COMMENTARY

Hawksbill sea turtles: can phylogenetics inform harvesting?

MATTHEW H. GODFREY,*GRAHAME J. W. WEBB,†S. CHARLIE MANOLIS† and N. MROSOVSKYS§

*NC Wildlife Resources Commission, 1507 Ann St., Beaufort, NC 28516, USA, †Wildlife Management International, PO Box 530, Sanderson, NT 0812, Australia, §Department of Ecology and Evolutionary Biology, University of Toronto, Toronto, Ontario, Canada M5S 3G5

In their recent articles, Mortimer et al. (2007) and Bowen et al. (2007) imply that historical declines in hawksbill sea turtle (*Eretmochelys imbricata*) populations in the Caribbean together with new phylogenetic data provide solid evidence that hawksbills cannot be harvested on a sustainable level. We suggest that broad inferences on the impacts of harvesting based on phylogenetic data alone are insufficient as an argument against sustainable use of sea turtles. Rather, we recommend that the merits of harvesting schemes should be assessed on a case-by-case basis, which should enable beneficial and sustainable projects to proceed and also discourage unsustainable ones.

As reported by Mortimer et al. (2007), recent data on mtDNA haplotype diversity show that rookeries and foraging areas in the Caribbean are connected, with juveniles moving across national boundaries from natal beaches to foraging grounds, and back again to natal beaches as adults (Bowen et al. 2007). Based on these associations, Bowen et al. (2007) suggest that ‘harvest [of hawksbills] in the Caribbean foraging areas will deplete nesting populations across multiple jurisdictions’, while Mortimer et al. (2007) state that any harvest on nesting beaches or feeding grounds could negatively impact hawksbill populations throughout the Caribbean region. We suggest that these claims are not necessarily true in all situations.

A case in point is the current harvesting of hawksbills in Cuban waters (Carrillo et al. 1999) and the ongoing increase of the nearby nesting population of hawksbills in the Yucatán Peninsula (Garduño-Andrade et al. 1999). Published phylogenetic studies have reported that a significant source rookery for turtles harvested in Cuba is the Yucatán Peninsula (Díaz-Fernández et al. 1999; Bowen et al. 2007). A second example is the hawksbill rookery in Antigua. Phylogenetic data show that hawksbills from Antigua contribute significantly to foraging grounds in Cuba (Bass 1999; Díaz-Fernández et al. 1999; Bowen et al. 2007). And yet, numbers of nesting females in Antigua have been increasing over the last decade, despite the ongoing harvest of hawksbills in Cuba (Richardson et al. 2006a). Clearly, the situation regarding harvesting and its impacts on regional nesting populations is more complex than presented in Mortimer et al. (2007) and Bowen et al. (2007).

A primary principle of wildlife management is that a target population can be kept at a level below its carrying capacity, through harvesting or culling, without causing a decline in the population, due to density-dependent rates of growth (Getz & Haight 1989). That is to say, harvesting individuals in a population does not lead a priori to population decline. As has been suggested for at least one sea turtle population, there is an inverse relationship between rates of growth and turtle density (Bjorndal et al. 2000). Again, this suggests that harvest of juvenile or adult hawksbills may not cause population declines in source (rookery) populations in some cases. Indeed, harvest was followed by an increase in population density for some wild reptile populations (Velasco et al. 2003). Although the new phylogenetic data provided by Bowen et al. (2007) illuminate hawksbill migratory behaviour, they do not specifically inform us about sustainable levels of mortality of sea turtle populations. In the Caribbean, there are currently legal harvesting projects of hawksbills in several islands (e.g. Cuba, various islands in the UK Overseas Territories — see Richardson et al. 2006b, etc.). Simultaneously, there are nesting populations that are growing (see above). Rather than dismiss possible sustainable use out of hand based on phylogenetic data, we urge our colleagues to engage in active dialogue that considers the possibility of harvesting in specific cases where the harvesting is sustainable. We recognize that some hawksbill nesting populations are not growing, such as Costa Rica (Troëng et al. 2005) and Panama (Meylan & Donnelly 1999), the latter decline presumably caused by unsustainable rates of harvest of adult females. Nevertheless, in certain circumstances, sustainable use is an effective conservation technique, as exemplified by management schemes for some other endangered mammals, reptiles and marine species (e.g. Ross 1998; Foster & Vincent 2005; Leader-Williams et al. 2005).

A second aspect of the arguments against all harvesting of hawksbill turtles used by Mortimer et al. (2007) and
Bowen et al. (2007) is this species’ conservation classification as ‘Critically Endangered.’ The Red List status of the hawksbill has been the subject of much debate, including whether it meets the World Conservation Union (IUCN) criteria for ‘Critically Endangered’ (Meylan 1998; Mrosovsky 2000, 2003; S&PS 2001). Most of the arguments have focused on the rate and timing of historical declines of hawksbill populations (e.g. Meylan & Donnelly 1999; Mrosovsky 2003). Often overlooked in debates about classifications of species is that the Red List status, while policy relevant, is not policy prescriptive (Seminoff 2004). The conservation and management regimes designed for particular populations of specific species do not hinge on whether the species is listed as Threatened, Endangered, or even Critically Endangered. Although often presented as mutually exclusive ideas, sustainable use and protected species management can go hand in hand, and have been considered useful tools with seahorses, marine mammals, crocodilians, etc. (Harwood & Smith 2002; Webb 2002; Foster & Vincent 2005). Indeed, sustainable use is considered to be part of the principal IUCN strategy (IUCN 1980).

The IUCN Marine Turtle Specialist Group’s Global Strategy for the Conservation of Marine Turtles (1995) identified the promotion of environmental sustainability as a priority issue in turtle conservation. Yet, there has been reluctance by sea turtle biologists, managers and conservationists to consider sustainable use as a potential conservation tool (Campbell 2002). Arguments against use have largely taken one of two forms: (i) that it is unnecessary because other nonconsumptive methods are at least as successful or more successful (e.g. Pritchard 2000; Troëng & Drews 2004); (ii) species such as the hawksbill cannot support consumptive take (e.g. Bowen & Bass 1997; Bowen et al. 2007). And yet, harvest of sea turtles and their eggs continue to this day in different parts of the world (e.g. Campbell 2003; Martin et al. 2005), and some of these programs are beneficial not only for turtles but also for the local human inhabitants (e.g. Campbell 1998). Although we do not suggest that all marine turtles everywhere should be subject to harvesting, we argue that some populations can support a managed harvest. We urge all our colleagues to move towards deeper discussions on all types of conservation methods including harvesting that benefit both sea turtles and local human populations.

Received 16 February 2007; revision received 6 March 2007; accepted 20 March 2007

References


M.H. Godfrey has worked on sea turtle ecology and conservation since the late 1980s, and is interested in social justice issues related to wildlife conservation. G.J.W. Webb is chair of the IUCN Crocodile Specialist Group. In 2001 he was awarded the prestigious Clunies Ross National Science and Technology Award for his contribution to a new vision for wildlife conservation based on sustainable use. S.C. Manolis has been involved with research, conservation and management of a number of crocodilian species in many countries around the world, and with hawksbill sea turtles in the Australian and Caribbean regions. In recent years his interests have diversified from pure scientific research to wildlife management and specifically the application of the concept of sustainable use to the conservation of wildlife and their habitats. N. Mrosovsky has a long-standing interest in the biology and conservation of sea turtles. His research has included studies of sea-finding of hatchlings, thermoregulation, natural sex ratios, pivotal temperatures and, recently, individual differences in nest-site selection.