

The Benefit of the Protection of Underwater Cultural Heritage for Sustainable Growth, Tourism and Urban Development

Elaborated by the UNESCO Secretariat and the Scientific and Technical Advisory Body of the Convention on the Protection of the Underwater Cultural Heritage (2001)

EXECUTIVE SUMMARY

The present study aims at evaluating in a non-comprehensive manner the benefit of the valorisation of underwater cultural heritage for the economic development for its region or city. A selection of museums have been used as case studies and range from small community museums to major tourist attractions with an average visitor rating ranging from 40,000 to 1 Million persons per year¹. Similarly, dive tourism on underwater cultural heritage sites has been assessed and evaluated in this study².

The document illustrates that:

- Allowing or fostering public access to underwater cultural heritage helps to increase its appreciation and contribute to its increased protection and recreational value as well as the public's understanding of its significance;
- Investment in appropriate infrastructures for the display and responsible visit to submerged heritage increases the access and thus the economic activity of the area in which it is located and fosters beneficial urban development;
- Responsible public access to underwater cultural heritage can help finance protection and research and is a means for ensuring the monitoring of its state of preservation and security.

Identification of new **ways of raising benefits for the public** and of **financing underwater archaeological research**, while keeping high standards of protection is also an aim of this study. A few examples are:

- **Reinforcing access** to *in situ* underwater sites by the establishment of specific infrastructures, such as metal cages, dive trails or glass bottom boat visits; the opening of archaeological work under water to tourists or controlled guardianship of sites in co-operation with selected dive centres;
- **Increasing the establishment of underwater heritage museums** also in regard to urban needs (*in situ* or land-based);
- **Increasing media cooperation** to publish archaeological work, as well as
- Enabling **virtual access to sites**.

¹Museums showing underwater cultural heritage are quite numerous. A relatively comprehensive list of such museums is provided at www.unesco.org/new/en/culture/themes/underwater-cultural-heritage/museums-and-tourism/land-based-museums

²Geographical distribution has been sought, but not fully respected, as some regions have longer tradition in underwater archaeology than others. This study is based on illustrative examples. It does not take into account all existing museums, dive sites or other publicly accessible underwater heritage.

CONTENTS

Executive Summary	1
Introduction.....	4
Development potential of underwater heritage	5
Cultural, Educational and Recreational Benefits	5
Tourism	6
Urban Development	8
Protection and Preservation Guarantee	9
Case Studies	11
Museums.....	11
China - Maritime Silk Road Museum	11
Canada/Spain - San Juan wreck.....	11
Germany – Haithabu.....	12
Denemark - Viking Ship Museum, Roskilde.....	13
Egypt - Alexandria Underwater Museum project.....	15
Sweden - Vasa Museum.....	16
Spain - National Museum of Underwater Archaeology ARQUA, Cartagena	17
Turkey - Bodrum Museum.....	18
United Kingdom - Mary Rose Museum	19
USA - Great Lake Maritime Museums	20
Dive Tourism.....	22
Australia – Yongala.....	23
Chuuk Lagoon- Federal States of Micronesia.....	24
Egypt – Alexandria Eastern harbour	25
Grenada – Shipwreck Diving	25
Italy – Baia	26
Jamaica- Port Royal.....	28
United Kingdom – Scapa Flow, Scylla and Stirling Castle Wrecks	28
USA - Thunder Bay National Marine Sanctuary & Great Lakes Maritime Heritage Center.....	29
USA - Florida Keys	31
New ways of raising benefits.....	31
Reinforcing Access	31
Establishment of Dive Trails, Glass-Bottom Boat Visits.....	31
Metal cage protection and underwater display	32
Dive club guardianship of sites	32

Replica Site Construction.....	33
Shared Archaeology.....	34
Pre-Evaluation of cultural Development Needs	34
Media cooperation.....	34
Virtual Visit to Shipwreck Sites	35

INTRODUCTION

Underwater cultural heritage holds a vast potential for valuable scientific research and education. Submerged prehistoric sites are of the highest importance for understanding the development of human civilisation³. Similarly, historical shipwrecks provide vital information on past cultural interchanges, trade and mutual influences, while sunken cities, dwellings and religious sites reveal important data on local life, religious ceremonies and sacrifices.

In addition to these information-finding opportunities, these sites have environmental, cultural, aesthetic, and social importance. Submerged heritage offers the opportunity for sustainable development, recreation urban development and the cultural enrichment of the surrounding area. Submerged heritage is an interesting and attractive form of heritage and is highly appreciated by the public due to the air of mystery which surrounds its underwater location and the stories they symbolise.

Submerged heritage provides long term opportunities for the cultural and recreational activities in a region, as well as tourism and urban development. Investment in museums on underwater archaeology and dive trails ensure protection and preservation of the underwater cultural heritage concerned, and promise a beneficial and lasting return.

Prior studies of land-based heritage⁴ show that every USD invested in heritage increases the economic activity around a site by a factor up to 12⁵, depending on the significance of the site and the extent of development. This was particularly obvious in the sector of tourism (hotels, food sales, transport benefit, guides). Additionally, it instigates an increase in consideration for heritage and local pride.

³ Sea levels were once much lower than now, as such 90 % of human history; a significant part of our development took place in regions now under water.

⁴ An overview is provided for example for the EU in the document "The economy of culture in Europe" http://ec.europa.eu/culture/pdf/doc883_en.pdf. According to this in the EU the sector turned over more than 654 billion Euros in 2003, contributed to 2,6% of EU GDP, the overall growth of the sector's value added was 19,7% in 1999-2003 and in 2004 at least 5,8 million people worked in the sector, equivalent to 3,1% of total employed population in Europe.

⁵ A frequently cited study of the State of Virginia contrasted spending patterns of heritage visitors with tourists who did no heritage activities showing that heritage visitors stay longer, visit twice as many places, and spend 2 ½ times more than other visitors. Similar data is available from other countries. A local impact study of Biltmore in North Carolina showed that for every USD spent by a visitor at Biltmore, USD 12 was spent elsewhere, i.e. hotels, restaurants, gas stations, retail shops, etc. In Norway only 6-10% of the spending involved in visiting a cultural heritage site was spent at the site itself. The balance was spent in the community around the site. See Donovan D. Rypkema in "Cultural Heritage and Sustainable Economic and Social Development", European Cultural Heritage Forum, Brussels, Belgium, December 7, 2005 www.hs-intl.com/pubs/speeches2005_002.pdf

DEVELOPMENT POTENTIAL OF UNDERWATER HERITAGE

Defined in the UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage, 'underwater cultural heritage' encompasses all traces of human existence that lie or once lay under water for at least 100 years and have a cultural or historical character. This includes ancient shipwrecks, submerged temples and cities, sunken heritage in Cenotes⁶, wells and lakes as well as fish traps and others sites. It includes artefacts *in situ* as well as recovered objects brought to land. It is estimated that three million ancient shipwreck sites lie under the world's oceans, at least 150 sunken cities and ports in the Mediterranean, and some 20,000 prehistoric sites in the North Sea and the Baltic. Traces of human existence have been found under water from up to 300,000 years ago. Notably spectacular sites, such as the lighthouse of Alexandria, Egypt, or the shipwreck field of Chuuk Lagoon, Micronesia, inspire the public imagination through the powerful historical messages they evoke. However, there is also public interest in heritage, stemming from the 'unusual' environment of the aquatic, which has prompted an increase in interest and in dive tourism. This trend is particularly important for Small Island Developing States⁷.

CULTURAL, EDUCATIONAL AND RECREATIONAL BENEFITS

The protection, research and public display of underwater cultural heritage can have an important cultural, recreational and educational impact on the community or region where it is found. It can shape cultural identity and foster the interaction between society and its past, preserved in its cultural heritage.

The present time globalization and media output-disparity can lead to a distorted perception of a population of its past and the importance and impact of certain historical facts on its today situation. This can happen for instance due to the wider distribution of certain TV channels or programmes, the greater ease of the use of certain languages or even changed writing styles such as the changed use of Latin, Cyrillic, or Arabic letters.

The valorisation of heritage and its inspired educational programmes can help reinvigorate the cultural well-being of the residents of the area and its visitors. Moreover, it provides a connection between societies and their own past. It can also help to add a tangible dimension to historic events and

⁶ Latin-American flooded karst-caves

⁷ As a growing form of marine tourism, scuba diving has seen annual increases of on average 12% to 14 % since the 1970s according to the world's biggest dive certifier, the Professional Association of Diving Instructors (PADI), which alone had certified nearly 18.5 million divers worldwide by 2009. The Egyptian Red Sea for example, has seen a steep increase in dive tourism, with ten times as many divers arriving now compared with the 1990s (Harriott, 2002; Garrod & Gossling, 2008). See: Dive Tourism and Local Communities: Active Participation or Passive Impacts? Case Studies from Malaysia, Bilge Daldeniz, Mark Hampton, Kent Business School Working Paper No. 245 June 2011 www.academia.edu/704256/Dive_tourism_and_local_communities_active_participation_or_passive_impacts_Case_studies_from_Malaysia

historic connections which otherwise remain fragments of literature and word of mouth; the qualification of these events in physical evidence, allows the history to come alive in one's imagination more vividly.

For submerged heritage this has a special importance as it reiterates the strong historic connection for ancient civilisations to the sea and to the sea trade, this symbiotic relationship and reliance has diminished over time due to the recess of the ocean, the change of the focus of trade, the installation of other ways of transport and other causes. The heritage preserved underwater can illustrate certain religious views, such as the veneration of sites, as seen by the Hawaiian fishponds, and the influences of other civilisations had in the development of a specific region.

TOURISM

The link between culture and tourism is inexorable and the increased dedication of resources to the former is certainly linked to the improvement of the latter, evidenced among others in a recent study which revealed 37% of the global tourism has a cultural motivation⁸.

Submerged sites are an attractive option of culture tourism and although many sites are not accessible *in situ* to the public, a considerable number of them, if managed appropriately, is or could be made accessible to the average tourist without threatening their preservation. Many pieces of underwater cultural heritage have also been made accessible in land-based museums. Forms of tourism that can be especially well developed, following a proper valorisation of underwater cultural heritage, are cultural, dive and cruise tourism.



*Reconstitution of the Vasa shipwreck ©
Swedish Maritime Museums*

'Dry-Footed' Access

Some countries with rich underwater heritage have decided to recover artefacts or whole wrecks and make them visible to the public⁹ in major museums, which now provide a lasting attraction for their region. Spectacular examples are the *Vasa* Museum in Sweden with at least one million visitors per year, the *Mary Rose* Museum in the UK, the Bodrum Museum, Turkey, the Roskilde Museum, Denmark, and the ARQUA Museum, Cartagena, Spain.

⁸ Cultural Heritage as a socio-economic development factor, Archimedes, Euromed; the same study states that according to recent estimates, more than 8 million jobs are directly and indirectly sustained by the Cultural Heritage sector in Europe. www.comune.venezia.it

⁹ This can be understood as enhancement of the underwater cultural heritage, which is one of the reasons for which activities directed at this heritage can be authorized according the Rule 1 of the Annex to the 2001 Convention.

The decision to bring artefacts from their *in situ* locations to land based museums, is often due to the original site being difficult to access by divers due to either remoteness or depth. Examples from decades ago show however also that many were moved to land based sites due to the perception that the seabed was a place inaccessible to normal human visitors.

However, today *in situ* access has also been made possible for the non-diver through glass-bottom boat visits. Individual, cruise or other tourism can thus come to the sites and propose visits of their underwater cultural heritage. This option is promising, as the average tourist feels inspired and curious by the idea of pirates, and the history of seafaring in general. A similar experience available is a ship excursion which crosses over underwater cultural heritage sites while the tourist view virtual presentations from the sites located on the seabed under their boarded boat¹⁰.

Another huge advance in the effective display of underwater cultural heritage is the establishment of true underwater museums or at least museum-aquarium settings, as seen in the Chinese Baiheliang and Maritime Silk Road¹¹ (Nanhai No 1) museums. Such museums show the underwater environment and the authentic site *in situ* or in a *close-to in situ* situation. Especially interesting is the Baiheliang museum, which allows the visitor to see the authentic submerged site in its original setting.

Dive Tourism

Unlike the transfer of artefacts from their authentic place to another location, *in situ* access respects the site's integrity and this study shows that it may even have a higher beneficial return.

Scuba diving is increasing in popularity as a leisure activity with estimates of a global growth of 12-14% per annum for newly certified divers¹². A raise of the average age of divers over the years indicates however that new aspects have to be identified to interest also more the young population, such as for instance by strengthening the access to cultural sites. Moreover, it has been shown that divers visiting submerged sites spend longer time in a region than tourists visiting artefacts displayed in "dry-footed" museum.

Many *in situ* underwater sites are located close to the coast. Dive Clubs can therefore provide organized visits of submerged heritage sites. Even visits to underwater archaeological sites that are in the process of being excavated can be arranged between diving centres and research institutions, ensuring the instructions and guidelines of the responsible authorities and the certified archaeologists in charge are up-to-date and adhered to.

¹⁰ As for instance offered on a tourist ship line between Sestri Levante and Portofino in Italy.

¹¹ The Nanhai Museum is not an *in situ* presentation of a wreck, as the wreck was cut out of the silt of the seabed and brought to the Aquarium. However the underwater presentation seeks to give some of the authentic context back to the wreck.

¹² See PADI statistics

Worldwide, national authorities have endeavoured to create official dive trails in order to foster greater visibility and enjoyment of the concerned heritage, but also increase diving tourism economies¹³. This is of special importance for states bordering the ocean, in particular also Small Island Developing States (SIDS), which can greatly enhance their tourist attractiveness through the extended valorisation and promotion of submerged archaeological sites. This trend is to be observed especially in many tourism-dependent States in and around the Caribbean, but also in Australia and in European States.

For dive trails and sites, their location is a crucial issue as low depth warm water sites are often more attractive to dive tourists than the perhaps culturally more significant, yet deeper cold water sites in more remote or more northerly locations. However, even these sites can be transformed in attraction centres by appropriate valorisation as shown by the UK wrecks *Coronation* and those at *Scapa Flow*.

URBAN DEVELOPMENT

Exceptional underwater heritage can, like land-based heritage, be a strong factor for urban development. The *Vasa*, *Mary Rose*, Bodrum and Roskilde Museums have for instance considerably changed the way Stockholm, Portsmouth, Bodrum and Roskilde look today.

When the construction of the Underwater Museum of Alexandria was proposed, it was met with international support and interest. Most importantly, it gained the support of the Mayor of Alexandria. The project was the ideal component to revive the city and develop its waning tourism¹⁴. Until now from 2% to 10 % of all visitors coming to Alexandria are foreign visitors and the city, despite its celebrated past, is often omitted off the usual tourist itineraries. The urban integration design of the underwater museum was suggested to be a part of a new urban and land use planning approach envisaged for both the city and north coastal zone areas in order to assure better safeguarding of its cultural heritage and natural resources.¹⁵

This example demonstrates the need to valorise the submerged heritage and to actively foster access in order to achieve the best possible social benefits.

¹³ See a list provided by the Australian government here: www.environment.gov.au/heritage/shipwrecks/trails.html

¹⁴ After the Alexandria museum creation, direct benefits were expected to include the creation of employment to operate and maintain it (staff, curators, tellers, security guards, personnel of suppliers and maintenance). A project of this scale was also immediately recognized to generate indirect benefits, in terms of consumption through services, like restaurants, hotels, transport, construction, maintenance. Other expected indirect effects were that the investment in the museum would encourage investors to invest in the development of the neighbourhood, i.e. hotels, services, infrastructure, entertainment, cruises, guided tours, weekends organized to combine Alexandria, north east and west coasts to Alamein or to Port Said and the Suez Canal. Urban development and cultural heritage protection were recognized to go hand in hand and therefore, protection is worth the effort.

¹⁵ Underwater Archaeology Museum of Alexandria: An Integrated Sustainable Development Role, Naguib Amin, Proceeding of UNESCO Meeting, Chongqing, China, 2010; See also the study 'The Tourism Sector in Alexandria', Alexandria City Development Strategy, World Bank, April 2005; Alexandria City Development Strategy (CDS) & Alexandria Growth Pole Project, Mohamed Bassiouny, Secretary General, Alexandria Governorate, CDS Partnership Forum, March, 2006; Itinéraires d'Alexandrie, Propositions, September 2006

Despite the presence of truly exceptional sites in and around the Bay of Alexandria the current beneficial return for the city is minimal. The average tourist is neither informed of the possibility to dive the sites nor invited to do so. Almost no indication draws attention to the submerged sites on the land-part of the Pharos lighthouse site, the Quait Bey Fort. Unfortunately, a similar account can be stated from other exceptional underwater heritage sites that do not fulfil their potential beneficial impact to the region they are located due to failing valorisation.

PROTECTION AND PRESERVATION GUARANTEE

In Article 2, paragraph 10 of the 2001 Convention, it calls for the development of “responsible non-intrusive access” to the *in situ* underwater cultural heritage, and makes the States Parties managers of the adoption of “practicable measures to raise public awareness regarding the value and significance of underwater cultural heritage and the importance of protecting it” (Article 20).

The underwater cultural heritage is a legacy for humanity, and the public have a right to access and develop an appreciation for it. However, the UNESCO 2001 Convention is very clear in its message: No public access should be allowed if there is a risk of threatening the integrity and preservation of the concerned underwater cultural heritage.

In this way, in order to avoid negatively impacting the underwater cultural heritage by making it accessible to the public, control mechanisms should be established and respected. This guarantees the protection and preservation of the heritage that is on display either in museums or *in situ* sites.

Ensuring proper protection and safety to the sites, even with the presence of touristic activity, can be achieved in a myriad of ways. Unfortunately, it has yet been difficult to definitively assess the impact leisure diving has on underwater cultural heritage. Much of the literature available related to dive tourism concentrates on the implications of the frequency of dives and their impact on coral quality and growth, but not on cultural heritage site’s preservation¹⁶. Although some areas are not directly relevant some of the conclusions of existing studies can apply to cultural sites and be used to alert possible negative impacts that public access can have.

For example, key dive sites can become congested when dive boats cluster in an area, which has been observed at shipwreck sites in Malaysia. Furthermore, vessels transporting visitors to these sites can also damage the

¹⁶ Multi-stakeholder Values on the Sustainability of Dive Tourism: Case studies of Sipadan and Perhentian Islands, Malaysia. Janet Haddock-Fraser, Mark Hampton, Kent Business School www.academia.edu/446390/Multi-stakeholder-values-on-the-sustainability-of-dive-tourism-Case-studies-of-Sipadan-and-Perhentian-islands-Malaysia as well as Dive Tourism and Local Communities: Active Participation or Passive Impacts? Case Studies From Malaysia. Bilge Daldeniz, Mark Hampton, Kent Business School Working Paper No. 245, June 2011 www.academia.edu/704256/Dive-tourism-and-local-communities-active-participation-or-passive-impacts-Case-studies-from-Malaysia

objects, as observed on the *Titanic* wreck. Furthermore, an unfortunate and undesirable impact can be souvenir hunting and pillaging. In a similar vein, a study on Sipadan and Perhentian dive sites in Malaysia showed a worrying lack of engagement amongst tourists with the conservation of locations that they visited¹⁷. Attention should therefore be paid to this issue by the active management from responsible authorities for the underwater cultural heritage site.

On-shore sites are also prone to difficulties with unplanned or poorly planned resort and tourism developments jeopardising the safety of the sites off the shore. This became unfortunately evident at the Perhentian, Malaysia, where the local government built two large concrete jetties in 2007, damaging coral and obscuring a cultural heritage site. Issues can also be sewage disposal problems, especially when toilets empty directly into the sea, observed in Malaysia's dive sites and in Alexandria, Egypt.

Despite these limitations, the investment in the research and study of underwater cultural heritage brings the society the benefit of increasing the knowledge of themselves and the socio-cultural environment that surrounds them.

At the same time, the more we know about heritage, the more meaning we will be giving to the physical remains that constitute it. In charging an archaeological site with a historical and cultural meaning it may be appreciated differently by diverse parts of the society. Whether valorisation can differ geographically, culturally or temporally, it always reinforces the existing links between the cultural heritage and the society as well as it helps to preserve it.

¹⁷ Multi-stakeholder Values on the Sustainability of Dive Tourism: Case studies of Sipadan and Perhentian Islands, Malaysia. Janet Haddock-Fraser, Mark Hampton, Kent Business School www.academia.edu/446390/Multi-stakeholder-values-on-the-sustainability-of-dive-tourism-Case-studies-of-Sipadan-and-Perhentian-islands-Malaysia

CASE STUDIES

Some case studies of selected museums and underwater sites shall serve to evaluate and illustrate the benefit of submerged heritage to society from a cultural, educational and sustainable development stand point. The selection has been made focusing on facilities where data was available. It was sought to achieve an equal geographical distribution of examples.

MUSEUMS

CHINA - MARITIME SILK ROAD MUSEUM

An example of advanced museum design and tourism development working in conjunction with scientific research is the Maritime Silk Road Museum in China. China planned to develop tourism on Hailing Island that had not much to attract visitors besides the beach. However, it lies close to the important ancient trade route, the



The interior of the new Nanhai No 1 – Maritime Silk Road Museum, China ©U. Guerin/UNESCO

Maritime Silk Road and an ancient shipwreck was discovered close to Hailing Island. Searching for the best way to bring this cultural attraction to the community and its visitors and to render the island more attractive, a world-first aquarium-museum was built called the 'Maritime Silk Road Museum'. The wreck, called *Nanhai No.1*, was recovered and brought to the aquarium still preserved in the surrounding silt. It is now excavated and will be shown as work-in-progress under water to the visiting public. The desirability of the island for touristic activity has been considerably increased with the cultural experience offered and the local development which has been undertaken. The stretch of beach used for building the museum was, in any case not suitable for swimming and visitors mainly came to this location from the surrounding beaches for the purpose of visiting the museum. In this way, the museum's construction did not negatively impact other types of recreational land-use.¹⁸

CANADA/SPAIN - SAN JUAN WRECK

The remains of the *San Juan*, a Basque galleon with three full decks and three masts that sank in Red Bay, Canada 1565 with a cargo of 900 to 1,000 barrels of whale oil, was excavated by underwater archaeologists of Parks Canada. It is the oldest shipwreck ever found in Canadian waters and is a sunken relic that symbolizes the early spread of European civilization and commerce to the New World.

¹⁸ There is no statistical data on the visitor numbers, but as the shipwreck is not yet entirely revealed, any data would be provisional.

Now, the 450-year-old *San Juan* is being replicated by a team of Spanish maritime heritage experts in a seaworthy replica. This has among others led to the Basque city of San Sebastian, the original home of the vessel, being chosen to be in 2016 Europe's Capital of Culture. This much desired nomination greatly enhances the tourism visibility and cultural investment in the city and will hopefully greatly improve its urban development.

The replica galleon is to be built in the coming years and is expected to travel between European cities during 2016 to mark the San Sebastian celebrations, then set sail for Labrador and other East Coast destinations in 2017 in time for the 150th anniversary of Confederation. This endeavour is hoped to help spread awareness of the deep historical connection between Canada and Spain and of the importance of underwater cultural heritage¹⁹.

The original galleon and its surrounding Red Bay have been inscribed in the UNESCO World Heritage List. The wreck's characteristic structure serves now also as part of the logo of the UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage. The Red Bay population does now, also due to the ending of fishing income, live basically of tourism based on the Red Bay wreck.

GERMANY - HAITHABU

Haithabu (Hedeby) was an important trading settlement in the Danish-northern German borderland during the Viking Age. It flourished from the 8th to the 11th centuries.



After lengthy excavations of the site and the recovery of shipwrecks from the water, a museum was created and opened in 1985. More importantly, an ambitious archaeological reconstruction program was initiated in 2005 on the original site. Based on the results of this archaeological research, exact copies of some of the original Viking houses were built. In the complex the visitors can now view underwater archaeological finds in the form of Viking shipwrecks.

The German region of Schleswig-Holstein has invested 2.3 million Euros in support for the new concept museum built in 2009-2010. The contribution of the museum to the local and regional tourism is multifaceted, but can be considered as significant through the enrichment of the region by the cultural and recreational experiences offered.

Although many of the tourists to this area stayed at beach locations, many frequented the cultural offers of the region, like that of the Haithabu

¹⁹ Canada's oldest shipwreck to be resurrected in replica of 16th-century Basque galleon, Randy Boswell, Postmedia News www.canada.com/Canada+oldest+shipwreck+resurrected+replica+16th+century+Basque+galleon/7981207/story.html

museum, which is located close to the small city of Schleswig. According to a survey of the Haithabu museum most visitors came to the museum from the region with 38.5 % from the immediate regional surrounding and 91.4 % from Germany²⁰. Visitors from foreign countries amounted to 8.6 %²¹.

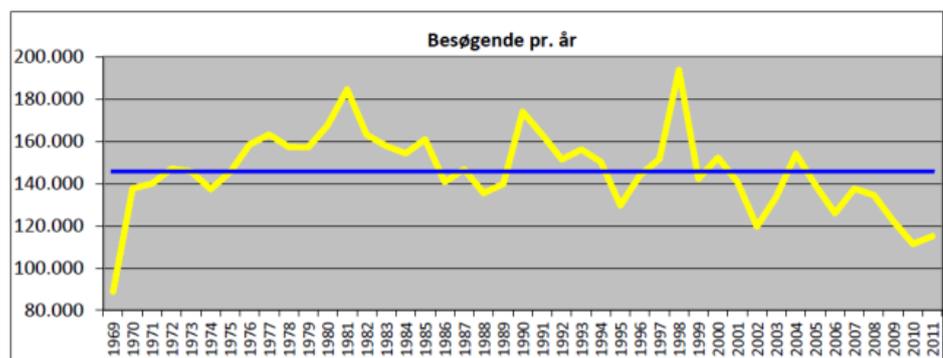
It should be noted that when visitors came to the museum, they spent a considerable portion of their day there. Since the opening in 1985 the Haithabu site has counted approximately 4.5 million visits. In 2011, there were 146,000 visits alone. This museum thrives from the Viking history steeped in the area and so this attraction leads the way for other museums in the German county of Schleswig-Holstein.

DANEMARK - VIKING SHIP MUSEUM, ROSKILDE

The Danish Roskilde Museum focuses on ancient and medieval ships, seafaring and boatbuilding. It displays five Viking ships discovered at Skuldelev. It also houses copies of a trading vessel and a warship. The boatbuilding tradition and culture of the Viking age are illustrated through working boat builders and exhibitions displayed at the museum. Craftsmen work in an archaeological workshop, where finds from throughout Denmark are measured and recorded, and maritime archaeology is held.



In 2011 there was a decrease in visitor numbers in accordance with the general decrease of tourism due to the economic crisis, although there were still an impressive 115,129 visitors²² (70,623 adults and 44,506 children under 18)²³ for a town of only 48.000 inhabitants. The following numbers were provided²⁴:



Graph showing visitor totals since the museum opened:

²⁰ Survey of the Schloss Gottdorf Haithabu museum undertaken in 2011

²¹ In 2002 a total of 176,198 hotel beds were available in Schleswig-Holstein, which were used in the same year by 2,968,406 visitors for 15,429,614 nights. 278,786 guests came from abroad, which represents 8.6% of the overnight guests.

²² Another well-visited and comparable, even if smaller, underwater cultural heritage museum in Denmark, the Strandingsmuseum St. Georg, attracts 40.000 visitors per year.

²³ Similar variations have been observed in other museums, like for instance in Portsmouth for the Mary Rose museum. It appears that temporary exhibitions, special events, openings and anniversaries are crucial for keeping the initial visitor numbers after a museum opening also for a long time.

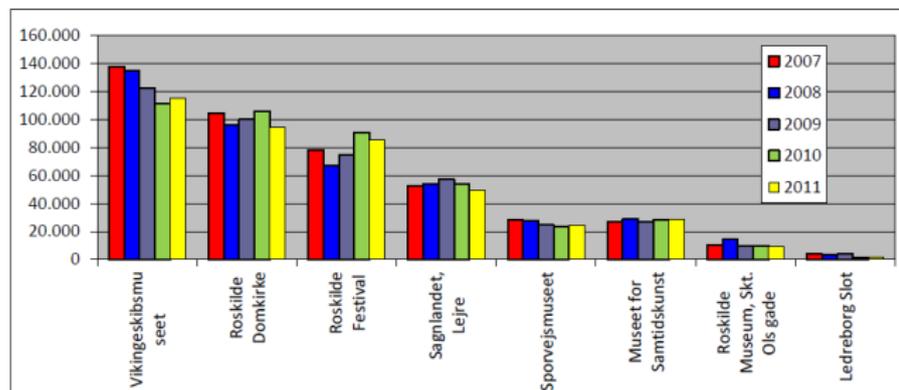
²⁴ Provided by the Viking Ship Museum, Roskilde in 2012.

Income from ticket sale: 1,069,455.31 USD

Costs in subsidies for the museum: The Viking Ship Museum has received approx. 2.4 Million USD in government grants in 2011, Roskilde municipality provided a grant of approx. 1.5 million USD. From the State, a total grant of approx. 850.000 USD was made in 2011 and the permanent government grants in 2011 totalled 36% of the museum's operating basis. It should be noted that each donation has reduced in comparison with previous years.

Purpose and stay of visitors in Roskilde: 39% of the Viking Ship Museum's visitors come to Roskilde solely to visit the museum and spend an average of 2-3 hours in the museum whereas 19% also visited Roskilde Cathedral, and 42% visited the town of Roskilde during their stay.

Visitor's expenditure in local economy during their stay: approx. 3.7 Million USD



Visitors' total of Roskilde attractions 2007-2011

The Viking Ship Museum has historical significance and is also central to the marketing of Roskilde as an active and attractive cultural destination. Its importance for tourism revenue in Roskilde and the Zealand region is illustrated by calculations²⁵ based on museum visit registrations and audience studies, which show that:

- 69.5% of visitors came from abroad
- 30.5% of visitors came from Denmark, of which 4.2% from Roskilde
- 44,900 people visited per year the area because of the Viking Ship Museum
- 21,875 people visited the area because of the Viking Ship Museum, but also for other attractions /locations in the area.
- 48,354 people visited the area or live in the area and visit the Viking Ship Museum
- 69% of the visitors were day visitors and 8% are overnight tourists.²⁶

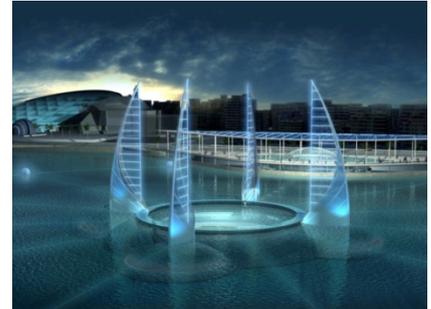
²⁵ made by ABS-analysis (Attractions' The Meaning of Society developed in cooperation ODA (Experience Development in Danish attractions)

²⁶ The data used have been processed in an adapted version of the officially recognized calculation models TØBBE and LINE. The calculations for 2011 are adjusted for the actual number of visitors to 115,129.

As an overall remark the Viking Ship Museum has benefitted the society in 2011 with tourism revenue of approx. 5.8 Mio USD with revenue of 3.7 Mio USD to the local area²⁷. Its cultural benefit, which is difficult to quantify, is of even more profound significance.

EGYPT - ALEXANDRIA UNDERWATER MUSEUM PROJECT

Some 40 years of intense archaeological research in the Eastern Harbour Bay of Alexandria and in the Bay of Abukir have revealed the existence of significant submerged ancient sites, including the "Portus Magnus" from the Ptolemaic period, remains of the lighthouse of Alexandria, three sunken cities and ancient shipwrecks including the flagship of Napoleon's fleet. Moreover, thousands of other equally important objects were discovered and identified.



While no museum has yet been built, an international exhibition was held in a number of countries and was dedicated to the discoveries of Alexandria and entitled "Egypt's Sunken Treasures". It was an immense success, demonstrating the vast international interest in these extraordinary findings²⁸. After Berlin, Paris, Bonn and Madrid, this exhibition went to Turin and then Yokohama in Japan. It was seen by almost 3 million visitors²⁹, making it one of the most noted exhibitions in recent years. The income generated was considerable and a portion was allocated to contribute to the planned underwater museum in Alexandria (1,6 Million USD).

Despite the exhibition's success, the city of Alexandria itself has yet to profit from this attention. A study from 2006 shows³⁰ that Alexandria's capacity for accommodating visitors is relatively limited³¹ but the expenditure of hotel clients in Alexandria was high (estimated at USD 44 million annually, including a contribution of USD 1.8 and USD 0.9 million in direct national and local tourism taxes). This total could be increased significantly if the length of the visitors stay was increased and if more cultural and recreational activities were introduced. This would especially need to target foreign leisure visitors.

²⁷ The museum's own turnover, employment and derivative taxes and fees are not included in the figures

²⁸ The exhibition "Egypt's Sunken Treasures" presented objects exclusively from the underwater excavations of the Institut Européen d'Archéologie Sous-Marine (IEASM), conducted since 1992 in Alexandria and Abukir Bay by Franck Goddio in co-operation with the Supreme Council of Antiquities in Egypt. Around 500 artefacts were on view, most of them never before shown in public. Among the impressive finds were 5 metres high statues of a king and queen, as well as statues of sphinxes, offerings and liturgical objects, stelae, jewellery and coins, ceramics and items from everyday life of ancient Egypt.

²⁹ Source: www.franckgoddio.org/events/temporary-exhibitions/egypts-sunken-treasures.html

³⁰ Alexandria City Development Strategy (CDS) & Alexandria Growth Pole Project

³¹ Hotel accommodation capacity of Alexandria is of 3,400 rooms, which is relatively low for such an important city, is insufficient for the number of visitors which would arrive, should an attraction be developed. Only 5 stars hotels had a good room occupancy rate of above 70 %, and only 2-10 % of foreign tourists to Egypt visited also Alexandria. In 2004, hotel arrivals totalled only 389,233 and bed-nights totalled 675,494. Both domestic and international hotel clients had only a very short average length of stay of 1.7 days and 70% of the hotel bookings were for business.

The proposal to build an underwater museum in Alexandria to accommodate the finds from Alexandria's harbour and in Abukir was greeted with much enthusiasm in the city, as it would provide the ideal reviving element to attract tourists who usually opt for visits to Gizeh and Sharm El Sheikh. It would also attract cruise and yachting tourism from the Mediterranean – as reiterated by an expert recommendation made at a UNESCO meeting in Alexandria in 2006.

The creation of the museum was estimated to lead to direct benefits in terms of employment (such as the construction industry) and upon completion, these are expected to continue with the jobs created for the operation and maintenance of the museum. A project of this scale was also expected to generate indirect benefits in terms of consumption through various services, with restaurants, hotels, transport, construction, and maintenance necessary for a rich tourism environment to flourish. Additionally, an indirect effect is the investment from other organisations and businesses in the development of the neighbourhood of the museum through the development of hotels, services, infrastructure, entertainment, cruises, guided tours, weekends organized to combine Alexandria, north east and west coasts to Alamein or to Port Said and the Suez Canal.

Until now the circumstances have not permitted the undertaking of such a project in Alexandria, however, it is foreseen in the long-term planning of the Egyptian authorities in cooperation with UNESCO.

SWEDEN - VASA MUSEUM

The Swedish *Vasa* Museum presents the *Vasa*, a warship, which was, at the time of launching, heralded as the most powerful boat ever built, but ironically sank in 1628, shortly after being launched. The exceptionally well preserved shipwreck was extracted from the port of



Stockholm in 1961 and is now exhibited in the *Vasa* museum, which is not only an exemplary in its guild but the recovery itself of the *Vasa* has also much influenced the development of underwater archaeology and conservation of water logged finds.

The *Vasa* shipwreck museum in Sweden is visited by 1 Million visitors a year and constitutes the most visited museum of the country. The ship has been visited by over 30 million people since the vessel's extraction in 1961.

Typically, these tourists spend an additional day in Stockholm, with an average of 200 Euros spent per tourist per day in hotel, meals and other expenses. This amounts to the attractive sum of 200 million Euros (260

million USD) of increased spending in the city of Stockholm per year, excluding the museum entry fees.³²

A survey of this museum from 2009 shows that the museum's visitors vary from all ages, with the average being 41 years of age. 20% of the visitors live in Sweden and 80% come from abroad. Visitors from Germany and the USA constitute the majority of those coming from over-seas with 13% of the *Vasa* museum's visitors from Germany and 13% from the USA. A rapidly growing demographic of visitors is constituted by Russian tourists. The percentage of visitors from Russia has increased from 3% to 7.5% in under a year and 6% of the participants in the survey were from Spain.³³

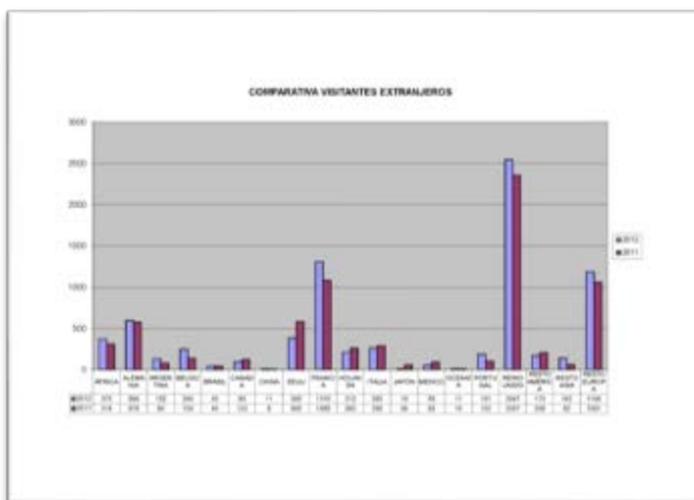
SPAIN - NATIONAL MUSEUM OF UNDERWATER ARCHAEOLOGY ARQUA, CARTAGENA

The National Museum of Underwater Archaeology of Spain, ARQUA, is the institution responsible for raising public awareness of the underwater cultural heritage of Spain, promoting its conservation, and thus enhancing its appreciation and enjoyment.³⁴



ARQUA's permanent exhibition features the timbers of a seventh-century B.C Phoenician shipwreck, the *Mazarón I*, which was discovered near Cartagena. The construction of this museum was inaugurated at the same time as the restoration of a close-by Roman amphitheatre which brought the complete renovation of Cartagena's city centre and its port area in 2008. Four years later,

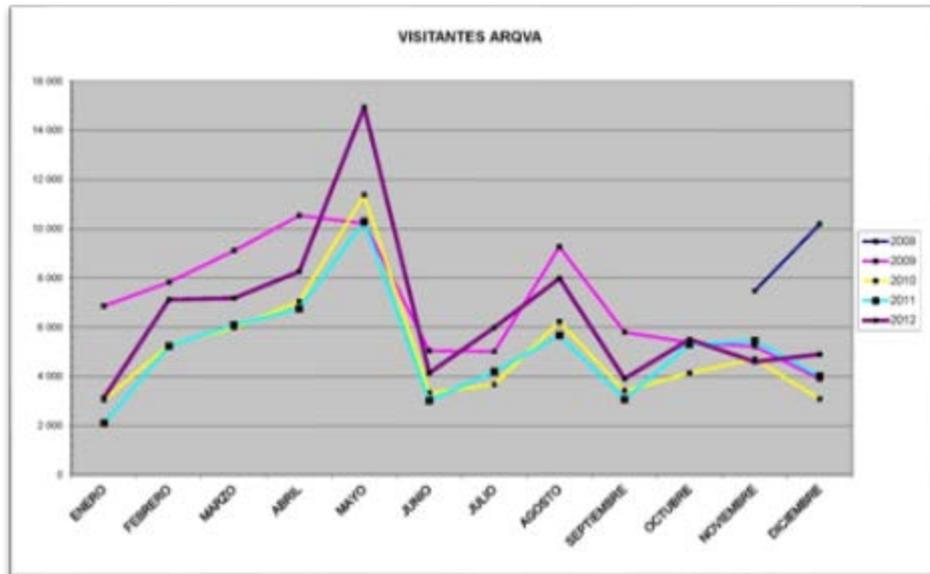
tourism in the city of Cartagena had increased by 10% with raising numbers of cruises including Cartagena in their stopovers contributing to the success.



³² These expenditure numbers do not consider the material effort made in exchange for them (hotel building, hotel staff, restaurant services etc.). These have not been considered as also hotel and restaurant staff employment and material acquisition have been considered beneficial for the city of Stockholm.

³³ The statistics are based on surveys conducted during visits in 2009. Every 70th visitor answered questions during a five day period, with a total of 514 respondents. www.vasamuseet.se/en/Press/Vasa-in-brief/Who-visits-Vasa

³⁴ See <http://en.museoarqua.mcu.es/museo/mision/index.html>



TURKEY - BODRUM MUSEUM

The *Bodrum museum* in Turkey is a striking example of how the protection of underwater cultural heritage contributes to the development of a city. When excavations of the Uluburun wreck started in 1959, Bodrum had



approximately 5,000 inhabitants. Through the valorisation of the wreck in the Bodrum castle, established in 1961, as well as the surrounding heritage, tourism has increased. The castle is now the second most visited museum in Turkey and has won numerous awards with its display of finds from underwater excavations along the Turkish coast.

Considering the development of this museum, although offering countless benefits, it should be noted that a large part of the today's visitors are now attracted by the town's beach and party attractions rather than the cultural sites that initiated the tourism build-up. The museum Director Yazar Yildiz estimated that in 2012 only 10-15 % of the tourists to Bodrum visited the museum.

In the year 2011 the Bodrum Museum had the following results:

- Number of museum visitors: 292.648
- Ticket income: approx. 1 million USD
- Length of stay of the visitors in museum: 1 or 3 hours per day

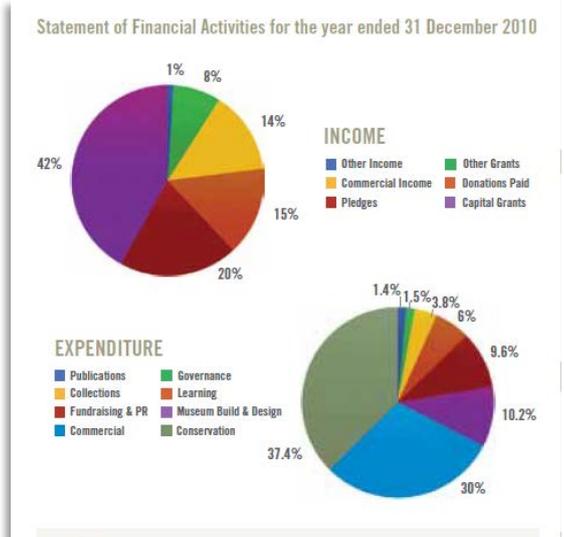
UNITED KINGDOM - MARY ROSE MUSEUM

Income & Expenditure	Total 2010	Total 2009
	£	£
Income Resources		
Visitor related	73,787	83,137
Commercial Trading Income	1,035,277	1,143,874
Grants receivable	4,097,391	2,801,497
Donations	2,911,304	3,030,865
Donated Gifts	41,007	68,635
Invested Income	40,137	38,874
Miscellaneous	2,970	2,575
Total Incoming Resources	8,201,873	7,169,457
Charitable Activities Expenditure		
Commercial Trading	928,429	1,004,872
Learning	185,355	166,072
Conservation	1,155,771	1,021,253
Collections	118,759	114,742
Publications	44,271	49,442
Museum Build & Design	259,374	272,705
	2,691,959	2,629,086
Other expenditure		
Fundraising and public relations	296,425	258,538
Governance Costs	47,754	49,224
Demolish Viewing Platform	54,602	0
	398,781	307,762
Total Resources Expended	3,090,740	2,936,848
Net incoming/(outgoing) resources	5,111,133	4,232,609
Total funds brought forward	13,608,823	9,376,214
Total funds carried forwards	18,719,956	13,608,823

NOTE -
 1. A major Fundraising Drive commenced in 2007 in order to raise £14 million towards the total cost of a new museum of £35 million. The results have raised £11.2 million, net of fundraising costs, of which £3.9 million has been pledged to be paid over the next 5 years.
 2. The accounts have been compiled in accordance with the latest SORP
 3. The grants received are significantly higher from the Heritage Lottery Fund, as we have now commissioned building the new museum.



The *Mary Rose* Museum in Portsmouth displays the 16th century Tudor navy warship *Mary Rose*, which was once the main vessel in King Henry VIII's fleet, as well as the historical context during the one she was used. Built in 1509-1510, it sunk in 1545 during a battle against France.



Discovered in 1971, the wreck was studied and recovered in 1982 and is now displayed on the wharf of Portsmouth, UK. Initially the wreck was exhibited in a temporary conservation hall but a new museum has subsequently been built and opened in 2013.

Although it has been recognised that the *Mary Rose* Trust has a collection of national importance, the *Mary Rose* Museum is not a national museum, and relies on income from visitors, grants, donations and sponsorship to carry out the work. The finalisation of the conservation of the hull and the building of a permanent museum was made possible by a 31 million USD grant from the UK's Heritage Lottery Fund. The *Mary Rose* Trust has to find the rest of the cost approx. 23 million USD from donations and grants from companies, charities, individuals and the general public.

By March 2011, over £12 million had been raised and the foundation stone for the new museum was laid on 18 March 2011. The formal opening took place in May 2013.

USA - GREAT LAKE MARITIME MUSEUMS

There are seven well-regarded maritime Underwater Cultural Heritage Museums in the US Great Lakes region, Vermont and Lake Champlain. All of them are well visited and appreciated by their surrounding community. They include:

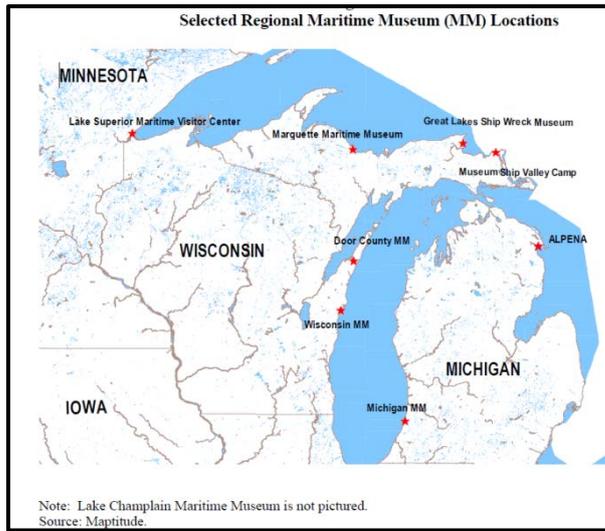
- Door County Maritime Museum
- Great Lakes Shipwreck Museum
- Lake Champlain Maritime Museum
- Lake Superior Maritime Visitors Centre
- Marquette Maritime Museum
- Michigan Maritime Museum
- Museum Ship Valley Camp
- Wisconsin Maritime Museum³⁵

The annual attendance of these museums is at an average of 91,978 visitors per museum. The Lake Superior Visitor Centre alone attracts annually more than 400,000 visitors. The budgets of the museums range from USD 110,000 to USD 2 million, depending on the size of the facility, the exhibitions, programming, staffing and operation hours.

Their revenue sources include donations, grants and contracts for specific projects and programs, membership dues, and earned income, including admissions, program fees, museum store sales and endowment distributions. Government sponsored facilities such as the Lake Superior Maritime Visitor Centre constitutes virtually the entirety of the funding from the government, while other museums receive very little public support - earned revenue at these comparable museums range from as little as 5 % to close to 90 %.

³⁵ Information from Study on the Market Potential of the Thunder Bay Maritime Center, ConsultEcon, Inc/Office of Thomas J. Martin Economic Research and Management Consultants, Prepared for National Marine Sanctuary Foundation, May 2003

Comparison of Operating Characteristics of Selected Maritime Museum



Museum	Paid Employees	Budget	Family Membership	Members
Door County Maritime Museum	5F/6P	\$600,000	\$45	1,000
The Great Lakes Shipwreck Museum	8F/32P	\$2,000,000	\$34	1,500
Lake Champlain Maritime Museum	14F/29P	\$1,700,000	\$50	1,250
Lake Superior Maritime Visitors Center	4F/2P	\$450,000	\$40	500
Marquette Maritime Museum	1F/5P	\$110,000	\$40	190
Michigan Maritime Museum	4F/10P	\$490,000	\$40	400
Museum Ship Valley Camp	1F/9P	NA	\$50	1,400
Wisconsin Maritime Museum	12F/23P	\$750,000	\$45	750
Average		\$871,429	\$43	874

Comparison of Market Characteristics of Selected Maritime Museums

Museum	Location	Adult Price	Seasonal	Metro/County Pop.	Annual Attendance
Door County Maritime Museum	Sturgeon Bay, WI ^{1/}	\$6.50	No	28,300	64,450
The Great Lakes Shipwreck Museum	Paradise, MI ^{2/}	\$8.50	Yes	39,200	87,000
Lake Champlain Maritime Museum	Vergennes, VT ^{3/}	\$10.00	Yes	36,600	24,856
Lake Superior Maritime Visitors Center	Duluth, MN ^{4/}	Free	No	243,600	410,000
Marquette Maritime Museum	Marquette, MI ^{5/}	\$3.00	Yes	64,000	12,000
Michigan Maritime Museum	South Haven, MI ^{6/}	\$2.50	No	454,900	30,000
Museum Ship Valley Camp	Sault Ste. Marie, MI ^{7/}	\$8.00	Yes	39,200	42,000
Wisconsin Maritime Museum	Manitowoc, WI ^{8/}	\$7.00	No	82,700	65,520
Average		\$5.69		123,563	91,978
Average (not including LSMVC)		\$6.50			46,547

1/ Door County
 2/ Chippewa County
 3/ Addison County
 4/ Duluth-Superior Metro Area
 5/ Marquette County
 6/ Kalamazoo-Battle Creek Metro Area
 7/ Chippewa County
 8/ Manitowoc County

The effect tourism has caused for the income of these museums and their surrounding region is considerable and there appears to be a strong market for these maritime museums and related tourism. All these museums have sustained their operations for a many years thanks to their exceptional calibre of exhibits and programs, strong business practices, and the interest and support from residents and visitors. In 1995 there were an estimated 34.5 million domestic travellers in Michigan, USA. The situation in the states of Wisconsin and Minnesota is similar. In 2000 Michigan’s travel and tourism industry generated USD 12.8 billion in direct revenues, with these revenues

supporting 173,000 employees with USD 3.8 billion in payroll. This industry generated over USD 800 million in tax receipts to State and local governments. Approximately 79 % of visitors travel for leisure, the remainder for business purposes. The region of the Center, North-eastern Michigan, is an overnight visitor market. Approximately 90 % stay overnight, with the remainder on day trips³⁶.

DIVE TOURISM

Underwater cultural heritage is an appreciated diving subject. A list of top ten dive attractions published in 2006 on the UK based website Scuba travel³⁷ placed the *Yongala* shipwreck site as the number 1 dive site worldwide. It was followed by the *Thistlegorm* wreck in the Red Sea and The *Liberty* wreck in Bali which was placed at number 9 of the list. The Bikini Atoll (Marshall Island), Scapa Flow (UK) and Chuuk Lagoon(FSM)³⁸ are also referred to in other publications due to their significance.

Statistics from PADI (the Professional Association of Diving Instructors) shows that 80 % of the qualified open water divers have a college education and can be counted as members of the higher income groups with the means to spend more money on their travels than the average tourist. However, in the same respect, it is important to note that although the demographic of divers is among the more financially stable, they are also aging, with slightly decreasing popularity among the younger generations. This may be due to the financial implications of diving. It may however also be due to the current main focus on coral reefs and fish populations. An increase in the accessibility of underwater cultural sites would here certainly serve to attract more young people to this field due to their cultural, and not purely environmental, draw.

It is difficult to measure the success and contribution that underwater and maritime heritage has made to the local economy - when divers are invited to access sites through charter boats, personal boats, or shore entry, counting their number may not be possible.³⁹ Some underwater preserves, such as those in Vermont and New York, USA are strictly controlled and

³⁶ Information from Study on the Market Potential of the Thunder Bay Maritime Center, Consult Econ, Inc/Office of Thomas J. Martin Economic Research and Management Consultants, Prepared for National Marine Sanctuary Foundation, May 2003

³⁷ www.scubatravel.co.uk

³⁸ See for example the CNN World's 50 best dive sites under <http://travel.cnn.com/explorations/escape/outdoor-adventures/worlds-50-best-dive-sites-895793> or the list of the Dive Site Directory listing Bikini Atoll, Truk Lagoon, Scapa Flow, the wreck sites in the Red Sea, and wreck diving in Malta

³⁹ Surveys and questionnaires, distributed through participating dive shops or via the Internet, are useful to count visitors whenever they make the effort to complete and submit them. It has been proposed that models could be instituted, in which diving to shipwreck sites will only be permitted through certain charter boat businesses or dive shops that agree to participate in preserving and monitoring the site and possibly pay also a fee. This, however, will not always account for divers who use private vessels or who enter the water from shore if the site is nearby.

visitors are required to register before diving the sites. Guided tours are also the only means to see Curaçao's *SS Mediator* preserve. In such cases visitors can be counted. Such measures are however only possible in locations with relatively light visitor traffic. Similar regulations would be difficult in locations such as Florida, the top sport diving destination in the USA, or in the Caribbean with a high volume of diving and snorkelling visitors.⁴⁰

Equally, when looking at the numbers of tourists coming to a country it is difficult to assess the extent that diving was a motive.

Some illustrative and impressive examples of the importance of underwater cultural heritage for sustainable tourism development, but also the cultural and recreational value of a region, which have been measured, are however given here below:

AUSTRALIA – YONGALA

The passenger ship *SS Yongala* sank off Cape Bowling Green, Queensland, Australia on 23 March 1911. Today it is a major tourist attraction for the scuba diving industry in Townsville, Australia. The wreck lies within the Central Section of the Great Barrier Reef Marine Park. This, combined with its own



beauty, makes it a popular dive spot. It features an extensive array of marine life and at 110 metres long, she is one of the largest, most intact historic shipwrecks, and unsurprisingly one of the top ten dive site recognised worldwide.

While the shipwreck has raised the awareness of wreck sites as cultural heritage site and tourist attraction, the site is impacted by the heavy visitor traffic. Due to this access is through permit only, obtained on application through the Museum of Tropical Queensland. Access conditions apply. The Maritime Museum of Townsville has moreover an extensive display of *Yongala* memorabilia.

The importance of the wreck for local tourism is considerable, with more than 10,000 divers visiting the wreck every year. While their number is smaller than that of museum visitors for the museums presented in this study, the amount spent for a diving excursion is considerably higher than that spent for museum visits and the stay of the divers in the town is also longer and this contribution to local tourism is thus considerably higher.

Divers book high-price diving excursions from one to several days, and when one day dive tour to the *Yongala* costs around approx. 224 USD⁴¹, so

⁴⁰ Preserves, Parks, and Trails: Strategy and Response in Maritime Archaeology, Della Scott-Ireton, USA

⁴¹ See for instance www.yongaladive.com.au/about-us and www.divethereef.com/DiveTrips/-55781637.asp.

multiplied by the visiting 10,000 divers creates 2.3 Million Australian dollars, approx. 237 million USD, for booked tours only per year (with the assumption that they take a simple one-day tour). Also for consideration is the money spent on hotels and restaurants in Townsville.

Tourism in Townsville and Queensland, Australia, is an important source of income. In 2010-11 tourism directly accounted for 124,000 jobs and indirectly 96,000 making up 9.5% of employment in the state of Queensland.⁴²

For 2012, tourism exports were \$3.8 billion (approx. 3.9 billion USD) for Queensland. Tourism is the state's second largest export, (second only to coal) and a major part of that tourism is dive tourism.⁴³

For 2012 domestic overnight visitors spent USD 14.3 billion whereas domestic day visitors spent USD 4.2 billion and international visitors spent USD 3.9 billion; totalling USD 22.5 billion; nearly USD 62 million per day.⁴⁴

CHUUK LAGOON- FEDERAL STATES OF MICRONESIA

Chuuk Lagoon, formerly known as Truk Lagoon, is a sheltered body of water in the central Pacific. It belongs to the Federal States of Micronesia and consists of a protective reef enclosing a natural harbour. During World War II, the lagoon was Japan's main base in the South Pacific. The US war operation 'Hailstone' sunk twelve Japanese warships, thirty-two merchant ships and 249 aircraft in the lagoon in 1944. The resulting wreck-remains are now world-renowned as a scuba diving paradise. The PADI *Encyclopedia of Recreational Diving* lists the lagoon is one of four "Meccas" for wreck diving. Although Chuuk Lagoon contains a number of spectacular wrecks, the *Fujikawa Maru* is often singled out by diving magazines and travel guides as one of the top 10 wreck dives in the world.⁴⁵

Today, diving visitors are the major source of income for Chuuk. In 2006 some 5,000 tourist visited Chuuk out of 13,300 that visited the Federal State of Micronesia⁴⁶.



⁴² This is substantially more than the mining sector (55,500 direct jobs) or even agriculture, forestry and fishing (77,900 direct jobs). Cafes, restaurants and takeaway food services had the largest share of tourism employment (26 %), followed by retail trade (18 %) and accommodation (14 %).⁴² In 2010-11 direct and indirect tourism GSP was \$17.5 billion (approx. 18 billion USD), or 6.6% of total Queensland GSP. Direct tourism income contributed \$8.4 billion (8.7 billion USD) directly to the Queensland economy, accounting for 3.1% of Queensland's GSP.⁴² The tourism sector is home to many small businesses, with 9 out of 10 tourism businesses employing less than 20 people. It is estimated that as of June 2011, Queensland had 55,700 tourism related businesses, representing 12.9% of all registered businesses in the state.⁴² Net taxes on tourism products arising from tourism consumption in Queensland were 795 million Australian Dollars (approx. 820 million USD) in federal, state and local government revenues and constituted 25.7% of total taxes on tourism products as a whole

⁴³ Tourism Research Australia - International Visitor Survey

⁴⁴ Tourism Research Australia - International and National Visitor Surveys

⁴⁵ See <http://wikitravel.org/en/Chuuk>

⁴⁶ 2006 FSM International Visitor Arrival Statistics report www.spc.int/prism/country/fm/stats/Publications/Quarterly/VAs/16IVA_Oct05-Dec06.pdf

This number could be much higher, bringing with it an increase in revenue, but until now there is still transport facilitation and tourist infrastructure to be improved.

A dive centre candidly promotes dives by writing on their website *“Chuuk is admittedly an unsophisticated destination without a social structure that invites the visitor outside of their hotel for an evening of entertainment.”*⁴⁷ Similarly, the contributors of the online travel guide Wikitravel state that *‘apart from scuba diving, there is not very much to do in Chuuk. There are no real beaches on Weno (although some of the outer islands which can be reached by boat do have beaches). None of the hotels on Chuuk even has a swimming pool. For non-diving spouses, a trip to Chuuk can be a dull and tiresome affair’.*⁴⁸

There are also issues of protection to be resolved, ranging from the simple preservation of the mainly metallic remains to unexploded ordnance and fuel substances still present in some wrecks. One of the major attractions of the wrecks is their beautiful coral growth that could be endangered by fuel leaks, similar to that encountered on the *Mississinewa* wreck⁴⁹.

EGYPT – ALEXANDRIA EASTERN HARBOUR

The remains of the lighthouse and the Ptolemaic palace previously mentioned can be visited by renting scuba diving gear from an Alexandria dive centre. However, divers must expect poor visibility due to the canalisation of the city that goes in part into the harbour. There are little safety procedures and there is a poor explanation of the site.

What has the potential to be one of the most fascinating dive sites the world has to offer, given that the lighthouse was once counted as one of the Seven Wonders of the World, is thus only a very scarcely visited site. This example demonstrates how the absence of the necessary infrastructure for touristic access and necessary facilities, valorisation and site protection lead to the loss of a great tourist potential for a city.

GRENADA – SHIPWRECK DIVING

Grenada is 344 km² and has the estimated population of 110,000. The annual overall income of the country is about USD 1 billion. Grenada enjoys thriving dive tourism, especially utilising shipwrecks. Despite being the host of many dive-worthy sites, Grenada’s signature wreck is the *Bianca C*, a former Italian luxury liner.

⁴⁷ See www.dive-truklagoon.com/faqs.html

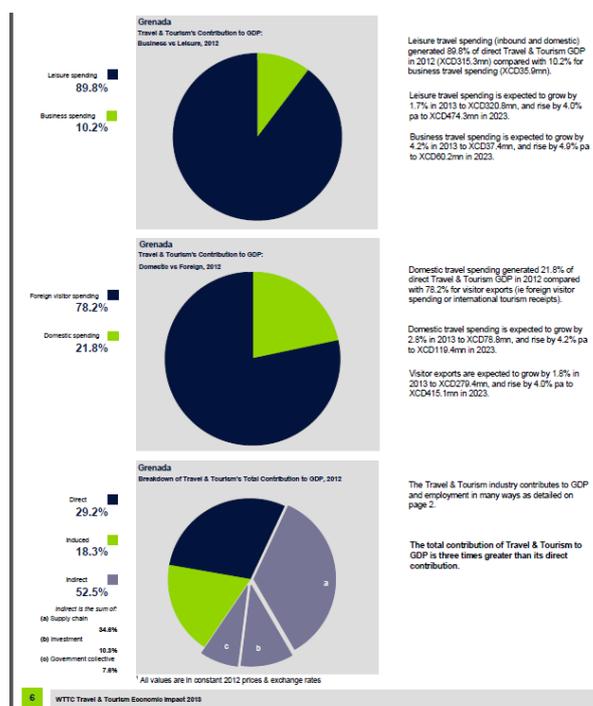
⁴⁸ See <http://wikitravel.org/en/Chuuk>

⁴⁹ The *Mississinewa* wreck leaked oil and cleaning was necessary in 2003. See for more on these issues in the UNESCO publication “Underwater Cultural heritage in Oceania” at <http://unesdoc.unesco.org/images/0018/001887/188770e.pdf>. See also the [Report of U.S. Navy survey dive expedition in August 2001](#) and the [Report of U.S. Navy oil recovery dives in February 2003](#).

Diving is important for the country, as it is reliant on tourism to fuel its economy, and as most tourists come for the enjoyment of water related sports, diving is of prominent importance.

At present tourism serves as the leading foreign currency earning sector⁵⁰. Tourist arrivals numbered 114,000 in 2009⁵¹. There were 1,758 hotel rooms with 3,844 beds available that same year. The average length of stay was seven nights. In 2005, the US Department of State estimated the daily cost of staying in Grenada at USD 261 from April through December. The rest of the year was estimated at USD 300 per day.⁵² Tourism expenditures in Grenada were last reported at 2.64 % of total imports in 2010⁵³.

Diving on the underwater cultural heritage sites will account for a major part of the income. A 2-dive excursion is available at around 100 USD plus the equipment (is extra)⁵⁴. There are also promotional package deals which for example offer 20 dives for 940 USD.



ITALY – BAIA

The ancient city of Baia was a popular seaside resort for rich families of the ancient Roman Empire. In fact, at the end of the Roman Republic it was more

⁵⁰ Especially since the construction of an international airport in 1985. Since 1989, American Airlines nonstop service to Grenada has boosted tourism. <http://worldfacts.us/Grenada.htm>

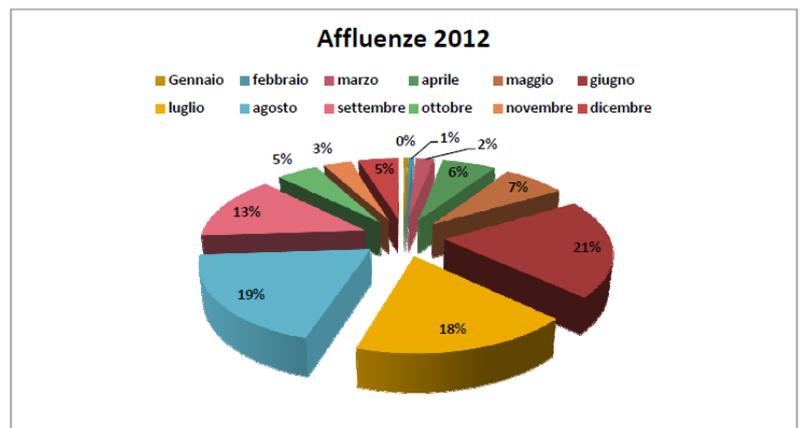
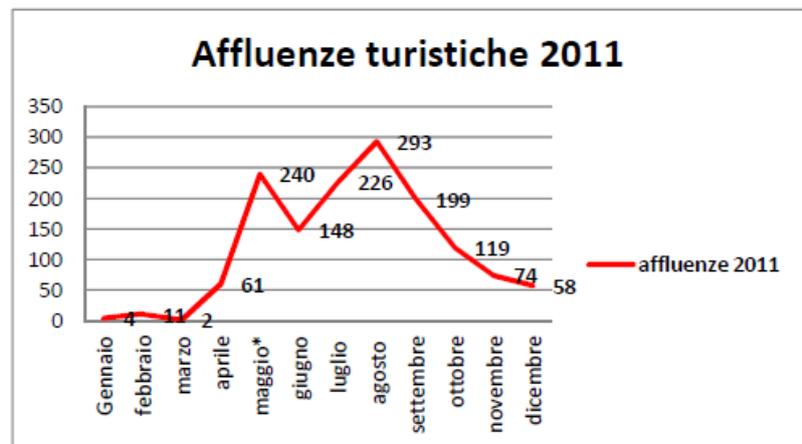
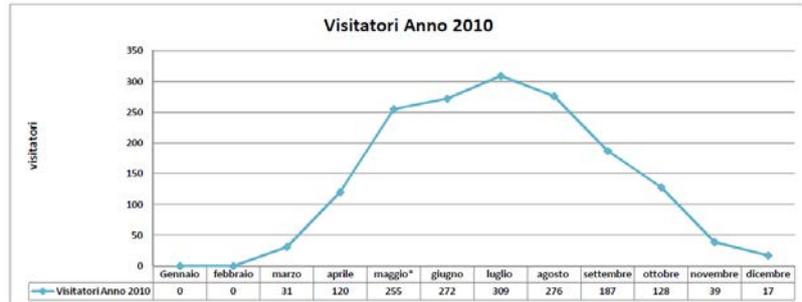
⁵¹ According to a World Bank report, published in 2010.

⁵² <http://www.encyclopedia.com/topic/Grenada.aspx>

⁵³ . As a result there has been substantial foreign investment in the hotel and construction sector. Travel & Tourism generated 2,500 jobs directly in 2012 (5.9% of total employment) and this is forecast to grow by 1.9% in 2013 to 3,000 (6.0% of total employment). This includes employment by hotels, travel agents, airlines and other transportation services. It also includes, for example, the activities of the restaurant and leisure industries directly supported by tourists. According to the WTTC by 2023, Travel & Tourism will account for 3,000 jobs directly, an increase of 0.9% per annum over the next ten years.

⁵⁴ <http://www.divegrenada.com/diving.htm>; <http://www.scubatech-grenada.com/en/our-prices>

important and fashionable than Pompeii or Herculaneum. However, due to volcanic activity and coastal subsidence, most of the Roman Baiae is submerged



The surrounding site of Baia is already popular with tourists. The site is close to the major city of Naples and the close by city of Pozzuoli, is also a cultural interesting site.

In 2002, the Underwater Archaeological Park of Baia was established. It prohibited all navigational activity in its waters and made efforts to protect the marine area. An agreement was made between authorities and diving clubs in order to provide the means to allow public access to the magnificent site.

Over the last three years the Underwater Archaeological Park of Baia has seen an increase in the number of visitors with the high season being from April to October, coinciding with the summer months which are most conducive comfortable access to the archaeological remains in situ.⁵⁵ The number of diving centres has also increased in the area fostering the economic activity of this specific area.

JAMAICA- PORT ROYAL

Once known as the "richest and wickedest city in the world", Port Royal is home to the history and tales of a 17th century pirate haven. The most famous pirate who operated from Port Royal was Sir Henry Morgan who plundered Spanish vessels travelling in the Caribbean. The city was initially prosperous, but a strong earthquake struck the area on 7 June 7 1692 sinking the ships in the harbour and killing many people. The earthquake moved much of the city into the sea⁵⁶ which caused a rich underwater heritage.

Most of the buildings at the port today are thus not the original buildings, but the remains of the latter are still preserved under water and have been archaeologically surveyed and excavated by the Texas based INA.

They are accessible, but here as well a better valorisation of the site would bring a strong increase in benefit. Until now that is little done. Its importance has been recognized by the Jamaican authorities that proposed it for World Heritage List inscription, but without an improvement in the management of the site its significance for the city or the country rests little visible.

UNITED KINGDOM - SCAPA FLOW, SCYLLA AND STIRLING CASTLE WRECKS

The UK has some 270,000⁵⁷ recreational divers with 70% of their activity focused on the British coast, if not abroad. Their recreational diving is focused on the thousands of wrecks around the UK coastline, made up mainly by wrecks left from the two World Wars. The remains of the German High Seas Fleet scuttled in Scapa Flow, Orkneys, from the end of World War I in June 1919 counts among the most popular sites. Over 15,000 dives were carried out on that fleet in 2006, with 1,640 scuba divers visiting three of Scotland's eight designated wrecks with a 'visitor licence' granted by Historic Scotland between 1994 and 2009⁵⁸. In England, increasing numbers of visitor licenses were issued for its protected sites, with the most popular being the *Coronation* wreck⁵⁹, which attracted approximately 1,000 licensed visitors in its first year of operation. The lack of data, due to the fragmented nature of

⁵⁵ Soprintendenza Speciale per I Beni Archeologici di Napoli e Pompei.

⁵⁶ [http://wikitravel.org/en/Kingston_\(Jamaica\)](http://wikitravel.org/en/Kingston_(Jamaica))

⁵⁷ According to information published in Charting Progress 2 (Department for Environment, Food and Rural Affairs [DEFRA] 2010)

⁵⁸ Scottish Government 2010 cited by Christopher j. Underwood in "Out of sight, out of mind, and at risk: the United Kingdom public's engagement with heritage."

⁵⁹ Coronation is a 90-gun second-rate ship, built in 1685 at Portsmouth (DCMS 2009).

the sector and the reality that visits to offshore wreck sites are often free, make it however difficult to calculate the overall direct economic benefit of these public visits to the wreck sites.

An example where the financial contribution of diver tourism is measurable and has raised government awareness of the social and economic potential of shipwrecks is the *Scylla*. The frigate became in 2004 Europe's first "artificial" wreck site as attraction for scuba divers. Following an initial investment of USD 2 million in the first operational year, it showed an overall return of USD 2.25 million: "... with an estimate of 35.46 full-time equivalent (FTE) jobs made up of supporting clubs, centres and charter boat operators as well as tourism related businesses...with 27.8 jobs (FTE) being created in the South-west region within which the *Scylla* is located with a net income of USD1.85 million"⁶⁰.

Contrastingly, a site which has been left undeveloped and thus unprofitable is *Stirling Castle* wreck in the UK, a ship which sank in 1703. After its discovery and survey there were no major initiatives organized aimed at the site's long-term stabilisation and preservation. Although scuba divers can visit the shipwreck under license, the site is in an exposed offshore location and diving is difficult. Visitors total on this site only a few hundred divers per year. They do hence not much influence the region's visitor figures. Due to the fact that most of the public could not get into direct contact with the wreck, even through the internet the story of the *Stirling Castle* has failed to motivate the public into more proactive action. This endangers the future of this important underwater heritage site⁶¹.

USA - THUNDER BAY NATIONAL MARINE SANCTUARY & GREAT LAKES MARITIME HERITAGE CENTER, MICHIGAN

Located in north western Lake Huron, Thunder Bay is adjacent to a treacherous stretch of water within the Great Lakes system, which caused many ships to wreck in this location. The US Thunder Bay National Marine Sanctuary and Underwater Preserve (Thunder Bay NMS) was designated in 2000 and is a freshwater inland sanctuary belonging to the US National Marine Sanctuary System. It protects 160 ancient shipwrecks.

The range of depths of the shipwrecks appeals to a variety of diver skill levels and also promises recreational opportunities for non-divers. The shallower wrecks can be viewed by snorkelers, kayakers, and boaters. The sanctuary partners with a local company to provide access to



⁶⁰ DEFRA: 2011 cited by Christopher J. Underwood in "Out of sight, out of mind, and at risk: the United Kingdom public's engagement with heritage."

⁶¹ Christopher J. Underwood, Out of sight, out of mind, and at risk: the United Kingdom public's engagement with heritage.

the shipwrecks through glass bottom boat tours, which charge 30 USD per ticket for adults and 10 USD for children.

In 2003, the National Marine Sanctuary Program of NOAA provided USD 530,000 in funding to the Thunder Bay NMS. The State of Michigan provided USD 250,000. The offers of the Sanctuary and its partners do however greatly contribute to local tourism development. Tourism is an important source of income for the region⁶². The region, Alpena County, with its natural beauty and its abundant recreational opportunities and maritime history make it a popular destination for tourists. The MSU Tourism Resource Centre estimated that in 1996 there were over 700,000 trips made in the county. These visitors were estimated to have an economic impact of over USD 38 million dollars. A further study indicates⁶³ that the average length of stay for leisure travellers was 2.05 days.

Furthermore, in a recent study⁶⁴ it was found that the counties surrounding Thunder Bay National Marine Sanctuary garner USD 100 million in sales associated with sanctuary activities, USD 39.1 million in personal income to residents, USD 59.1 million in value added and 1,704 jobs.⁶⁵

The Great Lakes Maritime Heritage Center complements now the marine sanctuary. A study on its feasibility, executed in 2003, estimated its attendance potential at 58,300 visitors annually, which was exceeded by the actual visitor numbers of 70,000 annually. Operating expenses were estimated at approximately USD 1,056,000 annually. The admission to this center is free.⁶⁶ Funding comes mainly from government sources, the center has however also created a non-profit foundation. Grants, donations, and profits from the gift shop provide additional funds.

⁶² Information from Study on the Market Potential of the Thunder Bay Maritime Center, ConsultEcon, Inc./Office of Thomas J. Martin Economic Research and Management Consultants, Prepared for National Marine Sanctuary Foundation, May 2003

⁶³ D.K. Shifflet Travel Survey of the 12 county area

⁶⁴ Ehler, Rod and Jordan Parrillo. Northeast Michigan Integrated Assessment Final Report: Socioeconomic Assessment. NOAA and Michigan Sea Grant. 2009.

⁶⁵ An overall study on the entire US National Park System (also including parks not focusing on underwater cultural heritage) showed that the parks received 281 million recreation visits in 2010. Park visitors spent USD 12.13 billion in local gateway regions (within roughly 60 miles of the park). Visitors staying outside the park in motels, hotels, cabins and bed and breakfasts accounted for 56% of the total spending. Half of the spending was for lodging and meals, 19% for gas and local transportation, 10% for amusements, 8% for groceries, and 13% for other retail purchases. The contribution of this spending to the US national economy was 258,400 jobs, USD 9.8 billion in labor income, and USD 16.6 billion in value added. The direct effects of visitor spending were at the local level in gateway regions around national parks. Local economic impacts were estimated after excluding spending by visitors from the local area (9.8% of the total). Combining local impacts across all parks yields a total local impact including direct and secondary effects of 156,280 jobs, USD 4.68 billion in labor income, and USD 7.65 billion value added. The four local economic sectors most directly affected by non-local visitor spending are lodging, restaurants, retail trade, and amusements. Visitor spending supported 43,160 jobs in restaurants and bars, 32,000 jobs in lodging sectors, 23,000 jobs in retail and wholesale trade, and 18,560 jobs in amusements. The parks also impacted the local and national economies through the NPS payroll. In 2010 the US National Park Service employed 26,031 people with a total payroll of USD 1,709 million in wages, salaries, and payroll benefits. Including the induced effects of the spending of NPS wages and salaries in the local region, the total local economic impacts of park payrolls are USD 1.95 billion in labor income, USD 2.16 billion in value added, and 32,407 jobs (including NPS jobs). The impacts of the park payroll on the national economy are USD 2.41 billion in labor income, \$2.96 billion in value added, and 41,700 jobs. Combining the impacts of non-local visitor spending and NPS payroll-related spending yields a total impact of 300,000 jobs nationally of which 189,000 are in the local regions around national parks.

⁶⁶ A report on the economic impact of this center is in preparation by the University of Michigan (2012).

USA - FLORIDA KEYS

In 1987, Florida began to develop a state-wide system of underwater parks featuring shipwrecks and other historic sites. The shipwreck preserves have become popular attractions for skin and scuba diving visitors to witness a part of Florida's history first-hand. They contain not only interesting archaeological features, but also an abundance of marine life that make the parks living museums in the sea. Each site is interpreted by an underwater plaque; a brochure and laminated underwater guides are available from local dive shops. The parks are open to the public year round, free of charge. There are eleven parks at present, and several others under development.

The contribution to the regional economy was immense. Between 2007-2008, approximately 739,000 visitors and residents participated in 2.8 million days of diving in the Florida Keys. USD 54 million was spent at diving/snorkelling operations. Moreover, divers spent a total of USD 470 million in Monroe County, Florida Keys, supporting more than 7,500 jobs.⁶⁷ Overall more than 33,000 jobs in the Florida Keys are supported by ocean recreation and tourism, accounting for 58 % of the local economy and USD 2.3 billion in annual sales.

NEW WAYS OF RAISING BENEFITS

New approaches to improving the appreciation and visibility of underwater sites as well as financing scientific underwater archaeological research are available. They can increase benefits to society and help to facilitate the sometimes scarce financing offered for underwater archaeological research. They can also be an economically convincing alternative to the commercial exploitation of ancient shipwrecks sites.

REINFORCING ACCESS

ESTABLISHMENT OF DIVE TRAILS, GLASS-BOTTOM BOAT VISITS

Dive-Trails are a much appreciated way of showing underwater cultural heritage to divers. Many of them have been created or are created all over the world. They can give a new impetus to dive sport, improve the attraction of specific sites in comparison to others - which is an advantage over purely environment related attractions - and give a greater variety to the discipline. Dive tourism to visit cultural heritage can be as much interesting to enrich the discipline as similar culture tourism on land-based sites.

Also glass-bottom boat visits are a good way of increasing access. They have the advantage that the visitors can come dry footed, do not have to be divers and that the access and impact on sites is more controllable.

⁶⁷ <http://sanctuaries.noaa.gov/news/features/1211socio.html>

The reinforcement of access and the increase in access could, if correctly managed, also increase the heritage valorisation and protection.

METAL CAGE PROTECTION AND UNDERWATER DISPLAY

Several experiments have been made to enhance the controlled visitor accessibility of fragile sites. An especially notable option was to protect endangered shipwrecks by fixed protection cages.

In Croatia metal cages have thus been installed over Roman wrecks. These cages are very large and permit diving into them or to see through them, as far as algae are taken off in due intervals. In these cases access has been allowed to dive clubs under contract.



Cage protecting a Roman wreck © Frka, Ministry of Culture of Croatia

While this is an excellent initiative allowing viewing the wrecks, precautions apply. Metal cages can have some negative effects on the underwater cultural heritage and be under certain circumstances a risk for the visiting divers if they are not properly maintained. They need to be cleaned, to be maintained fixed and monitored. Also security precautions for the divers are needed.

In Spain, the Phoenician shipwreck found off the coast of Mazarrón (Murcia), known as *Mazarrón II*, was equally protected *in situ* through the establishment of a metal protection cage that was solidly, but tightly fixed over the hull remains. The *Mazarrón I*, another Phoenician wreck discovered in the Bay of Mazarrón has been excavated and is now on display in the ARQUA Museum in Cartagena. Unfortunately though, the protection by a tight cover does not allow the underwater display of the remains for the diving public and – while it may increase the much needed protection – it does diminish the social benefits of the site.

DIVE CLUB GUARDIANSHIP OF SITES

One possibility is to control site access and grant responsibility and guardianship of submerged archaeological sites to authorized dive clubs.

Here, permissions for exclusive access⁶⁸ to selected sites can be negotiated by the national authorities with controlled dive clubs. These pay for the permission to access the sites with their clients collecting from them an entry fee, which benefits the national authority, and may permit, ideally, to invest in the research and protection of the underwater cultural heritage. The

⁶⁸ The 2001 Convention does expressly encourage the public access to sites for observation, as long as this does not endanger protection.

Clubs also guarantee by contract the control of the integrity of the site and monitor it regularly with a certified underwater archaeologist.

This system does not only help to finance underwater archaeology. It also permits to open more fragile sites to the public without compromising their protection. It moreover engages stronger the diver community that is encouraged to care for 'its own' sites. Such a system is at this moment for instance applied in Croatia.

REPLICA SITE CONSTRUCTION

The creation of underwater displays of artefacts recovered from the sea and in relation to the maritime archaeology of certain areas can be a way to avoid over-storage in some museums.



Creation of an "artificial" ancient shipwreck with original amphorae for recreational divers, Marseille, France (Source: LePoint.fr).

The back-draw of replica sites is however that they are not an authentic site. This argument might be felt stronger by the diving visitor than by the ('land-based') museum visitor, who expects this situation to arise. A pro is that at least the underwater environment does again add its specific attraction to the artefacts. An authentic, integer site is of course and however, always more significant and preferable.

An example of a replica site is located in France: Around 250 amphorae recovered in the 1950s by Jacques Cousteau and his team of the Calypso, were re-submerged in 2010 off the coast of Marseille, in a location with the appropriate conditions to allow access for divers of different levels.

This initiative, supported by the French Department of Underwater and Submarine Underwater Investigations (DRASSM) – which provided another 150 amphorae to complete the artificial site in a shipwreck shape - has attracted many divers and, fact of its visibility and management by the diving centre ensures that the amphorae are protected and supervised.

This place has now been there for three years and until now none of the amphorae has disappeared. The visits are welcomed by divers like a land-based cultural visit.

A similar replica site has been constructed in the Dominican Republic where ancient canons recovered from shipwrecks, have been re-immersed close to hotel sites.

SHARED ARCHAEOLOGY

A promising way of financing and adding value to research work is the organization of charged and controlled public visits to archaeological sites in the process of being researched (as shown in the *Natière* shipwreck in Brittany, France). In some cases it is also possible to involve divers as paying volunteers in the team that can watch, or even assist the archaeologists in their work, when the conditions of the site and the tasks given do not suppose a threat to the integrity of the heritage.

Similarly, lectures and workshops can be a means to educate an interested audience and the local community, allowing interaction and a 'hands-on' experience of the archaeological remains which can create a strong connection between the society and its heritage and add a sensational dimension to their participation.

In this context practically applied experimental archaeology, encompassing replica constructions, the permission to handle these replicas for the public and demonstrations can create a stronger connection of the society to the heritage as well.

PRE-EVALUATION OF CULTURAL DEVELOPMENT NEEDS

A more indirect approach to managing alternative funding more effectively to finance underwater archaeological research and museum construction is the thorough evaluation of cultural development needs. Before deciding on which archaeological site should be excavated a pre-evaluation of needs of regions can be undertaken from a scientific, but also a development point of view. Instead of researchers responding to chance finds and museums being created out of a need to store material, it might be promising to evaluate if a museum would be needed for a region's cultural development. Limited research budgets can then be attributed in priority to one site instead of another, to achieve a highest possible social benefit. Evidently, in the case of underwater cultural heritage sites at risk, priority should be given to ensuring maximum protection first and regardless of location.

This kind of evaluation is not without risk. Priority and consideration should always be given to site authenticity, integrity and protection and any action should be complemented by the creation of an inventory of underwater archaeological sites that allows identification of every area's potential and of sites in danger of disappearing. A good example of such a cultural enhancement of a location by underwater heritage is the above described Nanhai 1 Museum in China.

MEDIA COOPERATION

Underwater cultural heritage, like any heritage, needs communication and public outreach to achieve its best appreciation and protection. Stronger

attention should therefore be paid to tour and exhibition opportunities, as well as films and publication in planning archaeological excavations.

This kind of communication outreach can also help in financing scientific work. Retail activities as well as a gift sale with appropriate and varied merchandise can be an important part of the visitor experience and can also be an important revenue source. It can also be a way of communicating the message of protection and value of the underwater cultural heritage, as well as telling its specific story.

VIRTUAL VISIT TO SHIPWRECK SITES

While many underwater heritage sites can be visited *in situ* or in museums, many cannot. This may be due to their fragility, their depth or their far away location. A possibility to bring them nevertheless to the public is their virtual representation. This can also be used to enhance the visibility of accessible sites, such as undertaken now in a project by the Alexandria University, Egypt, for the lighthouse site in that city.

These virtual visits can be quite impressive in 3D versions, in 360 degree filming and other technical procedures.

Examples are the Virtual Dive project in France as well as the projects at the University of Birmingham as well as many other initiatives.