

Agenda Item 11

Any Other Scientific Issues

Information Document 11

Marine Mammal Conservation in the 21st Century:
A Plea for a Paradigm Shift towards Mindful
Conservation

Action Requested

Take note

Submitted by

Fabian Ritter, M.E.E.R eV



Marine mammal conservation in the 21st century: A plea for a paradigm shift towards mindful conservation

Fabian Ritter*

M.E.E.R. e.V., Berlin, Germany

*Corresponding author: e-mail address: ritter@m-e-e-r.de

Contents

| | |
|---|----|
| 1. Preface | 2 |
| 2. Change | 4 |
| 3. Three ways of marine (mammal) conservation | 6 |
| 3.1 A—Traditional conservation | 6 |
| 3.2 B—Contemporary conservation | 8 |
| 3.3 C—Mindful conservation | 10 |
| 4. Mindful conservation and the commons | 12 |
| 5. The personal (but not necessarily private) dimension | 13 |
| 6. Conclusion | 15 |
| Acknowledgements | 16 |
| References | 16 |

Abstract

Marine mammals are regarded in high esteem by the general public, and are recognized as flagship species for conservation, while at the same time they suffer from anthropogenic impacts on a global scale, and often in extreme ways. It seems there is a huge discrepancy between how we humans think about our fellow creatures in the sea, and how we behave to impact and/or conserve them. Here, I examine why the purely scientific and thus intellectual approach to marine mammal conservation has had limited success over the past decades. While there are some obvious success stories in cetacean conservation, the situation today is, for many species and populations, more dire than it has ever been. The idea of ‘we need to know more’—a credo of the scientific community—often is politically misrepresented to postpone necessary conservation decisions. To adapt our path towards more profound and, importantly, more effective marine conservation, as conservationists we need to go deeper and change the narrative of separation, i.e., the concept of humans being set apart from the rest of nature. Instead, there is a need to create a narrative of

connectedness, i.e., the consciousness of humans being an integral part of the planetary system. Rather than telling horror stories about the plight of marine mammals, conservationists also need to trigger positive emotions about them in ourselves. More holistic aspects of conservation need to be incorporated in our future efforts, including the fuller integration of traditional knowledge and indigenous wisdom, recognizing ecosystem functions of marine life and protecting the processes they sustain, respecting 'holiness' of nature while focusing on the animals' individuality, personhood and the cultural identity of distinct communities. Effective marine mammal conservation will be possible only on the basis of a profound change of our own values and a fundamental change of the societal system we are living in.



1. Preface

The 2022 Annual Conference of the European Cetacean Society (ECS) chose the topical theme 'Marine Mammal Conservation: Are we on the right path?'. Having spent a large part of my career dealing with marine conservation focusing on cetaceans, I submitted a talk which wasn't grounded on presenting scientific findings, but on reflecting on my roughly 30 years of work in the field of marine (mammal) research and conservation. The conference organizers accepted the talk and generously allowed it to be presented to the audience at the beginning of the event. This article is based on that talk. I will be quite philosophical, rather than presenting data. One could say I will be speaking (writing) from my heart rather than taking a purely intellectual approach. I have been inspired by the article *Combining Love and Knowledge to heal the Ocean* (Lotze, 2020)—which takes a similar approach to the one that I am elaborating here.

The short answer to the question 'Are we on the right path?' in my eyes is *No*. The longer answer has to do with the fact that we as scientist often do *not* speak from our hearts. My own case is pretty straightforward: it has always been my passion and love for cetaceans that drove me. As a matter of fact, I started dreaming regularly about dolphins when I was young, a recurring theme that finally had me reading books and watching documentaries about these animals. This eventually led into the study of biology and a profession focusing on scientific studies on cetaceans, and on marine mammal conservation. I am fairly sure that this same love and enthusiasm is the driving force for many of my colleagues, too.

The baseline is that we are in a dire situation. Not only many marine mammals, but also us as mankind: we are in deep trouble. A time has come where there is an urgent need to turn the wheel on a global scale. Regarding

cetaceans, the outlook of many of the roughly 90 species and numerous populations today seems to be less hopeful than it has ever been. That is true, despite the fact that a number of large whale populations have recovered quite well over the past decades (Lotze et al., 2011; Magera et al., 2013). Nevertheless, marine pollution, bycatch in fishing gear, underwater noise, shipping traffic, overfishing, climate change and a whole suite of other threats (Avila et al., 2018; Nelms et al., 2021) plus the cumulative and often synergistic effects (Wright and Kyhn, 2015; Judd et al., 2015) are hampering a healthy development of dolphins, whales and porpoises on a global scale—as well as other marine life and the ecosystems they are living in (e.g. see McCauley et al., 2015; Thomas et al., 2016). On a global scale, we are witnessing an overall decline of health in nature.

Here are two examples of conservation efforts I personally have been involved in over the past decades. The first is about harbour porpoises (*Phocoena phocoena*) living in the waters of the European Union (EU). Notably this is a species strictly protected through the EU Habitats Directive and the EU Marine Strategy Framework Directive, but also many other Agreements such as HELCOM and OSPAR (Carlén et al., 2021). Europe-wide, porpoises are dying in the thousands every year due to anthropogenic impacts, primarily as victims of the most prevalent direct threat: bycatch in fishing gear (Dolman et al., 2016; Rogan et al., 2021). The subpopulation in the Baltic Proper is critically endangered (Hammond et al., 2016), and the status of the Iberian subpopulation appears to be similar (Carlén et al., 2021). Do we see significant progress in conserving this species? I don't think so, despite International Agreements (including a dedicated treaty on the protection of small cetaceans, the *Agreement on the Conservation of Small Cetaceans in the Baltic, North East Atlantic, Irish and North Seas and North Sea and Contiguous Areas*, ASCOBANS), existing national and EU-wide policies, intense research efforts, and a lot of public education by a large number of Non-Governmental Organizations (NGOs).

The second example concerns ship strikes: Since I started to get involved in this issue some 20 years ago, the global number of cetaceans being hit by vessels seems to be ever increasing (Laist et al., 2001; Ritter and Panigada, 2018; Schoeman et al., 2020; van Waerebeek et al., 2007), making it another prevalent threat that these animals have to face today. In the Canary Islands where our research group is conducting long-term cetacean research, the problem arose in the late 1990s, and has increased steadily until today, notwithstanding a number of initiatives to foster mitigation measures and relevant conservation steps (Carrillo and Ritter, 2010; Ritter, 2010).

The overall situation of cetaceans world-wide led to an unprecedented statement of concern from >350 marine mammal experts issued in 2020 shortly after the Second World Marine Mammal Conference (Rochas-Bracho et al., 2020)^a. The experts noted that the situation for many populations and species is ‘now critical’ and that ‘The lack of concrete action to address threats adversely affecting cetaceans in our increasingly busy, polluted, over-exploited and human-dominated seas and major river systems, means that many, one after another, will likely be declared extinct within our lifetimes’.

So, what’s going wrong in marine (mammal) conservation, despite all the conservation efforts and the many commitments from the political level, from industries, from scientists, and from NGOs?



2. Change

Everyone would probably agree that changing our human behaviour is key to initiating a transformation of the path we are currently collectively pursuing. But changing both our individual and our collective behaviours seems to be the crux here. Is changing behaviour based on the amount of knowledge we have? We, as scientists, are trained to believe in the concept that more information (more data) will lead to better solutions—and in a way, that’s our job. But the idea of ‘We need to know more’—which is a logical stand of the scientific community—today often is even being politically misrepresented in order to postpone overdue conservation decisions. Whether it is the designation of a marine protected area (MPA), the determination of fishing quota or the calculation of bycatch rates of non-target species in fisheries, often it is stated that more research, and thus more knowledge is needed to achieve such goals. It may well turn out that this is a never-ending story. While scientists are not decision makers, they can, however, emphasize the need for swift action even in the absence of absolute knowledge. Missing knowledge should not need to lead to procrastination and in many cases, it just might not be feasible to fully determine scientifically what is being looked for. Hence, ‘*generating a new world view of so much respect for nature that we radically alter our present ways of subjugating and diminishing it in the name of supposed human progress*’ (Würsig, 2020, p. 25) becomes a necessity.

^a See https://static1.squarespace.com/static/5b8797f45417fc360d47af9f/t/607dce210a2ec22f63a04da0/1618857508201/Scientists+Sign+on+Final_MasterDocument-uPDATED.pdf.

It must be assumed that there is no ‘automatic’ relationship between understanding and (re)action. In my opinion, the idea of ‘We need to know more before we can act’ has often failed over the past decades, when it comes to marine conservation (compare Bearzi, 2020). While scientists are not the ones taking conservation decisions, they must be aware that decision makers may use the apparent need for more knowledge to delay efforts to protect nature or implementing scientific results.

The main reason for the demise of our planet is that it is rooted in an even more profound and dominating story of our time: the narrative of Separation. Setting us humans apart from nature, considering nature to be just a place of resources that can and must be exploited, is a prevailing human attitude, at least of those in the modern, ‘civilized’ world. Our lives are organized around the pursuit of wealth (or the safeguarding of acquired wealth) which is achieved by direct or indirect consumption, i.e., exploitation of ‘natural resources’, as we call it. Often, nature is even perceived as an enemy—e.g., wilderness for many has a negative connotation, and being in nature without any safety-lines connecting us to civilization will cause unease and fear in many of us. The COVID pandemic is a good example of how humankind is dealing with a perceived threat that slips out of control. Soon after the start of the pandemic, state leaders *declared war* against the virus and an accompanying bellicose language has been built around our strategies to deal with the pandemic (Panzeri et al., 2021) ever since, often depicting a fight where the ‘enemy’ (the virus) has to be destroyed and overcome.

What is more, our modern societal system is largely based on the longing for more, better, bigger. As individuals and societies, we want to reach goals, become more effective, more wealthy, more beautiful, more happy, more advanced, etc. The myth of ever-lasting growth is being pursued as the overall dictum of our times, despite the fact that the fundamental error in this narrative was disclosed already half a century ago by the famous Club of Rome (<https://www.clubofrome.org/publication/the-limits-to-growth/>). Tragically, setting ourselves apart from nature also led us to separating ourselves from each other—as communities, nations, races, genders, scientific disciplines, you name it. That path must come to an end. But how do we get there?

All the big crises we are facing today—including climate change and the subsequent sea level rise, marine pollution, biodiversity loss, even the COVID pandemic, and yes, also wars—have something in common: They exemplify our societies’ setup which detaches ourselves from the

natural and ecological processes on this planet. In my eyes, all these crises are not *causes* for the situation we are in, they are *symptoms* of an even bigger crisis. A crisis of our consciousness.

The famous Vietnamese Buddhist monk Tich Nhat Hanh (1926–2022) was an advocate of mindfulness, and he suggested that a mindful attitude will contribute to creating a better world. Mindfulness is an attitude focusing on the present moment and it is based on a good balance between mind and heart. It encompasses all facets of our perception, including the intellect and our thinking in general, our emotions and intuitions, as well as our beliefs. Thus, mindfulness touches on us in a truly holistic way. When looking for solutions, it doesn't just scratch the surface, but aims deeper at the root causes of our behaviours by uncovering the underlying psychological processes. Thus, it identifies the ideas, beliefs, and the story our actions are based on. Changing such beliefs is the precondition of long-lasting change. I believe that we can learn a lot from that philosophy. So, how can we incorporate mindfulness into marine conservation?



3. Three ways of marine (mammal) conservation

Broadly speaking, we can distinguish three ways of marine conservation, and they all have an underlying narrative:

- **A**—Traditional conservation, following the narrative of separation ('humans against nature')
- **B**—Contemporary conservation, based on a rather utilitarian narrative ('nature at service of humans'), while
- **C**—Mindful conservation, embedded in the narrative of connectedness ('humans as integral part of nature')

Obviously, these categories are not strictly separate from each other, rather they are connected, there is overlap, and they can be seen as building upon each other. I postulate that we currently are somewhere between A and B, and that we have to get to C to really turn the tide in the marine conservation realm.

3.1 A—Traditional conservation

Table 1 gives an overview of the three ways of conservation based on examples from my field of work, cetacean conservation. Traditionally, through a mechanistic and data-centric worldview, conservation was (and often still is) pursued in a purely rational way and grounded on the assumption that nature can be looked at objectively. The method that is assumed to be adequate to

Table 1 The three types of conservation as laid out in this paper: (A) Traditional, (B) Contemporary, (C) Mindful.

| | A—Traditional | B—Contemporary | C—Mindful |
|------------------------------------|---|--|--|
| Worldview | Mechanistic, reductionist, rational, | Eco-logical | Holistic |
| | Data-focused | Utilitarian | Traditional knowledge |
| | More knowledge = solution | Nature at service | Ecological wisdom |
| Narrative | <i>Separation</i> | <i>Interrelation</i> | <i>Connectedness</i> |
| | <i>Humans against nature</i> | <i>Nature at human's service</i> | <i>Humans as part of nature</i> |
| Units to conserve | Species/population/ (Sub-population) | Species/populations and their habitats as ecological entities (e.g. island waters, seamounts, canyons, etc.) | Ecosystems, plus animals cultural communities (families, matriline) and individuals (intrinsic value, personality) |
| Rationale (<i>What matters?</i>) | Population size | Ecosystem functions | Connectedness |
| | | Ecosystem services | Relation to 'big picture' Planetary health |
| Level of action | Protection by space and numbers | Precaution, ecosystem-based approach ecosystem services (incl. carbon values) | (Overarching) legal frameworks to conserve ecological processes, holiness and wilderness |
| | Management of human behaviour as 'threat control' | | Rights for nature |

understand natural processes is cutting them down into pieces and trying to understand those so as to explain the phenomena we observe (reductionism). The focus predominantly has been on species and populations, with population *size* often as the key determining variable, complemented by other quantitative approaches. Accordingly, managing human behaviour has been based on reaching numerical values, such as numbers of animals within a species or population, or thresholds for ‘acceptable’ levels of anthropogenic impacts. ‘Data is everything’—is the reality of conservation policies in most countries until today. The Potential Biological Removal (PBR) approach enshrined in the US Marine Mammal Protection Act is a good example. The PBR aims to determine the number of animals that can be ‘safely’ removed from a given marine mammal population. ‘Removal’ thereby is defined as any death caused by anthropogenic impacts, such as an animal fatally entangled in a net or hit by a vessel. The underlying logic is that a population can withstand the impacts as long as the PBR is not exceeded. Another example is the Catch Limit Algorithm (CLA) developed under the auspices of the International Whaling Commission (IWC). Similar to PBR, the CLA calculates a threshold that, if not exceeded, will make whaling operations sustainable. In these contexts, natural whale populations often are referred to as ‘stocks’ which further illustrates the thinking behind such frameworks. In the EU, there is currently also a strong trend to establish ‘sustainable removal rates’ for marine mammal population similar to PBR and CLA, a development much criticized by conservationists because it leaves out any consideration of animal welfare (compare [Clegg et al., 2021](#); [Papastavro et al., 2017](#)). Overall, the traditional strategy of conserving marine ‘resources’ follows the idea of reducing human impacts, a ‘threat control approach’, as it were, rather than preventing them in the first place. The big picture thus often has been missing in traditional conservation, especially at the management and implementation level.

3.2 B—Contemporary conservation

Today, ecosystem-based management (EBM) is slowly gaining ground within the international marine management and conservation arena, because it became obvious that a species or population has to be protected together with its habitats, simply because species and ecosystems cannot be separated from each other. Hence, the ecological relationships increasingly come to the fore, and the intertwined nature of habitats as well as their species diversity are to be conserved. The goal is to determine representative

fractions of ecosystems so as to protect them, e.g., by delineating a critical habitat as an MPA. Still rather data-centric, such contemporary approaches focus more on ecological entities. Furthermore, we begin to comprehend that cetaceans, and other marine life, are critical elements of marine ecosystems. They fulfill a whole range of ecosystem functions and "deliver" many "ecosystem services" to us (Roman and McCarthy, 2010; Roman et al., 2014; IWC, 2021)—it seems that they even can help us in combating climate change (Chami et al., 2019; Pershing et al., 2010). In that sense, it becomes clear that separating species from their natural environment has not been the ideal concept.

It is now acknowledged that safeguarding ecosystems at a larger scale will also benefit ourselves. As an example, it has been calculated that a single whale can have a monetary value of about 2 million US\$, based on the ecosystem service it delivers and its significance for the whale watching industry (Chami et al., 2019). Additionally, whales are accumulating large amounts of carbon in their bodies, and much of that carbon will be 'sequestered' into the deep sea when the whale dies and its carcass sinks to the sea floor (IWC, 2021). Such whale falls additionally create very diverse micro-habitats in great depths and might also be serving as stepping stones for the distribution of various deep-sea species (Smith et al., 2015). Shedding light on the services of natural ecosystems (and larger parts thereof such as whale populations) has become very common in the climate crisis debate, and so-called Nature Based Solutions (NBS)—i.e., regarding mangrove forests, seagrass meadows or populations of large marine vertebrates as effective carbon sinks—are at the core of such discussions. *Blue Carbon* has become a new buzz word.

While all this must be welcomed, such approaches that put a 'price tag' on nature, a concept which is now gaining a lot of traction, and evaluating its "services" in a rather economic way clearly follows a utilitarian narrative. There is a danger of focusing too strongly on monetary values, thereby disregarding the fact that nature can be valued in many other ways. We are doing nature no justice when we consider it only a variable in our economic thinking and a tool in the tool-box of solutions for the climate crisis. Nature is more than just 'at our service', natural places and beings have an *intrinsic value* irrespective of their usefulness for us humans. Cetaceans not only have intelligence and culture, but also *dignity* (White, 2021). Nature must not be saved for the sake of humans, but for its own sake.

Another significant facet of contemporary conservation is the precautionary principle. Importantly, the precautionary approach steps away from

the philosophy of ‘We need more data’. Explicitly, it needs to appear on the stage of conservation when there is a clear need for protecting species and habitats even in the absence of full scientific proof and solid data. However, my own experience during negotiations with industry representatives, federal agencies and within international fora such as the IWC and ASCOBANS led me to the conclusion that precaution today often is not being applied. Rather, it seems to be something willingly referred to, but often remaining just something being paid lip service to.

3.3 C—Mindful conservation

Mindful conservation, to the contrary, goes beyond all of this. The overarching guiding principle of mindful conservation is planetary health, i.e., *One Health*—a concept now being increasingly applied on an international level (e.g. see <https://www.who.int/news-room/questions-and-answers/item/one-health>). Fig. 1 illustrates the relationship between the three ways of conservation, showing that the more mindful conservation efforts are, the more inclusive they become, because they appreciate the complexity of life and its processes, rather than simplifying in a reductionist way.

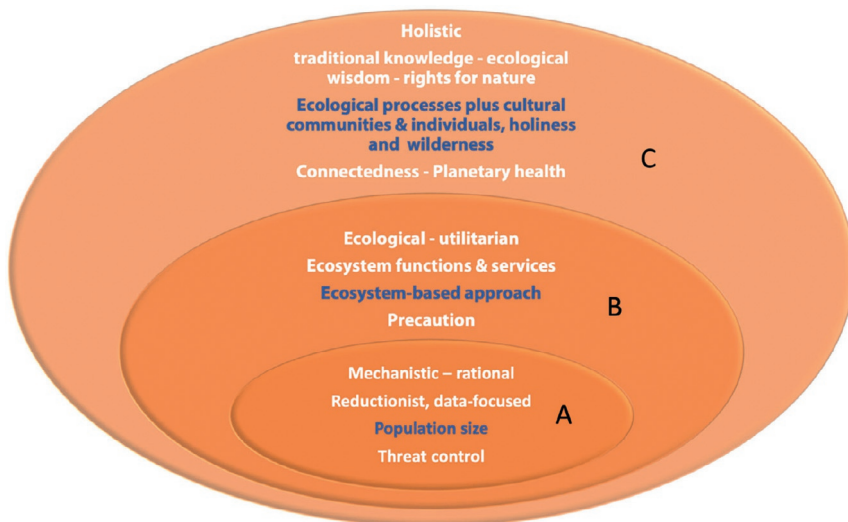


Fig. 1 The three types of conservation as laid out in this chapter: (A) Traditional, (B) Contemporary, (C) Mindful. The graph highlights that the more mindful conservation efforts (C) are, the more they encompass aspects of types (B) and (A). Blue font = level of action (compare Table 1).

More concretely, and with reference to marine mammals, the following aspects, in my opinion, need to be incorporated in future efforts for conservation to become (more) mindful:

- *Integration of traditional knowledge and indigenous wisdom*, on top of scientific data and the ecosystem-based approach. It is increasingly being recognized that such knowledge provides a unique and rich source of information on biodiversity, behaviour and the biology of cetaceans which can be used to foster conservation efforts. (Here, I am not referring to traditions to herd and hunt cetaceans to kill them, such as in the Faroe Islands and Taiji/Japan or the various kinds of whaling traditions that still exist).

Stakeholder participation, an important aspect when it comes to conservation efforts—such as establishing MPAs, fisheries regulation or developing guidelines for sustainable tourism—should encompass local people’s traditional knowledge and indigenous peoples’ wisdom while acknowledging their connection to the land- and seascapes, e.g., by way of surveys, interviews, or co-authorship.

- *Recognition of ecosystem functions of marine life and protecting the processes they sustain*, without a focus on their economic value. It is important to give emphasis on the interrelations between species and those between species and habitats. For example, these can be expressed as the nutrient flux between trophic levels or the carbon cycle they sustain. Looking at complex ecological networks doesn’t make things easier, and that is the reason why so many scientists prefer the reductionist way—it makes our professional life easier. The full complexity of nature should not hold us off trying to integrate it into our scientific thinking, though.
- *Appraisal of the uniqueness and ‘holiness’ of natural places and beings* to further underpin management measures. Many indigenous people build direct relationships to natural features such as landscapes and species, cherishing their spiritual relationship and ecological interdependence. Such appreciation should be integrated into conservation efforts, e.g., by protecting locations and areas based on cultural and spiritual ethics. Assigning a protection status to places of special (cultural and/or spiritual) significance, would be an example of relying on other tenets rather than a wealth of data.
- *Respecting the animals’ individuality and personhood*. It is increasingly being acknowledged that animals within a population differ individually, and fulfill specialized roles in their respective social networks (CMS, 2018). As a conceivable consequence, assigning rights to cetaceans, such as the

right to live undisturbed and unharmed, would demonstrate our respect in a new and more profound way. While this may have been seen as far-fetched until recently, there are now many examples world-wide which can be drawn from (see [White, 2021](#)), showing that the legal frameworks are shifting into new directions.

- *Letting nature be, i.e., letting wilderness rule, and pursuing a hands-off approach* while relying on the self-healing potential of the seas, will be crucial in many areas. This can be achieved through the establishment of ‘no-take zones’ which to date are extremely rare even within MPAs or otherwise protected areas (see <https://mpatlas.org/zones/>). The call from scientists for marine areas where humans are kept out completely must become stronger, and it must be better heard at the management level.
- *Treasuring the cultural identity of distinct animal communities.* Our knowledge about animal cultures is growing steadily. Such new insights must be incorporated in conservation endeavours by targeting cultural entities within larger populations (such as the different orca, *Orcinus orca*, ecotypes. Studying cultural traits of animals can become an important scientific discipline and cetaceans are the perfect fit for such studies.

Considering the latest findings around cetaceans’ cognitive capabilities (e.g. [Bearzi and Stanford, 2010](#); [Marino, 2002](#); [Marino et al., 2007](#); [White, 2021](#)), sentience ([Bearzi et al., 2018](#); [White, 2021](#)), social complexity ([Brakes et al., 2021](#); [King et al., 2018](#)) and culture(s) ([Whitehead and Rendell, 2015](#); [Fox et al., 2017](#); [Brakes et al., 2019, 2021](#)), I propose that we should look at whales and dolphins as the *indigenous people of the seas*—and treat them accordingly. As soon as we are following such lines of thought, our whole relationship with them can then become a different story.



4. Mindful conservation and the commons

Thich Nhat Hanh has used the term *Interbeing* to describe the connection between living beings, which represents a deeply ecological understanding (in fact, Thich Nhat Hanh wrote a number of books about the global ecological crisis and how to deal with it, e.g. [Nhat Hanh, 2021](#)). The current state of our modern world and the disastrous consequences of our focus on competition and individuality would benefit from a move towards more ‘Interbeing-ness’. After all, we are realizing that humans are just another part in the intricate networks of ecosystems and all forms of life ([Lent, 2021](#)).

Both humans, through their conscious and conscientious decision making, and cetaceans (or more broadly speaking, marine megafauna), through their ecosystem functions and services, can contribute a lot to the well-being of the oceans. In that sense, they all contribute to what now is termed *One Health*. Although this general concept is focused in the well-being of humans and thus follows a anthropocentric path, regarding the planet as a common good that all living beings are sharing does imply that conserving the seas, and building up *One Health* is a contribution from many sides, including animals, plants, fungi and the natural network/ecosystems they create and sustain. Caring for the Commons then becomes a matter of caring for other beings, and in doing so letting other beings help ourselves to heal and restore nature where that has become necessary. Following this line of thought, I believe it makes sense to define ‘the Commons’ in a new way by expanding the concept into the non-human realm. Broadening its scope from considering only the utility of common goods by humans and shifting towards a stronger focus on their value for the well-being of nature at large would also embed our role as humans into a larger, ecologically based philosophy. Therefore, I suggest the following expanded definition of the Commons:

All goods originating from the earth and serving the life on it, as well as all goods originating from life maintaining itself, shall be treated as common goods serving planetary health.

From such an ecological and holistic understanding arises the need—and the mandate—to care for all living beings appropriate to the specific ecological needs of each of its kind. In this way, our human role can shift from *ruler* or *dominator* to *caretaker* or *guardian* of the planet. This embodies the consideration that humans are inseparable from nature and that our behaviour is complexly connected to all other living beings.



5. The personal (but not necessarily private) dimension

Mindfulness obviously doesn’t fall from the sky. On the individual level, it is the result of continuous mental and physical practice. But how can we as scientists or conservationists practice mindfulness and strive to integrate it on a societal level, i.e., into policy, in a pragmatic manner?

I am convinced that making the first steps on a personal level will be key. Change always starts with oneself, and may spread from just a few to many by setting an example. Our search for truth and meaning, as scientists, always is embedded into our individual way to look at the world. Mindfulness, as a

practice, likewise has a concrete relationship to our personal development. It is related to individual exercise of e.g., meditation and breathwork. While I do not expect the readers of this article to start sitting in silence and focusing on their breath (although, from my personal experience, I can recommend it), the core quality to be cultivated here is to explore one's own place within the greater context. 'Everything is bound to everything' is a basic truth and while it has almost become a common place, it is also one of the basic laws of ecology as a scientific discipline. I find this an interesting homology between science and spiritual traditions, very much resonating with the idea of mindfulness.

We, as scientists and conservation biologists, chose to deal with the ecological threats to our study subjects in a rational way by collecting data, writing articles, recommending conservation measures to decision makers or engaging in some form of public education. Yet, there is another way to get our bearings within a global crisis: to feel it. As scientists, we are trained not to refer to our emotions and our often-intimate relationship to the 'objects' we study. I believe that the time is ripe to overcome this frontier. Marine conservationists by definition care a lot for the seas and nobody should hold them from expressing what they feel, and talk about it also in the scientific arena which otherwise runs the risk to be seen as 'sterile' and bare of humaneness (compare [Bearzi, 2020](#)). Scientific study and emotions are intricately connected, not separated.

Confronting our own emotions in the face of bad things happening such as a dolphin species going extinct, a marine habitat being destroyed or a coastline disappearing due to sea level rise is not an easy task, and psychologically there are good reasons to hide away from them. We may experience different phases of dealing with bad news, such as shock, neglect, anger, or grief, etc. Such emotions often are not easy to withstand, but at the same time these very emotions can become a very valid and powerful guide to take action, and to convince others to take action.

Accordingly, I suggest a change of perspective to create a deeper personal connection to nature in the face of the ecological crisis: Any wound that humans have caused to nature can be looked at as *our own* wounds. This new angle can instantly lead to a greater connectedness and in turn creates a deeper motivation in ourselves to heal—the wounds within as well as the wounds we have left on earth. Or, as Jeremy Lent has put it: 'If you believe that all living beings are family, you will treat them in a different way than if you think that the natural world is a resource to be exploited' ([Lent, 2021](#), p.5). While accepting and actually enduring the reality of

our emotions that are related to the wounds we experience, we can build the basis of an authentic personal (but not just private) relationship between ourselves and the world around us. This is how I would interpret Thich Nhat Hanh's *Interbeing*.



6. Conclusion

What I am advocating here is a 21st century paradigm shift in marine (mammal) conservation: A transformation of our collective narrative from *Separation* to *Connectedness*. However, it remains to be seen if our societies (and science, for that matter) can make that shift.

Academically, there is always the chance to refer to knowledge that is not purely rational and scientific, such as local ecological knowledge. There are now many approaches visible which I perceive as signs of hope. For example, it is good to see that the integration of traditional knowledge and indigenous wisdom is currently making its way into scientific thinking, and into environmental scientific literature (Carter and Nielsen, 2011; Noongwook et al., 2007; Singleton et al., 2021; Van der Wal et al., 2022). To build bridges between scientific knowledge and indigenous wisdom is exactly what I am advocating here: finding the connectedness where previously we have seen a gap.

As another example of scientific innovation, the International Whaling Commission has released a Resolution on the issue of ecosystem functioning of cetaceans (IWC, 2016), and in 2021, together with the Convention on the Protection of Migrating Species (CMS) hosted the first international expert workshop on this issue (IWC, 2021). Furthermore, as an important step, CMS has integrated into the framework of its work the idea that cultural entities in the cetaceans need to be recognized (CMS, 2014, 2017, 2018), and in the future must be protected in accordance, with attention given to the specialized role individuals play in their societies (CMS, 2018). Notably, here scientists are moving away from regarding cetaceans as identical specimens within a population, rather recognizing the individuals' biographies and their specific social roles. It is our choice (and our responsibility) to integrate these new ideas into our work or not. Thinking outside the box is becoming more and more popular, advanced and acknowledged. We should be courageous enough to express the full range of our ideas, even if they sometimes may be utopic, unrealistic or somewhat 'irrational'.

Science alone is not enough to save the oceans and neither is policy—wisdom and vision need to be combined with the two to initiate the necessary changes. As conservationists, rather than telling never-ending horror stories about the plight of marine mammals, we also need to trigger *positive* emotions in humans. In other words: we need to stop fighting and focus more on our connection with marine mammals, cherishing the astounding similarities between us and them. Emphasis needs to be given to the many benefits that can be gained from protecting marine wildlife and the seas at large, including their value in delivering food for billions of people, as recreational space, their importance for emotional and spiritual well-being and inspiration, the oceans' significance as the largest climate driver on earth, and so forth.

In this way we can heal the oceans by healing our relationship with them. To quote Heike Lotze from her 2020 article: '*Combining our emotional and rational sides can inspire our thinking and transform our actions in new, creative ways. In order to affect wide-ranging and long-lasting change, love and knowledge need to work together to transform our collective relationship with the ocean.*'

To conclude, in my eyes, more effective marine conservation will be possible only on the basis of a profound change of our values and beliefs and a fundamental change of the societal system we are living in, and the narrative it is based on. Such a shift will not come overnight, but rather we must start now to see such changes over the coming years, decades and generations. Signs are that the scientific community is moving in that direction. I am hopeful this article is a contribution to that development.

Acknowledgements

I am very grateful to Charles Sheppard who encouraged me to write this article and publish it, similarly to many colleagues who expressed their appreciation after my talk at the 2022 ECS Annual Conference. Many thanks to Philippa Brakes, Lori Marino, Heike Lotze, Thomas I. White, Mark Simmonds and Giovanni Bearzi who provided very useful comments and suggestions to an earlier manuscript.

References

- Avila, I.C., Kaschner, K., Dormann, C.F., 2018. Current global risks to marine mammals: taking stock of the threats. *Biol. Conserv.* 221, 54–58. <https://doi.org/10.1016/j.biocon.2018.02.021>.
- Bearzi, G., 2020. Marine biology on a violated planet: from science to conscience. *Ethics Sci. Environ. Polit.* 20, 1–13. <https://doi.org/10.3354/esep00189>.
- Bearzi, M., Stanford, C., 2010. A bigger, better brain. Observations of chimpanzees and dolphins strengthen the notion that humanlike intelligence may not be uniquely human. *Am. Sci.* 98, 402–409.

- Bearzi, G., Kerem, D., Reeves, R.R., 2018. Whale and dolphin behavioural responses to dead conspecifics. *Zoology* 128, 1–15.
- Brakes, P., et al., 2019. Animal cultures matter for conservation. *Science*. <https://doi.org/10.1126/science.aaw3557>.
- Brakes, P., et al., 2021. A deepening understanding of animal culture suggests lessons for conservation. *Proc. R. Soc. B* 288, 20202718. <https://doi.org/10.1098/rspb.2020.2718>.
- Carlén, I., Nunny, L., Simmonds, M.P., 2021. Out of sight, out of mind: how conservation is failing European porpoises. *Front. Mar. Sci.* 8, 617478. <https://doi.org/10.3389/fmars.2021.617478>.
- Carrillo, M., Ritter, F., 2010. Increasing numbers of ship strikes in the Canary Islands: proposals for immediate action to reduce risk of vessel-whale collisions. *J. Cetacean Res. Manage.* 11, 131–138.
- Carter, B.T.G., Nielsen, E.A., 2011. Exploring ecological changes in Cook Inlet beluga whale habitat through traditional and local ecological knowledge of contributing factors for population decline. *Marine Policy* 35 (2011), 299–308.
- Chami, R., Cosimano, T., Fullenkamp, C., Oztosun, S., 2019. Nature's solution to climate change. A strategy to protect whales can limit greenhouse gases and global warming. *Int. Monet. Fund Fin. Dev.* 56 (4), 34–38.
- Clegg, I.L.K., Boys, R.M., Stockin, K.A., 2021. Increasing the awareness of animal welfare science in marine mammal conservation: addressing language, translation and reception issues. *Animals* 11, 1596. <https://doi.org/10.3390/ani11061596>.
- CMS, 2014. Report of the CMS Scientific Council Workshop on the Conservation Implications of Cetacean Culture. 18 CMS Document UNEP/CMS/Cop11/Inf. 27 pp.
- CMS, 2017. UNEP/CMS/Resolution 11.23 (Rev.COP12): Conservation Implications of Animal Culture and Social Complexity.
- CMS, 2018. Report of the CMS Workshop on Conservation Implications of Animal Culture and Social Complexity. CMS Document UNEP/CMS/ScC-SC3/Inf.8. 41 pp.
- Dolman, S., Baulch, S., Evans, P.G.H., Read, F., Ritter, F., 2016. Towards an EU action plan on cetacean bycatch. *Marine Policy* 72, 67–75. <https://doi.org/10.1016/j.marpol.2016.06.020>.
- Fox, K.C.R., Muthukrishna, M., Shultz, S., 2017. The social and cultural roots of whale and dolphin brains. *Nat. Ecol. Evol.* 1, 1699–1705. <https://doi.org/10.1038/s41559-017-0336-y>.
- Hammond, P.S., Bearzi, G., Bjorge, A., Forney, K.A., Karczmarski, L., Kasuya, T., Perrin, W.F., Scott, M.D., Wang, J.Y., Wells, R.S., Wilson, B., 2016. *Phocoena phocoena* (Baltic Sea subpopulation) (no. e. T17031A98831650). The IUCN Red List of Threatened Species.
- IWC, 2016. Resolution on Cetaceans and Their Contribution to Ecosystem Functioning.
- IWC, 2021. Report of the IWC-CMS Workshop on Cetacean Ecosystem Functioning, Virtual 9–21 April 2021. IWC Document SC/68C/REP/03. 39 pp.
- Judd, A.D., Backhaus, T., Goodsir, F., 2015. An effective set of principles for practical implementation of marine cumulative effects assessment. *Environ. Sci. Policy* 54, 254–262.
- King, S.L., Friedman, W.R., Allen, S.J., Gerber, L., Jensen, F.H., Wittwer, S., Connor, R.C., Krützen, M., 2018. Bottlenose dolphins retain individual vocal labels in multi-level alliances. *Curr. Biol.* <https://doi.org/10.1016/j.cub.2018.05.013>.
- Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S., Podesta, M., 2001. Collisions between ships and whales. *Mar. Mamm. Sci.* 17, 35–75. <https://doi.org/10.1111/j.1748-7692.2001.tb00980.x>.
- Lent, J., 2021. *The Web of Meaning*. Profile Books, London. ISBN 978-1-7-565-5.
- Lotze, H.K., 2020. Combining love and knowledge to heal the ocean. *Ethics Sci. Environ. Polit.* 20, 33–39. <https://doi.org/10.3354/esep00193>.

- Lotze, H.K., Coll, M., Magera, A.M., Ward-Peigel, C., Airoidi, L., 2011. Recovery of marine animal populations and ecosystems. *Trends Ecol. Evol.* 26. <https://doi.org/10.1016/j.tree.2011.07.008>.
- Magera, A.M., Mills Flemming, J.E., Kaschner, K., Christensen, L.B., Lotze, H.K., 2013. Recovery trends in marine mammal populations. *PLoS One* 8 (10), e77908. <https://doi.org/10.1371/journal.pone.0077908>.
- Marino, L.A., 2002. Convergence of complex cognitive abilities in cetaceans and primates. *Brain, Behav. Evol.* 59, 21–32.
- Marino, L., Connor, R.C., Fordyce, R.E., Herman, L.M., Hof, P.R., et al., 2007. Cetaceans have complex brains for complex cognition. *PLoS Biol.* 5 (6), e139. <https://doi.org/10.1371/journal.pbio.0050139>.
- McCaughey, D.J., et al., 2015. Marine defaunation: animal loss in the global ocean. *Science* 347, 1255641. <https://doi.org/10.1126/science.1255641>.
- Nelms, S.E., et al., 2021. Marine mammal conservation: over the horizon. *Endangered Species Res.* 44, 291–325. <https://doi.org/10.3354/esr01115>.
- Nhat Hanh, T., 2021. *Zen and the Art of Saving the Planet*. Harper Collins. ISBN 978-0-06-295479-4.
- Noongwook, G., The Native Village of Savoonga, The Native Village of Gambell, Huntington, H.P., George, J.C., 2007. Traditional knowledge of the bowhead whale (*Balaena mysticetus*) around St. Lawrence Island, Alaska. *Arctic* 60 (1), 47–54.
- Panzeri, F., Di Paola, S., Domaneschi, F., 2021. Does the COVID-19 war metaphor influence reasoning? *PLoS One* 16 (4), e0250651. <https://doi.org/10.1371/journal.pone.0250651>.
- Papastavro, V., Leaper, R., Lavigne, D., 2017. Why management decisions involving marine mammals should include animal welfare. *Marine Policy* 79, 19–24.
- Pershing, A.J., Christensen, L.B., Record, N.R., Sherwood, G.D., Stetson, P.B., 2010. The impact of whaling on the ocean carbon cycle: why bigger was better. *PLoS One* 5 (8), e12444. <https://doi.org/10.1371/journal.pone.0012444>.
- Ritter, F., 2010. A quantification of ferry traffic in the Canary Islands (Spain) and its implications for collisions with cetaceans. *J. Cetacean Res. Manage.* 11 (2), 139–146.
- Ritter, F., Panigada, S., 2018. Collisions of vessels with cetaceans—The underestimated threat. In: Shepperd, C. (Ed.), *World Seas—An Environmental Evaluation—Volume III: Ecological Issues and Environmental Impacts*. Elsevier Academic Press, pp. 531–547.
- Rochas-Bracho et al., 2020. The Real And Imminent Extinction Risk To Whales, Dolphins And Porpoises: An Open Letter From Cetacean Scientist. This letter was first compiled during the 2nd World Marine Mammal Conference, Barcelona, December 9-12, 2019.
- Rogan, E., Read, A.J., Berggren, P., 2021. Empty promises: the European Union is failing to protect dolphins and porpoises from fisheries by-catch. *Fish Fisheries* 22, 865–869.
- Roman, J., McCarthy, J.J., 2010. The whale pump: marine mammals enhance primary productivity in a coastal basin. *PLoS One* 5 (10), e13255. <https://doi.org/10.1371/journal.pone.0013255>.
- Roman, J., Estes, J.A., Morissette, L., Smith, C., Costa, D., McCarthy, J., Nation, J.B., Nicol, S., Pershing, A., Smetacek, V., 2014. Whales as marine ecosystem engineers. *Front. Ecol. Environ.* 12 (7), 377–385. <https://doi.org/10.1890/130220>.
- Schoeman, R.P., Patterson-Abrolat, C., Plön, S., 2020. A global review of vessel collisions with marine animals. *Front. Mar. Sci.* 7, 292. <https://doi.org/10.3389/finars.2020.00292>.
- Singleton, B.E., Gillette, M.B., Burman, A., Green, C., 2021. Toward productive complicity: Applying ‘traditional ecological knowledge’ in environmental science. *Anthropocene Rev.* 1–22.
- Smith, C.R., Glover, A.G., Treude, T., Higgs, N.D., Amon, D.J., 2015. Whale-fall ecosystems: recent insights into ecology, paleoecology, and evolution. *Annu. Rev. Marine Sci.* 7, 571–596.

- Thomas, P.O., Reeves, R.R., Brownell Jr., R.L., 2016. Status of the world's baleen whales. *Mar. Mamm. Sci.* 32, 682–734.
- Van der Wal, J.E.M., Spottiswoode, C.N., Uomini, N.T., Cantor, M., Daura-Jorge, F.G., Afan, A.I., Cram, D.L., 2022. Safeguarding human-wildlife cooperation. *Conserv. Lett.*, e12886. <https://doi.org/10.1111/conl.12886>.
- van Waerebeek, K., Baker, A.N., Félix, F., Gedamke, J., Iniguez, M., Sanino, G.P., et al., 2007. Vessel collisions with small cetaceans worldwide and with large whales in the Southern Hemisphere, an initial assessment. *Lat. Am. J. Aquat. Mamm.* 6, 43–69. <https://doi.org/10.5597/lajam00109>.
- White, T.I., 2021. Dolphins, captivity, and cruelty. In: Thomas, N. (Ed.), *Animals and Business Ethics*. Springer, London.
- Whitehead, H., Rendell, L., 2015. *The Cultural Lives of Whales and Dolphins*. The University of Chicago Press. ISBN: 978-0-226-89531-4.
- Wright, A.J., Kyhn, L.A., 2015. Practical management of cumulative anthropogenic impacts with working marine examples. *Conserv. Biol.* 1–8.
- Würsig, B., 2020. From science only to science for conservation: a personal journey. *Ethics Sci. Environ. Polit.* 20, 25–32. <https://doi.org/10.3354/esep00191>.