

# THE ROLE OF WATER AND TOURISM MANAGEMENT IN VENICE AND NEW ORLEANS

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Nina Balan

University of New Orleans <nbalan1@my.uno.edu>

Bridget M. Bordelon

University of New Orleans <bmborde1@uno.edu>

**ABSTRACT:** This article examines the similarities and differences between New Orleans, USA, and Venice, Italy – two coastal cities built on river sediment that are extremely vulnerable to rising sea levels and climate change. In addition to their proximity to water, both cities are characterised by a strong economic dependence on the tourism and hospitality industry. Their adaption to increasing climate change requires different approaches and strategies which have survived progressive degradation during the last centuries. In both cases, various anthropogenic, morphologic factors and global changes have contributed to coastal erosion. Both cities' tourism numbers exceed carrying capacity and potentially pose a risk to local community well-being. The study aims to illustrate how adaptation and mitigation policies (or lack thereof) have evolved in these two international cities and develop new mitigation strategies to minimise negative impacts on the tourism economy and infrastructure.

**KEYWORDS:** High water, sea-level rise, destination management, heritage tourism

## Introduction

The fate of cities is often determined by the geographical characteristics of the sites where they are located (Seminara et al, 2011). This statement is particularly true for New Orleans, USA, and Venice, Italy, where the very existence of New Orleans is tied to the Mississippi Delta, and the origin of Venice is intimately connected with its Lagoon. Both cities are major tourist attractions due to their location, cultural heritage and festivals. New Orleans and Venice are annually exposed to mass tourism, including day-trippers and overnight tourists. Both cities are continuously exposed to a risk of flooding: in Venice, the flooding (known as *acqua alta*) is more likely to occur during the autumn and winter months, from October until January, while in New Orleans, the flooding is most likely to occur during hurricane season beginning June and ending in November. According to *Condé Nast Traveler*, New Orleans and Venice are among the world's top 25 best coastal cities (LaGrave, 2016). The festivals are held in high regard, and annually hundreds of thousands of tourists descend upon New Orleans for Mardi Gras and Venice for the Carnival. New Orleans is famous for the French Quarter – the city's oldest and one of the most iconic neighborhoods with a "quaint and distinctive character" (Hirsch, 1983: 108), while Venice's popular attraction is its historic Grand Canal and adjacent sites such as Piazza San Marco.

In a recent discussion of Barcelona's tourism situation, Martín, Martinez and Fernandez indicated:

*the urgent need of defining public policies that decrease socio-economic impacts derived from tourism growth in residential areas. The locals' attitude is necessary to sustain tourist products and preserve local communities, which are the cultural essence of the city.* (2018: 13).

This research explores the role of water in New Orleans and Venice, focusing on analysing preservation strategies and management policies. The research evaluated policy and planning implementation and efficacy in both cities to identify best practices. In addition, the research focused on understanding how heritage preservation can be intertwined with water management and what lessons can be applied. The paper is structured as a comparative case study and includes morphological degradation of the adjacent lands; recent actions undertaken by the water authorities; cruise tourism and CO<sub>2</sub> emissions; the commodification of heritage and community displacement; and finally, best practices for tourism management. The results of this research will assist stakeholders and industry professionals in anticipating and planning for continuing environmental effects in historic cities.

## Methodology

This research utilised qualitative methods to explore and analyse the intersection between water management and the commodification of tourism heritage. Data collection included the following secondary sources: official websites, archival documents and maps, peer-reviewed journals, and local news periodical content. A comparative case-based methodology allowed for a broad range of investigations to understand and propose how preservation can be utilised to prepare for future problems. The empirical methods consider the diverse needs of impact assessment, adaptation planning, and long-term decision making. The latter includes the requirements of strategic decision-makers and policy implementation. Research in these overlapping topics leaves significant gaps, highlighting the lack of current research about coastal communities planning where sea-level rise will inevitably cause areas to be irreversibly flooded. The effects of community-based prevention programs have been widely investigated using case methodology (Tellis, 1997). The case study methodology is one way of conducting social science research when the focus is on a contemporary phenomenon within a real-life context (Yin, 1994). The quintessential characteristic of case studies is that they strive towards a holistic understanding of cultural systems of actions (Feagin et al, 1990).

## Cause of Morphological Degradation of Adjacent Lands

The Venetian Lagoon, situated in the Veneto Region, influenced by the upper Adriatic Sea's tides, is Italy's largest lagoon expanding over 550 square kilometres. Its morphology consists of shallows, tidal flats, salt marshes, islands, and a network of channels (Brambati et al, 2003). Venice and its Lagoon are a UNESCO World Heritage area, one of the largest, most complete, and architecturally significant medieval urban constructions in the world (Tung, 2001). The city has a remarkable history and preserving the Lagoon environment and its cultural heritage is a pivotal issue (Davis and Marvin, 2004). Founded in the 5th Century CE

and spread over 118 small islands, Venice became a major maritime power in the 10th Century and its influence and control extended throughout the Mediterranean and into the Black Sea and adjacent areas. Venice is one of the few medieval urban environments that occupies a space similar to that of the natural environment at time of its initial construction. The Venetian Lagoon is protected from the sea by several narrow barrier islands and peninsulas, with three major openings through which the tides flow in and out of. In 1850 a causeway was constructed between the mainland and the central city, allowing the metropolis to connect by train to the rest of industrialised Europe. Over time, more hotels were constructed, and tourism gradually became the most vital growth sector of the urban economy.

The current setting of the Venice Lagoon is the result of several human interventions. Over time, the Lagoon has experienced changes brought by humans (anthropogenic factors) and nature (morphologic factors), which have triggered high precipitation leading to a phenomenon called *acqua alta* seasonal high tides that exceed the value of 80 cm above the tide gauge zero. At this height, the lower parts of the historical centre of Venice are submerged by water. The lowest point in the city is the Basilica of San Marco's entrance hall, which is flooded approximately 250 times a year (DiStefano, 2019: 38). The threat from flooding has been growing for some time, but the problem first came to global attention on November 4, 1966, with a record 194 cm (76 inches) *acqua alta* flooding 96% of the city. A new record (second highest) flood was recorded on November 12, 2019, of 187 cm (74 inches), the highest in more than 50 years, flooding over 85% of the city. On November 13, 2019, the mayor of Venice, Luigi Brugnaro, called for a state of emergency and the closing of all schools after the Italian city was submerged under the exceptionally high tide and called for the rapid completion of a long-delayed barrier system (Povoledo, 2019).

The 2019 flood is estimated to have cost the city approximately \$5.5 million in damages to the iconic Basilica of San Marco (Rizzo, 2019). Many Venetians and critics have blamed the flooding on cruise ships that enter the city's port and eroded the foundations (Romano, 2020). Also, climate change is adding to the overflow of water as ice melts, and sea levels rise. The 1966 *acqua alta* sparked an international outcry that led the Italian government to pass a special law in 1973, officially recognising that Venice and the Lagoon's need to be considered one entity for preservation purposes. This legislation aimed to reverse the last century's environmental devastation and restore the Lagoon's physical and ecological integrity by rescuing the salt marshes, ending land reclamation, and curbing pollution (Robbins, 2019).

Thus, the government of that time decided to carry out a project called MOdulo Sperimentale Elettromecanico (MOSE), an experimental electromechanical module intended to protect the Lagoon from tides of up to 3 metres. MOSE is a series of 78 large movable underwater barriers that can be mechanically raised above the surface, when needed, to block *acqua alta* surges.<sup>1</sup> Such tides, which occur several times a year, produce devastation in Venice that is rapid and, at times, disastrous, like the recent flood of 2019. Work on the \$7billion project began in 2003, more than 20 years after the proposal was submitted. The project has already cost 5.5 billion euros (approximately \$6.5 billion) and is now expected to be fully completed in 2022 (Farmer, 2019). On October 3, 2020, after decades of delays, controversy, and corruption, the city finally trialled its long-awaited flood barriers against the tide. All 78 barriers were fully raised, and while the water level rose to

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<sup>1</sup> For more information and visuals on the ongoing project MOSE, access: <https://www.mosevenezia.eu>

132 cm outside the MOSE, inside the Lagoon, it remained at 70 cm, enough to keep San Marco dry (Buckley, 2020).

New Orleans's origins can be traced back to its founding by the French explorer Jean Baptiste Le Moyne de Bienville in 1718. When Bienville first established the first settlement of the Louisiana colony, the land was a fairly well-drained area located on the natural levee of the Mississippi River (Kendall, 1922: 3). Nicknamed the Crescent City because of its quarter-moon shape, New Orleans was isolated from the mainland for close to 250 years. Because of the isolation, the city was a hub of cultural innovation, distinctive developments including jazz, Creole cuisine, gospel music, jazz funerals, and a mix of unique cultures. The city's original name was 'L'Isle de la Nouvelle Orléans' (French for 'the Isle of New Orleans'): an actual island surrounded by water and protected from the floods by an artificial levee about one meter high (Colten, 2005). Since most of New Orleans was built on reclaimed land formerly occupied by the Mississippi's mudflats, today, this land lies below mean sea level, enhancing the catastrophic effects of storms and flooding. The issue is similar to Venice and its Lagoon, in two noteworthy regards. First, the frequency of occurrence of high-water conditions has increased dramatically in the last century. Second, salt marshes have been dramatically reduced throughout the last century, and the tidal flats in the central and southern parts of the Lagoon are also significantly deeper now (Seminara et al, 2011).

Until the first central bridge was built linking the city to the mainland in 1958, New Orleans was dominated by more canals than Venice. Locals navigated by boat and by travelling on the historic streetcars that travelled more than 200 miles (322 km) of lines (Ramirez, 2021). Regardless of its inhospitable location and frequent inundations, the Mississippi delta had unique strategic importance for developing commercial connections between North America and the rest of the world. During modern historical times, the Mississippi River has received considerable attention for commerce and engineering. Over time, the iconic French Quarter neighborhood's growing centrality shaped public debates over building architecturally evocative hotels and an elevated riverfront expressway along the Mississippi River. Since the 1920s, preservationists had been forging a consensus favoring the protection of the French Quarter's appearance. In the 1940s, few locals supported preservation, but by the 1960s, the French Quarter's unique architecture shaped developers' attempts to profit from the tourists it attracted. Developers in the 1960s began to argue that new hotels dressed in lacy iron balconies and gas lamps reinforced rather than detracted from the French Quarter's romanticised notion of authentic cityscape (Souther, 2007).

## Tourism Overview

Tourism is one of the world's most important economic sectors. Since World War II, rising affluence and the growth of a middle class with leisure time produced a vastly expanded market for travel. Advertising, public relations, and television made tourism an important component of the 'good life' along with cars, clothes, and household appliances (Judd and Fainstein, 1999). However, a "developing tourist activity implies complex interactions that can positively and negatively impact the local community" (Martin et al, 2018: 4). Previous studies show that positive impacts can include: employment generation (Keogh, 1989), improvement of the business network, the preservation of local identity, enhancement of the quality of life of the residents, creation of new infrastructure, interaction with foreign cultures, and the appraisal of natural and historical resources, among others (Almeida et al, 2016; Andereck and Nyaupane, 2011; Andereck, 2005) On the other hand, some tourism

practices negatively impact the socio-economic and environmental aspects over time. As Butler (1980) indicates, as the tourism demand increases in an area, its impact on local communities becomes more evident.

Mass tourism has become an issue rather than a resource for many global coastal cities. This is the case for Venice, where the main stakeholders of the tourism industry focus on maximising tourist arrivals than improving residents' quality of life and practicing tourism sustainability. With the expansion of low-cost transportation, the tourism industry has continued to boom and play an important role in cities like New Orleans and Venice, where the economy is heavily dependent on tourism. Although tourism-led redevelopment often increases employment opportunities, leisure, and cultural enrichment for city residents, it can also have unpredictable effects on their lives (Gladstone and Préau, 2008). For Venice, its inhabitants, and stakeholders, the question of sustainability is complex. Indeed, today, the local economy relies almost entirely on tourism, but tourism must be balanced with the residents' needs. Davis and Marvin (2004) found an apparent contradiction between what appears beneficial for Venice in the short term – revenue from tourism – and what risks destroy the city in the near future – mass tourism. Other risk factors to consider include increased air pollution from the large cruise ships and other modes of transportation, displacement, relocation of locals to the mainland, and commodification of cultural and heritage sites.

Tourist arrivals in Venice more than doubled in the period 2003-2019. These numbers alone make sustainable tourism in Venice an urgent issue for a city that is already in a delicate situation, built on more than 100 small islands with a total area of 70,176 hectares (excluding Lagoon waters). The sheer visitor volume is harming the city, highlighting the need for initiatives to promote sustainable tourism and help visitors reduce their impact on this fragile city (Eaglescliffe, 2018). Overtourism in Venice has led to a declining. In 2008, Venice's population dropped to 60,699 residents and continued falling to 53,135 as of November 2018 (Visentin and Bertocchi, 2019). Tourism causes Venice to be a cultural asset risk as many tourist facilities fail to cater to the needs of residents. The construction of tourist attractions can displace locals, which contributes to the problem of the declining population.

With an estimated population of 390,144, New Orleans is the most populous city in Louisiana – a state that maintains five of the top 12 ports (by cargo volume) in the United States and is a major energy supplier of oil and natural gas for the United States. The city features extensive waterfront redevelopment, replete with parks, marketplaces, a large convention centre, and other themed attractions. Many annual events showcase the city's cuisine and music and appeal to leisure tourists from the region, around the USA and, to a growing degree, from other countries (Gladstone, 2012). Although tourists have always featured prominently in the urban landscape of New Orleans, both the number of visitors and the business catering to them has grown rapidly since the 1970s (Gladstone and Préau, 2008: 139).

Tourism is one of the top strategies in urban revitalisation for the city of New Orleans. Revenue is generated through tax expenditures from mega-events such as Mardi Gras as well as transportation, entertainment, food and beverage, and lodging. In terms of employment, the tourism industry dominates other sectors, including chemical, petroleum, and the port. Gotham has stated that:

*from 1960 to 2000, the central city of New Orleans lost almost 143 000 residents or 22 % of its total population. While the suburban areas grew in population, the population of Orleans Parish dropped from a high of 627 525 in 1960 to an all-time low of 484 674 in 2000. (2002: 6).*

Some speculate that this residential population decline in the city's main tourism area is because of the lack of affordable housing, decreased diversity in business sectors other than tourism and hospitality, and the effects of Hurricane Katrina in 2005 (Adelson, 2019).

According to research conducted by the University of New Orleans (UNO), the former Hospitality Research Center for the New Orleans Convention and Visitors Bureau (NOCVB) and New Orleans Tourism Marketing Corporation (NOTMC), data shows the number of visitors and their spending has consecutively increased since 2009. In 2004, New Orleans welcomed 10.1 million visitors, who spent \$4.9 billion while in the city. In 2006, after Hurricane Katrina, visitation dropped to 3.7 million, with \$2.9 billion in visitor spending. Due to the efforts of New Orleans & Company, NOTMC and others, visitor numbers and spending have steadily increased since Katrina, and the total number of visitors in 2016 surpassed the record visitation numbers set in 2004 (Figure 1). In 2016, visitors to New Orleans spent 7.41 billion dollars, a 5.1% increase compared to the visitor spending record set in 2015, and the city hosted a record-breaking 10.45 million visitors, the highest since 2004 and a 6.9% increase compared to 2015 (New Orleans Convention and Visitors Bureau, 2017).

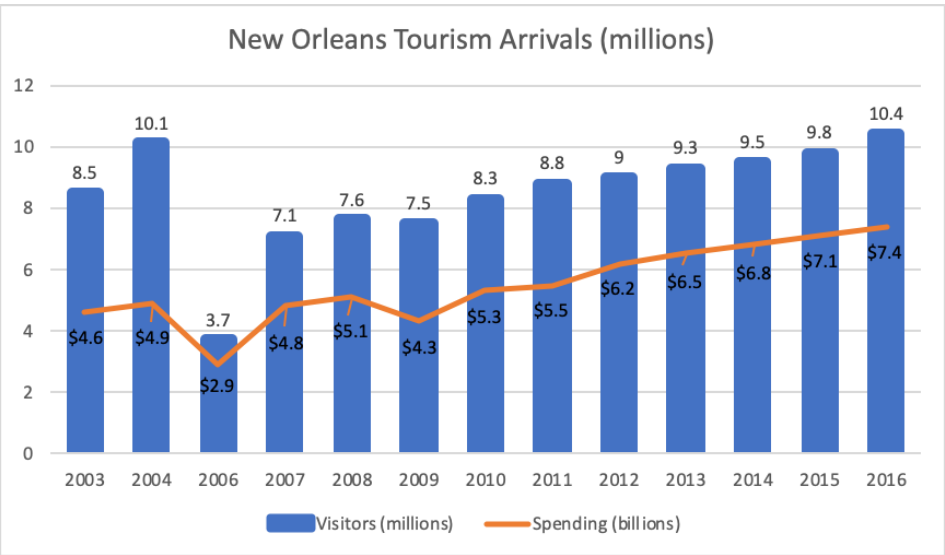


Figure 1 - New Orleans Tourism Arrivals 2003-2016. (A full-year report was not completed in 2005. The 2006 decline in visitation and spending was due to Hurricane Katrina.)

The number of international tourist arrivals in Venice has been steadily increasing over the years, reaching about 5.5 million in 2019 (Figure 2). Apart from the years 2008 and 2009, when tourist arrivals experienced a slight decreasing trend (assumptions are made that the decrease was due to the Great Recession that occurred between 2007–2009), this figure rose constantly until 2020 (Statista Research Department, 2020), before the impact of COVID.

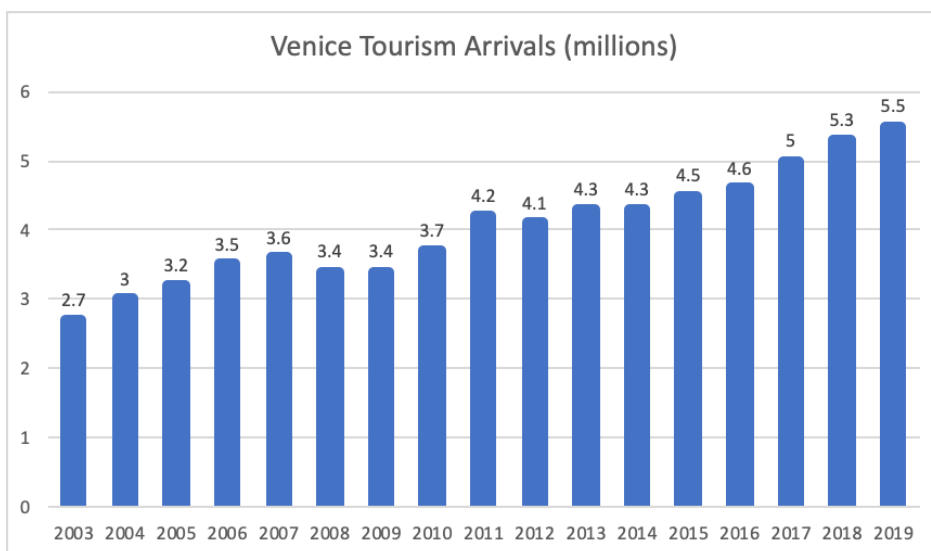


Figure 2 - Venice, Tourism Arrivals 2003-2019 (source: Statista Research Department, 2020).

The issue of sinking cities and rising sea-levels have long been featured in climate change research. Increases in sea-level rise (SLR) can cause flooding, soil erosion, inundation, and wave damage to coastlines, particularly in small island states and countries with low-lying deltas (Lainey, 2017). Climate change will increase the frequency of extreme weather and lead to both dryer and wetter conditions. Given subsidence and coastal Louisiana's low elevation, only 3 feet above sea level, coastal communities face high risk from sea-level rise and may experience significant warming by the 21st Century's end (Frankson et al, 2017).

Sea-level rise is expected to inundate between 272 and 427 United States communities by 2060 (Dahl et al, 2017). Louisiana has lost over 5180 square kilometres of land since the 1930s (Land Loss, 2017). On average, the state lost 4,460 square metres of land every hour between 1985 and 2010 (Hammer, 2017). The rate has slowed in recent years but can increase at any moment (Schleifstein, 2017). Though climate change has adversely impacted Louisiana's coastline, the seeds of its doom were not sowed by CO<sub>2</sub> emissions.<sup>2</sup> Lack of sediment is a major reason the Louisiana coast is disappearing so quickly.<sup>3</sup> New Orleans is the 3rd rainiest city in the country, with an average of 62 inches (157 cm) of rain annually (Greater New Orleans Foundation, nd: online) and is the only city in the United States that relies solely on a pumping drainage system. The drainage system can handle only one-half inch of rain every hour because 95% of Orleans Parish is at or below sea level. Louisiana's oil boom began with the Heywood well in Jennings in 1901, and the oil and gas industry was

<sup>2</sup> "The plight of the islanders certainly did not start with global warming. It is the result of a half-century of irresponsible oil and natural gas extraction practices and a levee project that left the islanders at the mercy of some Earth's most severe storms." (Tribes – Gulf Coast, nd: online).

<sup>3</sup> See Nienhuis, Tornqvist, Jankowski et al (2019), which names levees as the major cause of Louisiana's rapid subsistence though the process has likely occurred naturally at a much slower rate); also Colten (2017), which notes that levees redirect sediment that would have been deposited on the land into the Gulf of Mexico.

largely unregulated when it took off. To facilitate the movement of heavy equipment, the oil and gas industry carved thousands of miles of canals through Louisiana's wetlands. These canals allow saltwater to enter the freshwater marsh and kill the freshwater flora that binds Louisiana's wetlands. Consequently, the saltwater intrusion causes coastal erosion (Crepelle, 2018).

### **Actions Undertaken Recently by Water Authorities**

Venice and New Orleans have very different histories, but both have depended on wetlands for their protection from storms. In both places, the wetland environments are disappearing. In the past, it was possible to walk across areas of the Venice Lagoon at low tide because of the marshlands, but now the area has transformed into a bay. Scientists show that every hour and a half, Louisiana sheds another 5180 square kilometres to the Gulf of Mexico (Kolbert et al, 2019).<sup>4</sup> Both Venice and New Orleans are adopting solid solutions. In Louisiana, the U.S. Army Corps Engineers are building enormous flood walls around New Orleans and other southern areas (Figure 3). Venice is building its famous MOSE project, consisting of rows of mobile gates that can cut off the Venetian Lagoon from the Adriatic Sea during high tides (Figure 4).



Figure 3 - Lake Borgne Surge Barrier - ‘The Great Wall of Louisiana’  
(photo courtesy Flood Protection Authority-East).<sup>5</sup>

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<sup>4</sup> For visual and more information on Louisiana's most recent land loss, see Kolbert (2019).

<sup>5</sup> The 1.8 mile-long, \$1.3 billion Lake Borgne Storm Surge Barrier is the largest civil-works, design-build construction project in the U.S. Army Corps of Engineers' history. After its construction in 2013, the Corps transferred operation and maintenance responsibilities to the Flood Protection Authority-East. The Surge Barrier is a complex system made of concrete and steel located at the intersection of the Gulf Intracoastal Waterway (GIWW) and the Mississippi River Gulf Outlet (MRGO). It includes a monolithic flood barrier of 1,071 ‘soldier’ pilings, 42.5 metres in length, 8 metres above sea level, and extending to 61 metres underground. Adjoined to the barrier wall is a 46 metre-wide sector gate and a bypass barge gate. Combined with other features of the Hurricane and Storm Damage Risk Reduction System, it is designed to prevent a 100-year storm surge from Lake Borgne, the Mississippi River Gulf Outlet (MRGO), and the Gulf Intracoastal Waterway (GIWW) from inundating the Metropolitan New Orleans area, including





Figure 4 - Malamocco inlet flood barrier (courtesy Consorzio Venezia Nuova<sup>6</sup>).

The Interregional Superintendence of Public Works (former Venice Water Authority) is a body of the Italian Ministry of Infrastructure and Transport responsible for, among other functions, hydraulic safeguard, safety, and protection of a large area from Veneto to Friuli Venezia Giulia and Trentino Alto Adige. Following the signing of the Act of Understanding in 2007, the Interregional Superintendence of Public Works became a member of the Steering Committee of the UNESCO Site 'Venice and its Lagoon'. The Committee's competence extends over the entire Venetian Lagoon and it encompasses protection from erosion and water management of the territory and of the Lagoon habitat, protection from acqua alta events (the MOSE System) and heavy seas, authorisation to dump in the Lagoon, waterways traffic, authorisation the discharge into the Lagoon and regulation of water traffic. Louisiana works hand in hand with the U.S. Army Corps of Engineers (USACE) on flood risk reduction and large-scale restoration planning (Figure 5). The Coastal Protection and Restoration Authority (CPRA) is the primary local cost-share partner for USACE levee construction and flood control activities (CPRA, 2017).

New Orleans' economy is dominated by four major sectors: the oil and gas industry, tourism, shipping, and aerospace manufacturing. Although healthcare (in New Orleans), public administration (in Venice), and universities in both add to each city's economic base, tourism remains a significant job generator. For Venice, tourism may be the engine that drives the city and a substantial contributor to the economy, but it is also a major factor in the deterioration and degradation of the Lagoon. Some of the most important forms of land degradation directly affecting the Venetian Lagoon and the Mississippi Delta of New Orleans are disturbances to the ecosystem, cruise tourism, CO<sub>2</sub> emission, waste of resources, the commodification of heritage, and displacement of host communities in the case of Venice. In Louisiana, the wetlands are home to unique wildlife and some of the

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New Orleans, New Orleans East, the Ninth Ward, Gentilly, St. Bernard Parish, and the East Bank of Jefferson Parish.

<sup>6</sup> Chioggia and Malamocco inlets, in the south of the Venice lagoon, has 37 barriers. Consorzio Venezia Nuova is made up of national and local construction companies and is the concessionary of the Ministry of Infrastructure and Transport.

country's most productive fisheries. The wetlands provide a natural barrier when storm surge and wind from hurricanes arrive. In Venice, the wetlands help buffer the city from large shifts in tide while contributing salt, clams, and fish to the city's economy. Nevertheless, like Louisiana, Venice has chosen to invest substantially in an engineering solution to its water level problems, while scientists and critics in both cities advocate for developing different coping strategies to deal with the increasing number of environmental crises that threaten human settlements.



Figure 5 - Ongoing work at New Orleans; 17th Street Canal Pump Station (photo courtesy USACE.)

Historically, because New Orleans was prone to flooding, levees were erected around the city to protect the built environment. The flood protection included diverting parts of the Mississippi River, which has negatively impacted the Louisiana Delta, including the loss of the wetlands. The wetlands provide a natural barrier against storms and storm surges, and over the years, this buffer has shrunk. In New Orleans and the surrounding areas (Jefferson and St. Bernard parish), the average subsidence is 6mm a year. Over time, subsidence leads to increased flood risk and damage to infrastructure, the built environment, homes, and businesses (Erkens et al, 2015: 7).

### Cruise Tourism and CO<sub>2</sub> Emissions

Tourism is a significant factor in energy consumption and the generation of greenhouse gas emissions (GHG). A recent study suggests that tourism contributes 8% to global GHG emissions (Lenzen et al, 2018). Cruise tourism is a complex issue concerning the sustainability paradigm in coastal regions, including the footprint left ashore by cruise tourists since the number of cruise passengers has grown “more than 30-fold between 1970 and 2011” (Klein, 2011: 107) and continued to expand until the 2020 COVID outbreak. One of the leading environmental threats of the cruise tourism industry is air pollution, which is influenced by the type of fuel used, the type of engine, the speed of displacement, the manoeuvres undertaken, and electricity generation. Several stakeholders are involved in the cruise industry, including tourists, residents, cruise line companies, tour operators,

suppliers, local administrations, and environmental and heritage protection associations (Klein, 2011). In his research, Klein (2011) introduced the notion of “people pollution”, which has also become a concern as the number of cruise ships has increased, and the size of these ships has grown. People pollution refers to the point at which a port's carrying capacity is exceeded (Baekkelund, 1999).

Unlike other transportation modes, marine fuel is less refined, and emission standards are less regulated. Therefore, shipping is a significant air pollution source despite having fewer operational vessels in the global fleet. Research findings indicate that even a small number of cruise ships emit vast amounts of air pollution (Abbasov et al, 2019). Estimates from recent years suggest that, daily, a cruise ship has a carbon footprint greater than 12,000 cars (Caric, 2010), and the fuel tank that is required by a cruise ship has 2000 times more sulphur than road diesel vehicles, which means that ship emissions during a circuit are comparable to 350,000 cars (Baker and Stockton, 2013).

In the early 2000s, there was a sharp rise in marine passenger traffic. Vehicle transportation increased only to a limited extent, whereas cruise traffic grew exponentially because luxury cruises had become a form of mass tourism. Governments have attempted to reduce cruise pollution emission since as early as 2005 under the European Community issued Directive 2005/33/EC. Cruise companies have committed to reducing the current percentage of sulphur (3.5%) to 0.5% by the year 2020 (Ruiz-Guerra et al, 2019). Venice is one of the most popular cruise ports in southern Europe. Approximately 500 ships and an average of 1.5 million passengers have access to the port (Visentin and Bertocchi, 2019). Efforts to regulate the influx of mass tourism, far beyond what cities can sustain, and holding accountable large companies and port authorities for environmental degradation can improve cities' social well-being and provide a more balanced model of tourism. An example of an effort to alleviate environmental strain was banning cruise ships with a capacity of over 96,000 tons in 2018. Furthermore, Venice's port authorities work to redirect passenger traffic in these areas, with no substantial outcome, because of the reliance on tourism (Visentin and Bertocchi, 2019).

### **Commodification of Heritage and Displacement of Host Communities**

“Heritage tourism has been one of the most traditional motivations for leisure travel; for centuries people have visited sites of special historical interest” (Holocomb, 1999: 65). It allows tourists to experience a place of memory through representations of the past (Vesey and Dimanche, 2003). Heritage tourism is also an incentive for local enterprises and Governments who rely on tourism to revitalise historic neighbourhoods and justify urban redevelopment projects. Previous research on cultural tourism and authenticity argued that tourists are not cultural anthropologists seeking authentic experiences (McKercher, 1993). Instead, “they are consumers looking for purchasable versions of the culture they seek” (Vesey and Dimanche, 2003: 55). Wang identifies that the complex nature of authenticity and its validity has been widely discussed in literature since “many tourist motivations or experiences cannot be explained in terms of the conventional concept of authenticity” (1991: 1). Therefore, in postmodern society, tangible cultural heritage has become a commodity consumed by tourists (Pretes, 1995). In order to maintain their attraction for visitors and to keep up with the market demand, destinations have had to maintain their appeal through commercialising the past and offering evocative images of what consumers wish to experience in a tangible form: souvenirs, tours, food, and beverage experiences. As Vesey

and Dimanche (2003) argue, in New Orleans, like Venice, there are many aspects of the city that are “iconographically” marketed, using heritage to display the city for tourist consumption. Arts and culture can be found in every neighbourhood in New Orleans. For example, the Vieux Carré (old square) was designated as a National Historic Landmark. Venice and its Lagoon were added to the UNESCO World Heritage list in 1987 for the uniqueness of their cultural value and outstanding environmental, natural, and landscape context (UNESCO, 1987).

There is a consensus that applying sustainable development principles with the practice of tourism might represent a solution to the problems faced by the industry. Sustainability was defined in 1987 by the Brundtland Commission as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987: online). Therefore, sustainable tourism has been proposed as a development strategy that aims to increase economic opportunities by providing equitable socio-economic benefits to all stakeholders involved, including employment and income-earning opportunities and social services to host communities, while contributing to poverty alleviation, and to enhance local quality of life while preserving the destinations’ natural and living cultural resources and traditional values. To ensure the sector's long-term sustainability, tourism must grow in ‘harmony’ with the local population. Goodwin has concluded that tourists expect sustainable tourism, and that “sustainability can be used to add value to the tourism product” (2016: 21)

## **Measurements for Better Management**

A comprehensive approach towards a sustainable and resilient future of the two coastal cities is based on environmental, economic and socio-cultural factors (Figures 6 and 7). There are several existing challenges that New Orleans and Venice are facing as a result of climate change. These challenges have been showcased in the figures below, giving a comparative analysis for the two cities. Additionally, mitigation plans, adaptive responses, and future policy recommendations have been implemented and highlighted to support coastal communities facing a climate crisis. Various measures are being taken to combat the negative impact tourism has on the residents of Venice and New Orleans' quality of life, with a focus on sustainable tourism. In order to preserve the Venetian Lagoon as it existed in the Middle Ages and Renaissance, a series of awareness campaigns and projects have been initiated to save and protect the area, such as #EnjoyRespectVenezia campaign<sup>7</sup> and the implementation of the 1973 Special Law for Venice,<sup>8</sup> which was created to reduce pollution in the Lagoon and its waterways. This specific campaign raises awareness of the impact of tourism to guide visitors into respecting Venice's environment and landscape. To preserve Louisiana's natural, economic and cultural resource, the state of Louisiana has developed a master plan for a sustainable coast, building restoration strategies for the next 50 years,

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<sup>7</sup> #EnjoyRespectVenezia is the City of Venice's awareness campaign launched during the International Year of Sustainable Tourism for Development and designed to direct visitors towards adopting responsible and respectful behavior towards the environment, landscape, artistic beauties, and identity of Venice and its inhabitants. The objective is to raise awareness of tourist impact, believing that responsible traveling can contribute to sustainable development

<sup>8</sup> The 1973 Special Law for Venice aims to guarantee Venice's landscape, historical, archaeological, and artistic heritage, and its Lagoon by ensuring its socio-economic livelihood

including a continued commitment to New Orleans’ Hurricane Storm Damage Risk Reduction System (HSDRRS).<sup>9</sup>

Venice

Based on our analysis of Venice, the most challenging management issues are related to high tides, precipitation, public works (i.e. mobile barriers), tourism-related activities (i.e. carrying capacity and commodification of places), and the preservation of historical sites, cultural heritage, and development of urban settlements (Figure 6). Global warming and sea-level rise (SLR) are a direct outcome of the active man-made participation in natural ecosystems (i.e. water, oil, and gas extractions). To assure longevity and welcome future visitors, functional transformation and restoration practices must be adopted and utilised. At the regional level, land-use and urban planning tools aim to promote and implement the sustainable development of the area, protect the cultural and historical identity of the settlements, and control high water. At the provincial level, plans should include synergies between preserving and developing the environment and traditional economic activities and tourism. At the municipal level, the existing planning tools guarantee the renovation and upgrade of the existing architectural heritage and infrastructure, urban renewal, public housing programs, and roads. These measures aim to regulate activities, ensuring the preservation of its physical and typological characteristics and the compatibility among uses.

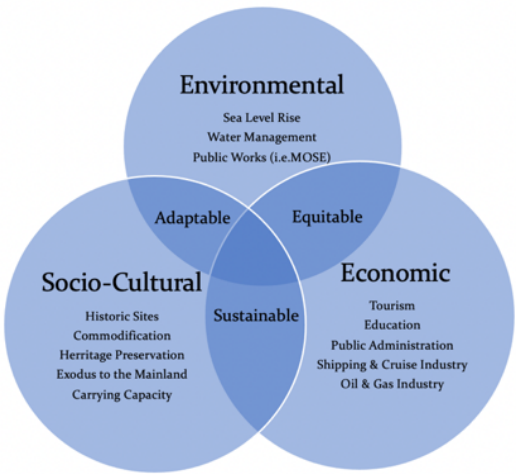


Figure 6 – Venice’s mitigation/adaptation strategies and practices.

New Orleans

Based on our in-depth analysis of New Orleans, the shift in climate indices, human-induced changes to the environment, and rising global temperatures have impacted people socially and economically (Figure 7). The major threats comprise loss of wetlands, ever-increasing

<sup>9</sup> See Coastal Protection and Restoration Authority (2017).

flood risks, water management, income inequalities that can be traced along with systemic racial segregation, accessible health, housing, transportation, and local culture. The 2005 catastrophic flooding, induced by natural and human factors, continues to impact residents. Over time, New Orleans adopted practices and techniques to connect economic resources within the existing infrastructure. At the local level, many of these practices have been adopted by nonprofit and faith-based organisations that involve a variety of initiatives across public and private properties, including grey and green infrastructure working together in a more comprehensive, efficient, and practical approach to urban water management. At the state level, the State of Louisiana's Office of Community Development Disaster Recovery Unit funded Greater New Orleans, Inc. (GNO, Inc.) to partner with local and international experts, neighbourhood groups, and civic leaders to develop a comprehensive, integrated, and sustainable Water Management Strategy that promises to bring investment and revitalisation to New Orleans's highest-need neighbourhoods. At the federal level, Louisiana is enhancing structural protection, non-structural protection, and restoration project activities that reduce flood risk, improve mitigation, and promote healthy ecosystems across the coast.



Figure 7 - New Orleans mitigation/adaptation strategies and practices

## Conclusion

Climate change is a rising concern for coastal regions, requiring immediate attention, further research, reliable scientific data, and holistic management steps to reduce its long-term impacts. In addition to the need for a greater focus on sustainability's environmental and socio-cultural pillars, delivering sustainable tourism growth is a continuous process requiring a commitment from policymakers, industry stakeholders, and local communities. Due to individual coastal cities' unique characteristics and requirements, tailored approaches to impact measurement and destination management are needed. For Venice, some of the best practices to regulate tourism growth and preserve cultural heritage involve monitoring and regulating the influx of day-trippers, international tourists, and cruise tourism visitors. Low-cost mobility and cruise tourism are a double-edged sword. On the one hand, they contribute to the local economy, providing employment for the residents. On the other hand, cruise tourism is polluting Venice and its Lagoon, affecting residents'

well-being and life quality. We propose a destination management plan and ongoing monitoring of best practices to preserve Venice's cultural and architectural treasures while providing a sustainable life for residents and environmentally friendly ecosystems for the fragile coastal community.

Like Venice, New Orleans presents an economic dependence on the tourism sector where the rush of production for consumption has taken priority over the heritage of culture, preservation of customs, and traditional practices. Tourism plays a role in the commodification of pleasure to satisfy the customer, leading to an increase in the economy, maximising profits while decreasing life quality. Better management practices for New Orleans include focusing on environmentally conscious travellers, implementing green practices for the hotel and lodging stakeholders, and encouraging conscious travelling while enhancing festival marketplaces and art galleries. Preserving historical architecture through the redevelopment of river and canal waterfront presents a vital initiative in the conservation of heritage tourism without creating exploitation of values.

### Implications and Future Research

Continuous monitoring and assessment of the challenges that climate change and tourism pose on coastal cities is relevant with regard to factors such as population relocation. In Venice, residents are leaving the city and moving to the mainland. The same is happening in New Orleans – residents are leaving the city for greater employment opportunities and affordable housing. In both cases, the main drive is seeking a better quality of life and choosing to escape some of the adverse effects of an overreliance on tourism and hospitality. There is an increased level of saltwater intrusion for Venice and land subsidence in New Orleans. Increased water scarcity can aggravate local water conflicts in coastal tourist cities. Based on this research, planners and stakeholders should develop an inventory of cultural, economic, and environmental assets to determine mitigation strategies with a renewed focus on the local, residential populations. Future research should include:

- Evaluating the equitable distribution of benefits and income from cruise tourism market and mobility within coastal cities.
- Applying lessons learned and best practices from New Orleans and Venice to other waterfront cities to develop tailored solutions and an in-depth investigation into sustainable tourism management.
- Exploring residents' perceptions and attitudes about tourism development, infrastructure in local communities.

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