



Implications for Resilience in the Cruise Tourism-Marine Protected Area Nexus in the Caribbean: The Case of St. Lucia

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INTRODUCTION

The cruise tourism industry developed in stages with the very first ocean pleasure cruise occurring in 1881 (Raluca and Monica 2008). By the 1920's cruising became the most favoured means of travel by the elite. Patullo (1996) noted that the sea has always been an economic highway for slavers, traders, buccaneers and fishermen. Today the Caribbean Sea acts as an economic highway that brings cruise visitors to the region. Raluca and Monica (2008, 630) defined a cruise as “*a multi-centre holiday where you take your hotel with you from place to place*”. It is characterized by ships which are comparable to moving resorts, transporting passengers from place to place (Dowling 2006).

Often described as a cultural, social and economic unit rich in biodiversity, the Caribbean attracts many cruise ships to its shores. Two factors

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attributed to this phenomenon are its tropical climate and its rich biodiversity. The Caribbean is also one of many “biodiversity hotspots” in the world. Johnson (2002) and Twining-Ward (1999) noted that cruise passengers are invariably attracted to “biological hotspots”. Approximately 70% of cruise destinations can be found in hotspots like the Caribbean (Sweeting & Wayne 2003). Consequently, destinations located in these hotspots struggle to absorb the additional pressures cruising exerts on their fragile ecosystems (Johnson 2002). These added stressors impact resilience in marine spaces.

The CT-MPA nexus is an area in which both conservation and recreational use (by multiple stakeholders) occur simultaneously. Marine protected areas (MPAs) are management tools aimed at reducing biodiversity loss to ensure that marine ecosystems continue to provide essential ecosystem services including food such as fish (the primary source of protein globally) and recreation such as tourism. Lately, it appears that the ecosystem services provided by MPAs are competing with each other, given that the recreational services provided through cruise tourism appear to threaten provisional services including food, water quality and pest control. This has implications for resilience of the CT-MPA nexus in the short term as well as the well-being of surrounding communities in the long term.

This research assesses MPAs as an approach to improve resilience. It identifies physical-ecological carrying capacity indicators (EC 2000) used to gain insight into whether cruise tourism has triggered a decline in ecosystem resilience on account of compromised physical-ecological carrying capacity levels (Coccosis and Mexa 2004). The aim of this research is to: (i) identify the challenges presented by cruise tourism; (ii) evaluate the measures taken to enhance resilience; (iii) discuss lessons learnt and (iv) propose recommendations for enhancing resilience.

LITERATURE REVIEW

There is no one precise definition of the Caribbean rather, its definition depends on context. In this research, “Caribbean” refers to the English-speaking islands of CARICOM (CARSEA 2007). The region is four times more tourism-dependent than any other region in the world and its cruise sector has experienced consistent growth. In 2018, cruise ships brought 15.44 million passengers to the region, representing an economic impact

of US\$1.48 billion. (FCCA 2018). Additionally, cruise related expenditures generated 45,225 jobs and paid US \$728.1 million in wages to employees in the industry (FCCA 2018).

The Tourism-Environment Relationship

From inception, taking pleasure in environments has had a major role in making tourism what it is today. However, the relationship between tourism and the environment is both multifaceted and symbiotic. Given that tourism profits from being in environments of a high quality, the tourism industry should institute measures to protect these environments (Williams 1998). With the rapid growth of tourism however, it has become indisputable that the symbiosis is now unbalanced and tourism is now the source of serious environmental issues. Consequently, efforts are being made firstly, to understand the impacts of tourism on the environment and secondly, to generate forms of tourism that sustain rather than degrade key resources. Given the varied and diverse nature of these impacts, disentangling tourism's influences from other agents of change remains one of the many complications of the tourism-environment relationship (Williams 1998).

Research suggests that environmental stability in small islands has been compromised by the practice of mass tourism and has disturbed the natural peace of island life (Briguglio and Briguglio 2002). Coastlines have become modified and endemic species have been reduced in number due to construction of large resorts and marinas and other infrastructural work. In addition, tourist activities may result in the corruption of land, ocean and coastal areas with solid and liquid waste produced by hotels, marinas and cruise ships (Neto 2003). This has become a real issue for small island systems that lack the requisite assimilative capacity, and are characterized by scarce resources, immense vulnerability, human resource constraints, limited expertise, burdensome bureaucracy, overlapping jurisdictions and the general lack of interagency co-operation (Neto 2003).

One of the most attractive settings for tourism has always been the marine environment. Marine tourism is defined as: "*those recreational activities that involve travel away from one's place of residence and which have the marine environment i.e. those waters which are saline and tide-affected as their focus*" (Orams 1999, 9). These recreational activities he noted include: fishing, scuba diving, snorkeling, the cruise and ferry

industry and beach activities such as kayaking, skiing, sailing and yachting and many more. MPAs play an important role as a resilience tool for safeguarding marine ecosystems and coastal communities. As a result of a call by the International Union for the Conservation of Nature to protect 10% of marine waters by 2020, there has been a noticeable increase in the number of MPAs globally. Kelleher (1999, xviii) defines a MPA as “*a clearly defined geographic space recognized, dedicated and managed, through legal or other effective means to achieve the long-term conservation of nature with associated ecosystem services and cultural values*”. The CT-MPA nexus is an area designated as a MPA in which cruise visitors participate in many of the abovementioned recreational activities. According to Spalburg (2009), 1.6% of all tourists participate in the cruise sector. For such a small niche which is reliant on the marine environment, its impacts are disproportionate to its size presenting challenges which are rooted in the concept of sustainable tourism (Farrell & Twining-Ward 2004).

A Call for Sustainable Tourism

For countries like St. Lucia, whose economy is driven by tourism, the environmental problems associated with unsustainable tourism are of immense concern. Neto (2003) proposed promoting sustainable tourism in order to reduce tourism’s environmental impact and take advantage of its benefits. Carter (1993) identified three key objectives of sustainable tourism: (i) improving the standard of living of the host population in the short and long term; (ii) satisfying the demands of growing numbers of tourists and (iii) safeguarding the natural environment in order to achieve both of the preceding goals. The UNEP & WTO (2005) defined sustainable tourism as: “*tourism that takes full account of its current and future economic, social and environmental impacts while addressing the needs of visitors, the industry, the environment and the host community*”.

One tool for measuring sustainable tourism is that of carrying capacity. Butler (1980) established the conceptual basis of carrying capacity in tourism planning in his Tourism Area Life Cycle (TALC). The TALC concept proposes that tourism cannot grow continuously in a place without causing irreversible damage to the local system. It conveys the idea of limits to growth. Mc Cool and Lime (2001) argue that the primary question underlying carrying capacity should not be “how much is too much” but rather “how many changes to the environmental conditions

are acceptable” The problem however, is that development efforts tend to be cumulative, making it difficult if not impossible to forecast the final impact that many incremental changes can have over time.

Symmonds and Hammitt (2000) and Williams (1998) proposed three types of parameters for determining tourism carrying capacity: physical-ecological; socio-cultural and political-economic. The physical-ecological parameters refer to fixed and flexible components. The fixed components (ecological capacity) refer to the assimilative capacity that allows the ecosystems and resources to absorb loads of pollutants, emissions etc. without the loss of its function while the flexible components (physical capacity) refer to elements of the built environment (EC 2000).

Cruise tourism can have both direct and indirect effects on the physical-ecological aspect of carrying capacity and hence the resilience of MPAs, given that cruise ships produce a variety of waste streams and cruise visitors participate in various activities. Calculations have revealed that a cruise ship with a capacity of some 2,000–3,000 passengers can generate 1,000 tons of waste per day. Food waste contributes to the increase in biological oxygen demand diminishing water quality and harming fish (Polgaze 2003) while plastic waste poses a threat to sea life. The intense use of tourism-related water-based transportation contributes to noise pollution, an underestimated pollutant, while fuel from these vessels increases air pollution. In addition, activities such as snorkelling, scuba diving and speed boats can disrupt marine life having a negative effect on fisheries (Neto 2003). By far, the most serious threat to coral reefs is anchor damage which is driven by the increased number of vessels traversing the Caribbean Sea (Hall 2001). The future of the local tourism and fishing industry may be at risk if coral reef damage is allowed to continue unabated (Neto 2003).

Wilkinson (2006) cautioned that Caribbean tourism cannot continue to grow at its present rate given that this type of activity increases the number, type and severity of impacts to marine ecosystems. The cruise industry relies on these ecosystems for its existence and Wilkinson (2006) further suggested that focus be placed on determining the carrying capacity of islands for this specific activity. For ecosystem services to be sustained overtime, the ecosystems providing them must be able to continue functioning in essential ways despite disruptions. They must be resilient i.e. have the capacity to keep functioning even when disturbed or have the ability to recover from disturbances. Disruption of marine ecosystems diminishes ecosystem services such as: the provision of fish

and other seafood, the maintenance of water quality and the control of pests and pathogens. It also reduces resilience.

METHODOLOGY

The Study Area

St. Lucia lies between 60° and 61° west longitude and 13° and 14° north latitude and is renowned for its safe and strategically located harbour. The island is part of the Windward Island chain in a southern group of islands in the Lesser Antilles in the West Indies and has an area of 239 square miles (616 square kilometers). It has a population of 172,811 and its official language is English yet many people speak Patois, a type of French. 40% of the population live in Castries, the capital, while 15.2% live in Gros Ilet (St. Lucia Central Statistical Office 2010). St. Lucia's cruise sector has been growing steadily and the destination hosted over 600,000 cruise visitors in 2019 and visitor expenditure accounted for over 55% of the country's GDP. Tourists arrive in St. Lucia via airlift, cruise ships and yachts. The cruise season peaks between December and March each year and accounts for more arrivals than stay over visitors. During these months, cruise visitors disembark at one of two private modern duty-free areas (Pointe Seraphine or La Place Carenage), and are taken by water or land taxi to popular sites and attractions as shown in Fig. 4.1. One such attraction is the dive site in CT-MPA nexus in Soufriere, a small fishing village located in the south of the island as shown in Fig. 4.2.

To realize the objectives of the research it was necessary to gather information from persons both directly and indirectly involved in cruise tourism in the marine environment. For this reason, a mixed method approach was used in which repeat cruise visitors, tour operators/guides, fishermen and experts from the cruise industry (seen in Table 4.1) were chosen as Interviewees.

Approximately 123,000 arrived by cruise ships in the month of January, and 17,729 disembarked from 13 ships. Using a confidence level of 95% a sample size of 377 was required (Raosoft 2004). The research employed a mixed method concurrent triangulation in which qualitative and quantitative data were collected concurrently due to time constraints, limited resources and availability of personnel. Data were collected with the assistance of 20 undergraduate tourism students who were trained and paid 3USD per questionnaire. Qualitative data were collected from



Fig. 4.1 Cruise Terminals in Castries, St. Lucia

8 elite interviewees using semi-structured interviews and 2 focus groups comprising 10 fisher folk each from Castries and Soufriere while quantitative data were collected via 284 surveys from cruise visitors and tour operators. The qualitative and quantitative data were analysed using content analysis and SPSS respectively, and the results were triangulated to elicit meaning as shown in Fig. 4.3.

FINDINGS & DISCUSSION

The quantitative and qualitative findings revealed that the demands of a fast-growing cruise industry in St. Lucia may be contributing to several of the changes observed in the marine environment and hence may have an effect on the environment's ability to provide needed ecosystem services. If these services can no longer be provided, human well-being may be at risk (MEA 2003, 2005). These changes include: (i) polluted and

Fig. 4.2 The CT-MPA nexus in Soufriere



Table 4.1 Description of elite interviewees

<i>Interviewee</i>	<i>Description</i>
Interviewee #1	Director of the St. Lucia Sustainable Tourism Development Programme
Interviewee #2	Fisheries Biologist; Former General Manager Soufriere Marine Management Authority
Interviewee #3	Senior Officer, Ministry of Sustainable Development, Energy, Science and Technology
Interviewee #4	Senior Manager, St. Lucia Air & Seaport Authority (SLASPA)
Interviewee #5	Operations Manager at a major tour company in St. Lucia
Interviewee #6	Dive shop owner; Diver
Interviewee #7	Senior Ranger, Soufriere Marine Management Authority
Interviewee #8	Hotel Manager, Castries

discoloured water; (ii) damaged reefs; (iii) decreased fish populations; (iv) increased solid waste and (v) increased conflict among users.

Polluted and discoloured water: When asked about recreational water quality, most (seven out of eight) of the elite interviewees had

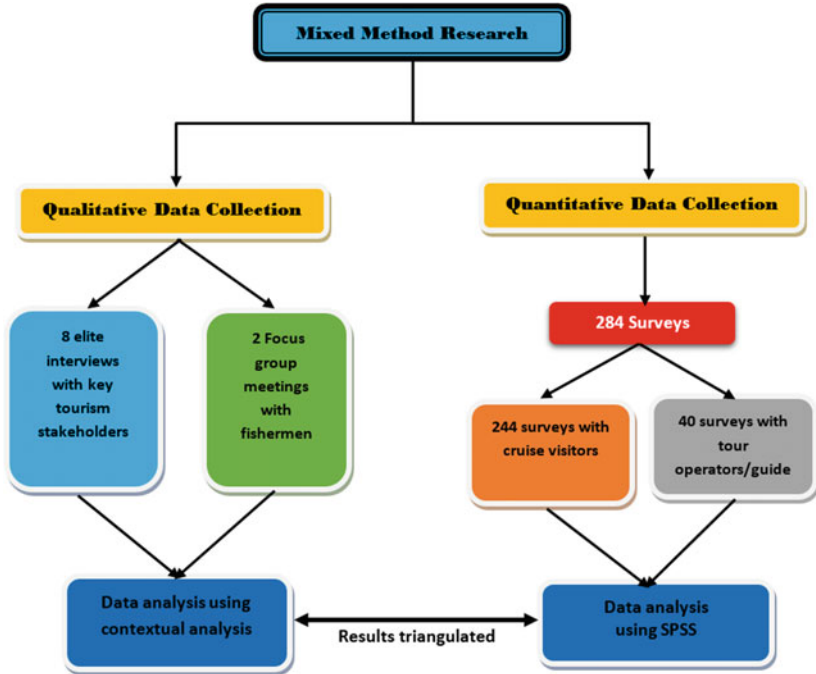


Fig. 4.3 Mixed Method Research Design

no issues with the quality of the water in St. Lucia and stated that the Department of Fisheries conducted water quality testing regularly. The quantitative data showed that 90.4% of the cruise visitors indicated that they had no complaints in this regard however, 10% of the tour operators stated that their guests had noticed changes in the quality of the water.

When asked about the discolouration of the water however, interviewees #3 and #8 lamented the discolouration of water in the Castries harbour over time. This was reiterated by both focus groups who further added that the water was not only discoloured but sometimes had an oily substance on its surface. Neto (2003) noted that high levels of fuels used by tourism-related transportation contribute to the pollution of waterways. Additionally, the quantitative data revealed that 16.7% of the cruise visitors and 45% of the tour operators noticed discoloured water.

Interviewees were also asked about cruise ships dumping waste at sea. Interviewee #8 stated that effluent had been dumped in the Castries harbour and suggested that this may be a contributor to the discolouration seen. Another interviewee added that some catamarans can only support 100 toilet flushes but at times exceeded the carrying capacity resulting in excess waste being dumped in the harbour. The fisherfolk in Castries made a similar observation while 26.4% of the cruise visitors and 25% of the tour operators stated that they had either seen or heard of cruise ships dumping waste at sea.

One of the drivers of these changes could be the increase in the number and size of cruise ships visiting St. Lucia due to expansion of the port. Presently, as many as 6 vessels can be accommodated simultaneously. As a result of infrastructural work (dredging of the channel and extending the berths) there was increased sediment load and consequent loss of marine flora and fauna. This type of expansion usually requires an environmental impact assessment (EIA) be conducted as stated in the Barbados Programme of Action (1994). However, the St. Lucia National Environmental Summary (2010) indicated that EIA legislation needs revamping to consider stronger post EIA monitoring and a stronger focus on strategic environmental assessment.

Increased solid waste: Interviewee #6 revealed that the reefs were full of solid waste while interviewee #8 added that the beaches were polluted with solid waste which usually occurred on public holidays when cruise visitors crowd-out the stay-over visitors at the beaches. She stated that visitors had complained about excessive amounts of solid waste at Rodney Bay, especially on public holidays when cruise ships were in port. Additionally, the fishermen noticed an increase in both the dumping of waste at sea and plastic material at reef sites. From the quantitative findings, 16.7% of the cruise visitors and 20% of the tour operators noticed floating objects in the sea. According to Cheshire and Alder (2009), increases in cruise visitor arrivals results in increased solid waste and the need for efficient solid waste management.

Neto (2003) pointed out that tourist activities can lead to contamination of land and marine resources with solid waste, a problem exacerbated by the rapid growth of cruise tourism. Beaches that are polluted when cruise ships dock on public holidays indicate that overcrowding may be an issue, as locals also add to the already high numbers at the beach. This raises the question of whether carrying capacity levels may be compromised on occasions such as these. One of the interviewees, a diver, pointed

out that he has participated in many reef clean-up exercises in which large amounts of plastic waste was removed from the reef. Cheshire and Alder (2009) noted this to be an adverse effect of cruise tourism.

Damaged reefs: Interviewee #1 commented on the damaged state of the reefs in St. Lucia, a situation which he stated accelerated over time. This was confirmed by the fishermen and cruise passengers. Interviewee #1 attributed this damage to overcrowding at the reefs and this was supported by interviewee #7 who stated that one reef site was sometimes visited by over 200 snorkelers simultaneously. Interviewee #2, concurred with this, pointing out that on some days when there are 5–6 cruise ships in port, as many as 2000–3000 cruise visitors are taken by day-boat charters to the reefs.

Anchorage of vessels, driven by an increase in the number of dive boats and catamarans anchoring near the reef, (Rogers et al. 1988) especially in Jalousie, may be a source of reef damage. Furthermore, interviewee #1 stated that when 200 inexperienced snorkelers and divers along with 2000–3000 cruise passengers overcrowd the reef, this causes damage, suggesting that permissible tourism carrying capacity levels may have been overstepped.

The focus group in Soufriere also indicated that in addition to climate change, the corals are under stress from sediment build up in the water and algal bloom from land-based activities. The sediment plumes seen at a dive site in Jalousie, resulted from the importation of white sand from Trinidad which was used for beach rehabilitation along with the construction of hotels along the coastline with no regard for setback distances (Mc Elroy and Albuquerque 1998).

Decrease in fish population: Four out of eight interviewees indicated that guests to St. Lucia noticed less fish at the reef while interviewee #8 stated that less fish was being caught. The fishermen also noted that their daily fish catch was much less than usual and further added that this decrease occurred concomitantly with the growth of cruise tourism. Furthermore, interviewee #8 revealed that cruise visitors complained about going to the reef and seeing less and less fish. Cohen (2006) posited that the expansion of coastal tourism activities may cause a decrease in fish populations.

Five out of eight elite interviewees alluded to increasing numbers of vessels, driven by the growth in unregulated and unregistered vessels, as reasons for the decrease. Additionally, the unauthorized use of fishing priority areas by dive-boats operators and their guests disturbed and

destroyed fish traps and equipment set by fishermen, driving fish away, causing conflict. Even cruise ships cross the path of fish traps and equipment, causing disturbance. Rogers et al. (1988) stated that ship engines are the main source of noise pollution which significantly impacts the marine environment negatively due to noise amplification in water. A study by Cohen (2006), revealed that a ten-fold increase in cruise related traffic in Yakutat Bay, Croatia caused a 66% reduction in seal population in the Bay over a ten year period.

In-depth analysis of the qualitative data revealed that 80% of the elite interviewees and fishermen alluded to: “*increase in informal sector*”, “*undocumented tours*”, “*increased noise pollution*”, “*water pollution by oil and diesel*” suggesting concerns over the increase in small vessels traversing the marine space while 80% also referred to: “*overcrowding of beaches*”, “*overuse of dive sites*”, “*overfishing*” expressing concerns with the exceeding of carrying capacity levels. Additionally, when asked about the management of the marine environment, 90% indicated that the establishment of the Soufriere Marine Management Authority (SMMA) has made a significant difference in this regard and made reference to: “*SMMA model*”, “*zoning*”, “*demarkation of boundaries*”, “*monitoring*”, “*conflict resolution*” but further stated that the effectiveness of the model was severely hampered by the lack of enforcement of regulations using expressions such as: “*overlapping jurisdictions*”, “*outdated laws*”, “*lenient fines*”, “*lack of political will*”, “*non-payment of fees*”.

Overall, the findings show that the demands of the growing cruise industry may be contributing to the changes in the CT-MPA nexus. This challenges resilience in the marine environment given that the environment’s ability the ecosystem services necessary for human well-being may be compromised (MEA 2003).

Management Strategies: Interviewees were asked to identify the measures perceived to be the most effective management strategy for minimizing the threat to the physical-ecological carrying capacity level and enhance resilience in the marine environment. The results revealed that enforcement of regulations was perceived to be the most effective management strategy, while an environmental fee was least effective. These findings concur with Orams (1999) who proposed education and enforcement as effective management strategies but contradict his statement that an environmental fee is also effective.

Enforcement of regulations: All interviewees indicated that environmental regulations are not enforced in St. Lucia. Interviewees of the focus groups stated that “many fishermen break the law because they have families to provide for”. Poor coordination, weak and inadequate existing laws and weak enforcement of current environmental regulations are some of the gaps hindering appropriate resource management (National Environmental Summary 2010).

Education and awareness: 81.2% of cruise visitors and 50% of tour operators were unaware of environment regulations in the marine environment. In addition, 30% of the tour operators stated that while conducting their tours, they did not engage visitors in discussions about their role in protecting the marine environment. Education can be a valuable tool in increasing awareness and Orams (1999) proposed that destinations incorporate environmental messages as an educational management strategy.

Environmental fee: The quantitative and the qualitative findings both suggest that an environmental fee is the least effective strategy despite the fact that 78.2% of cruise visitors were willing to pay a fee of at least 5 USD. interviewees stated:

- *“Most cruise visitors pay the environmental fee and do not know what it is for”.*
- *“Boat operators using the Marine reserve in Soufriere collect the fee from visitors but it is not remitted to the SMMA”.*
- *“Most boat operators are unwilling to pay the fee because they believe that they receive no benefits from it”.*

Implications for resilience in the CT-MPA

The foregoing challenges may have far-reaching implications for the resilience of the CT-MPA Nexus. For ecosystem services to be sustained overtime, the ecosystems providing them must be able to continue functioning despite disruptions. Documents such as the Barbados Programme of Action (1994), the Convention on Biological Diversity (2002) and the Barbados Tourism Policy (2000) along with writers such as Orams (1999) and Wilkinson (2006) have all emphasized the importance of determining tourism carrying capacity especially in marine environments. Using the capacity levels and indicators proposed by Coccossis and Mexa (2004)

and the challenges revealed by the research findings, Table 4.2 shows the level of threat to the carrying capacity threshold and suggests that the physical ecological TCC levels may be compromised thus decreasing resilience in the CT-MPA nexus.

Enhancing resilience in the CT-MPA nexus

Currently, St. Lucia hosts over 600,000 cruise visitors annually (SLASPA 2014). According to Weaver (1993), such occurrences affect the lives of people living near the port on a daily basis. Furthermore, despite being rich in natural resources and cultural assets, St. Lucia faces unique challenges with respect to planning and sustainable development. Notwithstanding, several initiatives have been undertaken in an effort to overcome these challenges. Firstly, St. Lucia is signatory to several international conventions regarding the marine environment and a national regulatory framework exists to guide St. Lucia with respect to the marine environment. Secondly, the Sustainable Development and Environment Unit of the Ministry of Planning, was established in 2001 with responsibility for coordinating national planning for sustainable development including coastal and marine, freshwater and land resources which are critical to sustainable development in St. Lucia (St. Lucia National Report 2001). Thirdly, recreational water quality standards were developed in 2009 to facilitate the implementation of the land-based sources protocol and in collaboration with Caribbean Environmental Health Institute, a pilot project was launched in 2010 to test the effectiveness of the water quality standards (National Environmental Summary 2010).

Fourthly, the Department of Fisheries was appointed the lead agency with responsibility for the management of St. Lucia's coastal and marine resources. As the lead agency, the Department established the Soufriere Marine Management Area (SMMA). Fifthly, the SMMA Inc. an independent self-sustained not-for-profit, non-governmental organization was established by the Government of St. Lucia to manage the SMMA. The management approach used is that of co-management. Its objectives are to: (i) conserve the coastal and marine resource base of Soufriere; (ii) enhance the equitable economic, social and cultural benefits generated from the sustainable use of the coastal and marine resources of Soufriere at the local and national levels; and (iii) manage the conflicts that may occur among users of the coastal and marine resources.

Table 4.2 Perceived level of threat to the physical-ecological capacity in the CT-MPA nexus

<i>Capacity levels for physical-ecological carrying capacity (EC 2000)</i>	<i>Question to be answered</i>	<i>Indicators</i>	<i>Evidence from the research findings</i>	<i>Threat to physical-ecological capacity level</i>	<i>Impact on resilience</i>
Acceptable levels of congestion or density of key areas e.g. coral reefs	Is the level of congestion of coral reefs under threat of exceeding the acceptable level?	Damage to coral reefs	Anchor damage due to increased numbers of vessels; reef touching due to overcrowding (>200 snorkelers per site; > 29,000 reef touches per year)	High	Decreased resilience
Maximum acceptable loss of natural resources without significant degradation of ecosystem functions and biodiversity loss	Are natural resources under threat of exceeding the maximum acceptable loss?	Loss of marine flora and fauna (e.g. fishes)	Dredging of channel and port expansion in Castries; Increased noise pollution and turbulence from boat engines; oil slicks on the water; reduction in fish population	High	Decreased resilience
Acceptable levels of water and noise pollution on the basis of tolerance or the assimilative capacity of local ecosystems	Is the level of noise and water pollution under threat of exceeding acceptable levels?	Water quality	Increased number of small vessels; increased noise pollution and turbulence from boat engines; oil slicks on the water; Release of human waste from small vessels	High	Decreased resilience

(continued)

Table 4.2 (continued)

<i>Capacity levels for physical-ecological carrying capacity (EC 2000)</i>	<i>Question to be answered</i>	<i>Indicators</i>	<i>Evidence from the research findings</i>	<i>Threat to physical-ecological capacity level</i>	<i>Impact on resilience</i>
Intensity of use of transport in the marine environment, infrastructure and facilities	Is the intensity of use of transport in the marine environment exceeding acceptable levels?	No. of accidents/incidents in the marine environment	Increase in the number of licensed and unlicensed small vessels; increase in conflict among users; harassment of guests on the beach; increase in crime against visitors	High	Decreased resilience
Use and congestion of utility facilities and services	Are facilities and services under threat of congestion and overcrowding	Management and disposal of solid waste	Increased littering at popular beaches; increase in solid waste (plastic) found at coral reef sites	High	Decreased resilience

Source Adapted from the EC (2000) and Coccossis and Mexa (2004)

In this regard, SMMA Inc. instituted a number of measures aimed at enhancing resilience in the CT-MPA Nexus including: (i) zoning of the marine protected area; (ii) monitoring of coral reefs and water quality; (iii) developing schedules to regulate the use of reef sites; (iv) collecting of user fees for use of the marine park; (v) staff training; (vi) using alternative dispute resolution to manage conflict. Orams (1999) contended that, “marine park regulations” and “zoning” should be instituted as a strategy for boosting resilience in marine ecosystems especially in islands where the number of tourists on day-visits may exceed the population of the island.

LESSONS LEARNT & RECOMMENDATIONS

Several lessons emerge from St. Lucia's attempt to enhance resilience in the marine environment. They all point to the fact that there is no one-off fix to enhance resilience rather, this must be an ongoing cyclical process involving planning, doing, evaluating and taking action. St. Lucia is signatory to several international agreements. The signing of international agreements and the development of a national regulatory framework does not guarantee that regulations and laws will be adhered to. Instead, regulatory frameworks are only effective if they are enforced. Enforcement of regulations has proven to be a challenge in St. Lucia and Neto (2003) noted that lack of enforcement hinders the planning process. Additionally, many unregistered vessels continue to use the marine park on account of inadequate enforcement of regulations which has implications for carrying capacity thresholds and resilience. Orams (1999) stated that the specific capacity for which a vessel is licensed should be adhered in order to limit the numbers at a site at any point in time. Unquestionably, vessel registration and use in the marine park needs to be regulated.

Another lesson came from the remittance of user fees. The stipulated portion of the user fees collected by tour operators from the cruise visitors is seldom ever collected by the SMMA. These remittances pay salaries, purchase equipment, administer training programmes etc. One elite interviewee stated that should these remittances be collected as stipulated, the SMMA would realize over 1 million USD per year to carry out their responsibilities. Uncollected user fees add no value.

Schedules were developed for some but not all snorkelling sites. Orams (1999) noted that schedules help to vary the itinerary so as to avoid exceeding the carrying capacity and reducing resilience. As such, the integrity of some sites remains compromised. Additionally, the adherence to the schedule requires the necessary personnel for monitoring so as to avoid overcrowding. Park rangers monitor the marine park between the hours of 8:00 a.m. and 4:00 p.m. only. On the contrary, many issues and conflicts involving yachts and fishermen occur outside of those hours and remain unresolved. Incidents of theft onboard yachts and disregard for zoning occur mainly after dark. Marine parks therefore need a system of 24-h monitoring strategy which requires additional financial and human resources. Lastly, notwithstanding an initial reduction in conflicts when the SMMA was established, it was not long before the SMMA became inundated with a resurgence of disputes and conflicts between fishermen

and yachters, divers and fishermen and tourism stakeholders and fishermen. This illustrates that establishing a MPA as a management tool is not a panacea for all problems.

Recent research indicates that the establishment of MPAs can build resilience against external pressures. However, for the most well-intentioned initiatives such as the SMMA, establishing the MPA alone may be insufficient. Many researchers have pointed out the complexity of these types of socio-ecological systems and call for new resilience-building management policies which are flexible and open to learning through monitoring and evaluation. Therefore, adaptive co-management, a management approach in which institutional arrangements and ecological knowledge are tested and revised in a dynamic, ongoing, self-organized process of learning-by-doing (Olssen and Folkes 2004) is strongly recommended for the CT-MPA nexus.

CONCLUSION

Cruise tourism continues to grow in St. Lucia and the CT-MPA nexus, an area in which conservation and use are two competing forces in a complex web of actors, continues to be impacted. The findings suggest that the physical-ecological carrying capacity levels are being threatened by increased activity in the area, thereby reducing resilience. While establishing MPAs as a management approach has been shown to reduce biodiversity loss and improve resilience, it is not a one-time fix but rather this management approach needs to be adaptive to deal with the dynamic nature of this type of ecosystem in which changes are sudden, unpredictable and cumulative. CT-MPA nexuses such as the area managed by the SMMA, should adopt adaptive co-management as the best approach for reaping socio-economic benefits (through tourism) and ecological benefits (improving resilience).

REFERENCES

- Briguglio, L., and Marie Briguglio. 2002. Sustainable Tourism in Small Islands: The Case of Malta. In *Tourism, Biodiversity and Information* edited by Castri and Balaji, 169–184. Leiden: Backhyus Publishers.
- Butler, Richard. 1980. The Concept of a Tourist Area Cycle of Evolution. *Canadian Geographer* 24 (1): 5–12. <https://doi.org/10.1111/j.1541-0064.1980.tb00970.x>.

- CARSEA (Caribbean Sea Ecosystem Assessment). 2007. *A Sub-Global Component of the Millennium Ecosystem Assessment*, edited by John Agard, Angela Cropper and Keisha Garcia. Caribbean Marine Studies, Special Edition.
- Cater, Erlet. 1993. Ecotourism in the Third World: Problems for Sustainable Tourism Development. *Tourism Management* 14 (2): 85–90. [https://doi.org/10.1016/0261-5177\(93\)90040-R](https://doi.org/10.1016/0261-5177(93)90040-R).
- Cheshire, A.C., E. Adler, J. Barbière, Y. Cohen, S. Evans, S. Jarayabhand, L. Jetic, R.T. Jung, S. Kinsey, E.T. Kusui, I. Lavine, P. Manyara, L. Oosterbaan, M.A. Pereira, S. Sheavly, A. Tkalin, S. Varadarajan, B. Wenneker, and G. Westphalen. 2009. *UNEP/IOC Guidelines on Survey and Monitoring of Marine Litter*. UNEP Regional Seas Reports and Studies, No. 186; IOC Technical Series No. 83: xii + 120 pp. <https://doi.org/10.25607/OBP-726>.
- Coccosis, Harry, and Alexandra Mexa. 2004. *The Challenge of Tourism Carrying Capacity Assessment: Theory and Practice*. Basingstoke, Hampshire: Ashgate.
- Cohen, G. 2006. *Campaign to Safeguard Americas Waters: Overview of Cruise Ship Facts, Criminal History, Regulatory Status and Threats to the Environment (C-SAW)*. Earth Island Institute.
- CSO (Central Statistical Office). 2010. Population and Housing Census. Castries, St. Lucia.
- Dowling, Ross. 2006. The Cruising Industry. In *Cruise Ship Tourism*, edited by Ross Dowling, 3–17. Wallingford, UK: CAB International. <https://doi.org/10.1079/9781780646084.0000>.
- EC (European Community). 2000. *Towards Quality Coastal Tourism: Integrated Quality Management of Coastal Tourist Destinations*, 156. Luxemburg: Office for Official Publications of the European Communities.
- FCCA (Florida-Caribbean Cruise Association). 2018. *Cruise Industry Overview*: Florida-Caribbean Cruise Association.
- Farrell, Brian, and Louise Twining-Ward. 2004. Reconceptualising Tourism. *Annals of Tourism Research* 31 (2): 274–295. <https://doi.org/10.1016/j.annals.2003.12.002>.
- Hall, Michael. 2001. Trends in Ocean and Coastal Tourism: The End of the Last Frontier? *Ocean and Coastal Management* 44 (9): 601–618. [https://doi.org/10.1016/S0964-5691\(01\)00071-0](https://doi.org/10.1016/S0964-5691(01)00071-0).
- Johnson, David. 2002. Environmentally Sustainable Cruise Tourism: A Reality Check. *Marine Policy* 26: 261–270. [https://doi.org/10.1016/S0308-597X\(02\)00008-8](https://doi.org/10.1016/S0308-597X(02)00008-8).
- Kelleher, G. 1999. *Guidelines for Marine Protected Areas*. Gland, Switzerland and Cambridge, UK: IUCN.
- McElroy, Jerome, and Klaus de Albuquerque. 1998. Tourism Penetration Index in Small Caribbean Islands. *Annals of Tourism Research* 25 (1): 445–468. [https://doi.org/10.1016/S0160-7383\(97\)00068-6](https://doi.org/10.1016/S0160-7383(97)00068-6).

- McCool, Stephen F., and David Lime. 2001. Tourism Carrying Capacity: Tempting Fantasy or Useful Reality? *Journal of Sustainable Tourism* 9 (5): 372–387. <https://doi.org/10.1080/09669580108667409>.
- MEA (Millennium Ecosystem Assessment). 2003. *Ecosystems and Human Well-Being: A Framework for Assessment*. Island Press, Washington, DC.
- Neto, Fredrico. 2003. A New Approach to Sustainable Tourism Development: Moving Beyond Environmental Protection. *Natural Resources Forum*
- Olsson, P., C. Folke, and F. Berkes. 2004. Adaptive Co-management for Building Resilience in Social-Ecological Systems. *Environmental Management* 34: 75–90. <https://doi.org/10.1007/s00267-003-0101-7>.
- Orams, Mark. 1999. *Marine Tourism: Development Impacts and Management*. London: Routledge.
- Patullo, Polly. 1996. *Last Resorts: The Cost of Tourism in the Caribbean*. London: Cassell.
- Polglaze, John. 2003. Can We Always Ignore Ship-Generated Food Waste. *Marine Pollution Bulletin* 46 (1): 33–38. [https://doi.org/10.1016/s0025-326x\(02\)00324-7](https://doi.org/10.1016/s0025-326x(02)00324-7).
- Rogers, Caroline, Larry McLain, and Evonne Zullo. 1988. Damage to Coral Reefs in Virgin Islands National Park and Biosphere Reserve from Recreational Activities. *Proceedings of the 6th International Coral Reef Symposium*, Townsville, Australia 2: 405–410, 8–12 August.
- Raluca, D., and Monica, G. 2008. The Impact of the Cruising Industry on Local Destinations.
- Raosoft. (2004). Raosoft Sample Size Calculator. Raosoft, Inc., Seattle.
- Soufriere Marine Management Authority – About Our Zones.
- Spalburg, Jo. 2009. Cruise Market Study, VIP Consulting Group.
- SLASPA (St. Lucia Air and Sea Port Authority). 2014. *Seaports: Cruise Schedules 2014/2015*.
- St. Lucia National Report on the World Summit on Sustainable Development. 2001.
- Sweeting, James, and Scott Wayne. 2003. *A Shifting Tide: Environmental Challenges and Cruise Industry Responses*. Interim Summary Report. The Center for Environmental Leadership in Business.
- Symmonds, Mathew, William Hammitt, and Virgil Quisenberry. 2000. Managing Recreational Trail Environments for Mountain Bike User Preferences. *Environmental Management* 25 (5): 549–564. <https://doi.org/10.1007/s00267-9910043>.
- Twining-Ward, Louise. 1999. Opinion Piece: Towards Sustainable Tourism Development: Observations from a Distance. *Tourism Management* 20: 187–188.
- UNEP (United Nations Environment Programme). 2010. *National Environmental Summary St. Lucia*.

- UNEP & WTO. (United Nations Environment Programme & World Tourism Organization). 2005. *Making Tourism More Sustainable: A Guide to Policy Makers*.
- Weaver, David. 1993. Model of Urban Tourism for Small Caribbean Islands. *Geographical Review* 83(2): 134–140. Accessed January 14, 2021. <https://doi.org/10.2307/215251>.
- Wilkinson, Paul. 2006. The Changing Geography of Cruise Tourism in the Caribbean. In *Cruise Ship Tourism*, edited by Ross Dowling, 170–181. CAB International.
- Williams, Stephen. 1998. *Tourism Geography. Routledge Contemporary Human Geography Series*. London: Routledge.