scuba-diving/</a>
Mobulid rays	Manta Sandy, Raja Ampat, Indonesia	Regulations and Code of Conduct for commercial interactions <a href="https://birdsheadseascape.com/diving/diving-manta-sandy-heres-need-know-meidiarti-kasmidi-nikka-amandra-gunadharm/">https://birdsheadseascape.com/diving/diving-manta-sandy-heres-need-know-meidiarti-kasmidi-nikka-amandra-gunadharm/</a>
Mobulid rays	Hawaii, US	Division of Boating and Ocean Recreation, West Hawaii Ocean Recreation Management Area. Proposed Administrative Rules for Manta viewing. <a href="https://dlnr.hawaii.gov/dobor/files/2013/08/MantaDiveSitesManagementPlan-9.9.16.pdf">https://dlnr.hawaii.gov/dobor/files/2013/08/MantaDiveSitesManagementPlan-9.9.16.pdf</a>
Mobulid rays, Whale Shark <i>Rhincodon typus</i>	Ningaloo Marine Park	Australian Government. Information for visitors <a href="https://parksaustralia.gov.au/marine/pub/scientific-publications/archive/ningaloo-visitors-info.pdf">https://parksaustralia.gov.au/marine/pub/scientific-publications/archive/ningaloo-visitors-info.pdf</a>
Oceanic Manta Ray <i>Mobula birostris</i>	La Reina, Mexico	Code of Conduct (in Spanish) <a href="https://static1.squarespace.com/static/5de7ab07465f7953ae1b53db/t/6008ceebc7161c330c64697e/1611189999200/MANTA+PACIFIC+CODIGO_manual+DIG+20200824_.pdf">https://static1.squarespace.com/static/5de7ab07465f7953ae1b53db/t/6008ceebc7161c330c64697e/1611189999200/MANTA+PACIFIC+CODIGO_manual+DIG+20200824_.pdf</a>
Sandbar Shark <i>Carcharhinus plumbeus</i>	Italy	University of Palermo, Marine Ecology and Conservation Group. Code of Conduct for tourism operations <a href="https://medpan.org/code-of-conduct-for-responsible-tourism-to-protect-the-sandbar-shark-carcharhinus-plumbeus/">https://medpan.org/code-of-conduct-for-responsible-tourism-to-protect-the-sandbar-shark-carcharhinus-plumbeus/</a>
Sharks		Recommendations from Global Shark Attack File <a href="https://sharkattackfile.net/recommendations.htm">https://sharkattackfile.net/recommendations.htm</a>
Sharks		Recommendations from International Shark Attack File at Florida Museum of Natural History. Safety advices to swimmers <a href="https://www.floridamuseum.ufl.edu/shark-attacks/reduce-risk/swimmers/">https://www.floridamuseum.ufl.edu/shark-attacks/reduce-risk/swimmers/</a> ; Safety advices to divers <a href="https://www.floridamuseum.ufl.edu/shark-attacks/reduce-risk/divers/">https://www.floridamuseum.ufl.edu/shark-attacks/reduce-risk/divers/</a>
Sharks	Azores	Code of conduct reported in Bentz et al. 2014
Sharks, cage diving	New Zealand	Code of Practice for cage diving <a href="https://www.doc.govt.nz/Documents/conservation/marine-and-coastal/shark-cage-diving/code-of-practice.pdf">https://www.doc.govt.nz/Documents/conservation/marine-and-coastal/shark-cage-diving/code-of-practice.pdf</a>
Sharks, Mobulid rays, Rays		Lawrence et al. 2016. Responsible Shark and Ray Tourism: A guide to best practices. <a href="https://sharks.panda.org/images/PDF/Best_Practice_Guide/shark_andrays_bestpracticeguide_2017_lores.pdf">https://sharks.panda.org/images/PDF/Best_Practice_Guide/shark_andrays_bestpracticeguide_2017_lores.pdf</a>
Sharks, Mobulid rays, Rays	Colombia	Código de Buenas Prácticas para el Santuario de Flora y Fauna Malpelo <a href="https://www.fundacionmalpelo.org/wp-content/uploads/2022/02/Codigo-de-Buenas-Practicas-en-SFF-Malpelo-FundacionMalpelo.pdf">https://www.fundacionmalpelo.org/wp-content/uploads/2022/02/Codigo-de-Buenas-Practicas-en-SFF-Malpelo-FundacionMalpelo.pdf</a>
Whale Shark <i>Rhincodon typus</i>	All countries	General code of conduct for swimming and diving with whale sharks in all countries (originally developed by Simon J. Pierce, Marine Megafauna Foundation and adapted from Scuba Mozambique.)

Species / Group of species	Location	Code and Source
		<a href="https://www.galapagoswhaleshark.org/whale-sharks/code-of-conduct/#:~:text=Divers%20must%20treat%20all%20whale,with%20its%20tail%20or%20fins.">https://www.galapagoswhaleshark.org/whale-sharks/code-of-conduct/#:~:text=Divers%20must%20treat%20all%20whale,with%20its%20tail%20or%20fins.</a>
Whale Shark <i>Rhincodon typus</i>	Australia	Department of Parks and Wildlife. Whale Shark Management with Particular Reference to Ningaloo Marine Park <a href="https://www.dpaw.wa.gov.au/images/documents/conservation-management/marine/20130277_Whale_Shark_management_-_Ningaloo_FINAL_small.pdf">https://www.dpaw.wa.gov.au/images/documents/conservation-management/marine/20130277_Whale_Shark_management_-_Ningaloo_FINAL_small.pdf</a>
Whale Shark <i>Rhincodon typus</i>	Belize	Southern Environmental Association. Interaction guidelines <a href="https://web.archive.org/web/20111002165342/http://seabelize.org/whale_sharks.html">https://web.archive.org/web/20111002165342/http://seabelize.org/whale_sharks.html</a>
Whale Shark <i>Rhincodon typus</i>	Mexico	Revillagigedo National Park, Mexico. Code of conduct for swimming and diving with whale sharks. <a href="https://static1.squarespace.com/static/5de7ab07465f7953ae1b53db/t/630e9837f1f4223c7f4023f0/1661900861010/Code_Conduct_TIBURON+BALLENA_Revillagigedo_ENG_DIG+2022-08-30.pdf">https://static1.squarespace.com/static/5de7ab07465f7953ae1b53db/t/630e9837f1f4223c7f4023f0/1661900861010/Code_Conduct_TIBURON+BALLENA_Revillagigedo_ENG_DIG+2022-08-30.pdf</a>

### Seabirds

Species / Group of species	Location	Code and Source
Birds in general	South Africa	BirdLife South Africa: Birder's code of ethics <a href="https://www.birdlife.org.za/wp-content/uploads/2018/01/BLSA-Code-of-Conduct-Eng.pdf">https://www.birdlife.org.za/wp-content/uploads/2018/01/BLSA-Code-of-Conduct-Eng.pdf</a>

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