Chapter 8. Aesthetic, Cultural, Religious and Spiritual Ecosystem Services Derived from the Marine Environment

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1. Introduction

At least since the ancestors of the Australian aboriginal people crossed what are now the Timor and Arafura Seas to reach Australia about 40,000 years ago (Lourandos, 1997), the ocean has been part of the development of human society. It is not surprising that human interaction with the ocean over this long period profoundly influenced the development of culture. Within "culture" it is convenient to include the other elements – aesthetic, religious and spiritual – that are regarded as aspects of the non-physical ecosystem services that humans derive from the environment around them. This is not to decry the difference between all these aspects, but rather to define a convenient umbrella term to encompass them all. On this basis, this chapter looks at the present-day implications of the interactions between human culture and the ocean under the headings of cultural products, cultural practices and cultural influences.

2. Cultural products

No clear-cut distinction exists between objects which have a utilitarian value (because they are put to a use) and objects which have a cultural value (because they are seen as beautiful or sacred or prized for some other non-utilitarian reason). The two categories can easily overlap. Furthermore, the value assigned to an object may change: something produced primarily for the use to which it can be put may become prized, either by the society that produces it or by some other society, for other reasons (Hawkes, 1955). In looking at products from the ocean as cultural ecosystem services, the focus is upon objects valued for non-utilitarian reasons. The value assigned to them will be affected by many factors: primarily their aesthetic or religious significance, their rarity and the difficulty of obtaining them from the ocean. The example of large numbers of beads made from marine shells found in the burial mounds dating from the first half of the first millennium CE of the Mound People in Iowa, United States of America, 1,650 kilometres from the sea, shows how exotic marine products can be given a cultural value (Alex, 2010).

Another good – albeit now purely historical – example is the purple dye derived from marine shellfish of the family *Muricidae*, often known as Tyrian purple. In the Mediterranean area, this purple dye was very highly valued, and from an early date (around 1800-1500 BCE) it was produced in semi-industrial fashion in Crete and later elsewhere. Its cost was high because large numbers of shellfish were required to produce small amounts of the dye. Because of this, its use became restricted to the elite. Under the Roman republic, the togas of members of the Senate were

distinguished by a border of this colour, and under the Roman empire it became the mark of the emperors (Stieglitz, 1994). This usage has produced a whole cultural structure revolving around the colour purple and spreading out into a range of metaphors and ideas: for example, the concept of the "purple patch," an elaborate passage in writing, first used by the Roman poet Horace (Horatius).

Goods derived from marine ecosystems that are given a cultural value because of their appearance and/or rarity include pearls, mother-of-pearl, coral and tortoiseshell. In the case of coral, as well as its long-standing uses as a semi-precious item of jewellery and inlay on other items, a more recent use in aquariums has developed.

2.1 Pearls and mother-of-pearl

Pearls and mother-of-pearl are a primary example of a marine product used for cultural purposes. Many species of molluscs line their shells with nacre – a lustrous material consisting of platelets of aragonite (a form of calcium carbonate (see Chapter 7)) in a matrix of various organic substances (Nudelman et al., 2006). The shells with this lining give mother-of-pearl. Pearls themselves are formed of layers of nacre secreted by various species of oyster and mussel around some foreign body which has worked its way into the shell (Bondad-Reantaso et al., 2007).

Archaeological evidence shows that pearls were already being used as jewellery in the 6th millennium BCE (Charpentier et al., 2012). By the time of the Romans, they could be described as "holding the first place among things of value" (Pliny). For the ancient world, the main source was the shellfish beds along the southern coast of the Persian Gulf, with Bahrain as the main centre. The pearl fishery in the Persian Gulf maintained itself as the major source of pearls throughout most of the first two millennia CE, and by the 18th century was sufficiently profitable to support the founding of many of the present Gulf States. It developed further in the 19th century, and by the start of the 20th century the Persian Gulf pearl trade reached a short-lived peak in value at about 160 million United States dollars a year, and was the mainstay of the economies of the Gulf States (Carter, 2005).

During the 20th century, however, the Persian Gulf pearl trade declined steadily, due substantially to competition from the Japanese cultured pearl industry and general economic conditions. With the emergence of the Gulf States as important oil producers, the economic significance of the pearl trade for the area declined. The Kuwait pearl market closed in 2000, and with its closure the Persian Gulf pearl fishery ceased to be of economic importance (Al-Shamlan, 2000). However, some pearling still continues as a tourist attraction and, with Japanese support, an attempt has been made to establish a cultivated pearl farm in Ras Al Kaimah (OBG, 2013). Other traditional areas for the harvesting of natural pearls include the Gulf of Cutch and the Gulf of Mannar in India, Halong Bay in Viet Nam and the Islas de las Perlas in Panama (CMFRI, 1991; Southgate, 2007).

The great transformation of the pearl industry came with the success of Japanese firms in applying the technique developed in Australia by an Englishman, William Saville-Kent. The technique required the insertion of a nucleus into the pearl oyster

in order to provoke the formation of a pearl. Using the oyster species from the Persian Gulf, this meant that, instead of the three or four pearls that could be found in a thousand wild oysters, a high percentage of the farmed oysters would deliver pearls. The Japanese industry started in about 1916. By 1938, there were about 360 pearl farms in Japanese waters, producing more than 10 million pearls a year (15 tons). Production continued to increase after World War II and reached a peak of 230 tons in 1966, from 4,700 farms. Pollution and disease in the oyster, however, rapidly caused the industry to contract. By 1977, only about 1,000 farms remained, producing about 35 tons of pearls. Competition from Chinese cultured freshwater pearls and an oyster epidemic in 1996 reduced the Japanese industry to the production of less than 25 tons a year. Nevertheless, this industry was still worth about 130 million dollars a year. From the 1970s, other Indian Ocean and Pacific Ocean areas were developing cultured pearl industries based on the traditional pearl oyster species: in India and in Viet Nam in the traditional pearling regions, and in Australia, China, the Republic of Korea and Venezuela. Apart from China, where production had reached 9-10 tons a year, these are relatively small; the largest is apparently in Viet Nam, which produces about 1 ton a year (Southgate, 2007).

At the same time, new forms of the industry developed, based on other oyster species. The two main branches are the "white South Sea" and "black South Sea" pearl industries, based on *Pinctada maxima* and *Pinctada margaritefera*, respectively. "Black" pearls are a range of colours from pale purple to true black. Australia (from 1950) and Indonesia (from the 1970s) developed substantial industries for "white South Sea" pearls, earning around 100 million dollars a year each. Malaysia, Myanmar, Papua New Guinea and the Philippines have smaller industries. The black "South Sea" pearl industry is centred in French Polynesia, particularly in the Gambier and Tuamotu archipelagos. The industry in French Polynesia was worth 173 million dollars in 2007 (SPC, 2011). The Cook Islands, building on a long-standing mother-of-pearl industry, started a cultured-pearl industry in 1972, which grew to a value of 9 million dollars by 2000. However, in that year poor farm hygiene and consequent mass mortality of the oysters led to a collapse to less than a quarter of that value by 2005. The trade has recovered somewhat since then, largely due to increased sales to tourists in the islands. Small "black South Sea" pearl industries also exist in the Federated States of Micronesia, Fiji, the Marshall Islands and Tonga. Small pearl industries based on the oyster species *Pterea penguin* and *Pterea sterna* exist in Australia, China, Japan, Mexico and Thailand (SPC, 2011; Southgate, 2007).

Reliable information on the cultured pearl industries is not easy to obtain: for example, significant divergences exist between the statistics for the *Pintada margaritifera* industry in the FAO Fisheries Global Information System database and those reported by the South Pacific Secretariat in their newsletters (SPC, 2011). The FAO itself noted the lack of global statistics on pearls (FAO, 2012). However, all sources suggest that the various industries suffered severe set-backs in 2009-2012 from a combination of the global economic crisis and overproduction. It is also clear that, apart from local sales to tourists, the bulk of all production passes through auctions in Hong Kong, China, and Japan.

Mother-of-pearl is produced mainly from the shells of pearl oysters, but other molluscs, such as abalone, may also be used. In the 19th century it was much used as a material for buttons and for decorating small metal objects and furniture. In many of these uses it has been superseded by plastics. It developed as an important industry in the islands around the Sulu Sea and the Celebes Sea, but substantial industries also existed in western Australia (now overtaken by the cultured-pearl industry), the Cook Islands and elsewhere (Southgate 2007). It remains important in the Philippines, which still produces several thousand tons a year (FAO, 2012).

2.2 Tortoiseshell

For several centuries, material from the shells of sea turtles was used both as a decorative inlay on high-quality wooden furniture and for the manufacture of small items such as combs, spectacle frames and so on. The lavish use of tortoiseshell was a particular feature of the work of André Charles Boulle, cabinetmaker to successive 18th century French kings. This established a pattern which was widely imitated (Penderel-Brodhurst, 1910). The shells of hawksbills turtles (*Eretmochelys imbricata*), in particular, were used for this purpose. The demand for the shells of hawksbill turtles produced an enormous and enduring effect on hawksbill populations around the world. Within the last 100 years, millions of hawksbills were killed for the tortoiseshell markets of Asia, Europe and the United States (NMFS, 2013). The species has been included in the most threatened category of the IUCN's Red List since the creation of the list in 1968, and since 1977 in the listing of all hawksbill populations on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora[1] (CITES) (trade prohibited unless not detrimental to the survival of the species). Some production of objects with tortoiseshell continues (particularly in Japan), but on a very much reduced scale.

2.3 Coral (and reef fish)

The Mediterranean red coral (*Corallium rubrum*), was used from a very early date for decoration and as a protective charm. In the 1st century, Pliny the Elder records both its use a charm to protect children and its scarcity as a result of its export to India (Pliny). As late as the second half of the 19th century, teething-rings were still being made with coral (Denhams, 2014). It is now principally used for jewellery. The Mediterranean red coral is still harvested. Similar genera/species from the western Pacific near Japan, Hawaii, and some Pacific seamounts are also harvested. The global harvest reached a short-lived peak at about 450 tons a year in 1986, as a result of the exploitation of some recently discovered beds on the Emperor Seamounts in the Pacific. It has fallen back to around 50 tons a year, primarily from the Mediterranean and adjoining parts of the Atlantic (CITES, 2010). This trade in the hard coral stone is estimated to be worth around 200 million dollars a year (FT, 2012), although another estimate places it at nearer 300 million dollars) (Tsounis, 2010). Despite proposals in 2007 and 2010, these corals are not listed under the CITES.

[1] United Nations, *Treaty Series*, vol.. 993, No. 14537.

Other corals of cultural interest, on the other hand, have been listed under CITES. The cultural use made of these genera and species is very different. The main use is inclusion in aquariums. Some experimental evidence exists that the ability to watch fish in aquariums has a soothing effect on humans (especially when suffering from dementia) (for example, Edwards et al., 2002). For similar reasons, many homes, offices, surgeries and hospitals have installed such aquariums. Suitable pieces of coral, either alive or dead, are seen as attractive parts of such aquarium scenes. The demand for coral for this purpose is substantial. International trade in coral skeletons for decorative purposes began in the 1950s. Until 1977 the source was largely the Philippines. In that year a national ban on export was introduced, and by 1993 the ban was fully effective. The main source then became Indonesia. Until the 1990s, the trade was mainly in dead corals for curios and aquarium decoration. Developments in the technology of handling live coral led to a big increase in the trade in live coral. CITES lists 60 genera of hard corals in Appendix II; hence their export is permitted only if the specimens have been legally acquired and export will not be detrimental to the survival of the species or its role in the ecosystem. For coral rock, the trade averaged about 2,000 tons a year in the decade 2000-2010, although declining slightly towards the end of the decade. Fiji (with 60 per cent) and Indonesia (with 11 per cent) were the major suppliers over this decade. Other countries supplying coral rock included Haiti, the Marshall Islands, Mozambique, Tonga, Vanuatu and Viet Nam, although the last five introduced bans towards the end of this period. The major importers were the United States (78 per cent) and the European Union (12 per cent). For live coral, the picture was slightly different: over the same decade, the number of pieces of live coral traded rose from some 700,000 to some 1,200,000. Of these, Indonesia supplied an average of about 70 per cent, with other important suppliers including Fiji (10 per cent), Tonga (5 per cent), Australia (5 per cent) and the Solomon Islands (4 per cent). The United States accounted for an average of 61 per cent of the imports, and the European Union took 31 per cent. For some species of coral, mariculture is possible, and by 2010 pieces produced by mariculture accounted for 20 per cent of the trade (Wood et al., 2012).

An aquarium would not be complete without fish, and this need has produced another major global trade: in reef fish. Because few marine ornamental fish species have been listed under CITES, a dearth of accurate information on the precise details of the trade exists. The FAO noted the lack of global statistics on the catches of, and trade in, ornamental fish in its 2012 Report on the State of the World's Fisheries and Aquaculture (FAO, 2012). The late Director of the trade association Ornamental Fish International, Dr. Ploeg, likewise lamented the lack of data (Ploeg, 2004). One estimate puts the scale of the trade in ornamental fish (freshwater and marine) at 15 billion dollars. In 2000 to 2004 an attempt was made to set up in UNEP/WCMC a Global Marine Aquarium Database (GMAD), drawing not only on official trade records, but also on information supplied by trade associations. This provides some interesting, albeit now dated, information, but it has not been kept up-to-date because of lack of funding. One of the most notable features was that the number of fish reported as imported was some 22 per cent more than the number reported as exported (Wabnitz et al., 2003). The need for better information is a matter of

on-going debate; the European Union has conducted a consultation exercise in 2008-2010 (EC, 2008).

The GMAD data suggested that some 3.5-4.3 million fish a year, from nearly 1,500 different species, were being traded worldwide. The main sources of fish (in order of size of exports) were the Philippines, Indonesia, the Solomon Islands, Sri Lanka, Australia, Fiji, the Maldives and Palau. These countries accounted for 98 per cent of the recorded trade, with the Philippines and Indonesia together accounting for nearly 70 per cent. The main destinations of the fish were the United States, the United Kingdom, the Netherlands, France and Germany, which accounted for 99 per cent of the recorded trade; the United States accounted for nearly 70 per cent. These figures probably do not include re-exports to other countries. It was estimated that the value of the trade in 2003 was 1 million to 300 million dollars (Wabnitz et al., 2003).

From the social perspective, the number of people depending on the trade is relatively small. A workshop organized by the Secretariat of the Pacific Community in 2008 showed that some 1,472 people in 12 Pacific island countries and territories depended on the trade in ornamental fish for their livelihoods (Kinch et al., 2010). GMAD reported an estimate of 7,000 collectors providing marine ornamental fish in the Philippines (Wabnitz et al., 2003). It also reported a much higher estimate of some 50,000 people in Sri Lanka being involved with the export of marine ornamentals, but this probably reflects the large, long-standing trade based on the aquaculture of ornamental freshwater fish.

2.4 Culinary and medicinal cultural products

Items of food, and specific ways of preparing dishes from them, can be very distinctive features of cultures. Products derived from marine ecosystems often play a significant role. One almost universal feature is salt. For millennia, salt was vital in much of the world for the preservation of meat and fish through the winter months. Although nowadays salt is mainly obtained from rock-salt and brine deposits in the ground, salt is still widely prepared by the evaporation of seawater, especially in those coastal areas where the heat of the sun can be used to drive the evaporation. Although statistics for the production of salt often do not differentiate between the sources for salt production, countries such as Brazil, India and Spain are recorded as producing many millions of tons of salt from the sea (BGS, 2014).

A further common preparation used in many forms of cooking is a sauce derived from fermenting or otherwise processing small fish and shellfish. Such sauces are recorded as *garum* and *liquamen* among the Romans from as long ago as the 1st century (Pliny). They are also crucial ingredients in the cuisines of many east Asian countries – China, Republic of Korea, Thailand, Viet Nam – and other fish-based sauces are found in many western cuisines, for example, *colatura de alici* (anchovy sauce) and Worcestershire sauce.

Cultural pressures can interact with the sustainable use of products derived from marine ecosystem services. Just as the demand for tortoiseshell inlay and objects was driven by desire to emulate the élite in both Asia and Europe, and affected the

hawksbill turtle, other species of marine turtle were also affected by the status of turtle soup as a prestige dish. In Europe, soup made from green turtles (*Chelonia mydas*) became a prestige dish when the turtles were brought back by European trading ships passing through the tropics. It was served lavishly at formal dinners – in the mid-19th century, a report of a routine large dinner refers to "four hundred tureens of turtle, each containing five pints" – that is, 1,136 litres in total (Thackeray, 1869). Large amounts were also commercialized in tins. In spite of growing conservation concerns, it was still seen as appropriate for inclusion in the dinner to welcome the victorious General Eisenhower back to the United States in 1945 (WAA, 1945). The dish has disappeared from menus since the green turtle was listed under Appendix I to CITES in 1981, except in areas where turtles are farmed or where freshwater species are used.

Another group of species where cultural forces create pressures for excessive harvesting is the sharks (see also chapter 40). Shark's fin soup is a prestige dish in much of eastern Asia, especially among Chinese-speaking communities. Prices for shark's fins are very high (hundreds of dollars per kilogramme). As shown in Figure 1, the trade in shark fins peaked in 2003-2004 and has subsequently levelled out at quantities 17-18 per cent lower (2008-2011). The statistics are subject to many qualifications, but trade in shark fins through Hong Kong, China (generally regarded as the largest trade centre in the world) rose by 10 per cent in 2011, but fell by 22 per cent in 2012. The FAO report from which the figure is drawn suggests that a number of factors, including new regulations by China on government officials' expenditures, consumer backlash against artificial shark fin products, increased regulation of finning (the practice of cutting fins of shark carcasses and discarding the rest), other trade bans and curbs, and a growing conservation awareness, may have contributed to the downturn. At the same time, new figures suggest the shark fin markets in Japan, Malaysia and Thailand, though focused on small, low-value fins, may be among the world's largest (FAO, 2014a).

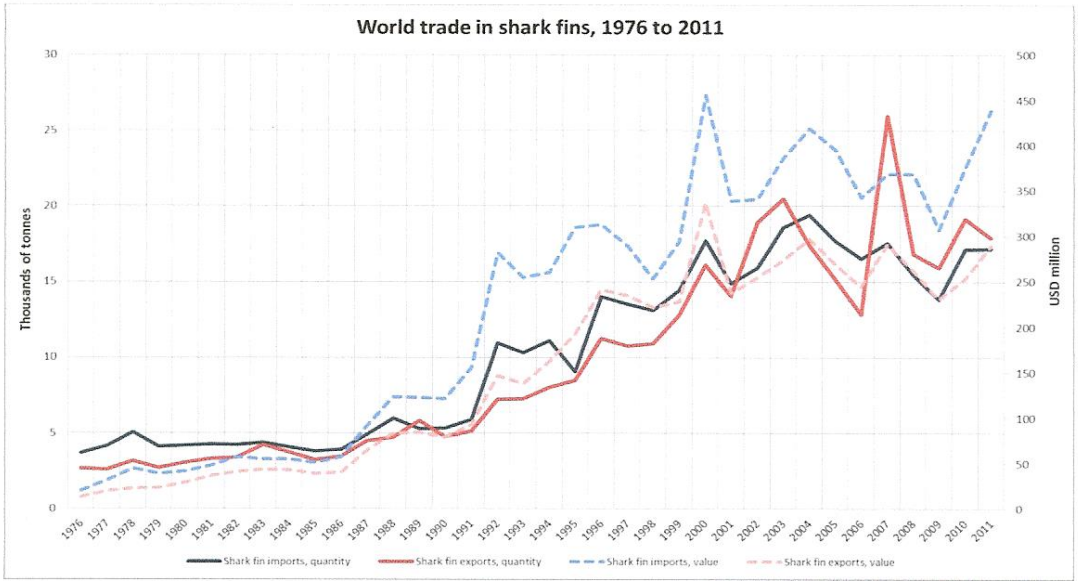

Figure 1. Source: FAO, 2014a.

Similar cultural pressures exist in relation to other aspects of marine ecosystems. Traditional medicine in eastern Asia, for example, uses dried seahorses for a range of illnesses. Most dried seahorses (caught when they are about 12-16 cm in size) are exported to China. The value in 2008 was 100-300 dollars per kilogramme, depending on the size and species; the larger animals are the most valuable. Production is said to be more than 20 million sea horses (70 tons) a year. Viet Nam and China are the major producers; Viet Nam has developed its seahorse aquaculture since 2006. This trade is seen as a significant pressure on the conservation status of several species of seahorse (FAO, 2014b).

Not all consequences of the cultural uses of the ocean's ecosystem services in relation to food are necessarily negative. The Mediterranean diet, with its substantial component of fish and shellfish, was inscribed in 2013 on the UNESCO Representative List of the Intangible Cultural Heritage of Humanity (UNESCO, 2014).

3. Cultural practices

3.1 Cultural practices that enable use of the sea

Humans interact with the ocean in a large number of ways, and many of these lead to cultural practices which enrich human life in aesthetic, religious or spiritual ways, as well as in purely practical matters. Such practices are beginning to be inscribed in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity. Those listed so far include a practice in Belgium of fishing for shrimp on horse-back: twice a week, except in winter months, riders on strong Brabant horses walk breast-deep in the surf, parallel to the coastline, pulling funnel-shaped nets held open by two wooden boards. A chain dragged over the sand creates vibrations, causing the shrimp to jump into the net. Shrimpers place the catch (which is later cooked and eaten) in baskets hanging at the horses' sides. In approving the inscription, the Intergovernmental Committee for the Safeguarding of the Intangible Cultural Heritage (ICSICH) noted that it would promote awareness of the importance of small, very local traditions, underline the close relations between humans, animals and nature, and promote respect for sustainable development and human creativity (UNESCO, 2014).c

Similarly, the Chinese tradition of building junks with separate water-tight bulkheads has been recognized as a cultural heritage that urgently needs protection. The ICSICH noted that, despite the historical importance of this shipbuilding technology, its continuity and viability are today at great risk because wooden ships are replaced by steel-hulled vessels, and the timber for their construction is in increasingly short supply; apprentices are reluctant to devote the time necessary to master the trade and craftspeople have not managed to find supplementary uses for their carpentry skills. Furthermore, the ICSICH noted that safeguarding measures designed to sustain the shipbuilding tradition are underway, including State financial assistance to master builders, educational programmes to make it possible for them to transmit their traditional knowledge to young people, and the reconstruction of historical

junks as a means to stimulate public awareness and provide employment (UNESCO, 2014).

Another cultural tradition linked to the sea is that of the lenj boats in the Islamic Republic of Iran. Lenj vessels are traditionally hand-built and are used by inhabitants of the northern coast of the Persian Gulf for sea journeys, trading, fishing and pearl diving. The traditional knowledge surrounding lenjes includes oral literature, performing arts and festivals, in addition to the sailing and navigation techniques, terminology and weather forecasting that are closely associated with sailing, and the skills of wooden boat-building itself. This tradition is also under threat, and the Islamic Republic of Iran has proposed a wide range of measures to safeguard it (UNESCO, 2014).

Along the north-east Pacific coast, sea-going canoes were one of the three major forms of monumental art among the Canadian First Nations and United States Native Americans, along with plank houses and totem poles. These canoes came to represent whole clans and communities and were a valuable trade item in the past, especially for the Haida, Tlingit and Nuu-Chah-Nulth. Recently, there has been a revival in the craft of making and sailing them, and they are capable of bringing prestige to communities (SFU, 2015).

Similar important navigational traditions survive in Melanesia, Micronesia and Polynesia. Using a combination of observations of stars, the shape of the waves, the interference patterns of sea swells, phosphorescence and wildlife, the Pacific Islanders have been able to cross vast distances at sea and make landfall on small islands. Although now largely being replaced by modern navigational aids, the Pacific navigational tradition shows how many aspects of the marine ecosystems can be welded together to provide results that at first sight seem impossible. Since the 1970s the tradition has been undergoing a renaissance (Lewis, 1994).

Apart from the practical cultural practices linked to the sea that support navigation, cultural practices in many parts of the world reflect the dangers of the ocean and the hope of seafarers to gain whatever supernatural help might be available. The fishing fleet is blessed throughout the Roman Catholic world, usually on 15 August, the Feast of the Assumption. This dates back to at least the 17th century in Liguria in Italy (Acta Sanctae Sedis, 1891). It spread generally around the Mediterranean, and was then taken by Italian, Portuguese and Spanish fishermen when they emigrated, and has been adopted in many countries, even those without a Roman Catholic tradition.

In many places in China and in the cultural zone influenced by China, a comparable festival is held on the festival of Mazu, also known (especially in Hong Kong, China) as Tian Hou (Queen of Heaven). According to legend, she was a fisherman's daughter from Fujian who intervened miraculously to save her father and/or her brothers and consequently became revered by fishermen, and was promoted by the Chinese Empire as part of their policy of unifying devotions. The main festival takes place on the 23rd day of the 3rd lunar month (late April/early May). A tradition of visiting a local shrine before a fishing voyage also continues in some places (Liu, 2003).

Miura, on the approaches to Tokyo Bay in Japan, developed as a military port and a harbour providing shelter to passing ships. Drawing on dances from other cities demonstrated to them by visiting sailors, the people of Miura began the tradition of Chakkirako to celebrate the New Year and bring fortune and a bountiful catch of fish in the months to come. By the mid-eighteenth century, the ceremony had taken its current form as a showcase for the talent of local girls. The dancers perform face-to-face in two lines or in a circle, holding fans before their faces in some pieces and clapping thin bamboo sticks together in others, whose sound gives its name to the ceremony. Now included in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity, the ceremony is intended to demonstrate cultural continuity (UNESCO, 2014).

A specific cultural practice that acknowledges the importance of sea trade is the "Marriage of the Sea" (*Sposalizio del Mare*) in Venice, Italy. This takes the form of a boat procession from the centre of city to the open water, where the civic head (originally the Doge, now the Sindaco) throws a wedding ring into the sea. In 1177, Venice had successfully established its independence from the Emperor and Patriarch in Constantinople (Istanbul), from the Pope in Rome and from the Holy Roman Emperor, by using its leverage to reconcile the two latter powers, and had become the great entrepôt between the eastern and western Mediterranean. Pope Alexander III acknowledged this by giving the Doge a ring. Henceforth, annually on Ascension Day, the Doge would "wed" the sea to demonstrate Venice's control of the Adriatic (Myers et al., 1971). Abolished when Napoleon dissolved the Venetian Republic, the ritual has been revived since 1965 as a tourist attraction (Veneziaunica, 2015).

3.2 Cultural practices that react to the sea

A verse in the Hebrew psalms speaks of the people "that go down to the sea in ships and...see...the wonders of the deep" (Psalm 107(106)/23, 24). A similar sense of awe at the sea appears in the Quran (Sura 2:164). This sense of awe at the ocean is widespread throughout the world. In many places it leads to a special sense of place with religious or spiritual connotations, which lead to special ways of behaving: in other words, to religious or spiritual ecosystem services from the ocean. A reductionist approach can see no more in such ways of behaviour than bases for prudential conduct: for example, fishing may be halted in some area at a specific time of year, which coincides with the spawning of a particular fish population, thus promoting the fish stock recruitment. But such a reductionist approach is not necessary, and can undermine a genuine sense of religious or spiritual reaction to the sea.

The risk exists that such reductionist approaches will be seen as the natural interpretation of ritual or religious practices. In a survey of the environmental history of the Pacific Islands, McNeill writes that "Lagoons and reefs probably felt the human touch even less [than the islands], although they made a large contribution to island sustenance...human cultural constraints often operated to preserve them. Pacific islanders moderated their impact on many ecosystems through restraints and restrictions on resource use. In many societies taboos or other prohibitions limited

the exploitation of reefs, lagoons, and the sea. These taboos often had social or political purposes, but among their effects was a reduction in pressures on local ecosystems. Decisions about when and where harvesting might take place were made by men who had encyclopaedic knowledge of the local marine biota" (McNeill, 1994).

This clearly sets out the external ("etic") view of the system of taboos and beliefs, i.e., the view that can be taken by an outside, dispassionate observer. It does not allow for the internal ("emic") view as seen by someone who is born, brought up and educated within that system. It is important to understand this distinction and allow for the way in which the insider will have a different frame of reference from the outsider.

Good examples of the way in which such an insider's religious or spiritual reactions can underpin a whole system of community feeling can be found among the First Nations of the Pacific seaboard of Canada. A member of the Huu-ay-aht First Nation, a tribe within the Nuu-chah-nulth Tribal Group in this area, describes their traditional approach to whaling as follows:

> "Whaling within Nuu chah nulth society was the foundation of our economic structure. It provided valuable products to sell, trade and barter. In essence it was our national bank... Whaling [however, also] strengthened, maintained and preserved our cultural practices, unwritten tribal laws, ceremonies, principles and teachings. All of these elements were practiced throughout the preparations, the hunt and the following celebrations. Whaling strengthened and preserved our spirituality and is clearly illustrated through the discipline that the Nuu chah nulth hereditary whaling chiefs exemplified in their months of bathing, praying and fasting in preparation for the hunt. The whale strengthened our relationships with other nations and communities. People came from great distances and often resulted in intertribal alliances, relationships and marriages. The whale strengthened the relationships between families because everyone was involved in the processing of the whale, the celebrations, the feasting, and the carving of the artefacts that can still be seen today in many museums around the world. The whale strengthened the relationships between family members since everyone shared in the bounty of the whale. And the whale strengthened our people spiritually, psychologically and physically" (Happynook, 2001).

Because of the restrictions imposed to respond to the crises in the whale population caused by commercial whaling, the Nuu-chah-nulth are not permitted to undertake whaling, and the related peoples further south in Washington State, United States, need to obtain special authorization (a request for which has been under consideration since 2005), and feel that part of their cultural heritage has been taken away from them. As the draft evaluation of the Makah request to resume whale-hunting puts it, with no authorization this element of their culture would remain a connection to the past without any present reinforcement. In effect, a cultural ecosystem service would be lost (NOAA, 2015).

3.3 Cultural practices tied to a specific sea area

Not all interactions between communities with traditions based on their long-standing uses of the ocean result in such clashes between opposing points of view. In Brazil, for example, the concept has been introduced of the Marine Extractive Reserve (*Reserva Extrativista Marinha*). These are defined areas of coast and coastal sea which aim to allow the long-standing inhabitants to continue to benefit from the resources of the reserve, applying their traditional knowledge and practices, while protecting the area against non-traditional, new exploitation, and protecting the environment (Chamy, 2002). Six such reserves have been created, and a further 12 are in the process of designation and organization (IBAMA, 2014).

In Australia, before colonization, the coastal clans of indigenous peoples regarded their territories as including both land and sea. The ocean, or "saltwater country", was not additional to a clan estate on land: it was inseparable from it. As on land, saltwater country contained evidence of the Dreamtime events by which all geographic features, animals, plants and people were created. It contained sacred sites, often related to these creation events, and it contained tracks, or Songlines, along which mythological beings travelled during the Dreamtime. Mountains, rivers, waterholes, animal and plant species, and other cultural resources came into being as a result of events which took place during these Dreamtime journeys. The sea, like the land, was integral to the identity of each clan, and clan members had a kin relationship to the important marine animals, plants, tides and currents. Many of these land features and heritage sites of cultural significance found within landscapes today have associations marked by physical, historical, ceremonial, religious and ritual manifestations located within the indigenous people's cultural beliefs and customary law. The Commonwealth and State Governments in Australia are now developing ways in which the groups of indigenous people can take a full part in managing the large marine reserves which have been, or are being, created, in line with their traditional culture. The techniques being used must vary, because they must take account of other vested rights and Australia's obligations under international law (AIATSIS, 2006).

Madagascar provides an interesting example of the way in which traditional beliefs can influence decisions on sea use. On the west coast of the northern tip of the island, a well-established shrimp-fishing industry is largely, but not entirely, undertaken by a local tribal group, the Antankarana. This group has a traditional set of beliefs, including in the existence of a set of spirits – the *antandrano* – who represent ancestors drowned in the sea centuries ago in an attempt to escape a local opposing tribal group, the Merina. These spirits are honoured by an annual ceremony focused on a particular rock in the sea in the shrimp fishery area. A proposal was made to create a shrimp aquaculture farm, which would have severely reduced the scope of the shrimp fishery. The Antankarana leader successfully invoked against this proposal reports from local mediums participating in the annual ceremony that the *antandrano* spirits would oppose the aquaculture proposal (which might well have been under Merina control). Thus a religious ecosystem service from the sea was deployed to defend a provisioning ecosystem service (Gezon, 1999).

At a global level, specific marine sites were inscribed by UNESCO in the World Heritage List, and thus brought under certain commitments and controls to safeguard them. So far 42 marine or coastal sites have been designated on the basis of their natural interest:

(a) 22 "contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance";

(b) 12 are "outstanding examples representing major stages of earth's history, including the record of life, significant ongoing geological processes in the development of landforms, or significant geomorphic or physiographic features";

(c) 14 are "outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals"; and

(d) 29 "contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation".

(Sites can qualify under more than one criterion.)

Fifteen are islands. Three have been declared to be in danger: the Belize barrier reef (the largest in the northern hemisphere), which is threatened by mangrove cutting and excessive development (2009); the Florida Everglades in the United States, which have suffered a 60 per cent reduction in water flow and are threatened by eutrophication (2010); and East Rennell in the Solomon Islands, which is threatened by logging (2013). In addition, four marine or coastal sites have been inscribed in the World Heritage List because of their mixed cultural and natural interest – the island of St Kilda in the United Kingdom (for centuries a very remote inhabited settlement, featuring some of the highest cliffs in Europe); the island of Ibiza in Spain (a combination of prehistoric archaeological sites, fortifications influential in fortress design and the interaction of marine and coastal ecosystems); the Rock Islands Southern Lagoon (Ngerukewid Islands National Wildlife Preserve) in Palau (a combination of neolithic villages and the largest group of saltwater lakes in the world); and Papahānaumokuākea (a chain of low-lying islands and atolls with deep cosmological and traditional significance for living native Hawaiian culture, as an ancestral environment, as an embodiment of the Hawaiian concept of kinship between people and the natural world, and as the place where it is believed that life originates and where the spirits return after death) (UNESCO, 2014).

Other marine sites of cultural interest are those which offer the possibility of learning more about their past through underwater archaeology. Underwater archaeology draws on submerged sites, artefacts, human remains and landscapes to explain the origin and development of civilizations, and to help understand culture, history and climate change. Three million shipwrecks and sunken ruins and cities, like the remains of the Pharos of Alexandria, Egypt – one of the Seven Wonders of the Ancient World - and thousands of submerged prehistoric sites, including ports

and methods of marine exploitation, such as fish traps, are estimated to exist worldwide. Material here is often better preserved than on land because of the different environmental conditions. In addition, shipwrecks can throw important light on ancient trade patterns; for example, the Uluburun shipwreck off the southern coast of Turkey, which illuminated the whole pattern of trade in the Middle East in the Bronze Age in the second millennium BCE (Aruz et al., 2008). Shipwrecks can also yield valuable information about the sociocultural, historical, economic, and political contexts at various scales of reference (local, regional, global) between the date of the vessel's construction (e.g. hull design, rig, materials used, its purpose, etc.) and its eventual demise in the sea (e.g. due to warfare, piracy/privateering, intentional abandonment, natural weather events, etc.) (Gould, 1983). Many national administrations pursue policies to ensure that underwater archaeological sites within their jurisdictions are properly treated. At the global level, the UNESCO Convention on the Protection of the Underwater Cultural Heritage (2001)[2] entered into force in 2009, and provides a framework for cooperation in this field and a widely recognized set of practical rules for the treatment and research of underwater cultural heritage. Where such approaches are not applied, there are risks that irreplaceable sources of knowledge about the past will be destroyed. Bottom-trawling is a specific threat to underwater archaeological sites, with implications for the coordination of fisheries and marine archaeological site management. Questions also arise over archaeological sites outside national jurisdictions (mainly those of shipwrecks).

Cultural practices related to the sea, coastal sites of cultural interest (such as the UNESCO World Heritage Sites) and underwater archaeological sites form important elements for ocean-related tourism, which is discussed in Chapter 27 (Tourism and recreation). In particular, shipwrecks provide attractions for divers.

Special problems arise over recent shipwrecks where close relatives of people who died in the shipwreck are still living, particularly where the wreck occurred in wartime. Where the wrecks are in waters within national jurisdiction, many States have declared such sites to be protected, and (where appropriate) as war graves. As underwater exploration techniques improve, the possibility of exploring such wrecks in water beyond national jurisdiction increases, and this gives rise to sharp controversies.

Even without special remains or outstanding features, the ocean can provide an ecosystem service by giving onlookers a sense of place. The sense of openness and exposure to the elements that is given by the ocean can be very important to those who live by the sea, or visit it as tourists (see also Chapter 27). Even where the landward view has been spoiled by development, the seaward view may still be important. This is well demonstrated by a recent legal case in England, seeking to quash an approval for an offshore wind-farm at Redcar. Redcar is a seaside town with a large steel plant and much industrialization visible in its immediate hinterland. The beach and its view to the south-east are, however, described as spectacular. The court had to decide whether construction of the wind-farm about 1.5 kilometres offshore would introduce such a major new industrial element into the

[2] United Nations, *Treaty Series*, vol. 2562. No. 45694.

seascape/landscape as to undermine efforts to regenerate the seaside part of the town. The court decided that the ministry was justified in its approval, but the case underlines the importance of the aesthetic ecosystem service that the sea can provide (Redcar, 2008).

As described in Chapter 27 (Tourism and recreation), over the past 200 years there has been a growing cultural practice worldwide of taking recreation in coastal areas and at sea. Some evidence is emerging of positive links between human health and the enjoyment of the coastal and marine environment (Depledge et al., 2009; Wyles et al., 2014; Sandifer et al., 2015).

4. Cultural influences

Art reflects the society in which it is produced, and is influenced by that society's interests. The relationship between a society and the ocean is therefore likely to be reflected in its art. Much visual art therefore reflects the sense of place that is predominant in the society that generates it. The sense of place in societies that are much concerned with the sea reflects the aesthetic ecosystem services provided by the sea, hence the visual arts are also likely to reflect the same service. Examples of the way in which this occurs are not difficult to find. The Dutch painting school of the 17th century developed the seascape – ships battling the elements at sea – just at the period when the Dutch merchant ships and Dutch naval vessels were the dominant forces on the local ocean. The French impressionists of the second half of the 19th century took to painting coastal and beach scenes in Normandy just at the period when the railways had enabled the Parisian élite – their most likely patrons – to escape to the newly developed seaside resorts on the coast of the English Channel. Similarly, Hokusai's *The Great Wave at Kanagawa* is focused on a distant view of Mount Fuji rather than on the ocean – not surprising given that it was painted at a time when shipping in Japan was predominantly coastal. Today, the advances in cameras capable of operating under water, and the availability of easily managed breathing gear and protective clothing, result in the most stunning pictures of submarine life.

This reflection of the aspects of the aesthetic ecosystem services from the ocean that preoccupy the society contemporaneously with the work of the artist can also be found in literature and music. Camões's great epic *The Lusiads* appears just at the time when Portugal was leading the world in navigation and exploration. In the same period, Chinese literature saw the emergence of both fictional and non-fictional works based on the seven voyages of Admiral Zheng He in the south-east Asian seas and the Indian Ocean. It is with the emergence in the 19th century of widespread trading voyages by American and British ships that authors like Conrad, Kipling and Melville bring nautical novels into favour. Likewise, the impressionist seascapes in visual art are paralleled by impressionist music such as Debussy's *La mer.*

5. The ultimate ecosystem service for humans

Burial at sea has long been practiced as a matter of necessity during long voyages. It was specifically provided for in 1662 in the English Book of Common Prayer (BCP, 1662). Both the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972[3] and its Protocol[4] (see chapter 24), which regulate the dumping of waste and other matter at sea, are careful to leave open the possibility of the burial of human remains at sea. Western European States regularly authorize a small number of such disposals every year (LC-LP, 2014). The United States authorities have issued a general permit for burial at sea of human remains, including cremated and non-cremated remains, under certain conditions (USA-ECFR, 2015). In Japan, increasing prices for burial plots and concerns about the expanding use of land for cemeteries have led to a growing pattern of cremation followed by the scattering of the cremated remains, often at sea. The practice started in 1991, when the law on the disposal of corpses was relaxed, and has become more popular following such funeral arrangements for a number of prominent people (Kawano, 2004).

6. Conclusions and identification of knowledge and capacity-building gaps

This chapter set out to review the ways in which ecosystem services from the sea interrelate with human aesthetic, cultural, religious and spiritual desires and needs. Five main conclusions emerge:

(a) Several goods produced by the ocean have been taken up as élite goods, that is, goods that can be used for conspicuous consumption or to demonstrate status in some other way. When that happens, a high risk exists that the pressures generated to acquire such élite goods, whether for display or consumption, will disrupt marine ecosystems, especially when the demand comes from relatively well-off consumers and the supply is provided by relatively poor producers. The development of the market in shark's fin is a good example of this (although signs exist that that particular situation has stopped getting worse).

(b) Some producers could be helped by a better understanding of the techniques and precautions needed to avoid ruining the production. As well as better knowledge, they may also need improved skills, equipment and/or machinery to implement that better understanding. The production of cultured pearls in the Cook Islands is a good example.

(c) Some élite goods pass through a number of hands between the original producer and the ultimate consumer. There appears to be a gap in capacity-building to safeguard producers and ensure more equitable

[3] United Nations, *Treaty Series*, vol. 1046, No. 15749.

[4] 36 *International Legal Materials* 1 (1997).

profit-sharing in the supply chain. The case of small producers of cultured pearls is an example.

(d) Very different perceptions of marine ecosystem services and how humans relate to them can exist between different groups in society, even when such groups are co-located. Understanding on all sides of the reasons for those differences is a prerequisite for effective management of the ecosystem services.

(e) Aspects of the marine environment that are valued as cultural assets of humanity need constant consideration; they cannot just be left to fend for themselves. Where technology or social change has overtaken human skills that are still seen as valuable to preserve, conditions need to be created in which people want to learn those skills and are able to deploy them. Where an area of coast or sea is seen as a cultural asset of humanity, the knowledge is needed of how it can be maintained in the condition which gives it that value.

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