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RESEARCH NOTE

First confirmed report of Hawksbill Sea Turtle *Eretmochelys imbricata* in nearshore waters of Easter Island (Rapa Nui)

Primer reporte confirmado de Tortuga Carey *Eretmochelys imbricata*
en aguas costeras de Isla de Pascua (Rapa Nui)

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Abstract. The hawksbill turtle (*Eretmochelys imbricata*; Critically Endangered) has a circumtropical distribution. In Polynesia it inhabits the waters of a great number of islands; however, up to date there are no official records for Easter Island. We document the first report of *E. imbricata* in Easter Island and Chile based on underwater photographs and examination of one individual. The confirmation of the presence of hawksbills extends the known distribution range for the species, increases the number of sea turtle species recorded for Chile, and highlights the need for further research on potential threats to the species and the importance of Rapa Nui as developmental and foraging habitat for hawksbills.

Key words: Hawksbill Turtle, Easter Island, Chile, Polynesia

INTRODUCTION

The hawksbill sea turtle *Eretmochelys imbricata* (Linnaeus, 1766) has a circumglobal distribution in tropical and subtropical waters throughout the Atlantic, Indian, and Pacific Oceans. Its worldwide population declined severely during the last century, mainly due to intense exploitation of eggs and turtles for food and tortoiseshell (Mortimer & Donnelly 2008, Gaos *et al.* 2010). Unfortunately, other threats have also increased over this period for this species, such as loss of nesting beaches and coral reef foraging habitats, and increased incidental capture and marine pollution. All these factors have resulted in the hawksbill turtle being categorized as Critically Endangered by the IUCN Red List of Threatened Species (Mortimer & Donnelly 2008).

In the Pacific Ocean *E. imbricata* ranges from the coast of Baja California to Peru (National Marine Fisheries Service & U.S Fish and Wildlife Service 1998, Quiñones

et al. 2011, NOAA 2014) and is found in several islands of the Indo-Pacific Region (Woodrom 2010). In Polynesia the species is present in waters of a great number of islands including Hawaii, Cook Islands, French Polynesia; Samoa, Tokelau, Tonga, Niue, and Pitcairns Islands (Witzell & Banner 1980, Balazs 1983, Woodrom 2010). However, to date although there are anecdotal reports of hawksbill turtles in Easter Island waters, there have been no confirmed records of this species for the island.

Easter Island (27.0724°S; 109.2157°W) is in the most easterly corner of the Polynesian triangle and is part of Chilean territory (Fig. 1). Its culture, isolated location and archaeological heritage attract more than 40,000 visitors per year, with tourism being the most important economic activity, followed by fishing (DIRPLAN 2011¹, INE 2012). In 2012 Álvarez-Varas *et al.* 2012² found that fishing, marine pollution and recreational activities (diving and

¹DIRPLAN. 2011. Minuta plan especial Isla de Pascua. Santiago. DIRPLAN, Departamento de Planificación, Ministerio de Obras Públicas, Santiago de Chile. <<http://www.dirplan.cl/planes/especiales/Paginas/DetallePlanesespeciales.aspx?item=22>>

²Álvarez-Varas R, K Skamiotis, P Stowhas & C Bonacic. 2012. Rapid assessment of sea turtles conservation in Easter Island (Rapa Nui) in the South Pacific. XXXII Annual Symposium on Sea Turtle Biology and Conservation, Huatulco-Mexico, 11-16 March 2012.

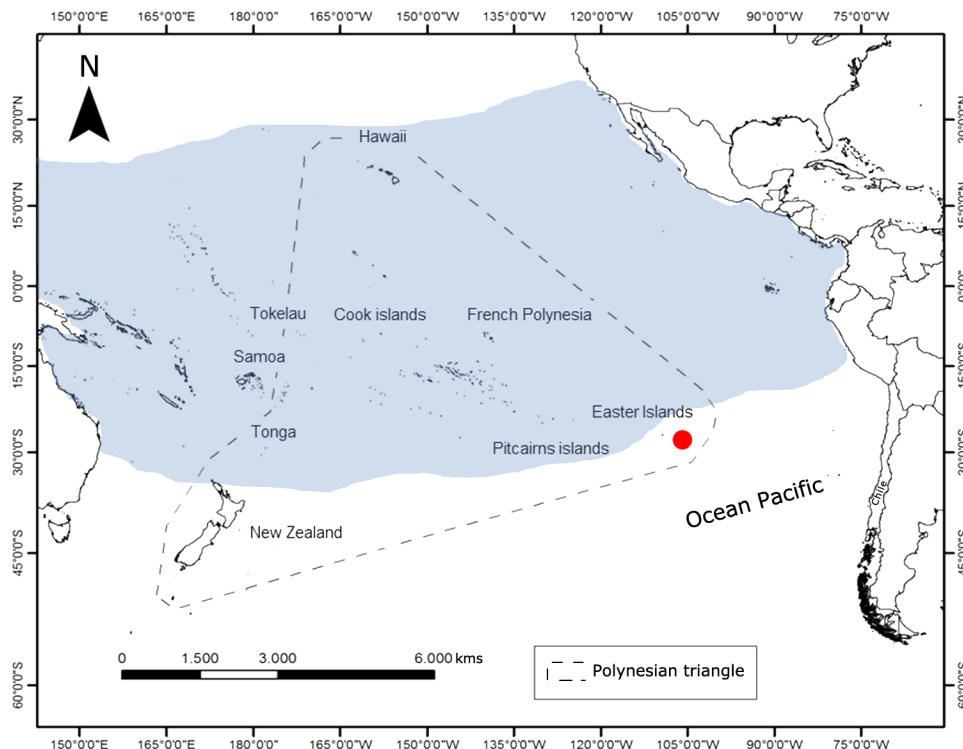


Figure 1. Polynesian triangle (dotted line) and the approximate distribution range of *Eretmochelys imbricata* (blue) in the Pacific Ocean. Red point indicates new report of hawksbill sea turtle. Distribution based on NOAA 2014 data and Daniel Godoy personal communication (New Zealand) / Triángulo Polinésico (línea punteada) y rango de distribución aproximado de *Eretmochelys imbricata* (azul) en el Océano Pacífico. El punto rojo indica el nuevo reporte de tortuga carey. Distribución basada en datos de NOAA 2014 y comunicación personal con Daniel Godoy (Nueva Zelanda)

snorkelling, among others) represented major threats to sea turtles in the island. In the present study, it was documented for the first time the presence of *E. imbricata* in Easter Island, through underwater photographs and examination of one individual.

MATERIALS AND METHODS

On August 14, 2013 at 15:49 pm at Hanga Roa bay (southwest portion; 27.0902°S; 109.2632°W), during diving activities, a hawksbill turtle was observed and photographed using a digital camera swimming in a coral reef (Canon® model Powershot G-15; Fig. 2). Approximately one year later on October 3, 2014, at 15:30 pm, also at Hanga Roa (27.0850°S; 109.2604°W), another individual was observed floating on the surface and was taken to shore by a surfer for examination. The turtle was assisted in the island by a local veterinarian and the Fisheries National Service of the Chilean Government (SERNAPESCA). Later, the turtle was transported to continental Chile, where it

was assisted by veterinarians of the Qarapara Tortugas Marinas Chile NGO and Universidad Santo Tomás. In October 26, 2014, the turtle was found dead, and according to the necropsy, the signs observed were consistent with chronic renal failure and intestinal obstruction.

The shape of the carapace (oval with a strongly serrated posterior margin and thick overlapping scutes), number of scutes (4 pairs of costal scutes and 5 central scutes), and the shape and number of scutes of the head (straight bird-like beak with 2 pairs of prefrontal scales) (Pritchard & Mortimer 1999), allowed us to definitively identify the species (Figs. 2 and 3). Age stage was defined according to Snover *et al.* (2013), who used skeletochronology in Hawaiian hawksbill turtles and determined the age of maturity as occurring between 17 to 22 years at a size of 78.6 cm of straight carapace length notch to tip (SCLn-t). In the case of the 2014 turtle, the sex was determined through direct gonad examination during the necropsy of the individual.



Figure 2. Individual of *Eretmochelys imbricata* swimming in coral reef 200 m west of Hanga Roa bay, Easter Island / Individuo de *Eretmochelys imbricata* nadando en el arrecife de coral a 200 m al oeste de la bahía Hanga Roa, Isla de Pascua



Figure 3. Juvenile *Eretmochelys imbricata* found floating on water surface. In the left photo a standard scale of 3 cm divided in 1 cm rectangles was used. Right photo shows the absence of its anterior right flipper and a marked indentation in the rear portion of the first central scute / Juvenil de *Eretmochelys imbricata* encontrado flotando en la superficie del agua. En la foto de la izquierda se utilizó una regla estándar de 3 cm dividida en 1 cm. La foto de la derecha muestra la ausencia de su aleta anterior derecha y una marcada hendidura en la porción posterior del primer escudo central

The 2014 individual was differentiated from the 2013 individual due to the absence of its anterior right flipper with well-healed tissue on the stump and the shape of the first central scute, which presented a marked indentation at its rear portion, probably caused by a lacerating wound (Figs. 2 and 3). Measurements of this individual were obtained based on Bolten (1999). The straight measurements of the 2014 turtle were obtained with a digital caliper (Mitutoyo model 700-128) with a 0.5 mm error and the curved measurements were determined with metric measuring tape. The weight was obtained with a balance (model PHSO40) with an error of ± 40 g.

RESULTS AND DISCUSSION

Although the hawksbill sighted in 2013 (Fig. 2) could not

be caught for measurement, based on photographs and the author's experience, we estimated a carapace length corresponding to a juvenile individual. The body measurements of the 2014 turtle were obtained the first day of examination, and were as follows: Minimum curved carapace length (CCLmin)= 44 cm; Curved carapace length notch to tip (CCLn-t)= 49 cm; Curved carapace width (CCW)= 42.8 cm; Straight carapace length notch to tip (SCLn-t)= 47 cm; Straight carapace width (SCW)= 37.9 cm; Plastron length (PL)= 34.4 cm; Plastron width (PW)= 32.6 cm; Head length (HL)= 13.22 cm; Head width (HD)= 7.38 cm; Total tail length (TL)= 5.44 cm; and Post-cloacal tail length (PTL)= 4.83 cm (see Fig. 3). It weighed 9.65 kg. In this case, the SCLn-t indicated that this turtles was a juvenile hawksbill turtle. During the necropsy, its sex was classified as female by examination of the gonads.

In general, data on the sea turtles of Easter Island are uncommon in the literature. At present, although 4 species have been described for Chilean continental waters (*Caretta caretta*, *Chelonia mydas*, *Dermochelys coriacea* and *Lepidochelys olivacea*; Ponce *et al.* 2013³), only 2 of these (*C. mydas* and *D. coriacea*) have been documented for Rapa Nui (Zárate 2012). In 1966, Donoso-Barros mentioned the presence of *Eretmochelys imbricata* (Linnaeus, 1766) in Easter Island, based on a description presented by Garman (1908), who recognized the presence of this species with the synonym of *Eretmochelys squamosa*. However, Garman's (1908) statement: '*To give an approximately complete idea of Herpetology of Easter Island it is necessary to consider and introduce provisionally into our list of species a number of marine tortoise and a sea serpent, which range throughout Polynesia and the tropical and the temperate portions of the Pacific and the Indian oceans, but which have not yet been taken or known directly from the island by the scientist... The tortoises, of which our knowledge depends wholly upon tradition or other evidence of the natives, cannot be satisfactorily identified*' suggests that he did not specifically identify the hawksbills and that Donoso-Barros's (1966) report of the hawksbill turtle in Easter Island was based on erroneous data (Garman's statement). Similarly, Yañez (1951) and later Witzell (1983) also reported the presence of hawksbill turtles in the island based on Garman's report. In 1971, Harrison mentioned the occurrence of at least 3 sea turtle species in the island (possibly 4), but he did not specify which species were present. Later, Pritchard (1981) mentioned the presence of hawksbills in Rapa Nui based on a letter written by Tom Harrison (March 1971), who indicated the occurrence of at least green, ridley and hawksbill turtles in the island. Nevertheless, Pritchard (1981) did not specify whether these species were observed and identified by Harrison or by others, and he did not provide photographic evidence of the sea turtles present in the island. Finally, in 1997 in a report of the National Forest Corporation of Chile (CONAF 1997) the sporadic presence of *E. imbricata* and *C. mydas* in the island was mentioned; however, the authors did not provided further information on how they had determined this.

Several authors have described the importance of coral reef ecosystems as foraging grounds and developmental areas for hawksbill turtles (*e.g.*, Musick & Limpus 1996, León & Bjorndal 2002, Troeng *et al.* 2005). These types of habitats support populations of juvenile and adults hawksbills foraging mainly on reef-associated sponges (León & Bjorndal 2002) throughout the year; with adults sometimes travelling large distances from their nesting areas (Bowen *et al.* 1996, Troeng *et al.* 2005, Vilaca *et al.* 2013). Thus, coral reefs are critical for hawksbill turtle conservation.

Easter Island provides extensive coral habitats, where 53% of the bottom can be covered by live coral (National Geographic Society *et al.* 2011⁴). To date 13 species of coral (Glynn *et al.* 2007) and at least 11 sponge species have been recognized in the island, the latter being highly abundant in certain areas (Di Salvo *et al.* 1988, Glynn *et al.* 2003). Although we could not obtain the measurements of the 2013 turtle, in both cases we estimated that they were juvenile individuals. The presence of juveniles of *E. imbricata* suggests that Easter Island could be an important foraging ground for hawksbill turtles in the middle of the Pacific Ocean, and its coral reef ecosystems play an important role in their development. Nevertheless, further research to determine their abundance, distribution and their diet in Rapa Nui's reefs, as well as genetic analyses and satellite tracking to determine their origin and movements would be needed, thus evaluating the importance of Rapa Nui as developmental habitats for hawksbill turtles.

Easter Island is one of the main touristic centers of Chile, reaching up to more than 40,000 visitors from around the world in 2012 with an increase of 19.9% since 2011 (INE 2012). This marked increase of tourism in the island intensifies the demand on marine natural resources and increases the development of recreational activities related to the sea. Thus, threats to marine life including increased fishing effort, marine pollution, habitat degradation, boat collisions, bycatch, among other threats, are probably becoming more significant. Although Álvarez-Varas *et al.* (2012)² found that nowadays the consumption of sea turtles is rarely practiced by the Rapa

³Ponce F, J Azocar & M Donoso. 2013. Convención Interamericana para la Protección y Conservación de las Tortugas Marinas Chile. Informe Anual 2013. Subsecretaría de Pesca y Acuicultura, Chile. <<http://www.iacseaturtle.org/docs/informes-anales/2013/Informe-Anual-2013-Chile.pdf>>

⁴National Geographic Society, Oceana Chile & Armada de Chile. 2011. Expedición a la Isla de Pascua y Salas y Gómez. Informe Científico, Febrero-Marzo 2011. <http://oceana.org/sites/default/files/o/uploads/_sao/InformecientificoExpedicionaSalasyGomezelsladePascuaFINAL_baja.pdf>

Nui community, there is an as yet unquantified demand for sea turtle meat by restaurants in the island. Increased tourism could therefore represent a new threat for sea turtles in Easter Island. Finally, all of these potential threats towards hawksbill turtles in Rapa Nui should be evaluated to define future protection plans that include outreach and educational activities with the local people.

The documented presence of *E. imbricata* in Easter Island extends the known distribution range for this species in the Polynesian Region, and also increases the number of sea turtle species recorded in Chile. As the only site for hawksbill sea turtles in Chile, the need to begin research on this critically endangered species and its habitats in Rapa Nui is highlighted. This information will allow us to understand the role of the island as a developmental and feeding area for hawksbills and formulate appropriate management and conservation strategies, especially considering the threats from growing tourism and increased fishing effort in Easter Island in recent years.

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