

## NATIONAL REVIEWS: CENTRAL AMERICA

### Belize

#### *Introduction*

Situated south of the Yucatán Peninsula in the Central American isthmus, Belize covers a land area of ca. 23 000 km<sup>2</sup> (including some 450 offshore cays) and a nearly equivalent 23 657 km<sup>2</sup> of territorial sea extending 20 km into the Caribbean Sea. The continental shelf of the country is protected by the Belize Barrier Reef, which stretches 220 km along the coast from the Mexican border to the Sapodilla Cays and is the longest in the Western Hemisphere. Within the reef are extensive stands of seagrass beds, composed primarily of Turtle Grass *Thalassia testudinum*, which have long been recognized as important foraging areas for Green Turtles, many of them migrating along the Central American coast (Smith *et al.*, 1992). Belize has strong economic and cultural ties with the Caribbean, in particular the former British colonies that comprise the Caribbean Community. Belize gained independence from the UK in 1981.

The prominence that marine turtles have played in the fishing industry in Belize is well documented. Smith *et al.* (1992), in reviewing the available literature, noted that turtle hunting was reported by one author to have constituted the most important form of fishing in Belize during the period from ca. 1650 to 1900 and that, in addition to local markets, turtles supplied international markets, in England in particular. Large numbers of Green Turtles were exported live to England during the latter part of the 19<sup>th</sup> century and, although international trade for meat dwindled, demand remained high in Belize during the 20<sup>th</sup> century. This demand and the industry that fed it also focused on Hawksbill shell and thrived in the early 1900s.

A Sea Turtle Recovery Action Plan (STRAP) for Belize, developed and published under the auspices of the Wider Caribbean Sea Turtle Conservation Network (WIDECAST) and the United Nations Caribbean Environment Programme (Smith *et al.*, 1992), reviewed in detail the status of and threats to marine turtles in Belize and presented a series of recommendations to improve the management and recovery of marine turtle populations. These authors presented evidence, both quantitative and qualitative, of the greatly depleted status of marine turtles in the country, which they and many of the individuals they interviewed for the STRAP attributed to heavy over-exploitation over several centuries, in particular of large juveniles and migrating, mating, and nesting adults. The STRAP identified the primary threats to marine turtles in the country to be: continuing exploitation of adults and large juveniles; incidental catch of turtles in trawls and other fishing gear; nesting beach development; and the degradation of foraging grounds by anchoring, dredging, waste disposal, and pollution. Finally, the STRAP cautioned that “time is short for the marine turtles of Belize” and that a lack of enforcement capacity hindered efforts to conserve remaining marine turtle populations.

Although efforts had been made by the Government of Belize in 1981 to conserve marine turtles through a moratorium on marine turtle exploitation set out in the *Wildlife Protection Act*, this measure was repealed owing to a direct conflict with the *Fisheries Regulations*, which at the time permitted a marine turtle fishery. It was not until a decade later that significant changes in management were instituted. The Government of Belize (2001) and the Belize Coastal Zone Management Authority and Institute (CZMAI) (CZMAI, 2002) note the important contribution of the STRAP to marine turtles in Belize, in particular in leading to a major revision, in 1993, of the country’s fisheries regulations, which conferred complete protection on Hawksbill Turtles and protected large

juvenile and adult turtles through maximum (vs. minimum) size limits based on measurements of shell length rather than total weight (which enable turtles to be measured at sea and returned if undersized). Subsequent legislation enacted in 2002 protects all marine turtle species at all times, with an exception for certain species that may be taken for traditional or cultural purposes on the basis of a permit and quota system.

The effectiveness of the virtually complete protection conferred on marine turtles in 2002 depends on the level of compliance by fishers and other consumers and this is, to a large degree, dependent on the investment made to inform them of existing regulations and to provide sufficient enforcement (Searle, 2001; Craig, 2002). Although there is evidence (e.g. Chacón, 2002) that the absolute protection conferred on Hawksbill Turtles has been effective in stemming trade in Hawksbill products, inadequate public awareness and enforcement efforts following the entry into effect of the 1993 regulations resulted in fishers' continuing—for the ensuing decade—to take large turtles, in contravention of the regulatory change to a maximum size limit (Searle, 2001). The apparent result is that, with the possible exception of Hawksbill Turtles, exploitation pressure on marine turtles in Belize is likely not to have eased significantly and meaningfully until very recently. However, because there seems to have been a genuine decline in demand for—and hence trade in—Hawksbill products and turtle meat (Chacón, 2002; CZMAI, 2002; Searle, 2001), the recent legal protection measures, if widely communicated and enforced, may prove effective in promoting the recovery of depleted populations.

There have been other achievements for marine turtles in Belize in the past decade, including the development of co-management arrangements for conserving the most important Hawksbill nesting beach at Manatee Bar and the protection of other nesting and foraging sites in a growing number of marine reserves and other types of protected areas for which Belize enjoys worldwide renown. However, management shortcomings persist. There are important gaps in knowledge regarding marine turtle nesting and foraging sites and a need for sustained and systematic population monitoring so as to: assess trends, evaluate the effectiveness of management measures, identify critical habitats and prioritize other actions that may be required. That a co-ordinated marine turtle conservation programme is not yet in place in Belize suggests that there is still significant progress to be made in the country to enhance the management and conservation of these species.

### **Summary of the status of marine turtles in Belize**

Three species of marine turtle regularly occur in the waters of Belize and nest on its many shores: the Loggerhead and Green and Hawksbill Turtles. Leatherbacks are observed in the open ocean between the barrier reef and Turneffe (Searle, 2001) and there have been reports of their occasionally venturing inshore from the barrier reef (Smith *et al.*, 1992; Searle, 2001). There are undocumented reports of Kemp's Rидleys (Smith *et al.*, 1992). Craig (2002) indicates that there are no known major foraging grounds but that these species—particularly Hawksbill Turtles and Loggerheads, according to CZMAI (2002)—forage along the entire barrier reef system and around the numerous offshore cays. The English Cay/Robinson Point area is thought to be an important foraging area for Green Turtles (CZMAI, 2002; Searle, 2003); it has been the source of supply for traditional turtle fishers for decades and is the source of most of the turtles that these fishers captured for sale in the markets in Belize City and Dangriga (Searle, 2001).

The most important nesting beaches for marine turtles in Belize are located on Ambergris Cay, on the southern cays from Silk Cay to the Sapodilla Cays, and on the mainland at Manatee Bar/Gales Point (Smith *et al.*, 1992). There are no major nesting concentrations of Green Turtles—historical rookeries for this species have been

“decimated” (Smith *et al.*, 1992). Nevertheless, Northern Ambergris Cay, Half Moon Cay, Sapodilla Cays and Turneffe Islands are considered important nesting sites for both Green Turtles and Loggerheads (CZMAI, 2002) and also for Hawksbill Turtles (L. Searle, Director, Symbios, *in litt.*, 8 October 2002). The major nesting concentration for Hawksbill Turtles is at Manatee Bar. Smith *et al.* (1992) reflected on the relatively few sites in the Caribbean where over 100 Hawksbill nests could be found on one beach; one of these was Manatee Bar Beach, “a national treasure that should be earnestly protected”.

#### Occurrence of marine turtles in Belize

English common name	Scientific name	Occurrence
Loggerhead	<i>Caretta caretta</i>	N, F
Green Turtle	<i>Chelonia mydas</i>	N, F
Leatherback	<i>Dermochelys coriacea</i>	I
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	N, F
Kemp’s Ridley	<i>Lepidochelys kempii</i>	A?
Olive Ridley	<i>Lepidochelys olivacea</i>	A

Key: N=nesting; F= foraging; I=infrequent; A=absent

Smith *et al.* (1992) wrote “it is clear that while some sea turtle stocks may be resident in the waters of Belize, many of the sea turtles observed at sea and especially on the nesting beaches are migrants”. This appears to be particularly the case with Green Turtles and Loggerheads, large numbers of which are reported to occur on a seasonal basis, while individuals of all age classes of Hawksbill Turtles are found in the waters of Belize throughout the year. Little is known, however, of their distribution or abundance at sea, or the details of their habitat use.

During interviews with fishers conducted for the 1992 STRAP, tags were solicited, and of the six tags presented by these fishers, five were from Green Turtles tagged in Costa Rica and one from a Hawksbill Turtle apparently tagged in Guatemala (the tag had a Guatemalan return address). The fishers reported catching an additional Hawksbill Turtle, apparently tagged in Guatemala, and a Green Turtle tagged in Mexico (Smith, 1990, cited in Smith *et al.*, 1992). Finally, reports have been made at a meeting of the Belize Sea Turtle Conservation Network

of fishers in Belize with jars of tags recovered from turtles that they have caught, including a tag from the Cayman Islands (Searle, 2003).



Credit: STCB

Release of a Hawksbill Turtle with satellite transmitter affixed.

More recent extra-territorial movements of marine turtles occurring in Belize include: the case of a Green Turtle, satellite-tagged after nesting at Tortuguero, Costa Rica, which travelled to Robinson Point and remained in the waters of Belize for several

months; other Green Turtles, tagged in Florida, Mexico, and Costa Rica, and Loggerheads tagged in Florida and the Bahamas, caught in Belize (CZMAI, 2002). According to Searle (2001), a Hawksbill Turtle tagged with a satellite transmitter in Antigua migrated into the waters of Belize and a Hawksbill Turtle fitted with a satellite transmitter during nesting at Manatee Bar in 2001 moved to southern Belize to forage in seamounts off Punta Gorda (L. Searle, *in litt.*, 8 October 2002). Genetic sampling and analysis suggest that Hawksbill Turtles born in Belize may be found as juveniles among foraging populations in Cuba and Mona Island, Puerto Rico (Bass, 1999).

## **Overview of the legal framework for marine turtle management**

### **Membership in international and regional treaties**

Belize is a member of numerous international environmental agreements of relevance to marine turtles. Particularly noteworthy is its accession to the Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC). Although Belize was included in the UK's ratification of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1976, its CITES membership after independence in 1981 became a point of uncertainty, such that the government formally declared succession to the treaty on 19 August 1986. Belize is, thus, considered to have been a party continuously since 1976, although the treaty is specified as having entered into effect on the date of independence from the UK. Belize is not party to International Labour Organization Convention N° 169 Concerning Indigenous and Tribal Peoples in Independent Countries.

### **Membership of Belize in multilateral agreements relating to marine turtles**

<b>Convention</b>	<b>Belize</b>
Cartagena Convention	22.09.1999 (A)
Protocol Concerning Specially Protected Areas and Wildlife (SPAW)	No
Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region	22.09.1999 (A)
Protocol Concerning Pollution from Land-based Sources and Activities	No
Convention on Biological Diversity (CBD)	30.12.1993 (R)
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	21.09.1981 (E)
Convention on Migratory Species (CMS)	No
Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC)	03.02.2003 (R)
MARPOL 73/78 (Annex I/II)	26.08.1995 (A)
MARPOL 73/78 (Annex III)	26.08.1995 (A)
MARPOL 73/78 (Annex IV)	26.08.1995 (A)
MARPOL 73/78 (Annex V)	26.08.1995 (A)
Convention on Wetlands of International Importance (Ramsar)	22.08.1998 (E)
UN Convention on Law of the Sea (UNCLOS)	13.08.1983 (R)
Western Hemisphere Convention	No
World Heritage Convention	06.11.1990 (R)

**Key:** Date of: Ratification (R); Accession (A); Entry into force (E)

### **Laws and regulations relating to marine turtles**

The legal requirements governing exploitation of marine turtles in Belize have evolved considerably over the past 30 years, culminating in virtually complete protection conferred in 2002.

The first regulatory measures relating to marine turtles were the *Fisheries Regulations* of 1977, which prohibited:

- the export, or attempted export, of any turtle or articles made from any part of a turtle unless under a licence granted by the relevant minister;
- the take of turtles “found on the shores of Belize and adjacent cays thereof”;
- the setting or attempted setting of any net or seine or other instrument with the intent of taking turtles within 100 yards of the shores of Belize or of the adjacent cays;
- the take or possession of any turtle or turtle eggs during a closed season from 1 June to 31 August; and
- the take, purchase, sale or possession of turtles under the following weights:

Loggerhead:	30 lb (13 kg)
Green Turtle:	50 lb (23 kg)
Hawksbill Turtle:	50 lb (23 kg)

The Regulations further provided for:

- the issuance of a commercial fisher’s licence in order to take turtles; and
- the levying of a maximum fine of 500 Belize dollars (BZD500) for persons convicted of violating the regulations.

The *Wildlife Protection Act* of 1981 included in its list of protected species four marine turtle species—the Loggerhead, Green Turtle, Hawksbill Turtle and Leatherback—thus establishing a moratorium on the hunting, sale or any dealing for profit, and import or export without a permit of any of these animals or part thereof, including nests and eggs. However, because of a conflict with the *Fisheries Regulations*, these four species were deleted from the Act through *Statutory Instrument No. 12* in January 1982 (Searle, 2001; Smith *et al.*, 1992).

The *Fisheries (Amendment) Regulations* of 1993 substantially revised the restrictions on the take of marine turtles, by prohibiting:

- the take, sale, purchase or possession of Hawksbill Turtles at all times;
- the take, sale, purchase or possession of any marine turtle during a six-month closed season from 1 April to 31 October;
- the take of any turtle found on land or interference with any turtle nest;
- the disturbance, damage, take, sale, purchase or possession of any turtle egg;
- the setting or attempted setting of any net, seine or other instrument with the intent of taking turtles within 100 yards of the shores or adjacent cays of Belize.
- the take, sale, purchase or possession of any Green Turtle or Loggerhead greater than 60 cm (24 ins) curved carapace length (CCL); and
- the import, transit, or export of any turtle without a valid permit issued by the relevant minister.

In addition, the Regulations prohibited the purchase, sale or possession of any articles made of turtle shell. Although possession of any articles held on the date of entry into force of the Regulations was allowed, those articles were prohibited from subsequent sale after 31 July 1993.

The most recent revision of the Regulations, the *Fisheries (Amendment) Regulations (Statutory Instrument No. 66)* of 2002, provides almost complete protection for the marine turtles of Belize. Designed to bring Belize in line with IAC, which Belize ratified in February 2003, these Regulations prohibit:

- fishing in the waters of Belize or the purchase, sale or possession of any marine turtle;
- the take of any turtle found on land; the disturbance, take, purchase, sale or possession of any turtle or turtle eggs; and the interference with any turtle nest, except under written permission by the Fisheries Administrator; and
- the import to, transit through, or export from Belize of any turtle or turtle products.

The Regulations also provide for:

- increased penalties for violations of the prohibitions set out in the law, namely a fine not exceeding one thousand dollars per turtle or part of a turtle, or imprisonment for a term not exceeding one year, or both the fine and imprisonment;
- prior issuance of a written permit from the Fisheries Administrator for the take or use of any marine turtle (other than Hawksbill Turtles, which are fully protected at all times) for traditional or cultural use. The permit must specify the “amount and specific purpose for such use”;
- the requirement that any shrimp trawler operating in the waters of Belize must be fitted with a pre-approved operational turtle excluder device (TED); and
- right to possession for personal use of any articles made of turtle shell held by anyone on the date of entry into force (1 June 2002) of the Regulations.

Marine protected areas (MPAs) in Belize may be designated under the *Fisheries Act Chapter 210* and the *National Parks System Act Chapter 215*. Under existing law, marine reserves in Belize are not no-take but, rather, zoned for multiple use and are administered by the Fisheries Department, in some instances through partnerships with NGOs via formal co-management arrangements (Gibson *et al.*, 2004). The *Coastal Zone Management Act Chapter 329* of April 1998 mandates the Coastal Zone Management Unit (now CZMAI) to address cross-sectoral sustainable development of coastal resources and to undertake research, monitoring, training and public awareness activities on all aspects of marine and related resources (J. Gibson, Wildlife Conservation Society, *in litt.*, 23 October 2004).

The CITES National Legislation Project assessed Belize’s CITES-implementing legislation as “believed generally not to meet the requirements for the implementation of CITES” (Anon., 2002) and assigned a deadline of 31 December 2003 for adequate implementing legislation to be enacted. This deadline was subsequently extended and, by the time of the 13<sup>th</sup> meeting of the Conference of the Parties to CITES, Belize had submitted draft implementing legislation to the CITES Secretariat (Anon., 2004). A CITES Legislation Plan has also recently been submitted (S. Nash, Chief, Capacity Building Unit, CITES Secretariat, *in litt.* to J. Gray, TRAFFIC International, 21 September 2005).

### **Responsible authorities**

The Fisheries Department of the Ministry of Agriculture, Fisheries and Co-operatives is responsible for marine turtle management in Belize. Both the fisheries legislation and *Wildlife Protection Act* grant respective ministers authority to appoint enforcement personnel, which include Fishery Officers, any member of the management committee of a fishing co-operative, and protected area staff, while the wildlife regulations confer on game wardens and game rangers powers of search, seizure and arrest to enforce the *Wildlife Protection Act*. CITES is administered by the Forestry Department of the Ministry of Natural Resources, Environment and Industry.

### **Exploitation and trade of marine turtles**

#### **Exploitation and use at the national level**

##### *Historical perspective*

There is a centuries-long history of marine turtle exploitation in Belize, for both national and international markets. Marine turtles were once the focus of a major industrial fishery in the country that primarily targeted Green Turtles for meat, Hawksbill Turtles for shell, and turtle eggs. This history is reviewed in detail by Smith *et al.* (1992), who reported that this industry flourished from the mid-17<sup>th</sup> to the mid-20<sup>th</sup> century but that, by the 1960s, marine turtle populations appeared greatly depleted and few fishers continued to focus their efforts on catching turtles. In a comprehensive historical account, Craig (1966) concluded that “the traditional pattern of fishing practices developed during the colonial period continued in force until the end of World War I, at which time....the turtle population had been decimated, without any attempt at conservation”.



Credit: Scott A. Eckert/WIDECAST

**An adult Loggerhead finds a resting hole in coral reefs**

Based on market surveys and interviews with fishers, at least in part conducted by the Fisheries Department, Miller (1984) reported an annual estimate ranging from 1125 turtles (in 1980) to 1005 turtles (in 1982) legally landed at seven landing sites during several months of the year during the period 1980–1982, with additional numbers “occasionally” landed in other months; up to 40% were Loggerheads, 33% were Hawksbill Turtles and 31% were Green Turtles. In addition, he provided an estimate of 10 000 turtle eggs taken for subsistence purposes.

Smith *et al.* (1992) reported a similar estimate for the number of turtles sold each year during subsequent years of the 1980s and that 500–800 turtles, most of them adults (30% Loggerheads, 10% Hawksbill Turtles and 60% Green Turtles), were sold in the markets every year in the early 1990s. They pointed to evidence of a decline in catches and marine turtle stocks: older fishers attested to serious declines in the number of marine turtles over their lifetimes, while catch-per-unit effort had dropped and turtles caught were considerably smaller than as recent a year as 1980. In addition, fisheries data indicated that the average weight of turtles landed fell 60% (from 163 kg to 67 kg) between 1982 and 1986. They further noted a decline in the number of fishers believed to be taking turtles full-time: Miller (1984) had estimated 20–30; Gillett (1987) had estimated 15–20; while they themselves estimated no more than 10. By contrast, they observed that fishers targeting lobsters, conches and fin-fish continued to take marine turtles opportunistically. Finally, they reported that all the fishers that they interviewed reported that they caught many more females than males.

Miller (1984) reported a “fairly heavy trade” in juvenile turtles to “satisfy tourist demand”. Moll (1985, cited in Groombridge and Luxmoore, 1989 and Smith *et al.*, 1992) reported the findings of his visits to the country in 1983 and 1984, namely that: Green and Hawksbill Turtles and Loggerheads were all exploited; the ban on egg collection imposed in 1977 was widely ignored; turtles were taken for meat during the closed season; and tortoiseshell curios and jewellery found a “ready market” amongst tourists from abroad. Gillett (1987) echoed these findings and also reported “turtles [are] being exploited for their eggs, meat, and shell. Turtles are being netted by local fishermen and a considerable trade in turtle eggs and turtles is allegedly being conducted by illegal fishermen from those countries south of our borders. These activities and the extent to which they exploit the resource [are unquantified because] they operate from the southern cays which are mostly uninhabited and isolated. Although our traditional fishermen are not solely dependent on the catch of turtles for their livelihood, there is a thriving trade in turtle products. Other lobster and conch fishers do take turtles when available as incidental catch. Marine turtles are also being caught in the nets of the shrimp trawlers operating in our waters.” He also suggested a “conservative estimate” of 700 turtles, primarily Green and Hawksbill Turtles, taken incidentally by shrimp trawlers during a single shrimping season.

Although Smith *et al.* (1992) cited Miller’s (1984) estimate of 10 000 marine turtle eggs being taken each year in spite of the legal prohibition, they indicated that the extent of illegal take of marine turtles in any given year was unknown.

#### *Recent (since 1992) exploitation*

From 1993, when Hawksbill Turtles were afforded complete protection, until the new regulations came into effect in 2002, the legal marine turtle fishery operated for Green Turtles and Loggerheads during a five-month open season stretching from 1 November to 31 March. During the open season, Green Turtles were sold openly at fish markets in Belize City and all turtles, including Hawksbill Turtles, were taken for food and possibly for sale out



of season (L. Searle, *in litt.*, 8 October 2002). Searle (2001) conducted daily surveys at two markets in Belize City during the 2000–2001 open season and recorded the species, size and sex of the turtles landed. She reported that, because of inadequate public awareness and enforcement efforts, fishers were unaware of the 1993 regulatory change from a minimum to a maximum size limit, such that large turtles continued to be landed; all the turtles that she recorded during her surveys were greater than the legal maximum size limit of 60 cm CCL.

There does not appear to have been any systematic collection by the Fisheries Department or the fishing co-operatives of data on turtles landed or sold prior to the prohibition. In general, according to Craig (2002), very few landing data were collected. According to Searle (*in litt.*, 8 October 2002), turtles were sold to “retailers” at fish markets for as much as BZD75 for a large Green Turtle and the meat was sold for as little as BZD1.50/lb, making the turtle meat less expensive than beef and fish. Based on her market surveys, Searle (2001) estimated that 83 Green Turtles were landed during the 2000–2001 season. She compared this figure with Miller’s (1984) and Gillett’s (1987) landing data for Belize City, which they estimated as 25–32% of the country total, and estimated that 239–332 turtles may have been landed throughout Belize during the 2000–2001 open season. This reduction of more than two-thirds from 1980 landing estimates may represent a decline in turtle populations, but Searle (*in litt.*, 8 October 2002) provides evidence that demand for marine turtles has decreased. She observed during her market surveys that turtle meat remained unsold for several days and that attitudes towards turtle consumption appeared to be a function of culture and generation: older Creoles and Garifuna consider this an important part of their culture, while the majority of young Belizeans find it “repulsive” to eat turtle.

CZMAI (2002) reports that the turtle fishery was primarily opportunistic and that very few fishers relied on marine turtles as a major source of income. Craig (2002), however, suggests that marine turtles may have been a significant source of incidental catch income. According to Searle (*in litt.*, 8 October 2002), turtle fishing has continued to be important for turtle fishers, for whom it has generated real income. In her experience, turtles captured incidentally by lobster or conch fishers are primarily consumed on the boat or taken home to their families.

Both Craig (2002) and Gibson (2002) report a local preference for Green Turtle meat, but the meat of Green Turtles and Loggerheads (and Hawksbill Turtles, according to Searle [*in litt.*, 8 October 2002]) has also been consumed, shared amongst friends and family or butchered at the local market and sold fresh, including, at least until 2002, to some restaurants. Searle (*in litt.*, 8 October 2002) notes, for example, that one turtle fisher in Belize City caught Green Turtles primarily for restaurants in Belize City. Green Turtle soup has remained a delicacy in the country, while turtle flipper soup, according to Craig (2002), is prized by the resident Chinese population. The meat is also used by the Garifuna in the “dugu”, a traditional ceremony of remembrance for relatives who have died.

There are no data from which to evaluate the illegal collection of turtle eggs. Craig (2002) reports that turtle eggs are not sold openly and are not as prized as in Honduras and Costa Rica. Large turtle shells are used as wall ornaments. Chacón (2002) reported on the results of market surveys and interviews conducted throughout Central America during the period 2000–2002 by the *Red Regional para la Conservación de las Tortugas Marinas en Centroamérica* (RCA—Central American Marine Turtle Conservation Network) in partnership with WIDECAS. In Belize, these surveys were conducted in several cities known for heavy tourist traffic. In a few instances, Hawksbill items were found for sale and reported to be very popular with buyers or available for sale only upon specific request; however, the majority of interviews revealed an awareness of the legal prohibition on

the sale of Hawksbill products and/or of concerns regarding the conservation of the species. In addition, at least two vendors reported that Hawksbill shell products that they had displayed for sale had been confiscated by government authorities enforcing the protective legislation. In at least one city, a vendor selling sea turtle cream made in Guatemala reported that he sold very few of these items despite their “being good for the skin”.

In addition to direct take, there has continued to be incidental mortality of marine turtles in fishing operations. Although shrimp trawlers are required by law to use pre-approved TEDs, mortalities apparently still occur: several turtles stranded along Manatee Bar beach during the peak nesting period in July 2002 were presumed to have been the result of the early opening of the shrimp fishing season that year (S. Beaton, Belize Sea Turtle Conservation Network, *in litt.* to D. Chacón, 24 September 2002). Smith *et al.* (1992) noted reports of an increase in the use by fishers in Belize of gill nets, which are well known to catch and drown marine turtles; they also raised questions as to possible incidental mortality in longline fisheries, which at the time of their writing were known to be operating in the north-eastern Caribbean.

### **International trade**

#### *Historical perspective*

As indicated above, the large fishery for marine turtles that operated over centuries in Belize also provided international markets. Smith *et al.* (1992) reported that large numbers of Green Turtles, as many as 2000–6000 annually in the 1860s, were transported live from the country to England during the late 19<sup>th</sup> century to be sold for their meat. This trade dwindled to “50–150 turtles annually” in the 1890s and appears to have been supplanted by exports of Hawksbill shell. According to Craig (1966), “Victorian demand for Hawksbill shell revitalized the earlier turtle industry of the buccaneers [and] substantial fortunes were made in British Honduras [now Belize] when the market for turtle shell was expanding”; by 1910 the price fell, “due largely to the competition of imitation celluloid products”.

The Hawksbill trade from Belize continued through the major part of the 20<sup>th</sup> century. Smith *et al.* (1992) cited the following statistics on Hawksbill shell exports, nearly all of it to England, in Rebel’s (1974) study:

<b>Year</b>	<b>Volume of Hawksbill shell exported (lb)</b>
1937	2576
1938	1457
1939	1211
1940	319
1941	850

Further, Smith *et al.* (1992) cited Moll’s (1985) report that a Placencia Fishermen’s Co-operative exported “many Hawksbill Turtles” to France in the mid-1970s. There appears also to have been international trade in marine turtle eggs. Smith *et al.* (1992) cited Moll’s (1985) information that marine turtle eggs collected in Belize were being purchased in 1982 by Honduran and Guatemalan citizens and smuggled back across the border. They also cited Smith’s (1990) information from a Belizean fisher that some Belizean fishers collected eggs on Manabique beach in Guatemala: “despite patrols many eggs were taken because so much money could be made: three to four men could return with as many as 1200 eggs”.

Smith *et al.* (1992) indicated that they received multiple reports from reliable sources that illegal exports of Hawksbill shell from the country continued.

CITES trade statistics derived from the UNEP-WCMC CITES Trade Database provide little evidence of international commercial trade in marine turtles involving Belize. No international trade was reported by CITES Parties between 1975 and 1979 and the only trade reported (including in CITES trade statistics submitted by the Government of Belize) in subsequent years to 1993 were imports into the USA, most of them seized on entry.

Japanese Customs statistics on the import of Hawksbill shell for 1970–1986 (Milliken and Tokunaga, 1987) and up to and including 1992 (H. Kiyono, TRAFFIC East Asia-Japan Office, *in litt.* to TRAFFIC International, 29 July 2002), the last year that Japan permitted these imports, show a dramatic rise in imports from Belize, beginning in 1985, with 1195 kg and 2231 kg reported imported in 1985 and 1986, respectively. After this, they ceased entirely. Milliken and Tokunaga (1987) reported that the Japanese dealers' import data recorded even higher volumes in those years (1628 kg in 1984, 3240 kg in 1985, 3280 kg in 1986), suggesting that real export volumes from Belize may have been much higher. This sudden increase in Hawksbill shell imports into Japan from Belize was attributed by Groombridge and Luxmoore (1989) and subsequent authors to the confused status of Belize's CITES membership: although Belize was included in the UK's ratification of CITES in 1976, when the country became independent, in 1981, it was not certain whether separate ratification of the treaty was necessary and, thus, whether Belize was bound by CITES or not. This issue was clarified in 1986, by which time, a total of 4666 kg of Hawksbill shell (5773 kg during the period 1970–1992) had been imported from Belize into Japan (according to Customs statistics).

**Japanese imports (kg) of Hawksbill Turtle shell, 1970–1992, from Belize, as recorded in Japanese Customs statistics**

<b>Year</b>	<b>1970</b>	<b>1971</b>	<b>1972</b>	<b>1973</b>	<b>1974</b>	<b>1975</b>	<b>1976</b>	<b>1977</b>	<b>1978</b>	<b>1979</b>	<b>1980</b>	<b>1981</b>
	97	82	0	28	276	0	12	40	0	314	258	0
<b>Year</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>Total</b>
	702	538	0	1195	2231	0	0	0	0	0	0	5773

Sources: Milliken and Tokunaga, 1987; H. Kiyono, TRAFFIC East Asia-Japan Office, *in litt.* to TRAFFIC International, 29 July 2002.

*Recent (since 1992) international trade*

There is very little evidence of international trade in marine turtles involving Belize since 1992. CITES trade statistics up to and including 2004 record only a small number of items in trade, most of them single items seized on entry in the USA. Chacón's (2002) review of the regional trade in marine turtle products in Central America presents little evidence of Belize as an import market for marine turtle products from the region. However, some vendors interviewed in neighbouring Guatemala reported that their Hawksbill products were made from scutes imported, via Punta Gorda, from Belize. This suggests that some illegal export trade in Hawksbill shell from the country may still occur.

## **Enforcement issues**

Based on other authors' findings and the results of their own research, Smith *et al.* (1992) identified conservation law enforcement as one area that "could be much improved", if marine turtle management measures in Belize were to be successful and noted that the necessary improvements would require greater will and expanded resources on the part of the government and a greater commitment by the general public to comply with conservation legislation. At the time of their writing, all members of the Maritime Wing of the Belize Defence Force, the Manager and Biologist for Hol Chan Marine Reserve, and Fisheries Department personnel enjoyed enforcement powers for fisheries regulations, while a game warden and game rangers were mandated to exercise power of search, seizure and arrest to enforce the *Wildlife Protection Act*. In addition, they noted that the Fisheries Department had recently established, with funding from the US Agency for International Development (USAID), a Conservation Compliance Unit furnished with five new patrol boats, two new law enforcement officers for each boat, an administrative officer and a mechanic. This Unit greatly enhanced the Department's surveillance and enforcement capabilities, with the result that arrests, convictions, and confiscations were on the rise and illegal fishing increasingly contained.

According to Gibson *et al.* (2004), while at the time of the USAID funding, the Conservation Compliance Unit enjoyed an enforcement capability considerably greater than that found in most other Caribbean countries, insufficient government resources have in recent years precluded the Unit from maintaining this original level of capacity. Although it remains active and continues to conduct patrols, illegal fishing, e.g. of undersized conches and lobsters, is known to occur, as does fishing during closed seasons, and illegal foreign fishers pose a major problem, particularly in the south of the country.

Illegal exploitation and trade of marine turtle products have continued in Belize, but it does not appear possible to make any judgments about overall trends, as they may differ according to the products involved, and the situation may have changed significantly since implementation of the complete prohibition enacted in 2002. Craig (2002) reports that there is a range of evidence—documented, anecdotal, and that based on seizures—of illegal exploitation of marine turtles in the country, primarily by local fishers but also by Honduran fishers in the south. Searle (2001) also reports illegal take and sale of turtle meat. Although both Craig (2002) and CZMAI (2002) report that there is still some illegal trade in Hawksbill jewellery, made by local craftsmen and sold by them on the street or, less commonly, through larger handicraft shops or local gift shops to both locals and tourists, Chacón's (2002) surveys found a lower prevalence of Hawksbill products for sale in the country than in other countries in the region, apparently the result of government enforcement efforts.

Although the 1993 protections afforded Hawksbill Turtles appear to have been widely communicated and to have had an impact on consumption, Searle (2001) reports a lack of awareness of—and, therefore, compliance with—the restrictions governing the take of turtles at sea. Her findings that fishers were unaware of the 1993 reversal to maximum (from the earlier minimum) size limits suggests that there should have been more vigorous efforts to communicate these new restrictions with fishers and other consumers; although public service announcements on the turtle regulations were made at the beginning and end of the closed season, these were inadequate in affecting what should have been a major improvement in the management of the legal fishery. No information has been provided in the course of this study as to whether this shortcoming has been repeated with the absolute protection conferred for marine turtles in 2002.

Although the illegal take of marine turtles continued in Belize at least until the 2002 prohibition, CZMAI (2002) did not believe it to be a severe problem for marine turtle management and noted that increased enforcement efforts—monitoring at sea and of marketplaces, especially during the closed season—had led to the confiscation of several turtles, the live ones of which were released. While, on the one hand, Craig (2002) suggests that illegal exploitation of marine turtles may be reduced by the increasing rise in tourism earnings in Belize and the consciousness that turtles are potentially worth far more alive than dead, he expresses concern that the new legislation protecting marine turtles at all times will require more resources to enforce; in addition, although the stiffer penalties put in place with the 2002 *Fisheries Regulations* should serve as a deterrent, this will only be the case if effort is made to document violations and pursue these cases through the courts.

Although illegal turtle products are being seized, contributors to this review knew of no stockpiles of marine turtle products. Other than for live turtles, information has not been provided on what is done with the products, such as Hawksbill shell products from vendors, that are seized.

The existence—and active management—of the expanding network of MPAs in Belize has contributed to efforts to enforce fisheries regulations and other protective measures: MPA staff enjoy certain enforcement powers and only need to call in fisheries officers in special circumstances. In addition, they can develop closer relationships with local fishers, thus engaging them on a more regular basis in the rationale for, and activities and results of, MPA management measures. National parks near national borders have also played a role in reducing illegal take by foreign fishers, such as has been documented in Bacalar Chico Marine Reserve, where the activities of staff have reduced incursions by Mexican fishers, and in the south at Glover's Reef and Port Honduras marine reserves, where they have reduced illegal fishing by Honduran and Guatemalan fishers (Gibson *et al.*, 2004). Finally, the establishment of MPAs in Belize has been developed through participatory processes which have both educated and involved fishers and other stakeholder groups: fishers have been engaged from early on in public fora and through other processes and have representatives serving on advisory or management committees for the MPAs (Gibson *et al.*, 2004).

### **Marine turtle management**

The 1992 STRAP proposed for Belize an initial three-year marine turtle conservation programme aimed to fill important gaps in knowledge, heighten public awareness, provide training, and resolve specific threats to marine turtles. Other than the significant revisions to the *Fisheries Regulations* for marine turtles and the legislative and other advances made through the efforts of CZMAI, it does not appear that the STRAP recommendations have been fully implemented. According to Searle (2001), the Belize Sea Turtle Conservation Network plans to implement these recommendations through alliances with NGOs; however, the constraints on existing efforts suggest a need for greater investment of human and financial resources and, quite possibly, a greater commitment by key actors to take this work forward.

### **Management of exploitation**

From a legal standpoint, the most significant steps in marine turtle management in Belize came with the 1993 and 2002 revisions to the fisheries regulations for marine turtles. The 1993 revisions were notable in a number of respects: a) complete protection was conferred on Critically Endangered (cf. IUCN) Hawksbill Turtles; b) a maximum size limit was established, thus protecting the adults and large juvenile turtles that are essential for

population maintenance and recovery; and c) the maximum size limit was based on carapace length rather than weight, which is much more workable (and, thus, likely to be adhered to), as it can be performed at sea and enable an undersized animal to be released quickly. The 2002 revisions protect the marine turtle resource fully, with the sole exception of traditional or cultural use (of other than the Hawksbill Turtle) that requires pre-issuance of a permit specifying the species, number, and specific purpose of such use.

The management framework prior to the 2002 revisions of the *Fisheries Regulations* is widely recognized to have been insufficient to prevent declines in marine turtle populations (Craig, 1966; Smith *et al.*, 1992; Craig, 2002; CZMAI, 2002). An additional management shortcoming was that there was little monitoring of the legal fishery—landings were not recorded and monitoring compliance with restrictions was only undertaken “to a limited extent” (CZMAI 2002). Monitoring by the Department of Fisheries at sea and in markets during the closed season (CZMAI, 2002) aimed at deterring illegal exploitation and trade, but no assessments appear to have been made to determine how effective these activities were.

The absence of systematic, continual monitoring of the fishery in the decade up to the 2002 prohibition precludes an assessment of fishery trends based on those statistics and any inference from those trends for trends in marine turtle numbers. In the absence of more comprehensive, systematic and sustained population monitoring, it is, therefore, impossible to judge the full impact of exploitation—or the measures to control that exploitation—on marine turtle populations.

Noteworthy is the observation by Searle (2001) that recent regulatory revisions appear to have significantly reduced the trade in Hawksbill shell products, but have been less effective in eliminating the (now illegal) fishery, as in large part, it would appear, the revisions were not widely known and, thus, respected, owing to inadequate communication of the regulations to fishers and the broader public. With this in mind, and recognizing that adoption of the 2002 revisions of the *Fisheries Regulations* represents a major change in the management regime, the effects of which have yet to be fully evaluated, several concerns should be noted:

1. **Exemption for “traditional or cultural” use.** According to CZMAI (2002), permits for this take are to be issued by the Fisheries Department on the basis of quotas. The scientific basis for the establishment of these quotas—and the degree to which they take into account projected or possible illegal exploitation—should be explicit and available for review. In addition, measures to ensure compliance with the quota system should be clarified.
2. **Detention for personal use of marine turtle articles already in personal possession.** This provision was first made in the *Fisheries Regulations* of 1993. It is not clear, however, to what extent this provision represented a loophole through which illegally acquired marine turtle products were clandestinely sold or stockpiled for sale—legal or illegal—some time in the future. Government enforcement efforts appear to have been effective in reducing illegal trade in Hawksbill products, but further efforts, such as an inventory and registration of articles held by individuals or retail outlets, may be useful in stemming continued trade of these and other marine turtle products in the future.
3. **Resources for enforcement.** Although there is indication of a declining interest in marine turtle consumption in Belize, there appears to be little question that the major shift in the management regime for marine turtles in Belize—from a legal fishery operating a full five months of every year and possibly taking over 300 turtles



Credit: Sea Turtle Conservation Bonaire

Measuring a turtle's straight carapace length at sea.

per year—will require an increase in public education, awareness, and enforcement. The challenges of the country's geography—a long coastline with hundreds of offshore cays and the barrier reef itself—and past shortcomings suggest a need for greater resources for monitoring and enforcement, along the lines below.

- **at sea:** as most marine turtles taken in recent years are thought to have been taken opportunistically, i.e., in the course of fishing for other species, there appears to be a real need to monitor fishing activities at sea and to pursue violations. In addition to detection and prosecution, a system should be established to record violations so as to monitor trends in compliance.
- **on nesting beaches:** increased protection of nesting beaches through patrols during the nesting season would seem to be necessary. For example, Beaton (*in litt.*, to D. Chacón, 24 September 2002) reports that at Manatee Bar there is principally only one person monitoring the six-mile nesting zone. He himself undertakes patrols and volunteers visit on a very limited scale—for a night or two during peak nesting season—but more funding is needed to step up patrols in the area. The co-management arrangements being developed with the Gales Point community at Manatee Bar should take advantage of experiences elsewhere in the region and be expanded to other important nesting sites.
- **in markets:** Chacón's findings (2002) suggest that illegal trade in Hawksbill products in Belize is not extensive and that most vendors know that such trade is illegal. However, it may be advisable to undertake a repeat survey of vendors and retail outlets in the cities surveyed for his study to verify the

findings and to inventory and/or confiscate any remaining Hawksbill items and discern whether any other marine turtle products, particularly from neighbouring countries, are being displayed for sale.

### **Species research and conservation**

Current marine turtle conservation activities in Belize are carried out by individuals, NGOs, government departments, and national and regional networks (Searle, 2001) and, in at least one instance, by a local community. The Belize Sea Turtle Conservation Network is putting more emphasis on the monitoring and surveying of nesting beaches and data are becoming available from satellite-tracking and tagging undertaken through the Fisheries Department and regional agencies and NGOs (CZMAI, 2002).

The Gales Point Turtle Project has operated for several years at Manatee Bar which, as the most important Hawksbill nesting site in the country, has been designated as an Index beach. Through a co-management agreement with the Belize Government, the Gales Point Wildlife Sanctuary Management Committee is overseeing and implementing conservation activities for the area. These include public education and outreach and, since 1988, turtle population monitoring, through annual nest surveys by volunteers from the Gales Point community in collaboration with the Department of Fisheries. In addition to nest counts, volunteers protect nests with cages or move them to higher ground if made too close to the water line. During the 2000 nesting season, 110 nests were recorded (Andrewin, 2001, cited in Searle, 2001). Although this project holds promise for the future of this important area, it faces a number of constraints, including a shortage of human, financial and logistical resources (McSweeney, 2004; CZMAI, 2002); the project is dependent on funds from external sources—only a small amount of funding appears to be available through the Fisheries Department for Manatee Bar (S. Beaton, *in litt.* to D. Chacón, 9 September 2002)—and this has prevented surveys from being conducted on a regular basis. Training, books and publications, education and outreach materials and other support have been provided through NGOs, such as WIDECAS and the Wildlife Conservation Society.

Population monitoring studies aimed at determining long-term marine turtle population trends are now under way through annual nest counts on North Ambergris Cay (Bacalar Chico Marine Reserve on the border with Mexico) and incorporate active nesting beach protection efforts based on internationally accepted standards (Craig, 2002). Because these began only in the 2001 nesting season (Searle, 2001) it will be some time yet before any real trends can be assessed.

Searle (2001) began her research on the status and distribution of marine turtles in Belize in October 2000 through literature reviews, interviews and market surveys. A Save-A-Sea-Turtle programme was launched in 2000 to purchase and release captured turtles (five female Green Turtles were purchased and released in 2000). It has also distributed marine turtle sighting sheets to all resorts and dive shops in an effort to collect more information on nesting and foraging of marine turtles in the country. Searle (*in litt.*, 8 October 2002) has also initiated underwater studies to determine the importance of the Robinson Point area as a foraging area for marine turtles.

Despite these efforts, there is still a need for co-ordinated, countrywide surveys of nesting marine turtles to follow up on those undertaken during the mid- to late-1980s (during preparation of the STRAP) and determine current population trends, and for surveys to be conducted along some coastal areas and offshore cays that have never been investigated.



As part of regional efforts to determine migration patterns of nesting Hawksbill Turtles, the Belize Fisheries Department, in conjunction with the US National Marine Fisheries Service, fitted a satellite transmitter to a Hawksbill Turtle in September 2000 and tracked the animal as it nested at Gales Point and moved towards the Belize–Honduras border.

### **Habitat conservation**

Belize is in the forefront globally in the development and implementation of MPAs. The designation of an area of Half Moon Caye on Lighthouse Reef atoll as a natural monument in 1982 (a portion of which had been protected since 1928 owing to its Red-footed Booby *Sula sula* colony) marked the first time that a marine habitat in Belize had been included in a protected area. Since that time, Belize has continued “to develop one of the world’s most advanced and visionary systems of marine protected areas” including no-take marine reserves, as an essential component of the country’s Coastal Zone Management Strategy; these MPAs aim to fulfill a range of objectives, including tourism management, biodiversity protection and fisheries management (Gibson *et al.*, 2004). An existing network of 13 MPAs, designed to incorporate the range of marine habitats in Belize and conserve overall ecosystem functions, was in place in 2002, when additional legislation was enacted to strengthen this system through the creation of 11 new no-take marine reserves aimed at protecting known spawning aggregations for the threatened Nassau Grouper *Epinephelus striatus* and other reef fish and providing additional protection for the Nassau Grouper during its spawning season (Gibson *et al.*, 2004).

There are currently eight multiple-use marine reserves designated in Belize: Hol Chan, Glover’s Reef, Bacalar Chico, Caye Caulker, South Water Caye, Sapodilla Cays, Port Honduras and Gladden Spit. In addition to these strictly marine sites, several areas that include marine zones have been designated as strictly no-extraction zones and administered by the Forest Department or designated co-managing organizations as: national parks (e.g. Laughing Bird Caye and Bacalar Chico); wildlife sanctuaries (Corozal Bay [Manatee] Sanctuary, Swallow Caye [Manatee] Sanctuary, and the Gales Point/Southern Lagoon Wildlife Sanctuary); natural monuments (Half Moon Caye and Blue Hole); and nature reserves. In some cases, adjacent marine and terrestrial protected areas have been designated and are managed jointly. In 1996, seven of Belize’s MPAs were declared by UNESCO as the Belize Barrier Reef Reserve System World Heritage Site (Gibson *et al.*, 2004).



Credit: WWF-Canon/Anthony B. Rath

Newly hatched Hawksbill Turtles resting in Sargassum. Manatee Lagoon Beach, Belize.

Several marine turtle nesting areas in Belize are included in nature or wildlife reserves (Craig, 2002; Government of Belize, 2001), namely Bacalar Chico Marine Reserve, Sapodilla Cayes Marine Reserve and Half Moon Caye Natural Monument (CZMAI, 2002). Although the Gales Point/Manatee Bar nesting site falls within the Manatee Special Development Area (Smith *et al.*, 2002), it does not lie within the boundaries of the Gales Point (Southern Lagoon) Wildlife Sanctuary (J. Gibson, *in litt.*, 23 October 2004).

Through the work of CZMAI and other agencies, legislation has been put in place to regulate mining, placement of beach stabilization structures, waste disposal, access, design setbacks, marine pollution and other impacts, and a national mooring buoy system has been established (Government of Belize, 2001). These measures are expected to provide additional benefits for marine turtles.

### **Education and public awareness**

Increasing awareness of the status of marine turtles and their conservation requirements was highlighted as a need in the 1992 STRAP and, based on more recent information reviewed here, continues to be a necessary prerequisite for the realization of sustainable management goals. In addition to more active and extensive publicizing of the laws in force in relation to marine turtle exploitation (and other regulated marine resources), Searle (2001) identifies the need for more focused outreach and consultation with the relatively small number of turtle fishers and merchants involved in marketing marine turtle products.

### **Constraints to marine turtle conservation and management**

Craig (2002) and CZMAI (2002) point to a range of issues constraining more effective management and conservation of marine turtles in Belize, namely:

- lack of knowledge of marine turtles, including limited data to enable quotas to be set for take for traditional and cultural purposes;
- limited manpower in the Fisheries Department for monitoring and enforcement;
- lack of trained personnel;
- lack of public support; and
- insufficient funding.

According to CZMAI (2002), shortcomings in management are gradually being addressed, but there remains, in particular, a need for funding and opportunities for additional training.

### **Summary and recommendations**

There have been numerous achievements in marine turtle conservation and management in Belize in recent decades. Most significant is the revision of the fisheries regulations for marine turtles, first in 1993 and subsequently in 2002. The 1993 revisions, in particular those providing for complete protection for Hawksbill Turtles and maximum (vs. minimum) size limits so as to protect the large juveniles and adults that are the most important age classes for marine turtle population maintenance and recovery, stand as an example for other countries in the region with legal turtle fisheries to consider. The narrow exemption for traditional and cultural uses (cf. Article IV of IAC), under a permit and quota system, which was enacted in 2002 in the context of the

absolute protection conferred on marine turtles—if judiciously implemented—may also serve as a viable compromise measure for other countries with long-standing turtling traditions to consider adapting to their own situations. That these measures would serve as an example for other countries would be consistent with Belize’s achievements at a broader level in the field of coastal zone management and MPA development and management.

However, although complete protection of the Hawksbill Turtle appears to have been enforced and largely effectively so, the effectiveness of regulations affecting the legal fishery in the decade up to 2002 appears to have been severely compromised by the lack of sustained outreach to fishers and others about the changes that had been adopted. The shift from a legal to virtually completely illegal fishery through the prohibition adopted in 2002 can only be effective in ensuring the conservation and recovery of marine turtles if the protections are complied with. While vigorous enforcement may be necessary, the first step should be to ensure that these restrictions are widely communicated, through community outreach and other education efforts, with fishers and other consumers of marine turtle products and the broader public. Outreach campaigns should seek to involve stakeholders in meaningful ways, such as through public events, beach clean-ups, sightings and reporting networks, population monitoring, youth activities and entrepreneurial outlets. An additional effort should be made to publicize violations and successful prosecutions, including the penalties levied, so as to deter future violations.

Equally important is the need to expand marine turtle survey and population monitoring efforts, including by using the more intensive Index site monitoring protocols, so as to assess the status of these species in the country, identify trends over time, inform management and conservation efforts, and evaluate mitigation measures. The recommendations set out by Smith *et al.* in the 1992 STRAP should be re-evaluated and implemented in the context of a more co-ordinated nationwide marine turtle conservation programme. The Belize Sea Turtle Conservation Network is making steps in that direction and it is hoped that it will provide the framework for the co-ordination and collaboration that are needed.

As indicated by CZMAI (2002) and evident from the findings of this review, funding and human resources, particularly given the geographical complexities of the country, are a major challenge for the government, NGOs and communities in taking forward marine turtle conservation efforts in Belize. Promising starts, such as the Gales Point Turtle Project and the development of the Belize Sea Turtle Conservation Network, which arose from the country’s involvement in WIDECAS, have been made and those enforcement efforts that have been made appear to have been effective. However, significant funding, in particular from external sources, is necessary and should be made available to develop and expand these activities.

Finally, Belize should move forward expeditiously with the enactment of CITES-implementing legislation so as to establish a strong basis for controlling trade in its wildlife resources. It is hoped that this legislation will provide a legal basis for the registration of wildlife products, such as CITES Appendix-I specimens or nationally protected species that are legally held by private parties but are considered to provide a possible cover for continued illegal exploitation or trade. Without a full inventory and full registration of marine turtle products held at the time of prohibition, the law of possession is “impossible to enforce as it stands” (J. Gibson, *in litt.*, 20 October 2004). These measures would establish a baseline for distinguishing newly acquired, illegal products from those existing from before the 1998 ban and, thus, may assist in efforts to discern the true extent of poaching, as well as to discourage continued poaching activities.

## References

- Andrewin, L. (2001). Manatee Bar nesting data. Unpublished report.
- Anon. (2002). CITES Document CoP12 Doc. 28. Working document of the 12<sup>th</sup> meeting of the Conference of the Parties, Santiago (Chile), 3–15 November 2002. Accessible at [www.cites.org](http://www.cites.org). Viewed 12 December 2005.
- Anon. (2004). CITES Document CoP13 Doc. 22 (Rev. 2). Working document of the 13<sup>th</sup> meeting of the Conference of the Parties, Bangkok (Thailand), 2–14 October 2004. Accessible at [www.cites.org](http://www.cites.org). Viewed 12 December 2005.
- Bass, A.L. (1999). Genetic analysis to elucidate the natural history and behavior of hawksbill turtles (*Eretmochelys imbricata*) in the wider Caribbean: a review and re-analysis. *Chelonian Conservation and Biology* 3(2):195–199.
- Chacón, D. (2002). *Diagnóstico sobre el comercio de las tortugas marinas y sus derivados en el istmo centroamericano*. Red Regional para la Conservación de las Tortugas Marinas en Centroamérica (RCA), San José, Costa Rica. 247 pp.
- Craig, A.K. (1996). *Geography of Fishing in British Honduras and Adjacent Coastal Areas*. Louisiana State University Coastal Studies Institute Technical Report 28:1–143. Baton Rouge, Louisiana.
- Craig, D. (2002). Belize Sea Turtle Working Group. Response to TRAFFIC International Questionnaire, CITES Review of Exploitation, Trade and Management of the Marine Turtles of the Lesser Antilles, Central America, Colombia and Venezuela. Dated 30 July 2002.
- CZMAI (Coastal Zone Management Authority and Institute). (2002). Response to TRAFFIC International Questionnaire, CITES Review of Exploitation, Trade and Management of the Marine Turtles of the Lesser Antilles, Central America, Colombia and Venezuela. Completed by Janet Gibson, Director, Coastal Zone Management Institute. Dated 29 July 2002.
- Gibson, J., M. McField, W. Heyman, S. Wells, J. Carter and G. Sedberry. (2004). Belize's Evolving System of Marine Reserves. Pp. 287–315. In: J.A. Sobel and C. Dahlgren (Eds). *Marine Reserves: a Guide to Science, Design and Use*. The Ocean Conservancy. Island Press, Washington, DC.
- Gillett, V. (1987). National Report for Belize. Presented to the Second Western Atlantic Turtle Symposium, 16 October 1987, Mayagüez, Puerto Rico. WATS2 091. 41 pp. Unpublished.
- Government of Belize. (2001). National Report for Belize. Presented to First CITES Wider Caribbean Hawksbill Turtle Dialogue Meeting, Mexico City (Mexico), 15–17 May 2001. 3 pp. Unpublished.
- Groombridge, B. and R. Luxmoore. (1989). *The Green Turtle and Hawksbill (Reptilia: Cheloniidae): World Status, Exploitation and Trade*. Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Lausanne, Switzerland. 601pp
- McSweeney, L., Gales Point Wildlife Sanctuary Management Committee. (2004). Country Report: Belize. Invited oral presentation to the 2004 Annual General Meeting of the Wider Caribbean Sea Turtle Conservation Network (WIDECAST), 22 February 2004, San José, Costa Rica.
- Miller, W.G. (1984). National Report for Belize. Submitted 25 January 1984. Pp. 41–48 In: P. Bacon *et al.* (Eds). *Proceedings of the Western Atlantic Turtle Symposium, 17–22 July 1983, San José, Costa Rica*, III, Appendix 7. University of Miami Press, Florida.
- Milliken, T. and H. Tokunaga. (1987). *The Japanese Sea Turtle Trade 1970–1986*. A special report by TRAFFIC (Japan). Center for Environmental Education, Washington, DC. 171pp.
- Moll, D. (1985). The marine turtles of Belize. *Oryx* 19:155–157.
- Rebel, T.P. (1974). *Sea Turtles and the Turtle Industry of the West Indies, Florida, and the Gulf of Mexico*, revised edn. University of Miami Press, Coral Gables. 250pp.

- Searle, L.A.W. (2001). A Brief History of Sea Turtle Communities, Conservation and Consumption in Belize. Paper presented at the 21<sup>st</sup> Annual International Symposium on Sea Turtle Biology and Conservation, Philadelphia, USA, February 2001.
- Searle, L.A.W. (2003). Diet of Green Turtles (*Chelonia mydas*) captured in the Robinson Point foraging ground, Belize. Pp. 228–299. In: Seminoff, J.A. (Compiler). *Proceedings of the 22<sup>nd</sup> Annual Symposium on Sea Turtle Biology and Conservation*. NOAA Technical Memorandum NMFS-SEFSC-503. US Department of Commerce.
- Smith, G.W. (1990). Ground Surveying for Sea Turtle Nesting Sites in Belize, 1990. Report to the Belize Audubon Society, Belize Fisheries Department and US Fish and Wildlife Service (Region 2, Albuquerque). 24pp. Unpublished.
- Smith, G.W., K.L. Eckert and J.P. Gibson. (1992). *WIDECAST Sea Turtle Recovery Action Plan for Belize* (Karen L. Eckert, Ed.). CEP Technical Report No. 18. UNEP Caribbean Environment Programme, Kingston, Jamaica. 86pp.