



# “Picking our Oysters” and “Swimming with our Whales”: How innovative tourism practices may engender sustainable development

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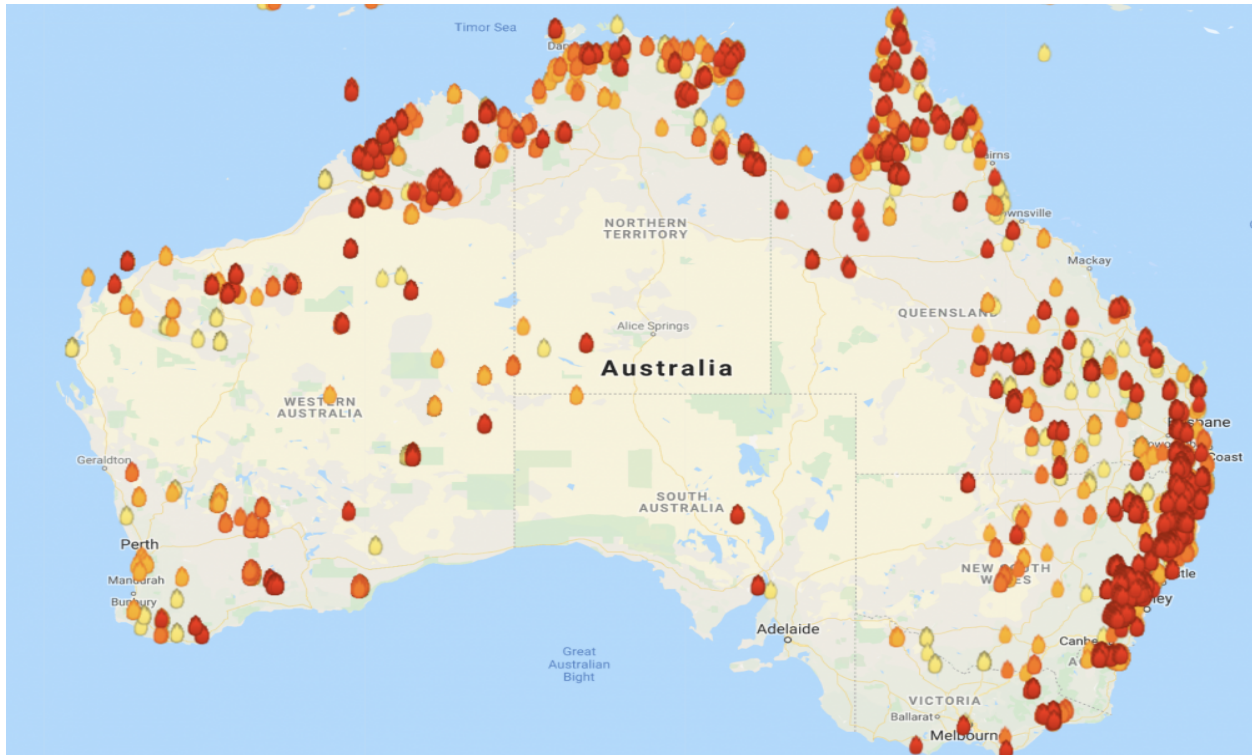
## ABSTRACT

In an unfolding scenario of environmental gloom and doom where humans have become the key disruptors and exploiters of nature, our article presents an optimistic and hopeful approach to how humans may interact with nature on nature’s premises—with reverence. To illustrate this communicative praxis, we carry out cross-case analyses of two real-life scenarios that we label “picking our oysters” and “swimming with our whales,” revealing how human beings interacting with others and nature through locally situated tourism interventions can spark cascading interactional effects into yet newer and expanding communities of caring for nature. When such happens, we contend that it represents the kind of sustainable development that the world badly needs, especially in the present perilous times. We contend that the insights emerging from our cross-case analyses have wide-ranging implications for both scholars and practitioners of tourism and communication—that is, collaborative local interactions, actions, and interventions can cascade into emergent and resilient sustainable development practices.

Keywords: ***tourism, innovation, sustainability, sustainable development, complex adaptive systems***

## INTRODUCTION

For seven months between June 2019 and February 2020, Australia burned with ferocious, widely dispersed, and unprecedented bushfires (Figure 1). The fires burned more than 46 million acres (72,000 square miles) of land, including 80–85% of the Blue Mountains World Heritage area in New South Wales and 53% of the Gondwana World Heritage Rainforests in Queensland (Yeung, 2020).<sup>1</sup> More than a billion animals were killed by the fires, including millions of livestock, a third of the Australia’s koala population, and hundreds of thousands of fish because of fire ash and sludge finding its way into the river systems (Asmelash, 2020).



Source: MyFireWatch (<https://disasterphilanthropy.org/disaster/2019-australian-wildfires/>)

**Figure 1.** Unprecedented bushfires in Australia (2019-20)

What is alarming is that environmental calamities such as the Australian bushfires are a consequence of human-induced impacts on our natural ecosystems, and much of the damage is irreversible. Rising temperatures and sea levels, rising mass of litter and microplastics in oceans, and rising losses in nature’s biodiversity puts our planet in peril and threatens our well-being and existence. It affects the migratory journeys of tens of millions of birds such as the common eider or herring gull, fish such as the spotted whale shark, and sea turtles such as the leatherback and hawksbill. The populations of many of these species have declined radically making them critically endangered.

Amidst this scenario of gloom and doom where humans have become the key disruptors and exploiters of nature, our purpose in this article is to present a more optimistic and hopeful approach to how humans may interact with nature on nature’s premises—with reverence. We carry out cross-case analyses of two real-life scenarios that we label “picking our oysters” and

“swimming with our whales,” revealing how human beings interacting with others and nature through locally situated tourism interventions can spark cascading interactional effects into yet newer and expanding communities of care. When such happens, we contend that it represents the kind of sustainable development that the world badly needs, especially in what represent perilous times.

“Picking our oysters” details the oyster safaris in the World Heritage Wadden Sea National Park, Denmark—an internationally protected ecosystem of Outstanding Universal Value. We argue that it represents an innovative case of sustainable development in the tourism arena in that the National Park has established an inclusive and creative approach to facilitate sustainable development through collaborative partnerships, enabling local stewards to host oyster safaris that allow tourists, both international and national, under their guidance and tutelage, to harvest invasive Pacific oysters. The practice of oyster safaris contributes to nature conservation and enhancement; provides sustenance to millions of migratory birds from around the world; increases nature appreciation and awareness about the rich local biodiversity; fuels culinary experimentation with a sought-after delicacy; and contributes handsomely to local livelihoods. “Swimming with our whales” details another innovative set of tourism practices that improve conservation for the threatened spotted whale sharks. A diverse set of actors from across the world come together to enable spotted whale shark identification using photos taken by tourists swimming with the sharks. Tourists upload their own photos from their encounters with whale sharks to a website ([www.whaleshark.org](http://www.whaleshark.org)). The system uses NASA star mapping technology to map whale shark skin spot patterns providing information about their sex, age, and migratory patterns. This information provides a greater understanding of whale shark ecology and behaviour, contributing to improved conservation and sustainable whale shark tourism operations. From our cross-case analyses of the two complex stories of real-life tourism situations as they unfold in practice—over temporal and spatial dimensions—we contend that collaborative local actions and interventions may engender sustainable development and resilient actions.

### *Sustainable tourism development and complex adaptive systems*

The gloom and doom illustrated by the Australian bushfires brings into sharper focus the exploitative nature of the human relationship with nature—expressed in excessive exploitation of our land and marine resources, degradation of biosphere, and natural ecosystems. This realization of humans as the biggest “predators” and “disruptors” has—in recent decades—brought to the fore a rising discourse on sustainable development (commonly couched as “sustainability”), a process to “improve and sustain human well-being indefinitely without impairing the life support systems on which it depends” (Farrell & Twining-Ward, 2004, p. 275).

The discourse on sustainability has evolved from it being focused on mere conservation efforts (some decades ago) to a much broader socio-political movement, focusing on the simultaneous well-being of nature and humans, including a rising reverence for the complex interactional elements between humans-and-nature and humans-and-humans. As one would expect, the discourse of sustainability has increasingly found its way into tourism practices, with increasing attention paid to the values of stakeholder collaboration, resource management, and people’s participation in what is called sustainable tourism development (Butler, 1999).

Influential scholars of sustainable tourism development like Miller and Twining-Ward (2005) and Farrell and Twining-Ward (2004) argue that “sustainability must be conceived as a transition, journey or path, rather than an end point or an achievable goal” (p. 275). They contend that tourism scholars and practitioners should better understand “the links between human and

natural systems and knowledge of non-linear methods" (p. 275) as they are fundamental to grasping the intricacies of "whole comprehensive tourism systems" (p. 276). They emphasise that tourism systems are characterised by complex adaptive properties and emergent relationships "with interdependent and integrated parts displaying unpredictable behaviour [that is] constantly evolving" (p. 276) and are not amenable to reductionist linear deterministic cause-effect science, which otherwise has dominated tourism studies.

Inspired by the above writings, in this article we conceptualise tourism through the lens of complex adaptive systems (CAS). By definition, complex adaptive systems cannot be understood as the sum of the constitutive parts but instead are characterised by continuous flow of non-linear relationships and unpredictable changes, events and outcomes. We contend that a perspective of complex adaptive systems helps in addressing the shortcomings of contemporary approaches to sustainable tourism development in at least three ways:

First, complex adaptive systems challenge dominant management orientations to tourism. For instance, the much-cited tourism area life cycle model (Butler, 1980) presents a view on the evolution of tourism in specific areas and destinations. The model illustrates a predictable logic of tourism development through a series of sequential phases—exploration, involvement, development, consolidation, stagnation, possibilities for rejuvenation and in turn decline. Based on the concept of carrying capacity, tourism managers can efficiently plan and intervene in order to avoid reaching the stage of tourism decline. The problem with this approach is that tourism does not operate in a vacuum—its temporal and spatial dimensions are greatly influenced by what may be non-local events e.g. the outbreak of SARS or the 9/11 attack on the United States of America. The orientation that development of tourism can be easily controlled and predicted as a cause-effect phenomenon tends to reduce, simplify and overtly rationalise the complexities and uncertainties of tourism.

Second, as noted previously, complex adaptive systems implicate sustainable tourism development as not being an achievable end but always in a process of transition or coming into being. This orientation challenges the core belief that it is possible over time to positively achieve and maintain a balance of sociocultural, economic, and environmental capacities. This orientation fails to account for the dynamic nature and unpredictable aspects of tourism (Liburd, 2018). Moreover, such 'balanced' forms of development—whether labelled "sustainable," "alternative," or "eco"—"allow us to conserve the natural environment while simultaneously permitting it to be exploited so as to ensure economic growth" (Hall, 1998, p. 23). In doing so, sustainability becomes a pursued "add-on" for tourism growth.

Third, following the view of complex adaptive systems, tourism is dynamically shaped and emerge as a series of relations and interconnections between the human and non-human, who are constantly adapting and learning. Accordingly, CAS advocates for interdisciplinary, stakeholder-driven and more inclusive communication and interactional approaches to tourism based on participation, collective learning, and an emphasis on values. McDonald (2009) emphasises that sustainable tourism development is an open-ended endeavour where no one resolution applies, and the human and social dimensions of values by which tourism is shaped serve as critical factors for sustainable development. Values may be considered as priorities, compasses or springboards that guide and frame action according to what is sought and what is to be avoided (Oyserman, 2001, p. 16150). Liburd and Becken (2017) contend that sustainable tourism development is continuously and dynamically shaped through human stewardship, values, and alliances. Tourism stewards care beyond their individual motivations enacting out their roles and responsibilities to care for nature.

We draw upon the perspective of complex adaptive systems to interrogate how sustainable tourism development is essentially a dynamic, interactive, communicative, and emergent process between nature, humans, and other actors.

### *Our methods: Iterative dialogue, cross-case analyses, and embodied experiences*

The idea for this article began with a chance conversation among us in Lillehammer, Norway in May 2018. Discovering that we shared interests in sustainable development practices and complex adaptive systems, we looked for an existing case study that incorporated the principles of sustainable tourism development. Subsequently, in some rapid-fire email exchanges, we identified the Ecocean case authored by Hughes (2013). The case illustrates tourists being able to swim with the spotted whale sharks and being able to upload their photos to track them. Later we also discussed our own embodied experiences such as picking and harvesting invasive oysters in the Danish Wadden Sea, followed by a session to cook and consume the fresh delicacies. When we met subsequently in Norway in November 2018 (some six months later), we had a spirited four-hour dialogue about these two cases and talked about several other cases (discussed later in Table 1). As our dialogue unfolded, we zoomed in on the swimming with whales and picking oysters cases, noting various commonalities and important differences, including how they represented uniquely embodied and experiential tourism practices where humans were with nature in as much in nature, and “acted their way” into a heightened awareness and appreciation of local biodiversity while contributing to sustainable development.

Noting that we could not grow oysters in a hot tub, nor could we keep whale sharks in a swimming pool, and that these were more than just citizen science projects or best practice examples, we felt compelled to inquire and delve deeper into what was going on here. We sensed we were on to something, just not sure what exactly. Our conversations continued into the next year--across the oceans and in person (we met twice in Norway in 2019), allowing us to delve even deeper into these two cases from the perspective of complex adaptive systems (Farrell & Twining-Hard, 2004), going beyond reductionism, appreciating the integration of human and natural systems, paying attention to interactional elements between the various actors, and understanding and learning about the art and science of sustainability by honouring a multiplicity of emergent perspectives and values (Schwandt & Gates, 2018; Xin, Tribe, & Chambers, 2013). We realized that our process of inquiry—in departing from understanding staged and performative tourist experiences of whales in captivity (as in the SeaWorld in San Diego, California) and privileging swimming with the whales in their natural habitat—is a thick expression of our values.

Various empirical materials served as primary sources for our ongoing inquiry (Hansen, 2014, p. 34). These included a combination of embodied fieldwork (the oyster safari) and archival research. Further, a series of curious and explorative investigations were engaged—reading journal and trade articles, watching YouTube videos of whale sharks, and learning about the socio-ecology of oysters and oyster shells. We also mined our troves of pictures and memories and fired our imagination with iterative conversations. Moreover, to better interrogate our primary cases within the wider societal understanding of collaborative ways of engaging civil society and tourists for sustainable development, we delved deeper into three other examples--the Great British Butterfly Hunt, the Norwegian ‘Keep the Inland Clean’ initiative, and the Sea Turtle Spotters project (Table 1).

**Table 1.** Notable examples of engaging civil society and tourists for sustainable development

Sustainable Initiatives	Description
<p><b>The Great British Butterfly Hunt (United Kingdom)</b></p> <p><b>Source:</b> <i>www.independent.co.uk/environment/nature/uk-butterflies/join-the-great-british-butterfly-hunt-1665114.html</i></p>	<p>In 2009, <i>The Independent</i>, a reputed British newspaper launched The Great British Butterfly Hunt (GBBH), inviting citizens to spot—whether in their gardens, neighbourhood parks, or the countryside—the 58 species of butterflies of which 56 are native and two continental migrators. GBBH came in the wake of two unusually wet summers (2007 and 2008) that sent butterfly populations plunging, including the lowest numbers ever recorded for 12 (out of the 58) species. GBBH was launched by providing a full-colour butterfly wall chart to newspaper readers, followed by regular guidance on how to identify butterflies such as the scarlet-and-black red admiral or the elusive brown hairstreak. The project got locals, visitors, children, adults, and elders involved in the hunt, raising awareness, appreciation, and pride in nationally prized butterflies. Competitions and prizes for those who recorded the sightings of most butterfly species added passion and fervour. GBBH illustrates the wide range of creative possibilities that exist to invite, include, and engage a citizenry in leisure, learning, and conservation efforts.</p>
<p><b>Beach Clean-Up: without a Beach (Norway)</b></p> <p><b>Source:</b> <i>www.holdnorderen.no/strandryddeuka/ and authors' correspondence with the local heads of partners</i></p>	<p>The Norwegian Beach Clean-up initiative is an annual spring event. Groups of locals across Norway's 103,000-kilometre-long coastline voluntarily organise to remove trash and carry out various actions to safeguard marine and coastal areas. Interestingly, in inland locations where no beach exists, creative citizen-led clean-up initiatives have emerged by lakes, streams, and waterfalls. For example, in 2018, in the Inland Region of Norway, local businesses, municipalities, and community-based organisations partnered in implementing the 'Keep the Inland Clean' Campaign. More than 2,000 volunteers—including residents and visitors—picked up 10 tons of litter, garbage and waste just in the northern part Lake Mjøsa—the largest Norwegian freshwater lake—and some of its tributaries. In 2019, over 100 institutional partners and 4,000 volunteers came together and expanded the clean-up area to other regional water bodies (e.g., Randsfjord and parts of Gudbrandsdalen), clearing 20 tons of waste. Through these annual Spring events, new citizen networks have been established, and awareness raised about the role of citizens and visitors to responsibly preserve local marine ecosystems. This initiative illustrates how an established national initiative can be creatively appropriated to a local context by engaging and uniting people around a common purpose.</p>
<p><b>Sea Turtle Spotters</b></p> <p><b>Source:</b> <i>www.upwell.org/sea-turtle-spotter</i></p>	<p>The Upwell Sea Turtle Spotter Project collaboratively engages seafarers to foster thriving and healthy populations of sea turtles, notably the endangered leatherback and hawksbill species. Most conservation efforts have focused on sea turtles' nesting beaches, and little is known about how turtles use their ocean environments—the place where they spend most of their lives and face the greatest threats to their existence. For instance, the population of the West Pacific leatherback—the largest sea turtle, the deepest diver, with a lifespan of 100+ years and one who completes a 7,000-mile migratory journey each year, has declined in recent decades by over 80%. Similarly, the hawksbill sea turtle, with their exquisite shell pattern, featuring radiant streaks of orange and red, is critically endangered worldwide. In response, Upwell developed innovative tools and outreach programmes to enlist sailors, skippers, and tourists on boats and cruisers to aide with observations and data points through a smartphone app and/or a website. Spotting a turtle in a time-space dimension allows Upwell to better understand changes in turtle populations, migratory movements, foraging locations, and habitat areas. The turtle spotting project illustrates how thousands of travelling seafaring eyes can be leveraged to foster awareness, care, and collaboration to save, preserve, and enhance the underwater species and the oceans.</p>

Our strategy of interpretation revolves around rigorous cross-case analyses. We believe that our two case studies (“picking our oysters” and “swimming with our whales”) appropriately serve as a focal point for zooming in on real-life situations in a rich, in-depth, and nuanced manner to examine a context-specific phenomenon as it unfolds in practice over temporal and spatial dimensions (Flyvbjerg, 2006; Jennings, 2010; Ridder, 2017). Our two cases are outcomes of several rounds of iterative dialoguing, distilling, nuancing, granulating and co-writing. Through these processes, our cases have become complex stories of tourism situations where collective local actions and interventions enhance resilient actions and mitigate degradation of nature. Our cases are not mere innovative sustainable business models that charge tourists to go on a safari and pick oysters, or innovative citizen science projects that ask tourists to contribute photos of the spotted whale sharks. They are about improving and sustaining “human wellbeing indefinitely without impairing the life support systems on which it depends” (Farrell & Twining-Hard, 2004, p. 275). It is from these cross-case analyses, that we have developed a shared framework of inquiry to map the emergent processes of sustainable tourism development.

### *Case #1: Picking our oysters in the Wadden sea*

Why embark on an oyster safari in the Danish Wadden Sea? A nature guide explained: “Those nasty oysters cut off access to the common mussels in the Wadden Sea, so when the seabirds migrate across the Baltic Sea, they arrive here starving, skinny and exhausted.” Interestingly, this nature guide works some 450 kilometers east of the Wadden Sea—a sobering fact about the spatial impact—across very long-distances—of the invasive oysters.

The Wadden Sea, designated as a UNESCO World Natural Heritage based on its Outstanding Universal Value, stretches from the Netherlands through Germany to Denmark (UNESCO, 2020). Rich biodiversity is abundant here as tidal waters continuously drain and expose the mudflats, creating favourable conditions for worms, snails, mussels, and crustaceans to thrive. This rich biodiversity makes the Wadden Sea an important point of convergence for 12 million migratory seabirds whose life depend on the area for rest, moulting (i.e. shedding feathers), and forage. Figure 2 visualises the East Atlantic Flyway within which the Wadden Sea (represented by the blue dot in the middle of the circle) serves as a life crucial nexus for migratory birds from around the world.

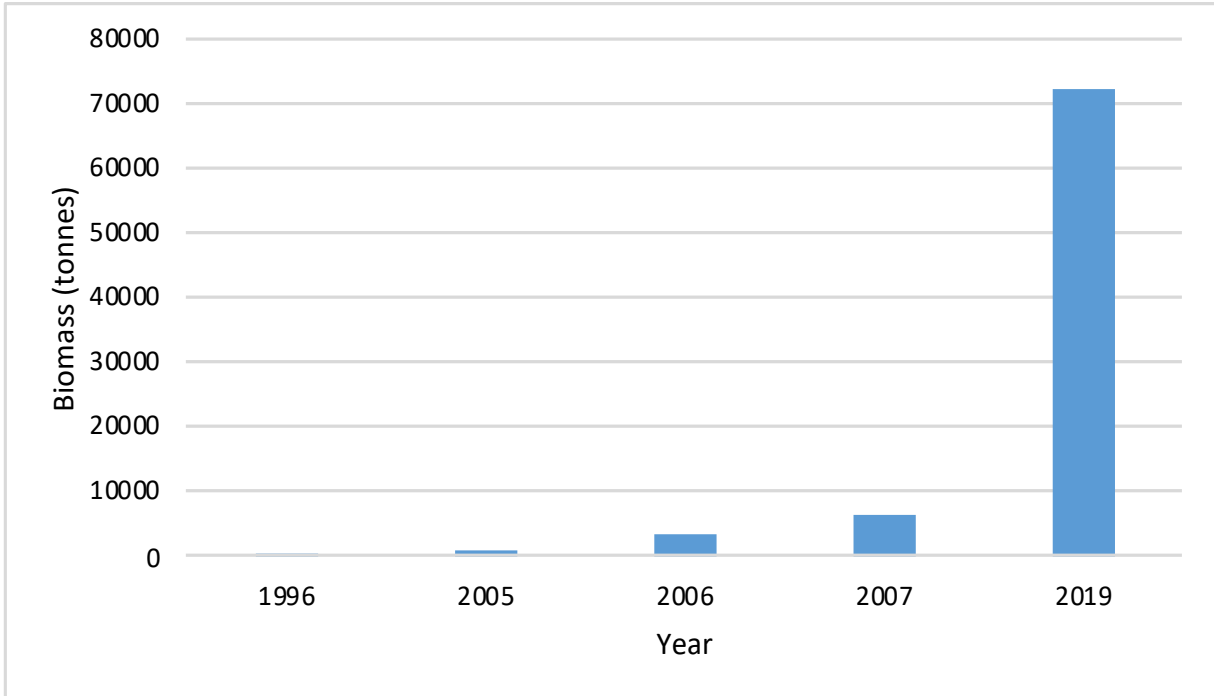


Source: Van Roomen et al. (2017)

**Figure 2.** The Wadden Sea: Where bird migration routes converge<sup>2</sup>

Unknown to the birds, in the 1980s, the Japanese Pacific oyster (*Crassostrea gigas*) was released on a German barrier island in the Wadden Sea as part of a managed agricultural experiment. Over time, its larvae (that spread in tempered water) travelled from the German mudflats to the Danish side, aided by the sun warming the exposed mudflats during low tides (Svendsen & Jensen, 2012). Figure 3 shows the rapid rise of the Pacific oyster invasion in the Danish Wadden Sea. The first invasive oysters were noticed here in 1996, followed by the detection of a strong spatfall—the attachment of young oysters to the sea’s base substrate—in 2004, and then a rapid hockey stick rise to an oyster biomass of 72,000 tons by 2019.

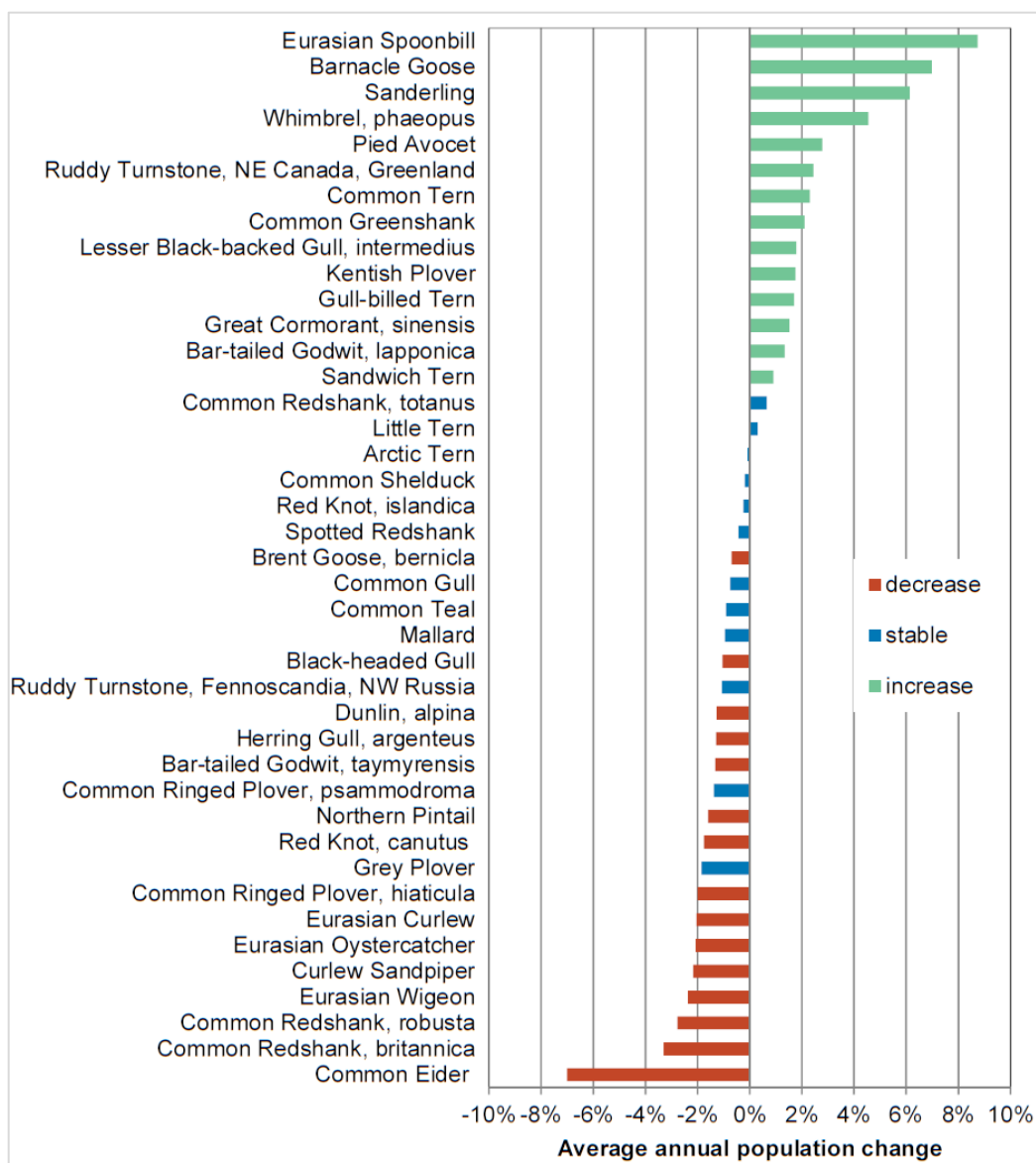




Source: Compiled from Kristensen and Pihl (2006); Nielsen, Geitner, Jakobsen, Köppl, and Petersen (2018).

**Figure 3.** The rapid rise of biomass of Pacific oysters in the Danish Wadden Sea.<sup>3</sup>

As the ecosystem changed and oyster reefs formed, the shellfish and blue mussels on which many birds depend for sustenance took refuge under the reefs. For birds, the thick closed shell of the oyster is hard to crack open (Ecomare, 2018; Nehls & Büttger, 2007; Svendsen & Jensen, 2012), and as a result, in the past decade, several populations of seabirds living primarily from shellfish and mussels have declined substantially: e.g. common eider (−39%), oystercatcher (−28%), and herring gull (−41%) (Blew et al., 2017). Although their decline is a complex matter and still unfolding (Frikke, 2017), the invasive oysters have much to do with the starving birds. Figure 4 illustrates the changes in the populations of the migratory birds that migrate along the East Atlantic Flyway as tracked in the Wadden Sea.



Source: Van Roomen et al. (2017)

**Figure 4.** Average annual population change of migratory birds in the Wadden Sea.<sup>4</sup>

As oysters suffer little predation on account of their hard shells, handpicking humans represent their chief predator (Nehls & Büttger, 2007; Waser et al., 2016). In partnership with the National Park, several local stewards invite tourists to pick oysters, who can also enjoy learning to prepare a subsequent oyster meal for around 50 Euros (about US\$60.00). While the increasing biomass of oysters far outpaces what tourists can harvest, their efforts are nevertheless helpful in nature sustenance and problem mitigation (Nationalpark Vadehavet, n.d).

Oyster picking is unlike picking apples or strawberries. Their thick shell and razor-sharp edges necessitate guidance of tourists by trained operators who can ensure adherence to oyster-picking guidelines that are instituted by municipal and park authorities. Tourists can only harvest oysters for their own consumption, and need to be closely supervised by tour operators to stave off

risks from algae toxins, pathogenic bacteria, and viruses (Danish Veterinary and Food Administration, 2018). Furthermore, tidal waters are linked to the forceful interconnections between earth, sun and moon pulling the ocean in different directions (Lützen & Jakobsen, 2012); so only twice a day when the tides are low, can tourists walk on the uncovered sea bottom. As the water can quickly rise to two meters during high tide, close supervision is critical. Further, questions arise whether an oyster is fresh or should be discarded? What is the optimal size of eatable oysters? How to open and store oysters?

At 10.00 a.m. sharp, the local guide leads a group of 17 tourists toward a carefully selected oyster bank. As they pass the green dyke, the landscape turns flat with brown-grey mudflats. Some seabirds are in sight beaking for prey. As one approaches the rising banks of oysters, one notices a seasoned tourist pulling an oyster-wagon—after all, the harvest needs to be transported back. As oysters have represented a culinary delicacy for centuries, the guide spins oyster tales invoking the mesmerizing effects of these hard-shelled creatures on kings, priests, and common folk. Rather quickly, the grey-brown mudflats transform into a verdant representation of biodiversity—insects, worms, snails, moss, and mussels.



Source: Personal files of the authors

**Figure 5.** A photo collage of oyster safaris in progress in the Danish Wadden Sea

As illustrated in the photo collage (Figure 5), the clayey, sticky, and uneven mudflats are challenging to navigate. As tourists enter the oyster bank, the gravity of invasive oysters is overwhelming. Oysters monopolise and appropriate existing natural resources, clustering and growing on existing beds of blue mussels and transforming them into mixed or pure oyster-reefs (Markert, Esser, Frank, Wehrmann, & Exo, 2013; Waser et al., 2016; Wolff, 2013). The fast-growing oysters can reach a shell length of up to 40 centimetres and weigh more than a kilogram during their potential 30-year lifespan. The tour operator provides guidance on how to pick oysters, and soon tourists develop their own techniques for navigating and identifying which ones to pick.

There are plenty for the taking. When pulling up oysters from the sticky reefs, mud swirl onto boots, clothes, and faces. Within half an hour, buckets and oyster wagons are full.

The high demand for oysters makes them an exclusive caviar-like delicacy served fresh at finer restaurants and at home during special occasions. Inside the otherwise rough shell, oysters may hide a marble-like mother of pearl. Back on land, tourists learn to open oysters with a knife by steadily pushing it into the oyster's mouth to sever its adductor muscle that attaches to the shell (Gouletquer, 2019). Inside, rests an egg-sized mass of wet glistening flesh of gills, heart, and guts—ready for partaking. In the next few hours, tourists interact with each other and with the local guides on how to prepare and cook oysters. The next evening, several of the tourists may cook oysters inspired from a pamphlet of locals' favourite oyster recipes. Here too, over a glass of wine and fresh oysters, conversations abound on the experience of being with nature in nature. For many, the question is whom to bring next time to harvest oysters in the Wadden Sea. Those who have been on a few oyster safaris, consider taking on the role as a guide or joining another tour.

Taking part in an oyster safari, revealed how a change in a local ecosystem from an agricultural experiment spurred an invasive oyster takeover. Further, the Wadden Sea because of it being a life-crucial nexus for millions of migratory seabirds reframes the take-over of oysters from being local to one that has far-reaching effects on global spatial and temporal scales. In the process of (inter)actively participating in the experience of picking oysters, a series of interconnections become apparent in the human-to-nature interaction. First, a range of active responses and adaptations occur in the here and the now in the form of a series of complex decision points—e.g., which oysters to pick, what are the risks attached to rising tidal waters, and how to guard against viruses, bacteria, and algae toxins? Second, a range of embodied micro-detailed interactions occur dynamically—tilting, balancing, and struggling to maintain balance on the mudflats. From not seeing pickable oysters to seeing so many pickable oysters, it is hard to stop picking. From grey-brown mudflats to tiptoeing on a biodiversity of eggs, sperms, turd, and worms. From a closed oyster to an open eatable oyster. From wondering about storage and size to storing perfectly-sized oysters. From being guided to becoming a guide. Third, a growing field of relations surface as new gratifications are expressed in oysters being picked, to bucketed, to cooked, to a dinner, to yet another trip in the future; also expressed as the crafting of specialised equipment such as the oyster wagon, new versions of oyster tours, the inclusion of locals' favourite oyster recipes, and more. Fourth, we identify an emergent situated unity with other humans (tourists) and with nature, including the intimate engagement with the mesmerising stories about oysters, in our roles as humble visitors in the natural ecosystem that through interactions make for something bigger, in collectively partaking in sustaining nature and mitigating migratory effects from oyster takeover, and in becoming aware, appreciative, and educated on local biodiversity that is intimately connected with the global world.

### *Case #2: Swimming with our whale*

While on the deck of a tour boat with Brad Norman—the well-known global “Whale Shark Warrior”—at Ningaloo Reef off northwest Australia, journalist Elizabeth Finkle waits for the signal to jump into the water with eight wet-suited tourists (Finkle, 2016). When a circling Cessna spots the whale sharks from the air and notifies the boat's skipper, it is time for the group to jump into the churning sea. As the snorkel-clasped heads go under water, Finkle reports: “A whale shark materializes out of the blue—like some immense royal personage parading past a guard of honor.” Finkle notes that the whale shark is not alone— “he's accompanied by a royal retinue: in tight formation; there's two long, thin sucker fish beneath his chest, a school of small bright blue fish

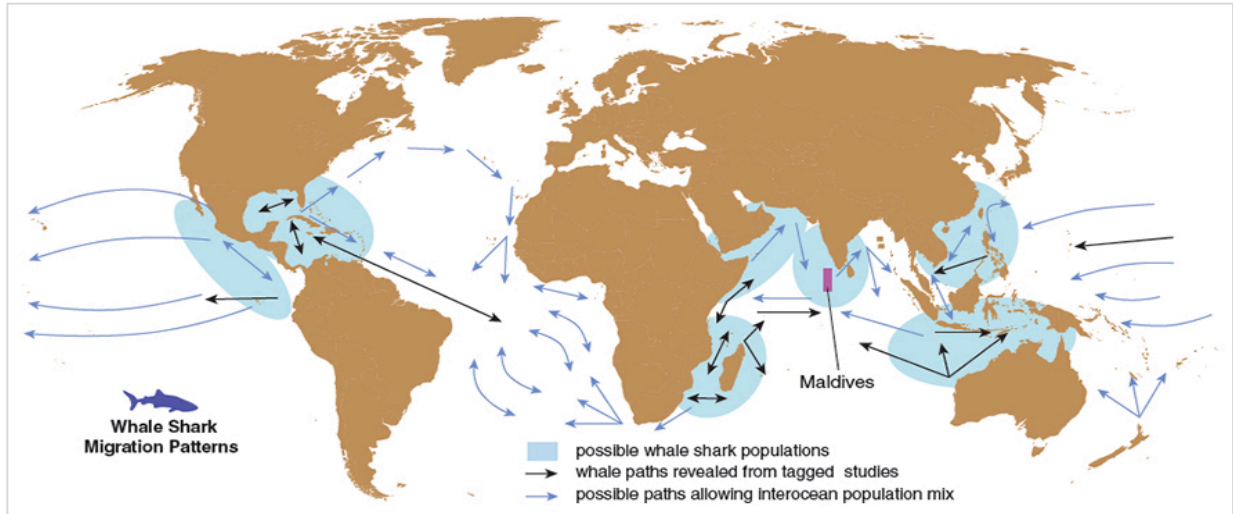
at his flank, and thousands of tiny crustacean hangers-on.” When Norman grabbed Finkle’s hand and tugged her ahead of the tourist pack, Finkle took several close-up shots of the spots behind its pectoral fin. At all times, Norman, the guides, and the awe-struck tourists maintained a safe distance from the whale shark, allowing the majestic creatures to glide in their natural environment without obstruction or hinderance. Remarkably, as illustrated in Figure 6, Finkle’s photo of the whale shark is not just another tourist snap; rather her photo will go into a library of images used to track whale sharks in order to better understand their biology, their patterns of migration, their life cycles, and their breeding habitats. “Like a fingerprint, no two are alike,” Finkle emphasises (Finkle, 2016).



Source: Destination Wildlife: Whale Shark Field Guide (Credit: S.J. Pierce)

**Figure 6:** Tourist swimming with a whale shark while photographing its unique spots

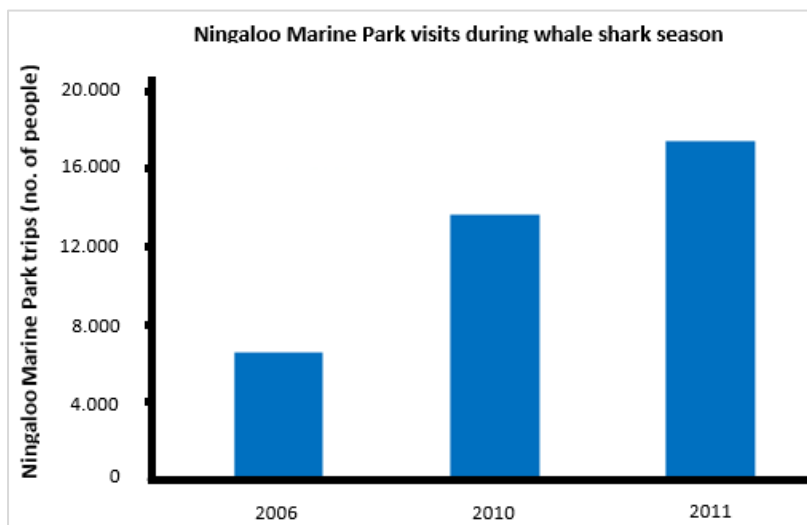
Why were Finkle and the tour group swimming with the spotted whale shark? Simply, because the spotted whale shark—the largest fish in the ocean (up to 18 meters long) is in peril, and by swimming with them and photographing them, their behaviours, migration patterns, and food habitats could be better understood, and perhaps this understanding could help in better protecting them (Hughes, 2013). Figure 7 illustrates what is known to be the spotted whale shark migratory patterns. In 2016, the International Union for Conservation of Nature (IUCN) updated the whale shark’s status from being “threatened” to being an “endangered” species. Their populations have declined steadily over 50% in the past 75 years (Finkle, 2016). Not surprisingly, humans represent the biggest threat to whale sharks—they are hunted on an industrial scale in some coastal areas of China and served as “tofu fish” in many countries of the Asia-Pacific. Their fins are valuable: they can produce tens of gallons of shark fin soup and serve as impressive table decorations at Chinese wedding banquets (Finkle, 2016).<sup>5</sup> Despite the IUCN designation of an endangered species, there are few coordinated protection action plans among the 100 countries where the whale shark is known to visit; in fact, it is protected in only 10% of the countries whose coastal waters they inhabit (Hughes, 2013).



Source: Adapted by Davies (2014) from Sequeira, Mellin, Meekan, Sims, and Bradshaw (2013)

**Figure 7.** Global migration patterns of the spotted whale shark

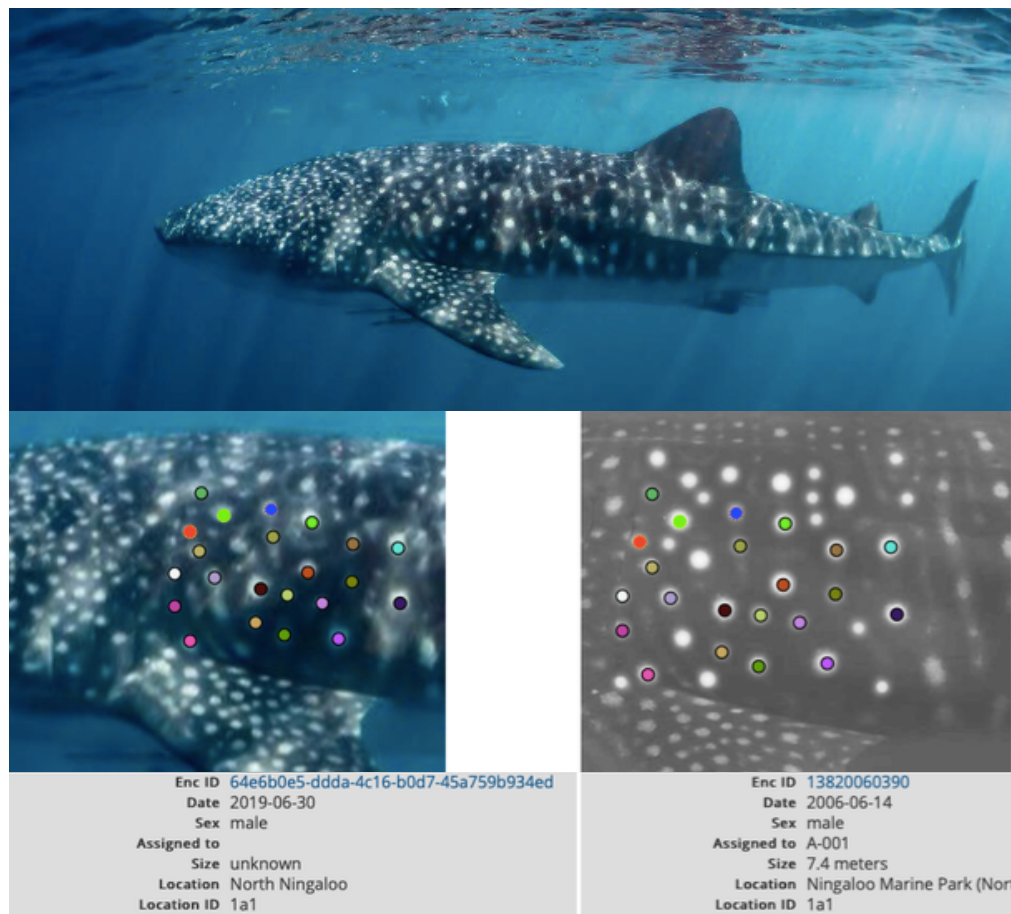
Brad Norman’s organisation, Ecocean—a not-for-profit organisation in Australia—is at the forefront of researching and safeguarding the whale sharks (Hughes, 2013). While he founded Ecocean in 1999, Norman began photographing whale sharks at Ningaloo Reef in Western Australia as early as in 1995. His initial curiosity was to identify individual whale sharks—i.e. to estimate how many were present, and how many come back each season. Year after year, he took thousands of photographs and tried to decipher their “fingerprint” spot markings with the naked eye to see if the spotted whale shark had returned (The Naked Scientists, 2010). Indeed, as emphasised in Figure 8, the number of visits to Ningaloo Marine Park has been rising according to temporal whale shark season in the area.



Source: See endnote<sup>6</sup>

**Figure 8.** Rise in marine park visits during whale shark season

Using the naked eye to identify whale sharks is a highly tedious process. Further, unless the whale sharks are photographed a second time from roughly the same angle, it is hard to verify a match. As Brad drowned in his thousands of carefully catalogued photographs, through a friend he met Zaven Arzoumanian, a NASA astrophysicist, who used an algorithm to identify star patterns in the night sky. They wondered if the algorithm could be adapted to identify individual whale sharks using their unique spot markings. To their delight, it was possible (Arzoumanian, Holmberg, & Norman, 2005). The whale shark algorithm is based on the angles between triangles of spots in an area behind the fish's gills (The Naked Scientists, 2010). So, if one were to photograph the fish from the side and were in a perpendicular line of sight, hundreds of triangles between spots could be matched with a high degree of precision (Figure 9). However, if photographs were taken from the front or behind, or from above or below, the angles get obtuse because of the photographer's angle to the shark. However, now using 3D modelling, any photo of a whale shark taken from any angle is layered on a virtual 3D model of a whale shark, allowing for the virtual model to be rotated until comparisons become possible (The Naked Scientists, 2010).



Source: Wildbook for Whale Sharks (2019)

**Figure 9.** Spot-mapping technology and analysis to identify “Stumpy,” the spotted whale shark. “Stumpy” has been sighted multiple times at Ningaloo Reef, Australia—first on June 13, 1995 and most recently, on June 30, 2019.

This is where “swimming with our whale” represents an innovative approach to sustainable tourism development, allowing tourists and others to partake and participate in processes integral to protecting the whale shark and honouring nature conservation efforts. Their photographs, each marked in a spatial-temporal dimension, can aid in better understanding whale shark habits, biology, and ecology (Hughes, 2013). Table 2 illustrates how dozens of tourism operations have sprung up around the world, often revolving around the annual appearances of these whale sharks, including at Ningaloo Reef in Australia. The knowledge gained from swimming, clicking, and uploading of photographs “makes a vital contribution toward the conservation of the whale sharks and the sustainability of the tourism businesses that rely on them.” (Hughes, 2013, p. 26).

**Table 2.** Swimming with our whale: Spatial and temporal dimensions<sup>7</sup>

<b>Spatial Dimensions</b>	<b>Temporal Dimensions</b>
Whale sharks arrive at Isla Holbox (Mexico) to feed and mate	Late May–September with peak July–August
Whale sharks arrive at Utila (Honduras)	Peak March–April and few September–December
Following a mass coral spawning, whale sharks arrive in Ningaloo Reef (Western Australia) to feed	April–July
Whale sharks arrive at Gladden Spit (Belize), most often a few days after full moon	April–May
Whale sharks arrive at Donsol Bay (Philippines)	November–June with peak between February–April
Whale sharks arrive at Tofo Beach (Mozambique) often in larger 50-strong congregations	October–March

Source: compiled from Reid (2019)

Interestingly, apart from working with tour operators, fisheries, and environmental conservation organisations in several countries (such as Taiwan, Indonesia, and the Philippines), Ecocean also works with dozens of primary schools in Western Australia on a project called The Race Around The World, allowing students to follow tagged whale sharks on their computers. Supported by the Department of Education, each school fundraises \$5000 for a whale tag, and the purpose is to meld principles of science, technology, engineering, and mathematics with conservation, biology, ecology, and sustainability (Bassett, 2017). Whale shark tracking has the potential to reveal yet unknown places where the fish mate and feed, making possible the protection of its critical breeding and feeding habitats (Bassett, 2017; Hughes, 2013). At Ningaloo Reef in Western Australia, where Norman began taking pictures in 1995, many of the same whale sharks are coming back every year—a good sign. Many are accompanied by new younger whale sharks—a terrific sign (Norman & Stevens, 2007).

What can thousands of tourists in different parts of the world do by swimming with the spotted whale shark? Norman notes: “As a scientist, myself and my colleagues can only be in one place, one day of the year. But we can have, and we are getting thousands of tourists who are becoming our research assistants. Their input is a really major part of our global monitoring system and we really appreciate it.” (The Naked Scientists, 2010).



### *Discussion: Innovative tourism practices and sustainable development*

Based on our cross-case investigation of ‘picking invasive oysters’ and ‘swimming with spotted whale sharks,’ and after several rounds of iterative dialoguing, distilling, and nuancing, we summarise our key insights in Table 3. Our insights speak to the values of facilitating tourism imperatives far beyond mere economic ones, suggesting that the innovative tourism practices detailed in our two cases hold important implications for engendering sustainable development.

**Table 3.** How “Picking Our Oysters” and “Swimming with Our Whale” speak to facilitating tourism imperatives for sustainable development

<b>Tourism Imperatives</b>	<b>Picking Our Oysters</b>	<b>Swimming with Our Whales</b>
Response Desired to Ecological Urgencies	The invasive oyster take-over in the Danish Wadden Sea threatens the survival of 12 million migratory birds.	The migratory whale shark, whose populations have declined by over 50% in the past 75 years, has become an endangered species.
The Urgencies are Complex	While seemingly local, the crisis has many global, spatial dimensions that cannot be resolved solely by one person or one group.	While whale sharks migrate globally across oceans and seas, the crisis has many local dimensions and cannot be resolved by one person or one group alone.
A Small Response Begins and Cascades	The first few oyster safaris started in the Danish Wadden Sea during the 2006 season. When the area was designated as a National Park in 2010, it created the conditions to establish an inclusive partner programme between the park and local tour operators to enhance sustainable tourism practices. Over time, the number of tour operators grew keeping with the rise of interest among tourists to embark on oyster safaris.	Brad Norman swims with whale sharks in the Ningaloo Reef in Australia and in 1995, begins to take their photographs to document their population and to track returnees. As tour operators begin offering swimming with whale shark experiences, Norman starts working with NASA scientists to enable the practice of photo-identifying whale sharks. In the span of 25 years, swimming with whale sharks and photographing them has spread internationally.
Inclusion and Engagement of Citizens and Tourists	Oyster safaris serve as an invitation to include and engage citizens and tourists in contrast to closing off the Wadden Sea tidal areas.	Swimming with whales serves as an invitation to include and engage divers, snorkelers, and tourists as opposed to closing off the coastal areas where whale sharks are observed.
Humans Interacting and Adapting with Nature in Nature and Doing So Respectfully in the Here and the Now	You can't grow oysters in your hot tub, but you can pick oysters during certain months of the year on nature's premises. You cannot control or stage the rise and ebb of tidal waters but rather appreciate its temporal and spatial here-and-now dimensions as determined by the gravitational forces from the sun and moon.	You can't keep whale sharks in your swimming pool, but you can swim and dive with them as they migrate along specific routes during specific times of the year—whether in the Maldives, the Philippines, or off the coast of Indonesia.

Values of Tourists	Tourists are enabled to engage in nature sustenance and bird conservation efforts. As they walk and talk with others on an embodied oyster safari, they become part of an emergent oyster community in which, they pick, cook, eat, learn new recipes, and create new stories about their adventures in nature. Each person on the tour contributes their unique resources and backgrounds — whether as a crafting handyman of oyster wagons, or as a discerner of which oysters to pick and which to leave alone.	Tourists are enabled to engage in nature sustenance and whale shark conservation efforts. While bodily swimming below the water, they immerse themselves and become part of an emergent whale shark community as they take, share, and upload photos of the whales, track their journeys, and create new stories. Each swimmer contributes with his/her unique resources and backgrounds—whether as a NASA employee or a curious journalist.
Values of Tour Operators	Tour operators are the stewards of the Wadden Sea, going beyond simply earning a wage. They generate values by introducing to a “novice” how to navigate the dangers of sticky and uneven mudflats, high tides, and protecting themselves from algae toxins and deadly pathogens. They do so while ensuring the birds and wildlife are not unnecessarily harmed, avoiding areas that are zoned off to the public.	Tour operators who care for spotted whale sharks are stewards of these beautiful and docile sea creatures, going beyond simple economic gain. They generate values as they introduce to the inexperienced how to navigate the dangers of diving, snorkelling and potential injuries while ensuring the whale sharks and marine wildlife are not unnecessarily disturbed and harmed <sup>8</sup> .
Values of Nature	A collective and collaborative mobilisation for nature leads to the removal, by 2019, of over 100 tons <sup>9</sup> of invasive oysters. Instead of working <i>upon</i> nature e.g. bringing tanks and trucks to remove oysters, humble visitors use their hands to pick them—ever mindful of the ebbs and flows of low and high tides, and contingencies governing their interaction with oysters and birds.	A collective and collaborative mobilisation for nature leads to more than 62,572 uploaded photo encounters, by 2019, with the whale sharks. Instead of working <i>upon</i> nature e.g. establishing secured underwater caves to keep the whales in-check, or zoning off areas where whale sharks show up, humble visitors swim <i>with</i> the whales—ever mindful of their endangered status and paying attention to the contingencies of their migratory patterns and habitat.
Cascading Effects Driven forth by Caring Humans	Taking part in an oyster safari spurs cascading interactional effects e.g. tourists pay local stewards, locals share oyster recipes with tourists, tourists innovate and craft new oyster wagons, and some begin to guide others in the practice of picking oysters.	Partaking in swimming with whales engender cascading effects into existing and new communities e.g. tourists pay local operators, tourists access online community to share photos, and students in primary and secondary schools “adopt” and follow journeys of certain whale sharks

Legislative Actions	Effective Wadden Sea conservation efforts spurred cascading effects in the form of World Heritage trilateral cooperation agreements between Denmark, Germany, and the Netherlands. Also, its UNESCO designation as World Heritage Site establishes global responsibility (among institutions and all of us as individuals) to protect its Outstanding Universal Value.	Effective whale shark conservation is challenging as their migratory routes are governed by different national conservation legislations. That said, supranational cascading effects of global responsibility include the passing of international legislation e.g. IUCN designation as the whale shark being an endangered species, as also the UNESCO World Heritage designation of Ningaloo Marine Park to preserve and save the whale sharks.
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When a nature tour guide, located 450 kilometres from the Danish Wadden Sea, points out the “starving, skinny, and exhausted” migratory seabirds to his tour group, and blames the distant but “nasty” invasive oysters for cutting off access to the food supply on which 12 million seabirds depend as they make their migratory journey along the East Atlantic Flyway, it is revealed that, in nature, the local and global, as well as the temporal and the spatial, are intimately interconnected. Simply put, not being able to access the shellfish and blue mussels in the Wadden Sea, leads to substantial declines over time in the populations of migratory birds. The story of the invasive oysters and the starving seabirds are but some of the thousands of complex global urgencies that researchers and tourism practitioners must contend.

In the aforementioned scenario, our article, through its detailed cross-case analyses of two real-life and unfolding tourism situations, presents a more optimistic and hopeful approach to the emergence of innovative tourism practices, shaped through complex yet emerging human and natural interconnections, and that leverage a series of caring, cascading, and complimentary dimensions for sustainable development.

Our two cases—“picking our oysters” and “swimming with our whales” demonstrate how sustainable tourism development may be understood as a complex open-ended endeavour—one that is always in the making, where no one resolution can be effectively pre-determined, pre-assigned, and controlled. Instead, a series of tempo-spatial complexities, often in a non-linear and unpredictable fashion, continuously influence tourism practices. A change in a local ecosystem from a seemingly managed and controlled agricultural experiment with Japanese Pacific Oysters on a German reef spurred an invasive oyster takeover in the Danish Wadden Sea. This takeover had far-ranging implications on global spatial and temporal scales for millions of migratory seabirds along the East Atlantic Flyway. Similarly, the urgencies following the endangered whale sharks migrating across global waters spurred far-ranging and disparate interventions on more local spatial and temporal scales—whether in Taiwan, Indonesia, or Australia. Tourism is a global inasmuch a local phenomenon and our two cases of innovative tourism practices suggest that opportunities for sustainable development should never be dismissed just because of their local situatedness. Rather, local actions may be understood in terms of their potentiality to intimately re-connect with the seemingly unconnectable global dimensions. This perspective, notably, stands in contrast to the view of sustainable tourism as a known and achievable outcome in a contained destination; that it can be prescribed as a “best practice” process by simplifying and reducing its complexities. Instead, our cross-case analyses advocates a shift to view sustainable tourism development as a process in which enabling conditions are created for others to participate and partake in the complex interactional and emergent processes that enhance and attain human and planetary well-being.

Clearly one individual, business, or organisation cannot alone solve the complex sustainability challenges of the world. Our cross-case analyses show how small, locally-situated responses may cascade over time into larger global ecosystem changes, especially when tourism practices set the enabling conditions for individuals—whether tourists, visitors, volunteers, residents, businesses, municipalities, community-based organisations, sailors, skippers, cruisers—to participate in a collaborative sustainable development process. These small, situated efforts create and radiate across many temporal and spatial fronts, enabling a bigger global movement for sustaining nature and mitigating harmful effects. For instance, picking and recycling one plastic bottle on a beach by one individual may collectively cascade into thousands of tons of litter removed, significantly improving the conditions for lakes, streams, and waterfalls while mitigating future degradation. Swimming and diving with spotted whale sharks while photographing the encounter and uploading the photo to the global repository (documenting some 63,000 global encounters) may significantly improve its conservation. Similarly, picking one or dozens of oysters on a safari can remove over 100 tons of invasive oysters annually just in the Danish Wadden Sea, enhancing nature sustenance and aiding problem mitigation for the millions of migratory seabirds. The seeds of potentiality lie in leveraging the global power of tourism. Indeed, through seemingly dispersed local locations and outcomes, a unity arose between and across people—whether navigating the high and low tides in the Wadden Sea mudlands or sailing and diving in the Ningaloo Reef in Australia. Such seemingly local tourism activities empower people across the world to join hands and come together through a shared motivation and in turn, concern for our planet.

Our cross-case analyses also demonstrate the possibilities for tourism practices to engage and unite people around the world for a common purpose, and for humans to engender values through varied and emergent communities of care. For instance, as researchers now we have become deeply intrigued by another set of interrelated questions. With layers of oysters on top of their reefs, how are the populations of shellfish and blue mussels holding up underneath? What about less flattering but still endangered species such as the blob fish—crowned as the ugliest fish species? As a caring community—whether of researchers or concerned citizens—when we choose to engage in a certain set of activities to improve the conservation of an endangered whale shark and alleviate the conditions of starving seabirds, the dimensions of “care” cascade in different directions. Ultimately, that is what represents the values of our whales and our oysters.

Our cases emphasise the values of tour operators who care beyond mere economic gain (the tourist fee provides for their sustenance) and feel that they are part of a system in which they can guide those interested about nature on its premises and contingencies. We thus suggest a radical shift from developing tourism *upon* nature *for* tourists—a scenario in which nature is reduced to serving as a backdrop of a scene on which tourist experiences are staged or performed—to identifying creative ways in which humans can attune themselves *to* and *with* others to meet nature in the here and now on its premises. We contend that tourism valuations need to be rethought—from understanding tourism merely as a revenue generator through tourist expenditures and seductive tourism multipliers,<sup>10</sup> to a deeper appreciation of the accompanying values of those involved in swimming with the whales, those picking oysters, and those removing trash, and by doing so, harnessing the latent opportunities which bring people together to care for each other, the planet, and the dynamic contingencies of nature.

Our cross-case analyses show the value of challenging dimensions of varying legislations (international or domestic) that often hamper effective conservation through socio-political and economic structures that divide the world into neat, manageable top-down sections. We do not

suggest that these are not important dimensions; rather, through “finding our oysters” and “swimming with our whales”, it becomes possible to spur bottom-up emergent communities of caring for endangered birds and whales, biodiversity loss, climate change, and rising sea levels, thereby finding innovative ways to transform tourism practices. Our micro-level analysis of human-to-human and human-to-nature interactions demonstrate the transformative power of cascading effects into ever-expanding communities of care. For instance, tour operators actively involving tourists in a continuous process of making and re-making of tourism practices—sharing oyster-cooking recipes, sharing stories and photos of the spotted whale sharks, and raising awareness and appreciation about the wonders of whales and oysters to spur wider sustainable development. This orientation brings into play the rich diversity that usually lies dormant (if not latent) in the variant backgrounds, experiences, and stories of tourists.

Notably, all the highlighted innovative sustainable tourism practices come—fortunately or unfortunately—with an expiration date. They cannot—as we know them—go on forever e.g. the spotted whale shark becomes extinct or (we hope) it thrives to such an extent that we leave it alone. By understanding the processes of sustainable tourism development as a complex adaptive system does not mean the end of tourism; rather, it suggests that tourism practitioners need to continuously engage others and whenever possible seize a range of emergent opportunities on multiple fronts that are currently still latent—that await our active identification and coming into being.

## CONCLUSION

We have come to ask ourselves if our two cases on innovative tourism practices are not simply best practice examples, mundane citizen science projects, or merely new business models for sustainable development? We feel our cases represent more. So, in conclusion, what might we learn from them regarding sustainable tourism development?

The invasive oyster takeover in the Wadden Sea with effects on millions of migratory seabirds and the endangered migratory spotted whale sharks are both intimate narrations of tourism situations with interlinked tempo-spatial complexities. They demonstrate how the complex sustainability challenges of the world hinges on collaborative efforts and unlike other sectors and industries, tourism indeed holds the potential to engage and unite people around the world through a common purpose. Our cases are about enhancing inasmuch attaining human and planetary wellbeing.

Our cross-case analyses suggest how a small locally situated tourism intervention may interactionally cascade into a bigger global phenomenon when tourism practices set the enabling conditions for individuals to participate and partake in a collaborative sustainable tourism development process, creating and expanding communities of care. Our analyses demonstrate that sustainable tourism development is as a complex open-ended endeavour—constantly in the making—where no one solution or resolution can be effectively pre-assigned, implemented, or controlled. Our analyses thus advocate a move for tourism practitioners to establish the enabling conditions for others to partake, strategically (as necessary), in spurring social and value-laden processes of sustainability transitions. Accordingly, through the micro-level processes of many people interacting at multiple levels, tourism practices may transform through cascading interactional effects into yet newer and expanding communities of care—continuously making and re-making tourism practices.

Our cross-case analyses do not imply that the future of sustainable tourism development is to make it the task of vacationing tourists to sustain nature. Rather, we believe that tourism is yet to fully realise its latent and emergent potential and arguably, its responsibility for inclusive sustainable development. In this vein, “picking our oysters” and “swimming with our whales” may point to what is possible.

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## Endnotes:

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<sup>1</sup> Also see the overview of the Australian bushfires at the Center for Disaster Philanthropy. <https://disasterphilanthropy.org/disaster/2019-australian-wildfires/>

<sup>2</sup> The figure illustrates the East Atlantic Flyway within which the Wadden Sea serves as an important nexus. Breeding birds of the Arctic tundra between NE Canada and Siberia use a network of staging and wintering sites down to NW Europe and Western and South Africa. There they mix up with local breeding birds that also use the same staging and wintering sites during their migration (Van Roomen et al., 2017).

<sup>3</sup> The numbers in the figure need to be interpreted with some caution as the means of measurement and the measurement locations changed from year to year. However, the trend of rapidly increasing biomass of invasive Pacific oysters is clear. The Technical University of Denmark (Nielsen et al., 2018) concluded that roughly a biomass of 72,000 tons of oysters—with varying density existed.

<sup>4</sup> The figure represents a summary of trends, expressed as average annual percentage change, at the flyway level of Wadden Sea for relevant bird populations. The calculations reflect the most recent ten years from the period 2000 to 2014, depending on data availability (Van Roomen et al., 2017).

<sup>5</sup> Other threats to whale sharks include loss of food habitats because of industrial pollution, agricultural run-off, global warming, and boat accidents (Bassett, 2017).

<sup>6</sup> The data used to compile these come from the Australian government and are available in a science forum called Ningaloo Atlas that states: “According to the latest figures (WA Government estimates), the number of people who made trips to see the world’s largest fish off WA’s World Heritage-listed Ningaloo Coast has risen 130% in 5 years.” Retrieved 18.02.2020 from <https://ningalooatlas.wordpress.com/2011/11/08/whale-shark-tourist-numbers-on-the-rise/>

<sup>7</sup> While this table details the whale sharks’ annual tempo-spatial dimensions, there exist other tempo-spatial dimensions that also affect its well-being: e.g. their hunting, sightseeing from boats, swimming with them, and photographing them. These various data points spurred international collaboration and responsibility to ensure its conservation. Similarly, data points on the proliferation of the invasive Pacific oyster species and its effects on the well-being of migratory birds resulted in the Wadden Sea being designated as a national park in 2007 and a World Heritage site in 2014.

<sup>8</sup> We acknowledge that there may be troublesome variations in how the practice of spotted whale shark swimming is carried out at certain sites.

<sup>9</sup> The estimate of 100 tons of oysters removed is based on our desk research and conservative proxies. Assuming nine operators offer oyster safaris and each operator offers a safari each Saturday and Sunday in the approved six winter months, it approximates to 60 tours. Assuming 15 tourists participate in each tour (maximum allowed are 25–30 per trip) and each participant picks 100 oysters (according to local newspapers, each pick 100–130 oysters per tour), and one picked oyster on average weighs 125 gram, tourists on oyster safaris annually remove 101.25 tons of invasive oysters.

<sup>10</sup> Tourism multiplier effect is an economic effect that measures how many times money spent by a tourist circulates through a country’s economy.

*"Picking our Oysters" and "Swimming with our Whales"* :  
How innovative tourism practices may engender sustainable development

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