NORSK HOTELLHØGSKOLE
BACHELOROPPGAVE

STUDIUM: Reiselivsledelse	OPPGAVEN ER SKREVET INNEN FØLGENDE FAGOMRÅDE: Reiseliv
	ER OPPGAVEN KONFIDENSIELL? Nei (**NB!** Bruk rødt skjema ved konfidensiell oppgave)

TITLE:

How do marine mammals alter their behavioral responses due to tourist interactions/activities?

FORFATTER(E) (**NB!** maks tre studenter pr oppgave):			VEILEDER: Åsa Helen Grahn
Kandidatnummer:	Studentnummer:	Navn:	
8122 …………………..	263650 ……………….…	Line Sophie Kämpfe Mauset ………………………………….	
8106 …………………..	260121 ……………….…	Johanna Maximilia Johansson ………………………………….	
…………………..	……………….…	………………………………….	

Authors:

8106 - Johanna Maximilia Johansson

8122 - Line Sophie Kämpfe Mauset

Title:

How do marine mammals alter their behavioral responses due to tourist interactions/activities?

Norsk Hotellhøgskole

Bachelor i Reiselivsledelse

Task scope: 20 credits

Words: 10775

May 2023

Abstract

Purpose: How do marine mammals alter their behavioral responses due to tourist interactions/activities?

Methods: This study is a literature review where relevant secondary data has been used to obtain information from Oria. The data has then been analyzed and discussed to answer the problem statement.

Results: The result of this thesis includes 13 studies, three studies about whales, five about pinnipeds, and five about dolphins. The studies explore the behavioral effects tourist activities have on the animals. The studies include activities like swim-with, marine mammal-watching, and food provisioning.

Conclusion: The findings in this thesis show that marine mammals alter their behavior due to tourist interactions. Behavior responses like stress and avoidance were the most common short-term effects and were mostly due to high vessel traffic. The study also found some long-term effects like change in habitat during high tourism seasons and change in population size due to the stressful environment. This study also found some management strategies that should be applied at marine tourist sights to minimize the impacts and make the sight as sustainable as possible.

Acknowledgment

We would like to thank our supervisor Åsa Helen Gran for a helpful collaboration. She has been a great asset in answering all our questions and has given us great inspiration throughout our study period.

We would also like to thank UIS and Norsk Hotellhøgskole for giving us the opportunity to write this bachelor thesis and providing us with a space to study. Lastly, we would like to thank each other for a smooth and joyful collaboration.

Table of content

List of Tables

List of Figures

1.0 Introduction

Traveling for the sole purpose of experiencing natural sights and participating in diverse outdoor activities for leisure like hiking, camping, fishing and national parks, is nature-based tourism (Higginbottom, 2004). The attraction of nature for leisure and tourism has a short history, however, Olafsdottir (2013) says that throughout history it has been driven by spiritual worship, commerce, war, health, art, and self-sustenance.

Wildlife tourism is defined as viewing or interacting with non-domesticated animals in their natural habitat or in captivity (Higginbottom, 2004). It is considered a growing industry that provides substantially economic benefits to various countries (Higginbottom, 2004) as well as being significant for both human health and the planet. Yet, altering one organism can impact a multitude of other interconnected ecological systems (UNWTO, n.d). As Sir David Attenborough, a biologist and broadcaster, once said:

"The whole world of the ecosystems of the world are based on the healthy ocean and if that part of the planet becomes dysfunctional and goes wrong, then the whole of life on this planet will suffer"

- Sir David Attenborough (referred in Just One Ocean, n.d, p.1)

The ocean is the world's biggest ecosystem covering 71% of the earth's surface (National Geographic Society, n.d). Dating all the way back to the 1850´s, excursions to coastal resorts have been documented (Higham & Luck, 2007, p.1), and today it has become a major venue for coastal and marine tourism covering about 50% of global tourism (Ocean Panel, n.d). The ocean is home to various marine mammal species, however, due to an increase in marine-wildlife tourism, their habitat is threatened (Tannir, n.d).

Norway is one of the countries with a thriving marine tourism, but unfortunately there is a lack of regulations and guidelines for tour operators on marine mammals' welfare (Tannir, n.d). This limits the scope of ethical considerations, accountability, and standardized operations, yet tour operators are encouraged by the government to form an industry standard for themselves (Tannir, n.d).

In the article *Human-wildlife interactions for tourism: a systematic review* by Dou & Day, (2020, p.529) they acknowledge that humans instinctively seek unique and memorable experience through interaction with wildlife as it opens up an emotional connection to another species. The increasing tourists' desire to interact with marine mammals has given rise to a growing concern regarding the impacts of human-wildlife interactions (Dou & Day, 2020).

Consequently, in this thesis, we aim to give an overview of the current scientific knowledge of potential impacts on marine mammals as a result of tourists' interactions through different activities. Based on this, our problem statement for this thesis follows: ***"How do marine mammals alter their behavior responses due to tourist interactions?"***

Specifically, the thesis will answer the following research questions:

- Which factors are empirically proven to alter marine mammals' behavior based on tourist interactions?
- Which in-water activity proves to cause the most impact on marine mammals?
- What short- and long-term effects does tourist interactions have on marine mammals?
- What different management strategies are predominantly being applied?
- Which factors need more scientific attention and what are the implications for future research?

To answer these questions, we will conduct a literature review on how marine mammals alter their behavior responses due to tourist interactions. In this way, we will summarize which factors have been empirically proven to contribute to the understanding of the

impacts/consequences of tourist/human-wildlife interactions and thus the management strategies the industry should take to develop these activities as sustainable as possible.

The focus of this literature review has been held on non- consumptive, free-ranging marine mammals like *dolphins*, *whales*, *seals* and *sea lions* (i.e. cetaceans and pinnipeds). We choose to base the thesis on different in-water activities like *swim-with*, *marine mammal-watching* and *food provisioning*. The vessels researched in the chosen studies were commercial tour vessels. We have excluded consumptive forms for marine tourism like hunting, shooting, and fishing.

During this study climate change was not taken into consideration. Impacts from other industries like fishing, recreational activities, passenger- and cargo transport were also not considered.

There is already a lot of research on this subject, and we, therefore, believe that a literature review will be valuable for the marine tourism industry to learn from and act upon for the future development of this industry. By addressing this issue, we believe it can be beneficial for future research and assist tour operators and countries to understand how this industry is affecting marine mammals and the importance of implementing sustainable management strategies.

2.0 Literature

2.1 Introduction

This chapter is reviewing the literature used to support our problem statement. We have looked into previous research, relevant reports, articles, and books that discuss literature. Information relevant to understanding human-wildlife interactions and behavior alterations due to marine tourism has also been investigated. This includes information about wildlife tourism, marine mammals, activities related to marine mammals, and relevant visitor management strategies. This literature chapter will provide relevant knowledge to help understand, support, and evaluate the findings in this thesis. It will give the reader a knowledge-based foundation and identify different issues about the marine tourism industry. As tourists desire to interact with marine mammals more closely and frequently, there is a necessity for research that can provide information on the impact that these activities have on the animals.

2.2 Human-animal relation

In the book *The Ethics of Tourism* the authors Lovelock and Lovelock (2013) mentions how the relationship between humans and animals has been close over the ages, and the desire to interact with animals has increased. In the present day, animals have become essential for tourism products, and some even argue that they are also considerable consumers of tourist experiences in their own right (Lovelock & Lovelock, 2013, p.225). Further, Lovelock and Lovelock (2013) notes that, animals are often used as entertainment in the tourism industry, such as artifacts in a zoo or a source of service like for example elephant rides. These activities raise concerns as the outcome and consequences can hurt the animal's welfare (Lovelock & Lovelock, 2013, p.225-226). Similar to Lovelock and Lovelock (2013), Page and Connell (2020) state in their book *Tourism, a modern synthesis*, that there is a

considerable amount of research on the impact of tourism on wildlife, and that wildlife can be disrupted both due to habitat effects and as a direct result of tourism activity. Additionally, they note that there is a debate on whether or not tourism and wildlife preservation can coexist for collective benefit (Page & Connell, 2020, p.396).

Gales et al. (2003) indicates that tourists are no longer satisfied with only observing the wild cetaceans, but rather crave an interaction with them. Duffus & Dearden (2003) found that there are potential negative consequences, with a gradual effect on the animals, when it comes to the marine tourism industry. Effects like constant disruption to the animal's behavior during breeding, feeding, and resting can harmfully impact the animal's health, reproduction, and selected habitat (Gales et al., 2003, p.230). As mentioned above, Gales et al. (2003) also found that there is not enough research about the consequences due to human-wildlife interactions. Further research that acknowledges the consequences of the behavior impacts on the animals show that building a sustainable tourism industry which aims to minimize the impacts on the animals is important (Dou & Day, 2020). Sustainable tourism is a type of tourism that seeks to reduce negative environmental, social, and economic impacts. This concept involves an integrated approach that balances the needs of the environment, society, and economy, and requires the collaboration of all stakeholders, including tourists, host communities, tourism businesses and governments (Lovelock & Lovelock, 2013, p.13).

Trave et al. (2017) states that wildlife tourism has the potential to impact the environment, even in small ways, due to human presence which can alter the habitat's composition or a species' behavior/physiology. As a result, it is crucial to assess if the impact is acceptable for ecologically sustainable tourism (Trave et al., 2017, p.213). Although a consistent definition of ecologically sustainable tourism is currently lacking, certain criteria can be used to evaluate each marine wildlife tourism practice for economic and ecological sustainability (Trave et al., 2017, p.213). According to Trave et al. (2017) these criteria include increased awareness of

marine species, limited negative effects on their behavior and environment, organized and adaptable management of marine resources, and direct involvement of local communities and authorities. Evaluating these criteria's helps identify areas that need improvement to achieve conservation goals (Trave et al., 2017, p.213). Understanding the impacts and causes of marine wildlife tourism is crucial to develop effective strategies and reach conservation targets (Trave et al., 2017, p.213).

Historically, tourism experiences have treated animals as products rather than acknowledging their individual needs and rights as beings (Lovelock & Lovelock, 2013, p 231). Lovelock and Lovelock (2013) discuss that as wildlife tourism expands and tourists seek more intense animal interactions, it is crucial to understand humans' perception of wildlife in a tourism context and the accompanying ethical implications. Advocates of the moralistic view call for addressing this ethical issue as the popularity of marine tourism activities have increased significantly (Orams, 2002, p.5). Though there is evidence that change is happening in the wildlife tourism sector, and the recognition of animal rights is seen by some tourism operators, there are a lot of shortcomings in this industry (Lovelock & Lovelock, 2013, p 240). Addressing this issue is important as this can have a great impact on the future marine ecosystems and societies (Orams, 2002, p.6).

2.2.1 Marine mammals

Marine mammals are mammals that have altered their living to the ocean (The Marine Mammal Center, n.d). Various marine mammals have thicker fat or fur so that they can survive the cold, and some have streamlined bodies so that they are able to swim quicker (The Marine Mammal Center, n.d). They depend on coming up to the surface to get oxygen but can stay underwater for quite a time by having extra oxygen stored in their muscles and blood (The Marine Mammal Center, n,d). Marine mammals are categorized into cetaceans, pinnipeds, sea otters, sirenians, and polar bears (The Marine Mammal Center, n.d).

Whales, dolphins, and porpoises are part of the **cetacean** family and are species that only can survive in water (The Marine Mammal Center, n.d). Regarding the population status of cetaceans, several whales are endangered as a result of past hunting for different goods like oil, meat, and ambergris, which was and still is very valuable (The Marine Mammal Center, n.d). Commercial hunting of whales has been banned since 1986, however, a few countries such as Norway, still execute this for scientific or commercial purposes (Hoyt & Hvenegaard, 2002). This is controversial as there are doubts about the necessity of taking the whales' lives for research (Hoyt & Hvenegaard, 2002). Globally, marine mammals are increasingly getting stranded, and species are suffering as a result of losing their habitat (The Marine Mammal Center, n.d). Cetaceans usually travel constantly therefore it is hard to say exactly what areas they are located in as the areas are on a much larger scale than on land. Whales and dolphins breed and feed in located areas and often will return to familiar places (Hoyt, 2011, p.40).

Pinnipeds include seals, sea lions, and walruses-animals (The Marine Mammal Center, n.d). These marine mammals are capable of living both in water and on land for extended periods

(The Marine Mammal Center, n.d). The phrase "pinniped" means fin and foot and evolved from the Latin word's "pinna" and "pes" (The Marine Mammal Center, n.d). Pinnipeds are mammals that have gradually adapted to the marine habitat over an extended period, as they have evolved from land-dwelling ancestors (The Marine Mammal Center, n.d).

2.3 In-water marine mammal tourism activities

Whale -watching is an activity that has progressed over the years, and it has expanded to include a broad range of activities and can now be conducted from land, water vessels, and even on air through helicopters or air balloons (Hoyt & Parsons, 2014, p.60). Whale-watching can be commercial in which tourists pay money for the trip, or recreational, which means people do the activity from their personal vessels (Hoyt & Parsons, 2014, p.60). It is significant to separate commercial and recreational whale-watching, as recreational whale-watching might not be regulated and can harm the target species (Hoyt & Parsons, 2014, p.60). The vessels used for these activities might either be powered or unpowered, like kayaks or motorboats (Hoyt & Parsons, 2014, p.60). It is significant to point out that the difference between powered and unpowered is important because powered vessels can produce more disturbance than unpowered, which can cause a bigger impact (Hoyt & Parsons, 2014, p.60).

As the whale-watching industry has evolved all over the world, there has been an increase in dedicated whale-watching tours and vessels which has led to a growing number of vessels surrounding groups of cetaceans in some locations (Hoyt & Parsons, 2014, p.63-64). In the book *Whale Watching* by Hoyt and Parsons (2014) they found that straight after a vessel departure from a sight, with another one approaching immediately, created a constant disturbance on the animals, causing stress. It even impacts areas where there is number limitations on vessels nearby whales (Hoyt & Parsons, 2014, p.63-64). The whale-watching

industry has evolved into a larger industry where there is a need for tour operators to get larger vessels to fit higher numbers of tourists (Hoyt & Parsons, 2014, p.63-64). The impact on the cetaceans is still persisting as bigger vessels could come with louder noises (Hoyt & Parsons, 2014, p.63-64). The bigger vessels are not as easy to move around as smaller vessels, but they can be beneficial if it reduces the vessel traffic (Hoyt & Parsons, 2014, p.63-64). Further Hoyt & Parsons (2014) found that there is also an increasing demand for faster vessels to transport tourists to whale-watching locations as this can transport more tourists in a day. As a result, faster vessels could cause increased challenges and lead to collisions as the cetaceans have less time to maneuver away from the vessels which at worst could end up killing them (Hoyt & Parsons, 2014, p.63-64). This also applies to other marine mammal watch-tours like pinnipeds and dolphins.

Another tourist activity that has been growing in demand is **swim-with** activities (Gales et al., 2003, p.277). Gales et al. (2003, p.277) states that the extent of these activities and their impact is not as known. A review from the book *Marine Mammals: Fisheries, Tourism and Management Issues*, focused on dolphins, revolved around four essential categories of engagement between humans and cetaceans in in-water activities (Gales et al., 2003, p.277). The four categories are solitary and social, those provided with food, those habituated to human presence, and those unfamiliar with human interaction (Gales et al., 2003, p.277). In the review they concluded that adaptation to humans and in-water interactions are generally a continuous process accomplished by humans even though dolphins are social mammals and those who often seek to make the first move toward humans (Gales et al., 2003, p.277-279). Animal habituation to humans can result in negative impacts that can be dangerous to their health, and in the worst-case cause death (Gales et al., 2003, p.277-279).

As the swim-with-whale industry became more globally known the registration of locations and species increased (Stack et al., 2021). Different regions allow for different methods to approach the animals with vessels and swim-with activities that may include floating at the surface, diving on breath hold, and/or scuba diving (Stack et al., 2021). Stack et al. (2021) states that the swim-with activities may have different impacts in contrast to whale-watching activities due to the involvement of bringing swimmers in closer range to the cetaceans by allowing them to access the water. As a result, the vessels used for swim-with-whale activities approach the cetaceans more closely; this could have a severe impact on the cetaceans by alternating their behavior (Stack et al., 2021).

Gales et al. (2003) also mentions **food provisioning** as an activity. It is said that food provisioning is the main cause of in-water interactions with dolphins in various locations globally (Gales et al., 2003, p.277-279). Despite this, uncontrolled feeding can be damaging to wild cetaceans. Some suggest strict regulations on feeding may reduce the danger (Gales et al., 2003, p.277-279).

In- water activities can have some negative impacts on marine mammals as in-water activities can come with high boat and human presence that can cause stress, alter behavior, and affect the population dynamics and distribution of the various species in marine wildlife tourism (Trave et al., 2017, p.213). According to Trave et al. (2017, p.213) can interactions between humans and marine mammals interfere with the animals daily habitual activities such as feeding, nursing, nesting, and communication patterns. These impacts can result in avoidance behaviors, alert signals, and threatening/aggressive displays, and further cause accidental injuries on the animals by reckless driving (Trave et al., 2017, p.213).

There are some existing positive impacts with in-water activities like economic benefits when having a well-managed marine mammal tourist operation (Marine mammals

management toolkit, n.d). It can promote a sense of pride and ownership in local communities, and provide educational opportunities (Marine mammals management toolkit, n.d). When whale-watching is done responsibly it can not only generate income and employment but also foster wildlife appreciation and awareness among tourists which can further lead to environmental actions (International whaling commission, n.d).

2.4 Visitor management strategies

With the impacts presented above, that are a result of tourism-related activities it is important to manage the visitors to reduce the negative impacts as much as possible and to increase the positive effects for both the tourist and the animals. The right management strategies can have significant implications not only in environmental terms but also for socio-cultural and economic (Mason, 2005). Due to the rapid growth of the wildlife tourism industry, there is a need to consider and evaluate necessary management strategies (Rodger et al., 2011). This is to control and protect various marine species, particularly whales and dolphins as these are the most popular marine mammals to interact with (Rodger et al., 2011).

According to Mason (2005) we can categorize visitor management into two approaches: the hard management approach and the soft management approach. Hard approaches use physical, regulatory, and economic measures to manage visitors, while soft approaches rely on education and interpretation (Mason, 2005).

2.4.1 Hard visitor management strategies

Hard visitor management strategies can be stated as "regulatory" (Mason, 2005). To regulate interactions between vessels/swimmers and marine mammals Mason (2005) suggested including speed and distance regulations to minimize the impact as fast vessels increase loud

noise which can result in habitat displacement, masking, and temporary threshold shift for marine mammals. Increased enforcement and executing time restrictions in the protected areas are also regulatory approaches that can minimize the impacts. Kuo (2002) as well as Mason (2005) suggest implementing viewing distances and increasing enforcement. He also mentions implementing zones to regulate vessel traffic and restrictions on certain activities to reduce the general impact on the animals (Kuo, 2002).

2.4.2 Soft visitor management strategies

Mason (2005) describes interpretation as a process of transferring knowledge and developing values related to the environment and culture of the place visited. With increasing education and outreach efforts with tour operators, recreational boat users, and the public it is argued that it can be used to help tourists become 'mindful' tourists by changing their thinking and behavior (Machernis et al., 2018; Mason, 2005). According to Tilden (1997, referred in Kuo, 2002, p.97) who established the concept of interpretation, found that interpretation and information are distinct concepts. While information is simply data or facts, interpretation involves revealing meaning based on that information. Despite their differences, it's worth noting that all interpretations necessarily rely on some underlying information (Tilden, 1997, referred in Kuo, 2002, p.97).

Education and enforcement programs should supplement rules and regulations to create a successful management plan (Machernis et al., 2018). It has been argued that culturally sensitive, well-trained guides are particularly effective at facilitating interpretation in the interactive process of tour guiding (Mason, 2005).

Self-regulation is another approach to a "soft" visitor management strategy. Self-regulation has been argued to be particularly effective when codes of conduct and guidelines are provided for operators and visitors (Mason, 2005). By implementing this, operators and visitors may develop conservation ethics that they can apply to other protected areas, and influence tourists' behavior in the future (Mason, 2005). Through this approach, we can see how regulations and education are connected in tourism management through self-regulation (Mason, 2005).

Compliance to hard and soft management strategies, preferably combined, is essential to reduce harassment and provide high-quality viewing experiences (Kuo, 2002; Machernis et al., 2018). Low compliance is often due to insufficient enforcement, but the increased presence of enforcement personnel can serve as a financial incentive for compliance (Machernis et al., 2018). Tourism is growing at a rapid pace, yet there is little data about how it impacts particular sites that attract tourists (Shackley, 1998, referred in Mason, 2005, p.192). This means that it is even less known if these visitor management strategies are effective. Therefore, it is important to research the potential negative impacts on ecology and tourist satisfaction, expatriation, attitudes, and management strategies to ensure the protected areas are sustainable long-term (Mason, 2005; Rodger et al., 2011).

3.0 Method

3.1 Introduction to the methodical approach

Literature review was used as the method in this thesis to answer the problem statement:

"How do marine mammals alter their behavioral responses due to tourist

interactions/activities?". The book *Introduksjon til samfunnsvitenskapelig metode* by

Johannessen et al. (2016) has been used as inspiration and guide in this process. They explain

how a literature review makes use of published literature on a specific topic or research

question and analyze it in a critical and systematic manner (Johannessen et al., 2016, p.103).

By conducting a literature review, one can identify and evaluate existing knowledge, uncover

research gaps, and lay the groundwork for future research on a specific topic (Johannessen et

al., 2016, p.103).

To execute a structured literature review some specific requirements have to be met

(Johannessen et al., 2016, p.103) in order to ensure that the study is executed in the right way.

Under the research process for this literature review we conducted a table (see Table 1, p. 15)

with inclusion and exclusion criteria. The criteria set for the research process was developed

strategically to ensure the research would support the problem statement.

Inclusion criteria	Exclusion criteria
- The studies had to be conducted the last 10 years (2012-2022) - Only peer reviewed articles can be included - Publications in English - The research has to present the behavioral impacts on marine mammals during tourist interactions - Studies with only quantitative design - Samples being marine mammals, tourism vessels and tourists - Articles including behavior changes in marine mammals after interactions with tourists and water vessels	- Studies before 2012 will be excluded - Articles specifically about the fishing industry, like whaling and artisanal fishers - Articles involving other animal groups then marine mammals

Table 1: *Inclusion and Exclusion Criteria's*

Based on our desire to attain knowledge and understand how interactions between tourist and marine mammals impact the animals we found that studies using quantitative methods were the best option as many of the studies gave us objective data through statistics and numbers. We believe it could give the research more trustworthy content and would be beneficial when analyzing the results in each study. Quantitative method is a research method used when collecting and analyzing data, and the purpose of the analysis is to find a patterns, connections, and regularities in the material (Johannessen et al., 2016, p.28).

3.2 Search Method

The initial search was made 07.02.2023 with the database ORIA where the following keywords were used: "mammals", "tourism" and "behavior" to identify studies that are suitable for further investigation. At this initial stage there was no advanced search applied. This was to get an overview of what types of studies are out there. The database ORIA was selected based on the fact that during the literature research process we tried different databases like Google scholar, ORIA and Hospitality and Tourism complete, and after trial and failure with adding different filters, we concluded that ORIA was the best database for our thesis. We see ORIA as a reliable source as it is a search portal for the combined material found at most Norwegian subject and research libraries. Only peer-reviewed studies in English over the last 10 years were used in the advanced search. English is the predominant language used in literature and therefore this was used to get a wider range of different studies. The timeframe of when the studies were published was set to 10 years (2012-2022). The reasoning for not including 2023 in the literature search was that the initial search was done so early in the year that there were no studies published yet.

The keywords "in water" and NOT "shark" were added in addition to changing "mammal" to "marine mammal" and "tourism" to "tourism interaction" as we saw that we needed to be more specific in the study selection. This left us with 21 studies.

We also wanted to look at the tourist perspective, therefore we did a second search where we changed "tourism interaction" to "tourist interaction" in the initial stage. The same advanced search criteria were used as in search one. The keyword NOT "shark" was also added here, but "in water" was removed as that left us with zero studies. The second search left us with 11 studies before emerging the searches together.

In total in search one & two there were 32 studies where two were duplicates. This left us with 30 studies. Ten studies were excluded after reading the titles. These were excluded as they didn't fit the criteria for our problem statement. Studies like "Socio economic impacts of marine heatwaves: Global issues and opportunities" where they look at the environmental and global aspects, as well as studies like "Repeated Vessel Interactions and Climate- or Fishery-Driven Changes in Prey Density Limit Energy Acquisition by Foraging Blue Whales" were they look at how the fishing industry impacts the animals, were not included. These themes were a common similarity between the studies excluded.

Three studies were excluded after reading the abstract as they did not fit the inclusion criteria set in Table 1 (p.15), they had a misleading title, the language wasn't good enough or they had insufficient result chapters.

There were four studies excluded after reading the full text. These were excluded as a result of not being thorough enough, not having the right target group or not addressing the right main focus. The 13 studies that are left are the ones included in our thesis. They are included because they analyze and discuss how marine mammals alter their behavior responses when interacting with tourists and tour vessels. Five of the studies discuss the impacts on Dolphins, three studies discuss the impacts on whales, and five studies discuss the impacts on pinnipeds. Two studies discuss the impacts done by both vessels and swim-with activities, two studies discuss only swim-with activities, and nine studies discuss the impacts of water vessels like boats and kayaks. 10 of the studies discuss management and regulations, and how they should be implemented in the marine tourism industry. They also discuss tourist interactions with marine mammals.

The exclusion process of the literature was systematized in a PRISMA flowchart (Figure 1):
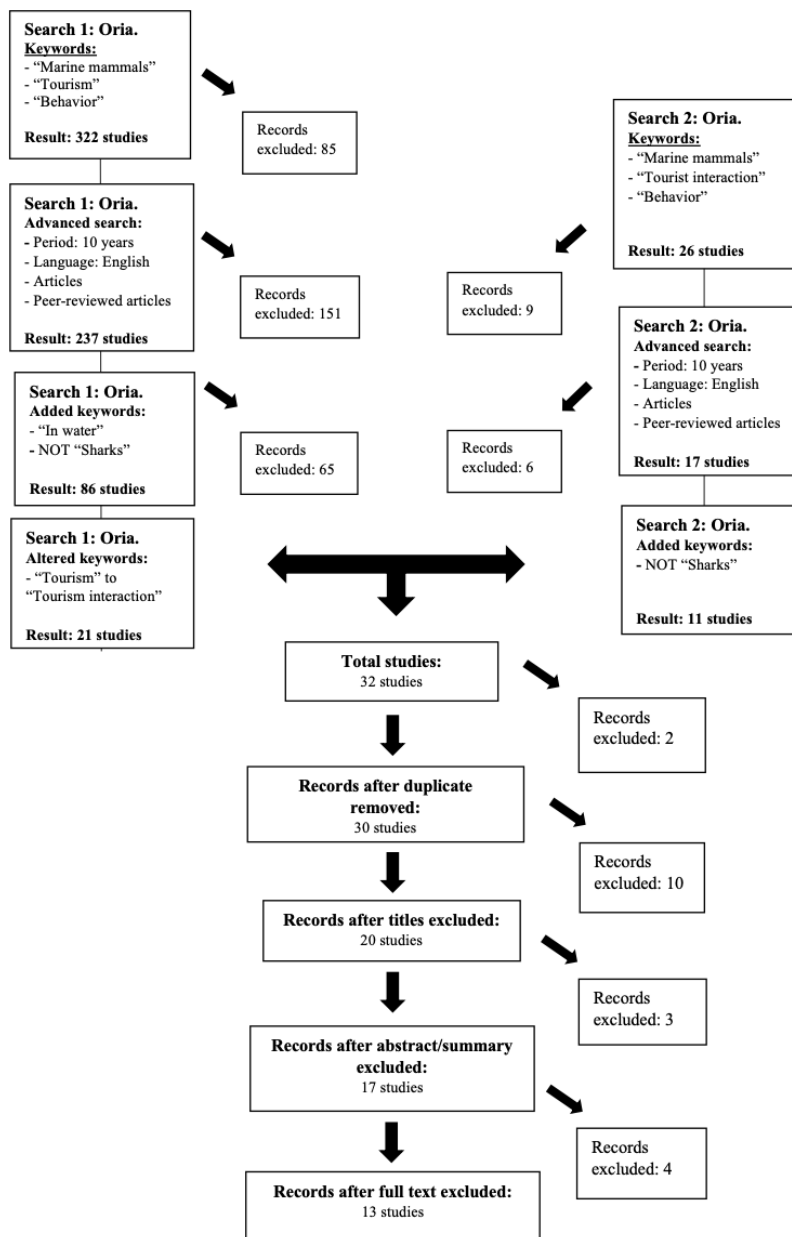
Figure 1: *PRISMA flowchart of the review process*

A table was conducted to get a systematic overview of all the selected studies that proved to be the most relevant to our thesis. We chose to list these categories; title, authors, years, country, animal, source of purpose, method, and database, as they cover the most important information we have gathered and give the reader an overview over relevant information. The chosen studies will be referred to after the numbers given in Table 2 (p.19).

	Studies							
Title	Athours	Year	Country	Animal	Scope and purpose	Method	Database
1. The Behavioural Impacts of Commercial Swimming With Whale Tours on Humpback Whales (Megaptera novaeangliae) in Hervey Bay, Australia	Stephanie H. Stack, Kate R. Sprogis, Grace L. Olson, Florence A. Sullivan, Abigail F. Machernis, and Jens J. Currie	2021	Australia	Whales	The aims of this study were to: (1) examine short-term behavioral responses in whales before, during, and after the swim-with-whale tours, and (2) investigate the behavioral responses of whales throughout the swim-with-whale tours compared to whale watch tours.	Quantitative	Frontiers in Marine Science
2. The effects of seal-swim activities on the new zealand fur sela (arctophoca australis forsteri) in the Bay of Plenty, New Zealand, and reccommandations for a sustainable tourism industry	M. Cowling, R. Kirkwood, L.J. Boren, C. Scarpaci	2013	New Zealand	Seals	To determine the effect of seal-swim tourism on New Zealand fur seals in the Bay of Plenty, New Zealand, and to provide a case study to monitor the wildlife conservation component of tourism sustainability.	Quantitative	Science Direct
3. Mediterranean Monk Seal (Monachus monachus) Behavior at Sea and Interactions with Boat Traffic: Implications for the Conservation of the Species in Greece.	Elena Mpougas, James J. Waggitt, Panagiotis Dendrinos, Styliani Adamantopoulou, and Alexandros A. Karamanlidis.	2019	Greece	Seals	Examine the behavior of the Mediterranean monk seal at the sea and how this is affected by tourism- and leisure-related boat traffic by evaluating whether (1) time of day and boat traffic had an effect on monk seal presence at sea, (2) boat traffic had a different effect on behavior based on monk seal age, and/or (3) boat traffic had a differential effect on specific monk seal behavior.	Quantitative	Academic Search Premier
4. Estimating the cumulative effects of the nature-based toruism in costal dolphin population from southern kenya.	Sergi Pérez-Jorge, Maite Louzao, Daniel Oro, Thalia Pereira, Chole Corne, Zeno Wijtten, Inês Gomes, John Wambua, Fredrik Christiansen	2016	Kenya	Dolphins	To assess the impact of nature-based tourism on the behavioral ecology of the Indo-Pacific bottlenose dolphin, and understand which effects must be managed to ensure that the local-dolphin industry is sustainable.	Quantitative	Science Direct
5. Effects of Whale-based tourism in Vava'u Kingdom of Tonga: Behavioural responses of humpback whales to vessel and swimming tourism activities.	Lorenzo Fiori, Emmanuelle Martinez, Mark B. Orams, and Barbara Bollard.	2019	Tonga	Whales	This study represents an assessment of the behavioral responses of humpback whales to vessel and swimmer approaches in the Vava'u Kingdom of Tonga	Quantitative	ProQuest
6. Wildlife tourism: Underwater behavioral responses of South American sea lions to swimmers	S.L. Dans, E.A Crespo, M.A. Coscarella	2016	South America	Sea lion	To describe the type of interaction between swimmers and sea lions, in particular if sea lions would show agonistic behaviors towards people, or behaviors that potentially pose a danger, and to detect which interaction may produce such behavior.	Quantitative	Science Direct
7. Dolphin Watching and Compliance to Guidelines Affect Spinner Dolphin´(Stenella longirostris) Behaviour in Reunion Island	Belén Quintana Martín-Montalvo, Ludovic Hoarau, Ophélie Deffes, Sylvian Delaspre, Fabienne Delfour and Enne-Ennanuelle Landes	2021	Reunion Island	Dolphins	To assess for the first time the effects of dolphin watching on spinner dolphins´ behavior through a focal follow instantaneous scan sampling approach.	Quantitative	Academic Search Premier
8. Human activities disturb haul out and nursing behavior of Pacific harbor seals at Punta Banda Estuary, Mexico.	Maria Guadalupe Ruiz-Mar, Gisela Heckel, Elena Solana-Arellano, Yolanda Schramm, Maria C.Garcia-Aguilar, Maria Clara Artega.	2022	Mexico	Seals	On-land observations that study the impact of different sources of disturbance on seal behavior and evaluate their effect on the amount of time dedicated to nursing over three pupping seasons.	Quantitative	ProQuest
9. Dolphin-watching tourism and indo-Pasific humpack dolphins (Sousa chinensis) in Sanniang Bay, China: impacts and solutions	Haioing Wu, Chongwei Peng, Hu Huang, Thomas A. Jefferson, Shiang-Lin Huang, Mo Chen, Qianhui Zeng, Xueying Yu, Xianyan Wang, and Youhou Xu	2020	China	Dolphins	To investigate the spatial and temporal activities of dolphin-watching tours in Sannigang Bay, China, where tours specifically focus on indo-Pacific humpback dolphins.	Quantitative	Springer Link
10. The importance of spinner dolphin (Stenella longirostris) resting habitat: implications for management.	Julian A. Tyne, David W. Johnston, Robert Rankin, Neil R. Loneragan, and Lars Bejder.	2015	Hawaii	Dolphins	Combined boat-based and land-based group focal follow data to determine the resting behavior of spinner dolphins across a range of available habitats. The specific objectives were to identify key habitat factors that contribute to the likelihood of spinner dolphin rest and determine the time periods that spinner dolphins are most likely to rest within these habitats.	Quantitative	JStor
11. Resource defence and dominance hierarchy in the boto (Inia geoffrensis) during a provisioning program	Luiz Cláudio Pinto de Sá Alves, Arthur Andriolo, Mark Byran Orams, Alexandre de Freitas Azevedo	2012	South-America	Dolphins	To determine if aggressiveness among conditioned botos during interactions with humans determined by the presence or absence of food rewards and to determine if providing leads to the establishment of a dominance hierarchy among those animals.	Quantitative	ProQuest
12. Soundwatch: Eighteen years of monitoring whale watch vessel activities in the Salish Sea	Elizabeth Seely, Richard W. Osborne, Kari Koski, Shawn Larson	2017	Sailish Sea, North America	Whales	The Soundwatch Boater Education Program compiles data on vessel types and interactions with marine mammals, focusing on the Southern Resident killer whale (SRKW), Orcinas orca. The primary goal of the Soundwatch program is to reduce vessel disturbance to SRKWs and other marine wildlife through the education of boaters on regional, local, and federal guidelines and regulations and the systematic monitoring of vessel activities around cetaceans. This study summarises the data and comes with management recommendations.	Quantitative	ProQuest
13. Factors Affecting Haul-Out Behavior of Harbor Seals (Phoca vitulina) in Tidewater Glacier Inlets in Alaska: Can tourism Vessels and Seals Coexist?	Gail M. Blundell, Grey W. Pendleton.	2015	Alaska	Seals	Exploring factors affecting haul-out behavior of harbor seals at a glacial site frequented by tourism vessels. Evaluating the influence of environmental and physical factors on the probability of being hauled-out, duration of haul-out bouts, and as factors associated with the start and end of a haulout.	Quantitative	ProQuest

Table 2: *Literature overview*

4.0 Results

The result of the method gives a more in-depth view of what the different studies address in their research on the impacts on marine mammals. We have chosen to present the results based on the differences in behavior responses across various animal species. Later in the discussion, we will compare these results. The results also include management strategies used and recommended in the different studies.

4.1 Whales

4.1.1 Purpose

Study 1, 5 and 12 research whales. Study 1 and 5 addresses the topic of whales' behavioral responses to water vessels and in-water activities, however study 12´s main focus is the importance of educating operators when it comes to managing water activities based on long term vessel-whale monitoring.

4.1.2 Method

In study 12 by Seely et al. (2017) the Soundwatch monitoring vessels collected data on vessel numbers, marine mammal interactions, and educated vessel operators on marine life from 1998 to 2015, May to September, in the Salish Sea region of Washington state, USA to British Columbia, Canada. Total hours collecting data each year differed between 312 to 573 (Seely et al., 2017). Study 1 by Stack et al. (2021) had a total of 400 hours of observation time. 250 of those were swim-with whale tours and 150 hours were whale-watching tours (Stack et al., 2021). The data was collected from 2018 to 2020 in Hervey Bay, Queensland, Australia "before-during- and after" whale watching and swim-with-whale tours, exploring the different behavioral responses between these activities (Stack et al., 2021). The study (5) by Fiori et al. (2019) collected data between July 2016 to October 2017 in Vavau´u, Kingdom of Tonga during humpback whales´ breeding season. A total of 190 vessel-whale encounters

were recorded during 237,4 hours of observation (Fiori et al., 2019). Of the total encounters 62 were mother-calf encounters and 128 encounters were without a calf present. On swim-with activities there were 162 attempts during 24.8 hours of observation (Fiori et al., 2019). The behavior responses observed were; resting, traveling, surface-active, socializing and feeding (Fiori et al., 2019).

4.1.3 Result

The Soundwatch's records show that vessel and kayak activities associated with whale-watching increased significantly, as well as some types of incidents with whales (Seely et al., 2017). In the eighteen years of monitoring whale-watching vessels Seely et al. (2017) found that the top incident types were: vessels that were in the path of traveling whales with a peak of 226 incidents in 2012, and vessels motoring inshore of whales with a peak of 610 incidents in 2009. From 2012 to 2015 there was a decrease in some incidents categories, and with the decreasing count of incidents there was a change in the travel behavior and distribution of the whales in 2015 (Seely et al., 2017). This indicates that with an increase of incidents the whales have a negative behavior reaction such as change in social interaction, resting, feeding, and breeding behavior (Seely et al., 2017).

Study 1 by Stack et al. (2021) shows behavioral changes in the stages *before*, *during*, and *after*, though it was during stages *during* and *after* the changes was most noteworthy. Whales show distinct differences in their behavioral responses to swim-with tours compared to whale-watching tours, with more directional shifts and 50% less rest periods (Stack et al., 2021). The behavioral changes in whales compared between the tour types were primarily linked with the distance between the whale and the tour vessels (Stack et al., 2021). In the *during* stage of swim-with-whale tours, the typical vessel distance was 212 meters, while in whale-watching

tours it was 157 meters (Stack et al., 2021). The swim-with tours cause different short-term behavioral changes in whales like surface activity, respiration rate, speed, and less direct swimming paths (Stack et al., 2021).

In study 5 by Fiori et al. (2019), the J approach, which is when the tour operators increase their approach speed and position their boats in the whale's path of travel to increase the success of the swim-with activity for tourists, had a 76,5% higher avoidance rate than parallel approaches where they follow the whales path. But when a minimum of 82.1 meters were held by the vessels there was no significant avoidance effect (Fiori et al., 2019). Fiori et al. (2019) found that in total 35.5% of the whales showed avoidance due to swim-with activities. During vessels and swim-with activities whale mothers showed a significant behavior change with doubling their diving time with a vessel present (Fiori et al., 2019). Splashing swimmers caused an earlier behavior avoidance than calm swimmers, and mothers with calves tripled their diving time when swimmers were in the water (Fiori et al., 2019). As a result of long-term disturbance, mother-calf pairs increasing swimming speed and reducing resting time led to a noticeable decline in the calves growth rate (Fiori et al., 2019).

4. 2 Pinnipeds

4.2.1 Purpose

Study 2, 3, 6, 8 and 13 address the behavior impacts tourists and vessels have on pinnipeds. Study 2 and 6 analyzes the impacts of swim-with-pinniped-tours and the pinnipeds behavior responses to them. Study 3, 8 and 13 address the topic on how the pinnipeds change behavior due to water vessels.

4.2.2 Method

In Study 2 by Cowling et al. (2014), data was collected on seals and tourist behavior from two locations in the Bay of Plenty, New Zealand, between December 2011 and March 2012. The data was gathered during and after the breeding season (December 2011 to February 2012), *before*, *during*, and *after* swim-with activities involving seven swimmers during 29 minute intervals (Cowling et al., 2014). Study 6 by Dans et al. (2017) took place in Punta Loma, Argentina and had the aim to research the behavior responses of sea lions during swim-with tours. The data collection took place from June 2011 to March 2012 through videotapes (Dans et al., 2017). Which behavioral events occurred, how often they occurred and in what order they occurred during an interaction was observed and analyzed (Dans et al., 2017). A total of 466 focal follows were documented, where 259 were during the pupping season and 207 were during the resting periods (Dans et al., 2017).

The research in study 3 by Mpougas et al. (2019) was conducted in Lichadonisia, an islet placed off the northwest coast of Evia, Greece. The area where the study was conducted is characterized by shallow waters, strong currents, and diurnal tides. A total of 75 hours of observations were conducted during June to July 2018 (Mpougas et al., 2019). Numbers of vessels, abundance and behavior of the monk seals were recorded and observed from a boat and on land with a camera (Mpougas et al., 2019). Study 8 by Ruiz-Mar et al. (2022) was conducted in Punta Banda Estuary, Baja California, Mexico where the Pacific harbor seals were recorded from 2015 to 2017 during their pupping season (February to April) (Ruiz-Mar et al., 2022). The observations analyzed seals behavior and the number of disturbance events caused by vessels in water by non-motorized and motorized vessels. In Tracy Arm Ford`s Terror (TAFT) Wilderness Area, Alaska study 13 by Blundell and Pendleton (2015) was conducted from 2008 to 2010. Observations of vessels were done by camera and telemetry

and through radio-tagged seals they document the presence and absence of them to find different behavior changes (Blundell & Pendleton, 2015).

4.2.3 Results

Study 2 by Cowling et al. (2014) shows that in 54% of the observations made, seals expressed little interest in the swimmers. Seals actively avoided swimmers only on rare occasions and 41% of the time they interacted with them (Cowling et al., 2014). After 22 minutes the interaction rate reduced, and the seals tended to ignore rather than avoid the swimmers (Cowling et al., 2014). During the breeding season Cowling et al. (2014) found that interactions with swimmers were higher but the swim numbers and distance had no significant impact. Seals avoided swimmers 2.6% of the time (Cowling et al., 2014). The seals ignored swimmers more frequently and the interaction reduced as time passed which implies that due to seals becoming too habituated to the activities seals might lose interest interacting with swimmers (Cowling et al., 2014).

Dans et al. (2017) found in study 6 that sea lions showed curiosity towards swimmers 6.8% of the time. The second most frequent occurrence was to look at the swimmer with no movement and the third most frequent behavioral response was to "bite"/touch the swimmer with their noses (Dans et al., 2017). All of these responses were followed by one more swim around the tourist and then leaving (Dans et al., 2017). During the pupping seasons the sea lions' most frequent response to swimmers were going up to the surface breathing and then diving again with an occurrence of 26.3% (Dans et al., 2017). The sea lions show behavior responses like approach and then avoidance depending on the social context with tourists and Dans et al. (2017) also mentioned that the boat itself can disturb the sea lions.

Mpougas et al. (2019) study (3) found that the likelihood of sighting monk seals decreased with an increased vessel activity. Further, the study projected that seal encounters were four times more likely during low vessel traffic compared to high traffic (Mpougas et al., 2019). There were also significant variations in behavioral responses among age groups and subadults were seen to be 25% more reactive to vessels than adults (Mpougas et al., 2019). When water vessels were around, 47% of the seals were aware and alert and 23% were fleeing, followed by 18% resting, 10% swimming, and 2% sleeping (Mpougas et al., 2019). The results show that tourism- and leisure-related vessel traffic seem to impact monk seals, and other seal species, activity negatively at sea (Mpougas et al., 2019).

Ruiz-Mar et al. (2022) found that the instant impact of habitually human interaction with Pacific harbor seals is a factor that lowers the seals time on land, and they flush to sea which increases their energy expenditure. In study 8 by Ruiz-Mar et al. (2022) it is shown that due to seals' watchful behavior and their reliance on nearshore haul-outs, they are especially vulnerable to the impact of vessels like boats and kayaks. In 2016 the dominant disturbance source was motorized vessels like boats and jet skis (Ruiz-Mar et al., 2022). After a disturbance event happened the studied seals recovered in 34% of the cases with the mean recovery time of 16.38 minutes in 2017, which was shorter than 2015 and 2016 (Ruiz-Mar et al., 2022). During the years analyzed, non-motorized water vessels like kayaks, paddle boards etc. caused a higher amount of seals to flush into water compared to motorized water vessels (Ruiz-Mar et al., 2022). As a result of this Ruiz-Mar et al. (2022) suggests that the seals see kayaks as a potential predator.

During the execution of study 13 by Blundell and Pendleton (2015) there was no restriction of vessel traffic, but an agreement between the US. Forest service and TAFT to protect the wildlife. This included the advice to have a 91-meter distance from the seals on icebergs and reducing the speed on the vessel when approaching the seals (Blundell & Pendleton, 2015). Most of the vessels were cruise ships or day-to multi-day tourism vessels (Blundell & Pendleton, 2015). Factors like year, season, location, and hour of the day influenced the haul-out probability, but the presence of a vessel reduced the odds for a seal to haul out even more (Blundell & Pendleton, 2015). There was no evidence that the vessel presence did affect the haul-out start, but both weather and vessels were associated with haul-out ending and were a significant factor (Blundell & Pendleton, 2015). However, Blundell and Pendleton (2015) found that big vessels like cruise ships alone did not have a significant effect on the haul out ending but the amount of vessels present were significant.

4.3 Dolphins

4.3.1 Purpose

Study 4, 7, 9 and 10 address how dolphins' behavior is altered due to different vessel traffic. Where study 11 discusses how food provision alters the dolphin's behavior towards tourists and other dolphins.

4.3.2 Method

Study 4 conducted by Pérez-Jorge et al. (2017) takes place in southern Kenya with a focus on Indo-Pacific bottlenose dolphins living in the Kisite-Mpunguti Marine Protected Area. Between October and December 2011 to 2013 data on adult and juvenile dolphins engaged in traveling, socializing, diving, and resting was collected with a distance of 20-100 meters to avoid disturbance (Pérez-Jorge et al., 2017). Pérez-Jorge et al. (2017) used the Markov Chain model as it measures how the current behavior of the animals is dependent on their previous

behavior. Study 7 by Martin-Montalvo et al. (2021) collected data on the western side of Reunion Island between February 2018 and June 2020. The study recorded vessel numbers within 300 meters of the groups and their effect on behavior, categorized as avoidance, neutral, or attraction (Martin-Montalvo et al., 2021). This study also used the Markov Chain to investigate the likelihood of transitioning from one behavioral state to another within a 3-minute interval, under both controlled and impacted conditions (Martin-Montalvo et al., 2021). The study (9) by Wu et al. (2020) was executed in Sanniang Bay, China from January 2013 to December 2015. During this study the boats had to follow a code of conduct which stated that they were allowed within a 500 meters diameter from the dolphins and only one boat at the time was allowed to follow the dolphins (Wu et al., 2020). Number of tours, location, duration, and the time following the dolphin groups were documented to analyze the dolphin's behavior response to the boats and tourists (Wu et al., 2020).

Study 10 by Tyne et al. (2015) was conducted in Hawaíi and was executed from both land- and boat. The boats had a 100-meter distance from the dolphins where 28 observations were made. They made 47 observations on spinner dolphins behavior responses from land (Tyne et al., 2015). The observations were made from four different bays with a total of 488 hours of data collected, where 402 hours was from the inside of the bays and 86 hours from outside (Tyne et al., 2015). Tyne et al. (2015) made a total of 2856 observations during the whole study. Pinto de Sá Alves et al. (2013) study (11) took place in central Amazon, Brazil at a floating restaurant. Data was collected from May to August 2008 and March to May 2009 (Pinto de Sá Alves et al., 2013). Observations were made from 1,5 meters above water, and tourists freely fed and interacted with dolphins throughout the study (Pinto de Sá Alves et al., 2013).

4.3.3 Results

In Pérez-Jorge et al. (2017) study (4), 567 behavioral transitions were recorded. Tour vessels caused a significant decrease in the average bout length for traveling and resting dolphins (Pérez-Jorge et al., 2017). The most common behavior state of the dolphins was traveling and that decreased from 61% to 46% when vessels were present and dolphins' diving time increased from 17% to 27% (Pérez-Jorge et al., 2017). Dolphins cumulative traveling and diving behavior were significantly disturbed for 50% and 58% of the time, but the resting and socializing states were not affected (Pérez-Jorge et al., 2017). The impact sequences at both 100 meters and 400 meters showed no significant differences, but vessel interactions significantly altered the proportion of time dolphins spent in each behavior state (Pérez-Jorge et al., 2017).

Study 7 by Martin-Montalvo et al. (2021) found that the presence of vessels decreased the likelihood of a dolphin transitioning from traveling to socializing and diving behavior and increased the transitioning from traveling to milling. Dolphins remaining in the diving state increased, but not significantly as well when vessels were present (Martin-Montalvo et al., 2021). Vessel presence significantly affected spinner dolphins' behavior as they spent less time socializing (10% vs 33%) and less time resting (27% vs 42%) (Martin-Montalvo et al., 2021). Due to boat presence, diving bouts increased from 3 to 5 minutes (Martin-Montalvo et al., 2021). Dolphin-watching vessels affected recovery time, increasing it for socializing, resting, and diving under impact conditions, whilst decreasing it for traveling and milling (Martin-Montalvo et al., 2021). Martin-Montalvo et al. (2021) found that dolphins react to vessels by forming tighter groups, changing speed, direction, and/or showing erratic surface movements. Their responses depend on group size and cohesion and with tighter and smaller groups displaying more observance and avoidance behaviors is present (Martin-Montalvo et

al., 2021). Vessel noises can trigger avoidance reactions before arrival, leading to energy depletion and long-term impacts on reproduction rates and population (Martin-Montalvo et al., 2021).

In study 11 by Pinto de Sá Alves et al. (2013), they found that the number of bites when the animals were not fed increased significantly with time. This indicates that there was an increase in social tension correlating with bite wounds (Pinto de Sá Alves et al., 2013). A total of 824 bite events were recorded (Pinto de Sá Alves et al., 2013). Conditioned botos have learned to expect food rewards through interactions with humans and may become more aggressive with each other if tourists do not provide food (Pinto de Sá Alves et al., 2013). Furthermore, Pinto de Sá Alves et al. (2013) found that the act of provisioning can increase competition and alter the social behavior of botos, leading to a hierarchical organization among individuals. Botos also use supplant behavior to regulate aggression, however interactions through provisioning are potentially harmful to botos and can be dangerous for humans (Pinto de Sá Alves et al., 2013).

In the high season months (February, May, August and October) study 9 by Wu et al. (2020) recorded 234 encounters and during the low seasons (the rest of the months) there were 154 encounters recorded. The results of these recordings show that there were different interaction sites during the high- and low- season of the dolphin tours in Shanniang Bay (Wu et al., 2020). This indicates the potential of a long-term consequence where dolphins change their habitat and distribution use patterns due to an increasing level of vessels/dolphin tours in their habitat (Wu et al., 2020).

Study 10 by Tyne et al. (2015) shows that spinner dolphins in Hawaii use sheltered bays to rest and socialize during the day and during night they travel to open waters. This is to minimize the predation risk whilst maximizing the foraging efficiency and also, they spent more time over sand than rock/boulder (Tyne et al., 2015). The research shows that the dolphins would mainly rest when inside the bays rather than outside the bays (Tyne et al., 2015). The results by Tyne et al. (2015) showed that spinner dolphins use these sheltered bays as resting habitats during daylight hours and most resting occurred from 10am-2pm. Tourism in these areas has grown drastically, therefore the dolphins leave their resting bays as a direct response to human/tourists' behavior (Tyne et al., 2015). The dolphins are less likely to rest when a swimmer comes closer than 15 meters from them (Tyne et al., 2015). This results in the dolphins being unable to recover from energetic and cognitive energy expenditure (Tyne et al., 2015). Tyne et al. (2015) found that in these areas there is no evidence that the swim-with exposure contributes to energetic deficit, but this research indicates that if tourism/human activity increases the dolphins are more likely to go into energetic deficit.

4.4. Management

To ensure human (Dans et al., 2017; Stack et al., 2021) and animal safety there need to be some management strategies implemented. The studies by Dans et al. (2017), Pérez-Jorge et al. (2017), Stack et al. (2021), and Wu et al. (2020) discusses the importance of implementing code of conduct to reduce the impacts on marine mammals caused by human interactions. Study 3, 4, 7, 8 and 12 (Martin-Montalvo et al., 2021; Mpougas et al., 2019; Pérez-Jorge et al., 2017; Ruiz-Mar et al., 2022; Seely et al., 2017) also mentions educating tourists and tour operators to raise awareness about the industry to make them act in a more sustainable way. Another way to reduce impact is to implement guidelines (Dans et al., 2017; Mpougas et al., 2019) and to ensure guidelines compliance, enforcement could be implemented (Ruiz-Mar et al., 2022; Seely et al., 2017; Stack et al., 2021).

Other management strategies mentioned in the studies are reducing vessel activity. This means reducing vessel traffic on the water (Fiori et al., 2019; Martin-Montalvo et al., 2021; Mpougas et al., 2019; Seely et al., 2017; Tyne et al., 2015) what time they are allowed to be around the animals (Dans et al., 2017; Martin-Montalvo et al., 2021; Seely et al., 2017) implementing distance regulations (Blundell & Pendleton, 2015; Fiori et al., 2019; Ruiz-Mar et al., 2022). Implementing "safe zone", "slow zones" and "no go zones" is also a way to manage the vessel activity around the animals (Seely et al., 2017).

5.0 Discussion

A literature review has been conducted and we are now shifting our focus on discussing the results in relation to the literature to answer our problem statement *"How does marine mammals alter their behavioral responses due to tourists' interactions/activities?"*. We aimed to assess the various impacts of wildlife tourism interactions and how these interactions affect marine mammals, and which management strategies found suitable to ensure a more sustainable interaction. By addressing this issue, we believe it can be beneficial for future research, and assist tour operators and municipalities/counties in comprehending the impact of this industry on marine mammals, as well as the importance of adopting sustainable management strategies. The discussion will be categorized into three main topics: Behavioral impacts, Short- and long-term effects and Management implications, and lastly there will be a source evaluation.

5.1 Behavioral impacts

5.1.1 Wildlife behavior alterations

Study 12 by Seely et al. (2017) shows that whales change social interaction, resting, feeding, and breeding behavior due to high vessel traffic. A similar conclusion was reached by Stack et al. (2021) that also found changes in behavior such as changes in whales surface activity, respiration rate, speed and they swim in a less direct path. In study 5 by Fiori et al. (2019) it was found that when tour guides used the J approach, the animals behavior changed in a higher avoidance rate, something that also is being supported by Hoyt and Parsons (2014) in their study on whale watching. Stack et al. (2021) also found a more distinct behavior change in whales in swim-with activities compared to whale-watching tours, where results showed a 50% less rest period among the whales and more direct shifts in swim-direction. A similar pattern of behavior alteration was reported by Fiori et al. (2019), who found that whales with calves tripled their diving time when approached with swimmers in-water. Although whales

and marine mammals in general can store oxygen in their muscles and blood, they are dependent on coming up to the surface to get oxygen (The Marine Mammal Center, n.d). This suggests that impacting whales' diving time, can result in long-term impacts on the animals (Fiori et al., 2019).

During swim-with activities pinnipeds, unlike whales, showed more curiosity at first before they changed their behavior to avoidance (Cowling et al., 2014; Dans et al., 2017). Sometimes their response to tourists also resulted in a "bite"/touch followed by avoidance (Dans et al., 2017). This finding is in line with the research done by Gales et al. (2003, p.277-279), where they state that marine mammals, in this case dolphins and pinnipeds are curious animals who often seek to make the first move, but animal habitation can result in negative impacts on the animal's welfare. In Mpougas et al. (2019) study the seals had various reactions depending on vessel activities. They found that during low vessel activities it was more likely to spot the seals (Mpougas et al., 2019). This correlates with the studies done by Ruiz-Mar et al. (2022) and Blundell & Pendleton (2015) where seals flushed to sea and had less time on land, increasing their energy expenditure, when human interaction occurred and there was high vessel traffic.

For dolphins the most common behavior is traveling, and both traveling and diving time for dolphins decreased when there were vessels present (Martin-Montalvo et al., 2021; Pérez-Jorge et al., 2017). Pérez-Jorge et al. (2017) found no change in resting and socializing states, however, Martin-Montalvo et al. (2021) found that the dolphins spent less time both socializing and resting whilst vessels were present. According to Gales et al. (2003) uncontrolled feeding can be dangerous to the animals. This is supported in the research done by Pinto de Sá Alves et al. (2013) where they found that the dolphins increased the number of

bites over time when they were not fed. This includes aggressiveness towards humans and themselves (Pinto de Sá Alves et al., 2013). As discussed earlier this can show that habituation to humans can cause damage to the animal's health (Gales et al., 2003).

As a result of the growing tourism industry in Hawaii, spinner dolphins are leaving their resting habitats in the bays (Tyne et al., 2015). Therefore, dolphins are unable to recover from energetic and cognitive energy expenditure (Tyne et al., 2015). Supporting these results is Trave et al. (2017) research saying in-water activities affect the distribution of various marine wildlife species. This is consistent with what has been found in Wu et al. (2020) research where they found that the dolphins change location during the low- and high tourism seasons.

Throughout the reviewed studies, similarities between the marine mammals' behavioral responses to vessels and swim-with activities are found. Throughout all studies, number of vessels and swimmers close to the animals and the distance between them, is an occurring cause for disturbance and behavior change (Blundell & Pendleton, 2015; Cowling et al., 2014; Dans et al., 2017; Fiori et al., 2019; Martin-Montalvo et al., 2021; Mpougas et al., 2019; Pérez-Jorge et al., 2017; Ruiz-Mar et al., 2022; Seely et al., 2017; Stack et al., 2021; Tyne et al., 2015; Wu et al., 2020)

5.1.2 Activity impacts

The vessels used for these different water-activities will have different impacts on the animals. One can assume that bigger vessels like cruise ships will affect the animals more, but Blundell and Pendleton (2015) found that it was the number of vessels around the animals that impacted them more. However, the literature by Hoyt and Parsons (2014) states that with bigger vessels comes louder noises that can disturb the animals more.

The impact of vessels will also differentiate on whether the vessels are motorized or not (Hoyt & Parsons, 2014). As Martin-Montalvo et al. (2021) found vessel noises can trigger avoidance reactions already before arrival. However, Blundell & Pendleton (2015) and Ruiz-Mar et al. (2022) found that non-motorized vessels like kayaks disturbed more as they were able to get closer to the animals. Although the research shows how the different vessels impact the animals it is important to note that it is the amount of vessels that has the biggest effect on marine mammals (Blundell & Pendleton, 2015; Cowling et al., 2014; Dans et al., 2017; Fiori et al., 2019; Martin-Montalvo et al., 2021; Mpougas et al., 2019; Pérez-Jorge et al., 2017; Ruiz-Mar et al., 2022; Seely et al., 2017; Stack et al., 2021; Tyne et al., 2015; Wu et al., 2020)

5.2 Short- and long-term effects

5.2.1 Short term effects

As a consequence of marine tourism, there are some long- and short-term effects on the animals. Whales respond in altering their swimming speed and path, use less time on the surface and less time resting (Fiori et al., 2019; Seely et al., 2017; Stack et al., 2021). They also change their social interactions, feeding and breeding behavior as well as their avoidance rate (Fiori et al., 2019; Seely et al., 2017). By comparing the behavior alterations, dolphins show some of the same short-term effects like whales in the way that they use less time socializing and traveling, as well as their diving time increase (Martin-Montalvo et al., 2021; Tyne et al., 2015). In our literature Trave et al. (2017) found that high vessel and human activity altered the marine mammal's behavior and caused stress. This findings are in accordance with Tyne et al. (2015) research where the dolphins were unable to recover from energetic and cognitive energy expenditure due to tourist activities.

Pinnipeds also show avoidance behavior by decreasing their haul-out probability, and increase their energy expenditure due to tourist, but on the other hand they seem to not react as strongly as the species are more curious (Blundell & Pendleton, 2015; Dans et al., 2017; Gales et al., 2003; Mpougas et al., 2019; Ruiz-Mar et al., 2022).

5.2.2 Long-term effects

There are almost no studies discussing the long-term effects on the marine mammals, however, Fiori et al. (2019) found that mother-calf pairs increase their swimming speed and reduce their resting time due to tourism, and this leads to a noticeable decline in the calves growth rate. Wu et al. (2020) also found that in the high seasons of tourism, dolphins in Shanniang Bay change their habitat and distribution use patterns due to an increasing level of vessels/dolphin tours. Further Ruiz-Mar et al. (2022) discusses that an increase of stress hormones can cause infertility, loss of weight and muscles, immunosuppression, stop growth, injure the nervous system, and provoke deterioration in cognitive function. Which for the worse can impact their reproduction (Ruiz-Mar et al., 2022).

5.3 Management implications

When operating in an industry involving another being it is important to manage the visitors to minimize the negative impacts on the animals (Mason, 2005). Machernis et al. (2018) refers to the importance of controlling these interactions between vessels/swimmers and marine mammals through management strategies. A soft management strategy is presented in study 1, were Stack et al. (2021) recommends implementing codes of conduct, which is supported by Dans et al. (2017), Pérez-Jorge et al. (2017) and Wu et al. (2020). Seely et al. (2017) underlines the importance of educating tour operators and tourists. Tilden´s (1997, referred in Kuo, 2002) theory where he acknowledges that interpretation is finding meaning based on information presented to us helps understand the importance of education, which is

supported in Mason´s (2005) literature by arguing for the possibilities to influence and change their thinking and behavior by becoming more mindful and aware of what they are a part of. The studies by Martin-Montalvo et al. (2021), Mpougas et al. (2019), Ruiz-Mar et al. (2022) and Pérez-Jorge et al. (2017) also support this strategy. The studies by Dans et al. (2017) and Mpougas et al. (2019), notes that implementing guidelines can promote safety for both the animal and humans. Mason (2005) argues that when implementing codes of conducts and guidelines, the tour operators and tourists develop conservation ethics that they then can apply to other areas as well. But it is noteworthy that these soft approaches may take longer to implement than hard approaches.

Although often soft management strategies are not enough on its own, Stack et al. (2021) supports implementing hard management strategies as well to ensure safety and minimize impact on the animals. Implementations like managing the vessel traffic is supported by Fiori et al. (2019), Martin-Montalvo et al. (2021), Mpougas et al. (2019), Seely et al. (2017) and Tyne et al. (2015). Managing visiting times can also be important as some animal species have resting periods and disturbances can impact these (Dans et al., 2017; Martin-Montalvo et al., 2021; Seely et al., 2017). In the studies by Blundell and Pendleton (2015), Fiori et al. (2019) and Ruiz-Mar et al. (2022) they acknowledge the importance of distance regulations as keeping a distance will not affect the animals as significantly. Study 12 by Seely et al. (2017) also suggests implementing different zones. This can be used as a tool to help manage the vessel traffic and is also supported by Kuo (2002). Machernis et al. (2018) also support these hard approaches to management strategies to ensure a more sustainable tourism industry.

Most countries that practice whale-watching still prohibit the practice of swim-with whales activities and the scientific community has urged a more careful management of commercial tourism operators (Fiori et al., 2019). However, they also discuss in study 5 by Fiori et al. (2019) how the tourism industry and swim-with activities are promoted, and the government allows such marketing. In Tonga the whale-based tourism has a major economic impact on the nation (Fiori et al., 2019) this may be the reason for allowing these activities. It is important to educate and collaborate with all the stakeholder involved to ensure the industry is managed as sustainable and ethical as possible. Supporting this is study 8 by Ruiz-Mar et al. (2022) that acknowledges the importance of collaborating with local, regional, and national authorities, local citizens, and other stakeholders. Page and Connell (2020) argue if tourism and wildlife preservation can coexist for collective benefit as this industry is mainly motivated by the financial benefits rather than the animal's welfare.

5.4 Source evaluation

Source evaluation is important when doing a literature review as it helps evaluate credibility and accuracy of studies. It gives a better understanding on complex topics and helps determent if the information is relevant for the intended use (Johannessen et al., 2016, p.101).

Only peer-reviewed studies were included as these have to be quality checked, often anonymously, by experts in the field before they are published. Often, they go through multiple rounds of peer review before publishing (Utdanningsforskning, n.d). Orams, Kirkwood and Machernis are three authors that are involved in more than one study. These authors are established in the tourism industry research and therefore we can have a high confidence in these studies. All studies include additional relevant sources to support their findings which adds to the reliability of their research.

Although the studies were published in the 10-year time frame, five of the 13 studies were executed before this criteria. This is noteworthy as the growth of the tourism industry over the last 20 years has been significant, and therefore might have a different and more considerable impact on the marine mammals than discovered at that time.

During these decades, the development of research technology has also improved. This is worth mentioning as most of these studies document their observations through cameras and telescopes, which are equipment that has been improved. As a result, the accuracy of the earlier studies' results may have been impacted by the quality of the equipment used.

Three of the studies were researched during a time frame of one year or less, and nine studies were researched over multiple years, which we consider more credible as they provided a more extensive range of results. One study (10) did not disclose when their research was executed, which questions the reliability of the study as there is no knowledge of factors that can impact the execution of the research, such as high and low tourist season.

6.0 Conclusion

Throughout our literature review on how marine tourism impacts whales, seals, sea lions and dolphins we found that marine mammals are impacted in various ways. The main short-term impacts were stress and avoidance caused by high vessel traffic around the animals. With the continued pressure of tourism, it can cause long-term damage like change in habitat and population. With these behavior alterations it is important to implement management strategies to ensure tourism can continue and be as sustainable as possible. The most efficient strategy is shown to be soft management strategies combined with regulations.

Spreading awareness is important and with today's social media, we can reach so many people that can contribute to changing this industry for the better. With social media, it is also easier to reach the right stakeholder that can help with this change, but it is also important to note that face-to-face education can provide a deeper interpretation. Through today's generation becoming more focused on sustainability, morality, and ethics through knowledge we have gained throughout the years, animal rights have become an important topic. Therefore, exposing and educating the industry can build a future emphasizing sustainable tourism.

With each study comes limitations and whilst reading though the studies in this literature review, unfamiliar terminology like "Cetaceans" and "Pinnipeds" were encountered. These could have been utilized as keywords in our research prosses to give us a more precises outcome.

The behavioral impacts of tourism on dolphins due to food provisioning cannot be determined in this thesis as there is only one study on this subject. This also applies for the research on sea lions as also here we have only one study selected. These studies should have been excluded in the exclusion prosses as narrowing down the different activates could provide a

deeper understanding of their reactions to human presence. Additionally give us a deeper insight into the underlying factors contributing to the animal's behavior alteration.

Further research and studies should look more into long-term impacts, the effectiveness of different management strategies, and how this contributes to a sustainable industry. We also see this thesis as an opportunity to learn more about this field and use our knowledge to spread awareness about how marine mammals' behavioral responses is affected by the growing industry, and highlight how important it is to implement management strategies to protect marine mammals.

Bibliography

Blundell, G. M., & Pendleton, G. W. (2015). Factors Affecting Haul-Out Behavior of Harbor

    Seals (Phoca vitulina) in Tidewater Glacier Inlets in Alaska: Can Tourism Vessels and

    Seals Coexist? *PLoS One*, *10*(5), e0125486.

    https://doi.org/10.1371/journal.pone.0125486

Cowling, M., Kirkwood, R., Boren, L. J., & Scarpaci, C. (2014). The effects of seal-swim

    activities on the New Zealand fur seal (Arctophoca australis forsteri) in the Bay of

    Plenty, New Zealand, and recommendations for a sustainable tourism industry.

    Marine Policy, *45*, 39–44. https://doi.org/10.1016/j.marpol.2013.11.010

Dans, S. L., Crespo, E. A., & Coscarella, M. A. (2017). Wildlife tourism: Underwater

    behavioral responses of South American sea lions to swimmers. *Applied Animal*

    Behaviour Science, *188*, 91–96. https://doi.org/10.1016/j.applanim.2016.12.010

Dou, X., & Day, J. (2020). Human-wildlife interactions for tourism: A systematic review.

    Journal of Hospitality and Tourism Insights, *3*(5), 529–547.

    https://doi.org/10.1108/JHTI-01-2020-0007

Duffus, D. A., & Dearden, P. (2003). Non-consumptive wildlife-oriented recreation: A

    conseptual framework. *Department of Geography University of Victoria*, *53*(3), 213–

    231.

Fiori, L., Martinez, E., Orams, M. B., & Bollard, B. (2019). Effects of whale-based tourism in

    Vava'u, Kingdom of Tonga: Behavioural responses of humpback whales to vessel and

    swimming tourism activities, *14*(7), e0219364.

    https://doi.org/10.1371/journal.pone.0219364

Gales, N., Hindell, M., & Kirkwood, R. (Eds.). (2003). *Marine Mammales Fisheries, Tourism and Management Issues*. CSIRO.

Higginbottom, K. (2004). *Wildlife Tourism: A strategic destination analysis*. ResearchGate. https://www.researchgate.net/profile/Noel-Scott-4/publication/40871766_Wildlife_Tourism_a_strategic_destination_analysis/links/54f6a1c20cf27d8ed71e448e/Wildlife-Tourism-a-strategic-destination-analysis.pdf

Higham, J., & Luck, M. (2007). *Marine Wildlife and Tourism Management: Insights from the Natural and Social Sciences*. CABI.

Hoyt, E. (2011). *Marine Protected Areas for Whales, Dolphins and Porpoises* (2nd ed.). Taylor & Francis Group.

Hoyt, E., & Hvenegaard, G. T. (2002). A Review of Whale-Watching and Whaling with Applications for the Caribbean. *Taylor & Francis*, *30*, 381–399. https://doi.org/10.1080/089207502900273

Hoyt, E., & Parsons, E. C. M. (2014). *The whale-watching industry: Historical development* (J. Higham, L. Bejder, & R. Williams, Eds.; 1st ed.). Cambridge University Press. https://doi.org/10.1017/CBO9781139018166.006

International whaling commission. (n.d). *The benefits and impacts of whale watching*. Whale Watching Handbook. Retrieved April 25, 2023, from https://wwhandbook.iwc.int/en/responsible-management/benefits-and-impacts-of-whale-watching

Johannessen, A., Christoffersen, L., & Tufte, P. A. (2016). *Introduksjon til samfunnsvitenskapelig metode* (5. utg.). Abstrakt.

Just One Ocean. (n.d). *Just One Ocean – Committed to saving the ocean for future generations*. Retrieved April 26, 2023, from https://justoneocean.org/

Kuo, I.-L. (2002). The effectiveness of environmental interpretation at resource-Sensitive tourism destinations. *International Journal of Tourism Research*, *4*(2), 87–101. https://doi.org/10.1002/jtr.362

Lovelock, B., & Lovelock, K. M. (2013). *The Ethics of Tourism*. Routledge.

Machernis, A. F., Powell, J. R., Engleby, L., & Spradlin, T. R. (2018). An updated literature review examining the impacts of tourism on marine mammals over the last fifteen years (2000-2015) to inform research and management programs. *NOAA Technical Memorandum.* https://doi.org/10.7289/V5/TM-NMFS-SER-7

Marine mammals management toolkit. (n.d). *Whale and dolphin watching – OCEAN GOVERNANCE MARINE MAMMALS*. Retrieved April 26, 2023, from https://marine-mammals.info/whale-and-dolphin-watching/

Martin-Montalvo, B. Q., Hoarau, L., Deffes, O., Delaspre, S., Delfour, F., & Landes, A.-E. (2021). Dolphin Watching and Compliance to Guidelines Affect Spinner Dolphins' (Stenella longirostris) Behaviour in Reunion Island. *Animals (Basel)*, *11*(9), 2674-. https://doi.org/10.3390/ani11092674

Mason, P. (2005). Visitor Management in Protected Areas: From 'Hard' to 'Soft' Approaches? *Routledge*, *8*(2–3), 181–194. https://doi.org/10.1080/13683500508668213

Mpougas, E., Waggitt, J. J., Dendrinos, P., Adamantopoulou, S., & Karamanlidis, A. A. (2019). Mediterranean Monk Seal (Monachus monachus) Behavior at Sea and Interactions with Boat Traffic: Implications for the Conservation of the Species in

Greece. *Aquatic Mammals*, *45*(4), 419–424.

https://doi.org/10.1578/AM.45.4.2019.419

National Geographic Society. (n.d). *Ocean*. National Geographic. Retrieved April 26, 2023,

from https://education.nationalgeographic.org/resource/ocean

Ocean Panel. (n.d). *Sustainable Coastal & Marine Tourism Archives*. Retrieved April 26,

2023, from https://oceanpanel.org/opportunity/sustainable-coastal-marine-tourism/

Olafsdottir, G. (2013). On nature-based tourism. *Tourist Studies*, *13*, 127–138.

https://doi.org/10.1177/1468797613490370

Orams, M. (2002). *Marine Tourism: Development, impacts and management*. Taylor &

Francis.

Page, S. J., & Connell, J. (2020). *Tourism a mothern synthesis* (5th ed.). Routledge.

Pérez-Jorge, S., Louzao, M., Oro, D., Pereira, T., Corne, C., Wijtten, Z., Gomes, I., Wambua,

J., & Christiansen, F. (2017). Estimating the cumulative effects of the nature-based

tourism in a coastal dolphin population from southern Kenya. *Deep Sea Research Part

II: Topical Studies in Oceanography*, *140*, 278–289.

https://doi.org/10.1016/j.dsr2.2016.08.011

Pinto de Sá Alves, L. C., Andriolo, A., Orams, M. B., & de Freitas Azevedo, A. (2013).

Resource defence and dominance hierarchy in the boto (Inia geoffrensis) during a

provisioning program. *Acta Ethologica*, *16*(1), 9–19. https://doi.org/10.1007/s10211-

012-0132-2

Rodger, K., Smith, A., Newsome, D., & Moore, S. A. (2011). Developing and testing an

assessment framework to guide the sustainability of the marine wildlife tourism

industry. *Routledge*, *10*(2), 149–164. https://doi.org/10.1080/14724049.2011.571692

Ruiz-Mar, M. G., Heckel, G., Solana-Arellano, E., Schramm, Y., García-Aguilar, M. C., &
    Arteaga, M. C. (2022). Human activities disturb haul out and nursing behavior of
    Pacific harbor seals at Punta Banda Estuary, Mexico. *PloS One*, *17*(7), e0270129–
    e0270129. https://doi.org/10.1371/journal.pone.0270129

Seely, E., Osborne, R. W., Koski, K., & Larson, S. (2017). Soundwatch: Eighteen years of
    monitoring whale watch vessel activities in the Salish Sea. *PloS One*, *12*(12),
    e0189764–e0189764. https://doi.org/10.1371/journal.pone.0189764

Stack, S. H., Sprogis, K. R., Olson, G. L., Sullivan, F. A., Machernis, A. F., & Currie, J. J.
    (2021). The Behavioural Impacts of Commercial Swimming With Whale Tours on
    Humpback Whales (Megaptera novaeangliae) in Hervey Bay, Australia. *Frontiers in
    Marine Science*, *8*. https://www.frontiersin.org/articles/10.3389/fmars.2021.696136

Tannir, L. (n.d.). An ethical endeavour: The technological advances of Norway's whale
    watching industry. *Oceanographic*. Retrieved April 28, 2023, from
    https://oceanographicmagazine.com/features/whale-watching-tromso/

The Marine Mammal Center. (n.d). *Learn About Marine Mammals | The Marine Mammal
    Center*. Retrieved April 28, 2023, from https://www.marinemammalcenter.org/animal-
    care/learn-about-marine-mammals

Trave, C., Brunnschweiler, J., Sheaves, M., Diedrich, A., & Barnett, A. (2017). Are we killing
    them with kindness? Evaluation of sustainable marine wildlife tourism. *Biological
    Conservation*, *209*, 211–222. https://doi.org/10.1016/j.biocon.2017.02.020

Tyne, J. A., Johnston, D. W., Rankin, R., Loneragan, N. R., & Bejder, L. (2015). The
    importance of spinner dolphin (Stenella longirostris) resting habitat: Implications for
    management. *Journal of Applied Ecology*, *52*(3), 621–630.

UNWTO. (n.d). *Why Wildlife? | UNWTO*. Retrieved April 28, 2023, from

https://www.unwto.org/asia/unwto-chimelong-why-wildlife

Utdanningsforskning. (n.d). *Hva er en fagfellevurdert artikkel?*. Retrieved April 26, 2023,

from https://utdanningsforskning.no/artikler/2016/hva-er-fagfellevurdert-artikkel/

Wu, H., Peng, C., Huang, H., Jefferson, T. A., Huang, S.-L., Chen, M., Zeng, Q., Yu, X.,

Wang, X., & Xu, Y. (2020). Dolphin-watching tourism and indo-Pacific humpback

dolphins (Sousa chinensis) in Sanniang Bay, China: Impacts and solutions. *European*

Journal of Wildlife Research, *66*(1), 17. https://doi.org/10.1007/s10344-019-1355-6